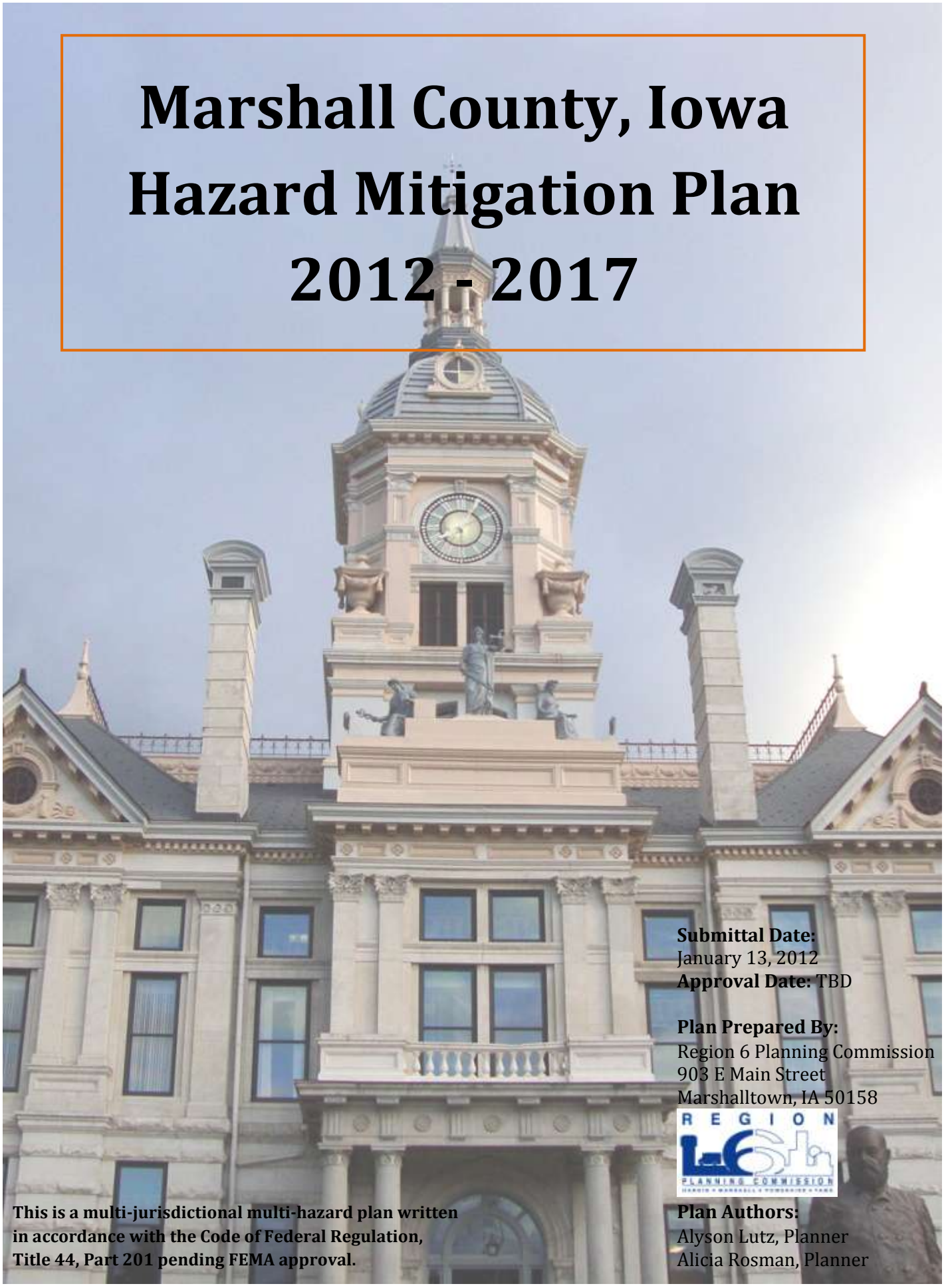
Marshall County, Iowa Hazard Mitigation Plan 2012 - 2017



Submittal Date:
January 13, 2012
Approval Date: TBD

Plan Prepared By:
Region 6 Planning Commission
903 E Main Street
Marshalltown, IA 50158

This is a multi-jurisdictional multi-hazard plan written in accordance with the Code of Federal Regulation, Title 44, Part 201 pending FEMA approval.

Plan Authors:
Alyson Lutz, Planner
Alicia Rosman, Planner

Table of Contents

**Continue to next page for Appendices*

Appendices

A: Resolutions for Adoption

B: Community Inventories

C: Kick off Meeting Materials

D: Countywide Meeting #1 Materials

E: Countywide Meeting #2 Materials

F: Countywide Hazard Mitigation Action List

G: STAPLEE Evaluations

H: Public Comment Documentation

Special Thanks

A special thank you goes out to all those involved in the creation of the Marshall County Multi-Jurisdictional Hazard Mitigation Plan. These participants include:

Marshall County Planning Team; Marshall County Emergency Management Coordinator, Kim Elder; and Staff of the Region 6 Planning Commission.

Without the hard work and dedication of these people's time and effort, this plan would not be a reality. It now serves as documentation of the will of the people of Marshall County to protect the lives and physical assets in their area.

Executive Summary

This multi-jurisdictional hazard mitigation plan is being submitted to FEMA by the Region 6 Planning Commission in Marshalltown, Iowa on behalf of one of its four jurisdictional counties, Marshall County.

This plan defines hazards as- "any source of danger that threatens humans, property, and the environment" (FEMA 385-2/August 2001, Page iii) - and hazard mitigation planning - a proactive approach to prepare individual Marshall County jurisdictions for hazards that could affect them. The entire mitigation process is outlined, including the steps of organizing community resources, risk assessment and mitigation strategy, writing the plan, community comment period, submitting the plan, plan approval and adoption, and finally plan implementation by jurisdictions and counties.

One of the most important steps is the risk assessment and mitigation strategy in which countywide meetings attended by each participating jurisdiction were held. Asset mapping, identifying critical facilities and vulnerable populations, as well as establishing goals and prioritizing mitigation actions are all exercises the participants completed to help determine the needs of each jurisdiction.

The planning authors completed background research to produce a profile of Marshall County, which is the entire planning area. Information including location, demographics, housing, transportation, and economic conditions gives a statistically detailed depiction of the planning area. Similar data is presented for the individual jurisdictions of Marshall County, along with even more detailed information of the area including local government, services provided, resources employed, and previous mitigation efforts taken at the city level. Two school districts are also included in the planning area; profiles include enrollment and school building locations.

In the Risk Assessment chapter, every hazard that could possibly affect Marshall County is identified and profiled with the information of its description, probability, magnitude and severity of its possible destruction, warning time available to residents and visitors and duration of its effects on the county. Based on the frequency and/or impact of each of these descriptors, the hazards are ranked with the highest, tornadoes being the biggest threat to Marshall County.

The individual jurisdiction's assets and vulnerable populations (identified at the countywide meetings) are displayed in the plan in order to gauge what/who needs priority when a hazard strikes. City facilities, grocery stores, and elderly and disabled populations are the most frequently identified as critical facilities and vulnerable populations.

With these elements, along with the severity of the different hazards gauged, the vulnerability across all individual jurisdictions is calculated, the highest rated hazard being tornadoes.

Though all jurisdictions of Marshall County are affected by several hazards, none are of particular priority in the plan. None of the jurisdictions have repetitive loss properties identified by Iowa Homeland Security.

The mitigation strategy produced by each jurisdiction takes into account their risk assessment and vulnerability to hazards to create goals with subsequent projects that will help reach those goals. Some of the most popular goals include protecting the health and safety of residents, minimizing losses to structures, educating citizens of the dangers of hazards, and continuity of operations of the jurisdictions and county. Projects identified to help achieve those goals include the installation of safe rooms, purchase of generators, elevation of roads, and the creation of emergency contact sheets and procedures. Projects are evaluated and ranked to set their priority to each community using the STAPLEE evaluation method.

It is of the utmost importance that the maintenance and update of this plan continues in order to carry on proactive efforts in all jurisdictions of the planning area regarding hazards. Incorporating the plan and its ideals into everyday legislation, decisions and planning will ensure that hazards are considered in the future development and operations of cities. The opportunities of annual meetings to monitor and evaluate the plan, as well as publicizing success stories of projects, will keep the public involved and informed of what hazard mitigation can and is doing for their jurisdiction.

Recommendations made by the plan authors give final input and advice on the smooth running and implementation of the goals set forth by each jurisdiction.

Prerequisites

44 CFR Requirement §201.6(c)(5): *[The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commission, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.*

Note to reviewers: When this plan has been reviewed and approved pending adoption by FEMA Region VII, the adoption resolutions will be signed by the participating jurisdictions and added to Appendix A.

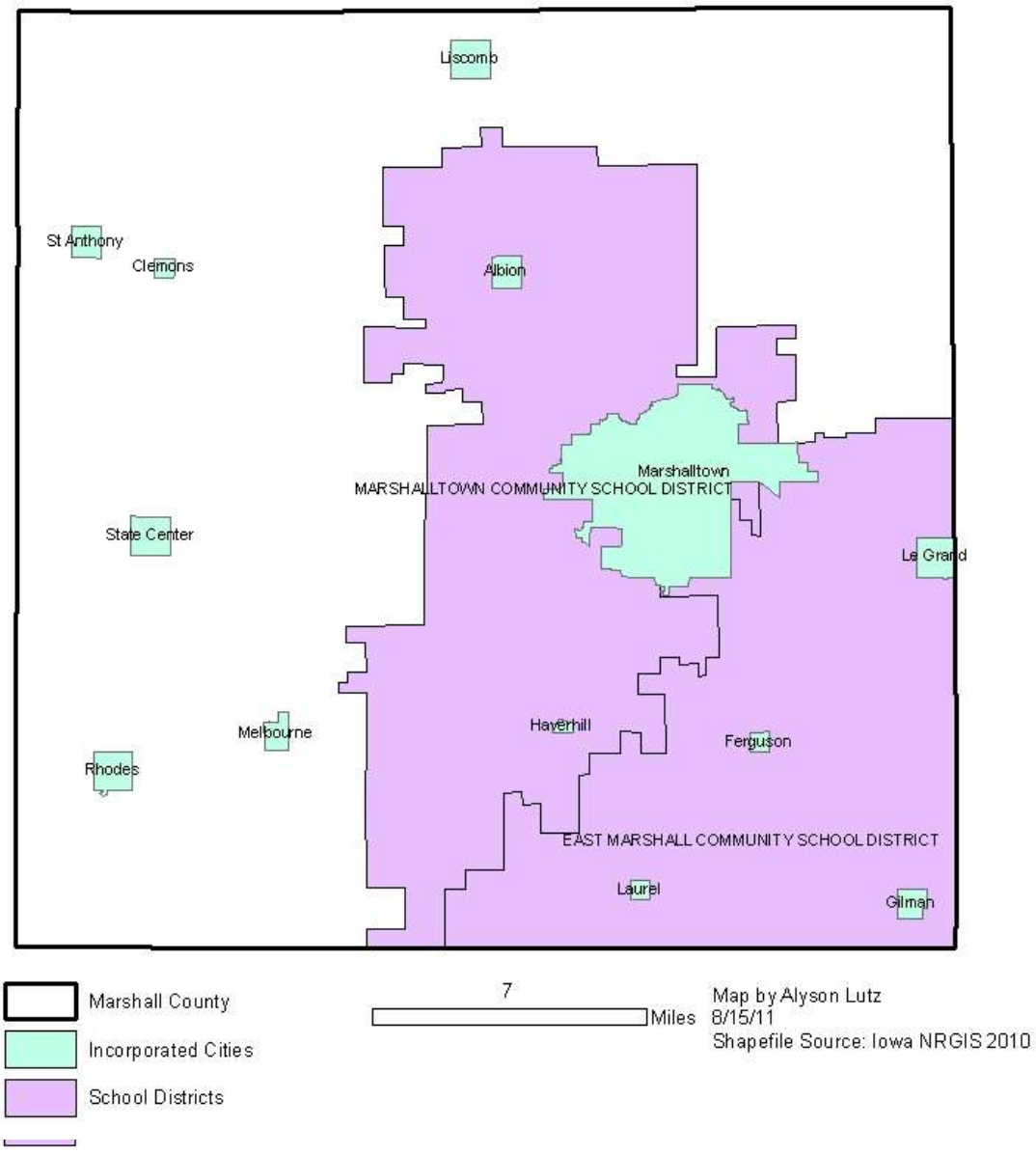
The following 16 jurisdictions participated in the creation of this plan. An extra contingent of volunteer planners labeled "Marshall County Services" helped contribute information to the plan on behalf of the county. This group was made of health care, emergency, agriculture services, and veteran affairs personnel, all of which serve the county. Two jurisdictions have adopted the multi-jurisdictional plan and the other 14 jurisdictions will adopt within a year of the plan's approval. Refer to Figure 1 for a map of the jurisdictions included in this plan.

- City of Albion
- City of Clemons
- City of Ferguson
- City of Gilman
- City of Haverhill
- City of Laurel
- City of Le Grand
- City of Liscomb
- City of Marshalltown
- City of Melbourne
- City of Rhodes
- City of St. Anthony
- City of State Center
- Marshall County (Unincorporated)
- East Marshall Community School District
- Marshalltown Community School District

The Green Mountain-Garwin Community School District and West Marshall Community School District were invited to participate in this plan process. They did not complete the entire process with the knowledge of being excluded from the plan as a result.

The planning boundary for this multi-jurisdictional hazard mitigation plan includes all of the incorporated and unincorporated areas of Marshall County, Iowa. All of the school districts and associated buildings that are located in Marshall County are included in the planning boundary except the Green Mountain-Garwin and West Marshall Community School Districts. Refer to Figure 1 on the next page.

Figure 1: Marshall County Participating Jurisdictions



44 CFR §201.6(a) (4): *Multi-jurisdictional plan may be accepted, as appropriate, as long as each jurisdiction has participated in the process.*

In order to be included in the plan and eligible for Hazard Mitigation Grant Program funding, each jurisdiction had to fulfill certain planning participation requirements. In order to be considered a full participant eligible for inclusion and funding, each jurisdiction must do the following:

1. Complete a community assessment (optional)
2. Host a hazard mitigation kick-off meeting (optional)
3. Appoint jurisdiction representative(s) (see Table 1)
4. Representative(s) of the jurisdiction attend two countywide hazard mitigation meetings (see Table 1)
5. Collaborate with the Region 6 Planning Commission to complete all required plan-related tasks and research (information is incorporated throughout plan)
6. Host a public comment period for plan revisions
7. Adopt the Marshall County Multi-Jurisdictional Hazard Mitigation Plan (pending approval)

Refer to Table 1 for meeting attendance and representatives for each jurisdiction. Some jurisdictions had multiple representatives in order to ensure that someone was always available for plan development meetings and information gathering.

All jurisdictions included in this plan participated in the entirety of the planning process. Each jurisdiction was represented by an official, staff member, or resident. Refer to Table 1 below.

Table 1: Marshall County Strategic Planning Team Members and Meeting Attendance

Jurisdiction	Representative	Kick-Off Meeting	County Meeting #1	Make-up Meeting 1	County Meeting #2	Make-up Meeting 2
City of Albion	Doug Loffgren	X	X	N/A	X	N/A
	Karen Betts	X	X	N/A	X	N/A
City of Clemons	Shirley Davis	X	X	N/A	X	N/A
City of Ferguson	Tom Bowman	---	X	N/A	X	N/A
	Chuck Finders	X	X	N/A	---	N/A
	Dale Thompson	X	---	N/A	X	N/A
City of Gilman	Phil Summer	N/A	X	N/A	---	N/A
	Jeff Duncan	N/A	---	N/A	X	N/A
	Randy Mommer	N/A	---	N/A	X	N/A
City of Haverhill	Joanie Grife	X	X	N/A	X	N/A
City of Laurel	Lynne Gummert	X	X	N/A	---	N/A
	Lillian Nixon	X	---	N/A	---	X
City of Le Grand	Rob Schrader	---	X	N/A	---	N/A
	Cheryl Culver	---	X	N/A	X	N/A
	Tony Westendorf	---	X	N/A	---	N/A
City of Liscomb	Kristi Schiebel	X	---	X	---	X
City of Marshalltown	Gene Beach	N/A	X	N/A	---	N/A
	Steve Edwards	N/A	X	N/A	X	N/A
	Scott Johnson	N/A	X	N/A	X	N/A
	R.R. Miller	N/A	X	N/A	---	N/A
	Michael Hanken	N/A	---	N/A	X	N/A
City of Melbourne	Bob Monroe	---	X	N/A	X	N/A
	Marilyn Purdy	X	---	N/A	X	N/A
	Deb Mercer	X	---	N/A	X	N/A
City of Rhodes	Gale Klosterman	---	---	X	X	N/A
City of St. Anthony	John Witte	N/A	X	N/A	---	X
City of State Center	Harlan Quick	---	X	N/A	---	N/A
	Jim Eckhardt	---	---	N/A	X	N/A
	Lori Martin	X	---	N/A	X	N/A
Marshall County						
Marshall County EMA	Kim Elder	X	X	N/A	X	N/A
M Co Conservation	Mike Stegmann	N/A	X	N/A	X	N/A
M Co Chief Deputy Sheriff	Burt Tecklenburg	N/A	X	N/A	---	N/A
M Co Sheriff Executive Assistant	Mindy Kruse	N/A	X	N/A	---	N/A
M Co Engineer	Paul Geilendfeldt	N/A	X	N/A	X	N/A
M Co GIS Specialist	Melanie Ewalt	N/A	X	N/A	X	N/A
M Co GIS Director	Wayne Chizek	N/A	X	N/A	---	N/A
M Co Board of Supervisors	Dave Thompson	N/A	X	N/A	X	N/A
	Denny Grabenbauer	N/A	---	N/A	X	N/A
M Co Treasurer	Jarrett Heil	N/A	X	N/A	X	N/A
Poweshiek County EMA	Karen Meek	N/A	X	N/A	---	N/A

Jurisdiction	Representative	Kick-Off Meeting	County Meeting #1	Make-up Meeting 1	County Meeting #2	Make-up Meeting 2
Marshall County Services						
Director of Home Care and Public Health	Tina Coleman	N/A	X	N/A	X	N/A
Communication Coordinator, MMSC	Dennis Bachman	N/A	X	N/A	---	N/A
Lennox	Dale Evans	N/A	X	N/A	---	N/A
	Leah Cox	N/A	---	---	X	N/A
Public Health	Pat Thompson	N/A	X	N/A	X	N/A
Central Iowa RSVP	Linda J. Von Holten	N/A	X	N/A	---	N/A
KFJB/KXIA NEWS	Lance Renaud	N/A	X	N/A	X	N/A
Banger Church	Royal Young	N/A	X	N/A	---	N/A
Heartland Group	Mark Kingery	N/A	X	N/A	X	N/A
Times Republican	Tammy Lawson	N/A	X	N/A	---	N/A
MMSC	Barb Grabenbauer	N/A	---	N/A	X	N/A
Marshalltown Police	Teresa Lang	N/A	X	N/A	---	N/A
Community School Districts						
East Marshall CSD	Dr. Alan Meyer	N/A	X	N/A	X	N/A
Green Mountain-Garwin CSD	Mel Hewitt	N/A	X	N/A	---	---
Marshalltown CSD	Rick Simpson	N/A	X	N/A	X	N/A
West Marshall CSD	Ned Sellers	N/A	X	N/A	---	---

**N/A – no kick off meeting required for these jurisdictions, but representative may have attended a city kick-off meeting

1 Introduction

Hazards

A hazard is any source of danger that threatens humans, property, and the environment (FEMA 385-2/August 2001, Page iii). In the context of hazard mitigation planning, there are two types of hazards. The first type of hazard is a natural hazard, which is one that occurs in nature often due to climate and geographic location. There are 16 main natural hazards identified by the State of Iowa. The other hazard type is a man-made or technological hazard, which is caused by some sort of human activity. Table 1.1 lists both natural and man-made hazards.

Table 1.1: All Hazards

Natural Hazards	Man-made Hazards
Dam Failure	Animal/Crop/Plant Disease
Drought	Hazardous Materials Incident
Earthquake	Human Disease
Expansive Soils	Infrastructure Failure
Extreme Heat	Radiological
Flash Flood	Terrorism
Grass or Wildland Fire	Transportation Incident
Hailstorm	
Landslide	
Levee Failure	
River Flood	
Sinkholes	
Severe Winter Storm	
Thunderstorms and Lightning	
Tornado	
Windstorm	

Note that dam and levee failure are included under natural hazards. These are normally considered man-made, but FEMA requires the inclusion of these two hazards so they are considered a natural hazard in this plan. The natural hazards listed are identified by both FEMA and the 2010 Iowa Hazard Mitigation Plan, while the man-made hazards were only identified in Iowa's state hazard mitigation plan. Both natural and man-made hazards will be considered in this plan.

Hazard Mitigation Planning

To better structure the way in which communities in the United States respond to disasters, the "four phases of emergency management" were introduced in the early 1980s after the similarities between natural disasters and civil defense became clear. This approach can be applied to all disasters. The "four phases of emergency management" are described below.

1. **Mitigation** is defined as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event. Mitigation, also known as prevention, encourages long-term reduction of hazard vulnerability. The goal of mitigation is to save lives and reduce property damage. Mitigation can accomplish this, and should be cost-effective and environmentally sound. This, in turn, 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. Examples include land use planning, adoption of building codes, elevation, acquisition, or relocation of homes away from floodplains.

2. **Preparedness** includes plans and preparations made to save lives and property and to facilitate response operations.

3. **Response** includes actions taken to provide emergency assistance, save lives, minimize property damage, and speed recovery immediately following a disaster.

4. **Recovery** includes actions taken to return to normal or improved operating condition following a disaster. (FEMA 386-1/September 2002, Page v)

Hazard mitigation planning involves both phases one and two of emergency management, mitigation and preparedness. A proactive rather than reactive approach to emergency management is used for hazard mitigation planning.

As defined by FEMA, planning is the act or process of making or carrying out plans, specifically the establishment of goals, policies, and procedures for a social or economic unit (FEMA 386-1/September 2002, Page i). **In essence, planning, coupled with hazard mitigation, results in a process that involves determining what actions a community can take to reduce or eliminate the long-term risks to human life and property from natural and man-made hazards.**

Hazard Mitigation Planning Enabling Legislation

In the past, federal legislation has provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act of 2000 (DMA 2000) is the latest legislation to improve this planning process and was put into motion on October 20, 2000, when President George W. Bush signed the Act (Public Law 106-390). The legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, this Act establishes a pre-disaster hazard mitigation program and requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP).

Section 322 of the Act specifically addresses mitigation planning at the state and local levels. It identifies requirements that allow HMGP funds to be used for planning activities, and increases the amount of HMGP funds available to states that have developed a comprehensive, enhanced mitigation plan prior to disaster. States and communities must have an approved mitigation plan in place prior to receiving post-disaster HMGP funds. Local and tribal mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to and the capabilities of the individual communities.

State governments have certain responsibilities for implementing Section 322, including:

- Preparing and submitting a standard or enhanced state mitigation plan;
- Reviewing and updating the state mitigation plan every three years;
- Providing technical assistance and training to local governments to assist them in applying for HMGP grants and in developing local mitigation plans; and
- Reviewing and approving local plans if the state is designated a managing state and has an approved enhanced plan.

DMA 2000 is intended to facilitate cooperation between state and local authorities, prompting them to work together. It encourages and rewards local and state pre-disaster planning and promotes sustainability as a strategy for disaster resistance. This enhanced planning network will better enable local and state governments to articulate accurate needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects.

To implement the DMA 2000 requirements, FEMA prepared an Interim Final Rule, published in the Code of Federal Registration (CFR) on February 26, 2002, at 44 CFR Parts 201 and 206, which establishes planning and funding criteria for states and local communities. (FEMA 386-1/September 2002, Page i)

Multi-jurisdictional Hazard Mitigation Plan

The agreement for this plan indicates that it is a multi-jurisdictional hazard mitigation plan, which is a plan that is jointly prepared by more than one jurisdiction. The term "jurisdiction" in this context means "local government." Title 44 Part 201 Mitigation Planning in the CFR defines a "local government" as "any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity."

In this specific case, the Region 6 Planning Commission is under contract with Marshall County Emergency Management to write the Marshall County Multi-Jurisdiction Hazard Mitigation Plan. Operating as a non-profit, council of government, Region 6 maintains planning staff with knowledge and expertise to facilitate the hazard mitigation planning process and write the final plan.

Local jurisdictions have the option of preparing a multi-jurisdictional hazard mitigation plan under DMA 2000. Jurisdictions can benefit in several ways when they choose to participate in a multi-jurisdictional planning process. Among such benefits, this process:

- enables comprehensive approaches to mitigation of hazards that affect multiple jurisdictions;
- allows economies of scale by leveraging individual capabilities and sharing costs and resources;
- avoids duplication of efforts; and
- imposes an external discipline on the process

A multi-jurisdictional planning approach may also have certain complications. Some potential challenges include:

- less individual control over the process;
- needing strong, centralized leadership and organizational skills;
- conflict that may arise among participants; and
- requiring consistent participation by each jurisdiction throughout the planning process so that the plan stays on schedule.

(FEMA 386-8/August 2006, Page 1)

Each jurisdiction considered whether the advantages in participating in a joint planning effort outweighed the disadvantages for its particular situation. Jurisdictions understood that when opting to participate in a multijurisdictional plan, they still must meet all planning requirements in the Rule, including formal adoption of the plan. It was noted that failure to meet requirements would disqualify the noncompliant jurisdictions from adopting the plan, getting it approved by FEMA, and consequently being eligible for project grants.

2 Hazard Mitigation Planning Process

44 CFR Requirement §201.6(c)(1): *[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

Hazard mitigation planning is the process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and human-made hazards. According to FEMA, four basic phases comprise the basic hazard mitigation planning process.

1. **Organize resources:** involves organizing resources, mobilizing the community, and getting started with the planning process.
    a. Assess community support
    b. Build the planning team
    c. Engage the public

2. **Assess risks:** identifies hazards and estimates the losses associated with these hazards.
    a. Identify hazards
    b. Profile hazard events
    c. Inventory assets
    d. Estimate losses

3. **Develop mitigation plan:** describes how to identify, plan, and initiate cost-effective actions.
    a. Develop mitigation goals and objectives
    b. Identify and prioritize mitigation actions
    c. Prepare an implementation strategy
    d. Document the mitigation planning process

4. **Implementation and monitoring progress:** leads communities and states through the formal adoption of the plan and discusses how to implement, monitor, and evaluate the results of the mitigation actions to keep the mitigation plan relevant over time.
    a. Adopt the mitigation plan
    b. Implement the plan recommendations
    c. Evaluate planning results
    d. Revise the plan

(FEMA 386-1/September 2002)

This is a general outline of the planning process that was used to create the hazard mitigation plans for Marshall County. Since this plan is specifically a multi-jurisdictional hazard mitigation plan, modifications had to be made throughout the planning process to better reflect each participating community's values and capabilities. The detailed process used for creating this plan is outlined and narrated in the following pages.

Marshall County Hazard Mitigation Planning Process

1. **Organize Community Resources**
    A. Region 6 meets with Marshall County Emergency Management Coordinator
    B. Complete community inventory in each jurisdiction with Region 6
    C. Region 6 completes county and community profiles, determine local capabilities, research existing regulations
    D. Hazard mitigation planning kick-off meeting in jurisdictions facilitated by Region 6
    E. Marshall County Emergency Management assists Region 6 with forming county-wide strategic planning team

2. **Risk Assessment and Mitigation Strategy**
    A. Marshall County Strategic Planning Team Meeting #1 and Make-up Work Session facilitated by Region 6
        i. Identify hazards for Marshall County
        ii. Profile all possible hazards
        iii. Rank hazards
        iv. Identify hazard boundaries
        v. Inventory assets through concept mapping
        vi. Identify potential mitigation actions based on assets and hazard boundaries
    B. Marshall County Strategic Planning Team Meeting #2 and Make-up Work Session facilitated by Region 6
        i. Identify critical facilities and vulnerable populations
        ii. Vulnerability assessment
        iii. Determine overall goals
        iv. Determine potential mitigation actions
        v. Evaluate mitigation actions
    C. Region 6 follows-up with the county and each jurisdiction
        i. Finish determining goals, mitigation actions, and evaluations
        ii. Create work plans for mitigation actions
        iii. Prioritize mitigation actions based on evaluations and work plans
        iv. Create implementation plan

3. **Write Plan** (primary plan authors are Alyson Lutz and Alicia Rosman at Region 6)

4. **Community Comment Period** with plan posted 30 days

5. **Submit Plan** for comment and approval

6. **Plan Approval and Adoption** by resolution in each jurisdiction and the county

7. **Plan Implementation by Jurisdictions and County**

1. Organize Community Resources

A. Meeting with Marshall County Emergency Management Coordinator

In early 2011, Region 6 met with the Emergency Management Coordinator (EMC) for Marshall County. We discussed the EMC's role in the hazard mitigation process in terms of the information she can provide, involvement in kick-off and planning team meetings, and the main hazards affecting Marshall County. Throughout the hazard mitigation planning process, the Marshall County EMC was a valuable resource for both information and establishing contacts within each jurisdiction.

Also, an interest in meeting with other emergency management coordinators from surrounding counties was expressed. Meeting annually to discuss common issues is a feasible option. During the hazard mitigation process, getting regional participation from the other counties belonging to the Region 6 Planning Commission proved to be difficult, so having these meetings may help to incorporate regionalism into future plan updates.

B. Complete community inventory

After meeting with the Marshall County EMC, Region 6 created a community inventory that was optionally completed in jurisdictions that were willing to participate. The jurisdictions that participated in this assessment include:

- City of Ferguson
- City of Laurel
- City of Le Grand
- City of Liscomb

The inventory covered a wide range of topics like zoning, ordinances, transportation safety, NOAA All-Hazards Radios, warning sirens, backup power capabilities, housing, water distribution and sewer infrastructure, wastewater treatment, flooding, agriculture, and hazardous materials.

The main goal of this inventory was to gain an understanding of the broad range of issues that are being faced in each jurisdiction. Secondary goals were to introduce hazard mitigation planning and to establish a reliable contact within the jurisdiction. In most jurisdictions, the contact established was either the mayor or city clerk. Refer to Appendix B.

C. Complete county and community profiles, determine local capabilities, research existing regulations

Through extensive research and local knowledge, Region 6 completed a profile for Marshall County and each jurisdiction that participated in the planning process. The profiles for the county and each jurisdiction highlight a broad range of topics including geographic location, population identification and trends, housing and residential development trends, and commercial and industrial development trends. Other topics like historic structures, recreational activities, and cultural institutions are also discussed. Also, each jurisdiction's capability to administer and fund mitigation projects, current regulations, and existing mitigation projects are included. Existing regulations in each jurisdiction were used like the city code, zoning ordinance, and Iowa Code.

D. Hazard mitigation planning kick-off meeting in each jurisdiction

With an understanding of the main issues faced by jurisdictions, Region 6 was able to facilitate a Hazard Mitigation and Community Development Meeting that served as the kick-off planning meeting for each jurisdiction. These meetings were advertised to the public with the help of our contact in the jurisdiction and the Marshall County EMC. The jurisdictions that participated in the kick-off process included:

- City of Albion
- City of Clemons
- City of Haverhill
- City of Laurel
- City of Le Grand
- City of Liscomb
- City of Melbourne
- City of Rhodes
- City of State Center
- Marshall County (Unincorporated)

At the kick-off meeting, Region 6 introduced the concept of hazard mitigation planning and guided attendees through a brainstorming and prioritization exercise. This exercise gave city officials, employees, and citizens a chance to share their ideas and decide which ideas are the most important. The meeting was ended with a discussion that outlines the next steps in the hazard mitigation planning process and the need for representation in the countywide planning team.

The kick-off meeting in each jurisdiction was very valuable, because it not only introduced the concept and process of hazard mitigation planning but also engaged the community in a discussion about its needs and gave the public a chance to share their ideas. Most ideas for hazard mitigation fall into the emergency services and structural projects categories. The meeting materials, correspondence, minutes, and complete list of all the mitigations ideas from these meetings are included in Appendix C.

E. Form countywide strategic planning team

Once kick-off meetings were held in jurisdictions, the Marshall County Strategic Planning Team was formed. This group of people is responsible for representing their particular jurisdiction, school district, or the unincorporated areas of Marshall County during the bulk of the hazard mitigation planning process. The public was invited to participate throughout the entire process, but the people in this particular group ensured that their jurisdiction had representation throughout the remainder of the process. These particular people were identified for the Marshall County Strategic Planning Team with the help of the Marshall County Emergency Management Coordinator. Everyone except the Marshall County Emergency Management Coordinator participated as a volunteer planner who was not compensated for their time spent on hazard mitigation planning.

The Marshall County Strategic Planning Team is made up of almost 60 people who live in Marshall County; a majority also work in Marshall County. The members of the Planning Team are listed in Table 1 along with the extent of their participation. Throughout the text of this plan, the Marshall County Strategic Planning Team will be referred to as the Planning Team.

2. Risk Assessment, Inventory Assets, and Mitigation Strategy

After establishing the Planning Team, two countywide meetings and two smaller make-up work sessions were held to complete the risk assessment, asset inventory, and develop a mitigation strategy. Some planning work was completed outside these meetings by both Region 6 and community representatives.

A. Marshall County Strategic Planning Team Meeting #1 and Make-up Work Session

All of the Planning Team members were invited to attend the first countywide hazard meeting by Alyson Lutz via mail or email depending on the contact information that was available. To invite the general public, a press release was sent to the Times Republican and Mid Iowa Enterprise Record, which combined, serve all jurisdictions in the county. For all meeting materials, refer to Appendix D. Other counties were invited to the following meeting so they could provide input on goals, projects, and possible collaborations. The regional presence at this meeting was Karen Meek, EMC for Poweshiek County.

On Wednesday, April 27, 2011, the first Planning Team meeting was held in the City of Marshalltown (county seat) at the Marshalltown Public Library, facilitated by Alyson. The team lead for all participating jurisdictions was Kim Elder, EMC for Marshall County. The meeting doubled as a luncheon so the members of the Planning Team could use their lunch break to volunteer their time. The theme of this meeting was "Dine and Diagram," which involved eating, listening, discussing, and participating in diagramming exercises tailored to hazard mitigation planning.

The following steps in the hazard mitigation process were completed either before or during the first countywide hazard mitigation meeting: identify and profile countywide hazards, rank hazards, determine hazard boundaries, inventory assets, and identify potential goals and mitigation actions based on activities. The following sections outline how these steps were completed.

Attendance at this meeting was not as expected so additional time was needed to ensure that all Marshall County jurisdictions could be included in the plan. All jurisdictions and participating school districts were represented except Liscomb and Rhodes who did their work from home and emailed it in at a later date.

Marshall County Strategic Planning Team Meeting #1: Dine and Diagram

Representatives from Marshalltown work on their asset map

Almost 50 representatives attended the meeting

i. Identify hazards for Marshall County

Ultimately, the hazards chosen for the plan were determined by the Planning Team. Before the county meeting, Region 6 identified the hazards most likely to affect the county based on 2010 Iowa Hazard Mitigation Plan, research, and knowledge of the area.

At the meeting, the Planning Team was asked to agree or disagree with the list of hazards that Region 6 assumed would be chosen. The entire list of possible hazards (Table 1.1) was provided so Planning Team members could add hazards to the list. Members were also able to eliminate hazards if they could provide sufficient reasoning.

ii. Profile all Marshall County hazards

All hazards that were identified for Marshall County were profiled. This was done through review of the Iowa Hazard Mitigation Plan, past events and declared disasters, research, and reviewing data from Marshall County Emergency Management and the National Climatic Data Center.

The actual profiles of each possible hazard are based on the format used by Iowa's plan. The following information for hazards in Marshall County is addressed:

- Definition of the hazard
- General description of the hazard
- Probability of the hazard occurring in the future
- Magnitude/Severity of the hazard's potential impact on human life and property
- Warning time before the hazard occurs
- Duration of hazard event and aftermath

iii. Rank hazards

Once the hazards for Marshall County were chosen and profiled, they were ranked against each other to determine which hazards can have the greatest impact on the county. The ranking was done according to the method used in the 2010 Iowa Hazard Mitigation Plan. The ranking method involves assigning a rating for probability, magnitude/severity, warning time, and duration.

iv. Determine hazard boundaries

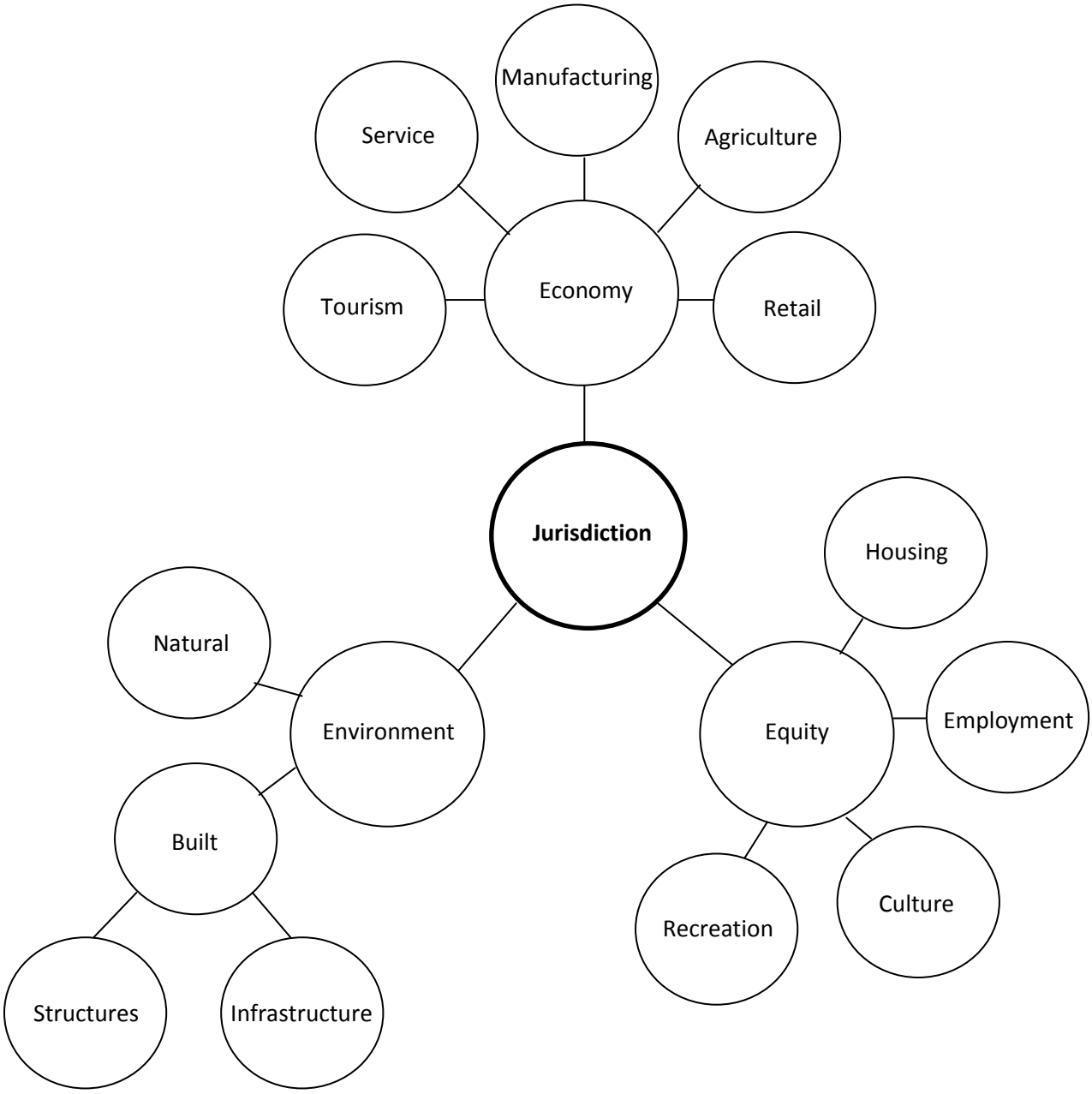
Many hazards are countywide or cover the entire planning boundary in terms of their potential magnitude, but others do not affect all of Marshall County's jurisdictions. The hazards that are specific to a jurisdiction were identified through research and extensive discussion at the first countywide meeting. Maps were also created to easily identify hazard boundaries.

iv. Inventory community assets through concept mapping

To identify county and community assets, Region 6 developed a concept mapping activity that guided meeting participants through the asset inventory process. A diagram was developed and

used to complete a comprehensive review of both assets and weaknesses. A simplified example of the diagram that was used is below in Figure 2.1.

Figure 2.1: Basic Asset Identification Diagram



The asset identification process involved adding more circles to the diagram and writing in the community's specific assets. Participants were also asked to identify community weaknesses.

A community asset diagram was completed for each individual jurisdiction and the unincorporated areas of Marshall County. The schools were also included in this process. Each school representative participated in the asset mapping for the community in which their buildings are

located. The diagram was completed by Planning Team members who attended the meeting. The assets particular to each jurisdiction can be found in the vulnerability section of the risk assessment section of this plan. An example of a completed diagram is below in Figure 2.2.

Figure 2.2: Example Asset Identification Diagram

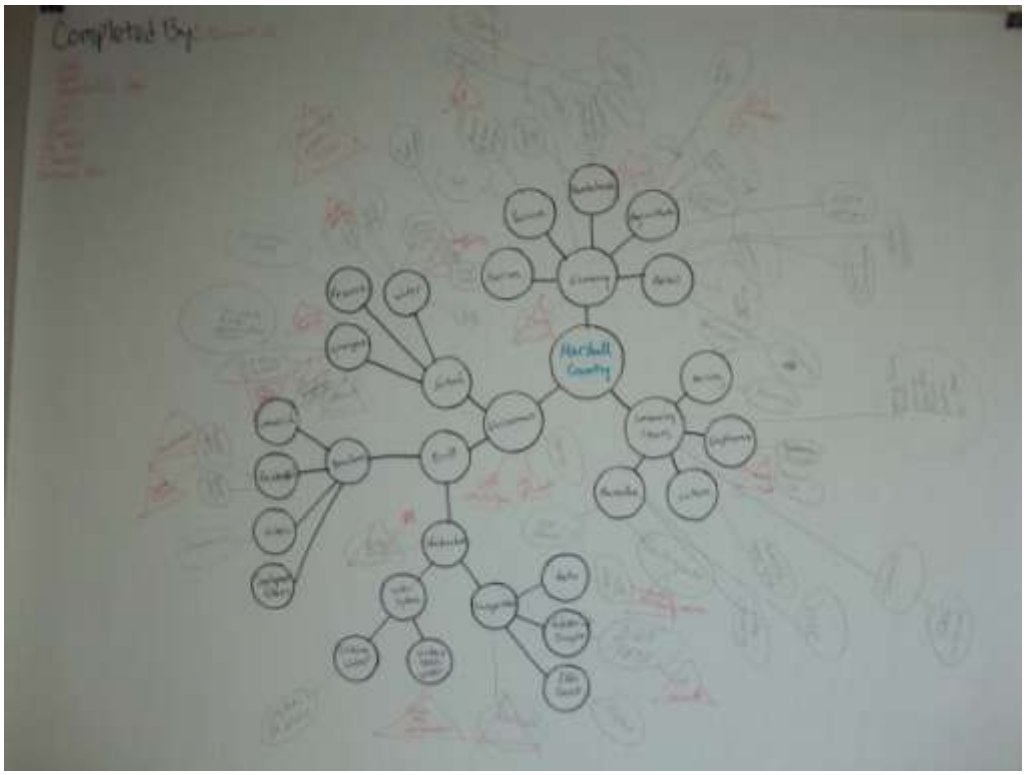


Image Source: Region 6 Planning Commission, April 2011

Most Planning Team members identified a wide, comprehensive range of assets in their jurisdiction along with its weaknesses. The land area, population, and culture of each jurisdiction differ so the resulting assets and weaknesses were very unique to each jurisdiction. Planning Team members were asked to use the results of their asset identification for the next meeting activity involving goal setting and identifying potential mitigation actions.

vi. Identify potential goals and mitigation action based on hazard boundaries and assets

Planning Team members were asked to think about potential goals and mitigation projects based on the community assets and weaknesses that they identified. They were also given a FEMA mitigation actions idea document to use as a reference. For this first goal setting and mitigation exercise, each jurisdiction was asked to consider the full range of hazards that could affect their respective community. At this point, goals and mitigation actions were just initial ideas. Refer to Appendix D.

B. Marshall County Strategic Planning Team Meeting #2 and Make-up Work Session

The second countywide meeting was held on June 13, 2011 from noon to 1:30 PM at the Marshalltown Public Library. This meeting was held at lunchtime so Planning Team members could volunteer their lunch time in order to contribute to the hazard mitigation planning process. Again, the meeting was facilitated by Alyson Lutz with Kim Elder as team lead for all participating jurisdictions.

All of the Planning Team members plus others were invited to attend the meeting by either mail or email depending on the contact information that was available. To invite the general public, a press release was sent to local newspapers: Times Republican, Mid Iowa Enterprise Record, and Marshalltown Broadcasting, Inc. To encourage a regional effort, emergency management coordinators from other counties (Region 6 Counties: Poweshiek, Hardin, and Tama) were invited to share their ideas and also invite people from their county to participate. There was no regional representation at this meeting. Refer to Appendix E for all meeting related materials.

At this meeting, the following elements of the plan process were completed: confirm community assets and identify critical facilities, identify vulnerable populations, determine goals, determine potential mitigation actions, and evaluation of mitigation actions. Not all of these activities were completed in the allowed 90 minutes so some communities had to finish certain activities outside of the meeting. The following sections detail how these activities were completed.

Attendance at this meeting was not as expected so an additional meeting was needed to ensure that all Marshall County jurisdictions could be included in the plan. All jurisdictions and participating school districts were represented at the meeting except Laurel, Liscomb, St Anthony, GMG Community School District and West Marshall Community School District. The make-up meeting was held at the Marshalltown Public Library on Thursday, June 30, from noon to 1pm. The school districts did not participate in the make-up session or respond to any other offers to complete the needed work.

Marshall County Planning Strategic Planning Team Meeting #2

Image Source: Region 6 Planning Commission, June, 2011

i. Identify critical facilities and vulnerable populations

The community assets and weaknesses that were identified through concept mapping at the first countywide meeting were compiled by Region 6 into jurisdiction specific worksheets that were given to each jurisdiction's representative(s). The Planning Team members who attended the meeting were asked to confirm their community's assets and weaknesses by adding or removing items from their respective list. In most cases, representatives added assets that they did not think to include at the first planning meeting.

Second, Region 6 provided Planning Team members with FEMA aerial maps of their community for the purpose of identifying critical facilities. An explanation and information sheet was provided to ensure that representatives understood the definition of a critical facility and vulnerable population. Ultimately, though, the Planning Team got to decide what structures are critical and which members of their community are most vulnerable during a disaster. This activity involved both recording the critical facilities and vulnerable populations on a worksheet and marking the location on the aerial map.

It should be noted that communities were allowed to list structures not located in their own community as a critical facility. Marshall County has several small, rural communities that do not contain all basic services like a grocery store, hardware store, or bank so they were allowed to identify critical facilities located in other communities that they depend on in the event of a disaster. Otherwise, the FEMA recognized definition of critical facility and vulnerable population were used in this exercise.

ii. Vulnerability assessment

The vulnerability assessment involves the identification of assets, critical facilities, and vulnerable populations, which was completed in the previous step. It also includes determining how vulnerable or open to damage jurisdictions are to each hazard. To make this determination, the Planning Team helped identify what hazards affect the entire county and what hazards affect only certain jurisdictions. This was used along with scores given to hazards during the ranking process. The sum of these scores is the score for vulnerability to determine whether a jurisdiction is at a high, medium, or low-risk for that particular hazard.

iii. Determine goals

Based on previous hazard research, information from the first countywide meeting, FEMA suggestions, and case studies, Region 6 identified four basic hazard mitigation goals for Marshall County. At the meeting, the county and each jurisdiction were able to accept the goals in the original form, modify them to fit their community, or create new goals.

Planning Team members were asked to record the resulting goals on a worksheet. The four basic goals provided are below:

1. Minimize losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority structures.
2. Protect the health and safety of Marshall County residents and visitors.
3. Educate Marshall County citizens about the dangers of hazards and how they can be prepared.
4. The continuity of local operations will not be significantly disrupted by disasters in Marshall County.

The county as a whole accepted these goals since they are broad enough to include each jurisdiction, unincorporated areas of Marshall County, and all hazards. Several jurisdictions chose certain goals and modified them to fit their unique community needs.

iv. Determine potential mitigation actions

Before the meeting, all of the mitigation ideas from the first countywide meeting were compiled by Region 6 into a document that separated the ideas by corresponding hazard and by the jurisdiction that proposed the idea. This document was provided to each Planning Team member to use when choosing potential mitigation projects for their community. The Planning Team could see not only their specific mitigation ideas but also other community's ideas, as well as those of other Region 6 Counties. This way, ideas were easily shared across the county. Refer to Appendix F for the full list.

To choose potential mitigation actions, Planning Team members were asked to narrow down their large list of mitigation ideas according to the hazard mitigation goals for their jurisdiction. The Planning Team members were informed of the mitigation action requirement: each jurisdiction needs at least one hazard mitigation action per goal while there must be a comprehensive, all-hazard inclusive set of actions for the entire county.

Region 6 encouraged each community to consider both large and small projects along with the five major projects suggested by FEMA. The suggested mitigation projects are below:

1. Construction of a safe room
2. Acquisition and elevation of structures
3. Add lift stations, detention basins, and culverts
4. Purchase generators
5. Elevate roads

Most jurisdictions included these mitigation projects along with others that fit their community's specific needs. A very broad and comprehensive range of projects were identified.

At the county level, since mitigation actions are required for each hazard, county representatives had to consider not just countywide goals but also the full list of hazards that may affect the county. Due to limited time, some jurisdictions and the county especially needed to finish this activity outside of the meeting.

v. Evaluate mitigation actions

After Planning Team members chose mitigation actions for their jurisdiction, Region 6 explained the need for a comprehensive evaluation of each mitigation action. The suggested FEMA designed evaluation method, STAPLEE, was used for this part of the plan process. The areas the evaluation covers are below:

1. Social
    a. Community acceptance
    b. Effect on segment of population
2. Technical
    a. Technical feasibility
    b. Long-term solution
    c. Secondary impacts
3. Administrative
    a. Staffing
    b. Funding allocated
    c. Maintenance/operations
4. Political
    a. Political support
    b. Local champion
    c. Public support
5. Legal
    d. State authority
    e. Existing local authority
    f. Potential legal challenge
6. Economic
    a. Benefit of action
    b. Cost of action
    c. Contributes to economic goals
    d. Outside funding required
7. Environmental
    a. Effect on land/water
    b. Effect on endangered species
    c. Effect on HAZMAT/waste
    d. Consistent with community environmental goals

Most Planning Team members had sufficient time to complete all of the evaluations for their jurisdiction's mitigation actions. Only the county finished outside of the meeting with the guidance of Region 6. All related materials for this activity can be found in Appendix G.

C. Follow-up with the county and each jurisdiction

i. Finish determining goals, mitigation actions, and evaluations

Since some representatives did not have enough time at the meetings to finish determining the goals and mitigation actions for their jurisdiction, they took meeting materials with them to complete this part of the planning process on their own time. When representatives finished these tasks, they sent their completed materials back to Region 6 so they could be incorporated in the plan.

ii. Create work plans

The work plans for each mitigation action were largely created using the information collected in the section outlining each jurisdiction's capabilities and current regulations. Also, inherent knowledge of jurisdictions and consultation with many of the jurisdiction representatives was used to complete the work plans. The work plan for each mitigation project includes a plan for implementation and administration, lead agency, partners, potential funding, estimated total cost, benefits or loss avoided, and completion date.

iii. Prioritize mitigation actions based on evaluations and work plans

The STAPLEE evaluations that were completed for each mitigation action were used to prioritize the various projects for each jurisdiction. The projects were ranked in accordance with the score they received so the higher the score for the project the higher the priority it received. In the next five years, priorities may change due to new circumstances like loss of funding or a natural disaster, so prioritization is subject to change.

iv. Create implementation plan

The implementation plan was created through case study research and discussion with Planning Team members. Along with the knowledge of local conditions provided by Planning Team members, previously approved mitigation plans served as an invaluable resource in this planning effort.

3. Write the Plan

The plan was written primarily by Alyson Lutz and Alicia Rosman, who are both planners at the Region 6 Planning Commission. The plan was reviewed and edited by Alyson. The main resources used to create this plan include FEMA's plan guidance known as *The Blue Book*, FEMA's how-to guides (386-1,2,3,4), information learned in hazard mitigation planning workshops and personal meetings with FEMA technical assistance planners, previously approved hazard mitigation plans, and case studies like the Neosho County, MO plan.

Along with general hazard mitigation guidance, several data sources were used for specific hazard information. These sources are cited throughout the plan. Other sources of information used include existing plans, reports, technical information, and regulations. Some of these documents include code of ordinances, zoning ordinances, floodplain maps, outdated hazard mitigation plans, soil surveys, and other relevant documents that are cited.

Above all, the public and Planning Team input is the most important contribution to development of this plan. In any planning effort, the best information and ideas often come from the people who live and work in the community that is the subject of the plan. The information and ideas provided by the participants of the planning process are incorporated throughout the entire plan.

4. Community Comment Period

The comment period for this plan began on October 7, 2011 and ended November 7, 2011. The comment period is concurrent with plan review so public comments will be incorporated into this section once the comment period expires. A notice was published in the major newspapers of Marshall County so residents were aware of their ability to review and comment on the written plan. Copies of the plan were located at the Marshall County Auditor's Office and Marshall County Emergency Management Office in Marshalltown. An electronic copy of the plan was available by request. A copy of the notice along with public comments will be available in Appendix H once the affidavit of publications is received from each newspaper.

5. Submit Plan

The plan was submitted by email to the state plan review staff and the State Hazard Mitigation Officer on October 7, 2011. The plan must receive approval by January 20, 2012. This submittal date gives sufficient time for review and final edits before its approval deadline.

6. Plan Approval and Adoption

As mentioned in the Prerequisites section of this plan, the adoption of this plan is pending approval. Each jurisdiction will adopt this plan by resolution and the resolutions will be included in Appendix A. Information about revisions and plan approval will also be added to this section of the plan process.

7. Plan Implementation by Jurisdictions and County

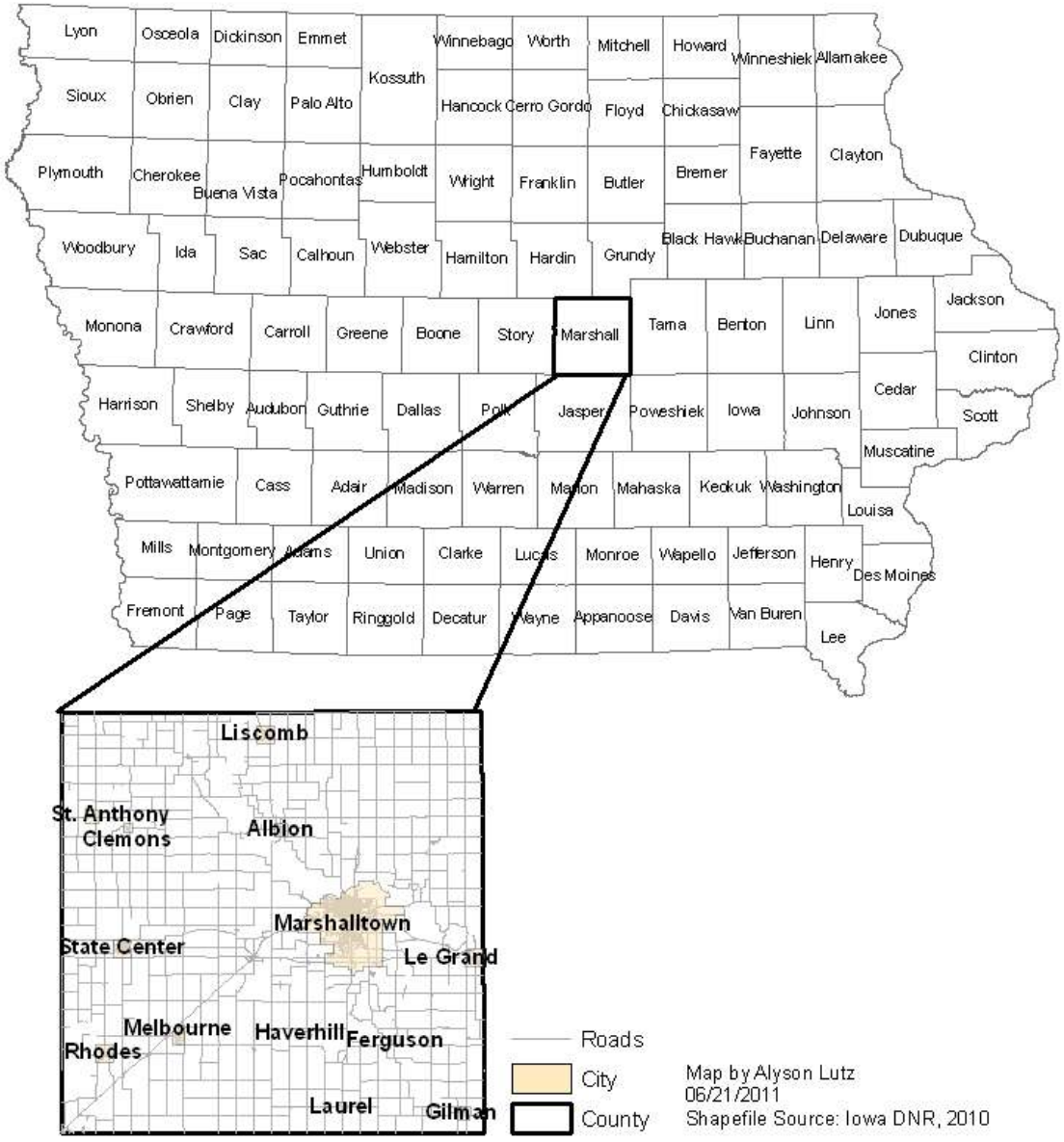
This part of the planning process is yet to be seen. In the next five years, the jurisdictions included in this plan will be expected to fulfill their goals and implement the projects they have identified to mitigate their hazards.

3.1 Planning Area Profile

Location and Size

Marshall County is a fifth tier county located in central Iowa. The county is bordered on its north side by Hardin and Grundy Counties, Tama County on the east, Jasper County on the south side, and Story County on the west side. In Figure 3.1.1, Marshall County is in bold to show its location in relation to all Iowa counties.

Figure 3.1.1: Iowa Counties



Geography, Topography, and Hydrology

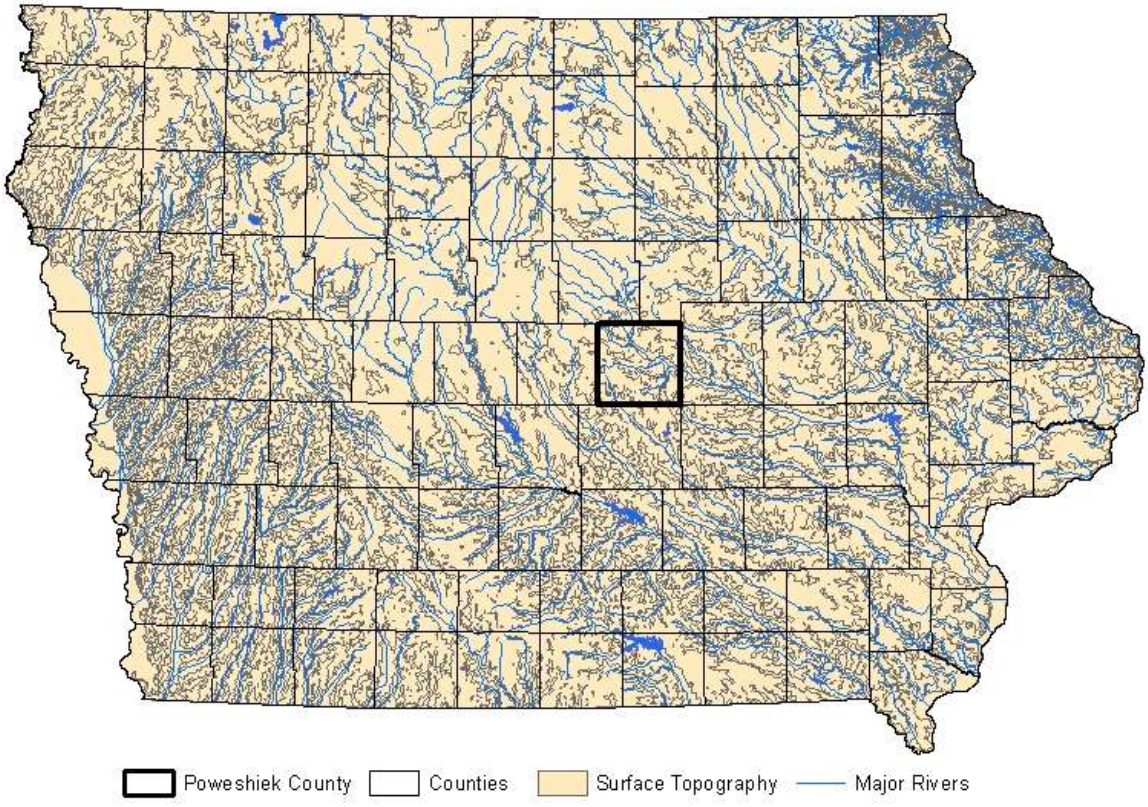
Marshall County has an area of 366,732.8 acres, or about 573.02 square miles. Most of the soils in the county are nearly level to gently sloping or moderately sloping.

The highest surface elevation in the county of 1150 feet is in State Center Township in the SE quarter of the SW quarter, Section 5. This is approximately 1.5 miles west of State Center on 230th St., between Binford and Canfield Avenues. The lowest elevation of 820 feet is at the Ferguson Quarry, East of Underwood Avenue and North of 290th Street near Ferguson. It is located in Green Castle Township in the NW quarter of the SE quarter, Section 5.

There are two major drainage systems for Marshall County, consisting of the Iowa-Cedar River and the Skunk River, according to the 1981 Marshall County Soil Survey. Nearly 80 percent of the county is drained by the Iowa River and its tributaries. A small area in northeastern Marshall County is drained by the Wolf Creek and the remaining area in the southwestern portion of the County is drained by the Skunk River. Though 12% of the soils in the county are poorly to very poorly drained, they are drained enough for crop production. In other areas with insufficient underground and surface drainage, crops may be ruined by the pooling of the still water.

About 182,000 acres (50%) of Marshall County land is prime farmland, perfect for crops, mainly corn and soybeans. Some of this land, which would be ideally left for farming, has been converted into industrial and urban uses.

Figure 3.1.2: Topography and Waterways of Iowa



Map by Alyson Lutz, 06/21/2011, Shapefile Source: Iowa DNR

All of Iowa is shown in the map in Figure 3.1.2 in order to provide a reference for comparison. Marshall County is one of the moderately hilly, central counties in Iowa.

Marshall has seven soil associations. The one soil that takes up the most (30%) of the county is, "Moderately sloping, to steep, well drained and moderately well drained, silty and loamy soils formed in loess and glacial till; on uplands" (Marshall County Soil Survey, 1981) This soil is called Killduff-Tama-Shelby.

The main enterprises that come from the Killduff-Tama-Shelby soil association are cash grain crops and feeing swine and beef cattle. The suitability for this association are cultivated crops, hay, and pasture. Much of the land is suited for row crops like corn and beans. The association has a good drainage pattern.

For more extensive information on the soils in Marshall County, refer to the Soil Survey of Marshall County, Iowa. This survey was completed in 1981 by the USDA and several Iowa government departments and institutions.

Land Use Regulation and Development

Development Patterns

Marshall County is settled primarily as an urban county with almost 67% (26,122 people) of its population living in urban areas. This is just above the population of the City of Marshalltown, Of these urban residents, all live in urban clusters with none in urbanized areas. According to the State Data Center, in 1990, less people (13,098) lived in Marshall County's rural areas, showing a decrease of rural living. Today, the rural population is about 34% (13,189 people) of the county's total population. Of this number only 11% or 1,443 people farm, the rest of the rural community is non farmers. Refer to Table 3.1.1.

Table 3.1.1: Urban Vs. Rural Population in 2000

		Urban			Rural		
Area	Total Population	Total	Inside Urbanized Areas	Inside Urban Clusters	Total	Farm	Nonfarm
State of Iowa	2,926,324	1,786,683	1,114,949	671,734	1,139,641	171,374	968,267
Marshall County	39,311	26,122	0	26,122	13,189	1,443	11,746
Albion	608	0	0	0	608	16	592
Clemons	144	0	0	0	144	0	144
Ferguson	141	0	0	0	141	8	133
Gilman	583	0	0	0	583	0	583
Haverhill	172	0	0	0	172	0	172
Laurel	287	0	0	0	287	0	287
Le Grand	898	0	0	0	898	0	898
Liscomb	270	0	0	0	270	0	270
Marshalltown	26,032	25,559	0	25,559	473	0	473
Melbourne	791	0	0	0	791	2	789
Rhodes	289	0	0	0	289	0	289
St Anthony	107	0	0	0	107	0	107
State Center	1,348	0	0	0	1,348	8	1,340

Data from the State Data Center of Iowa, 2000

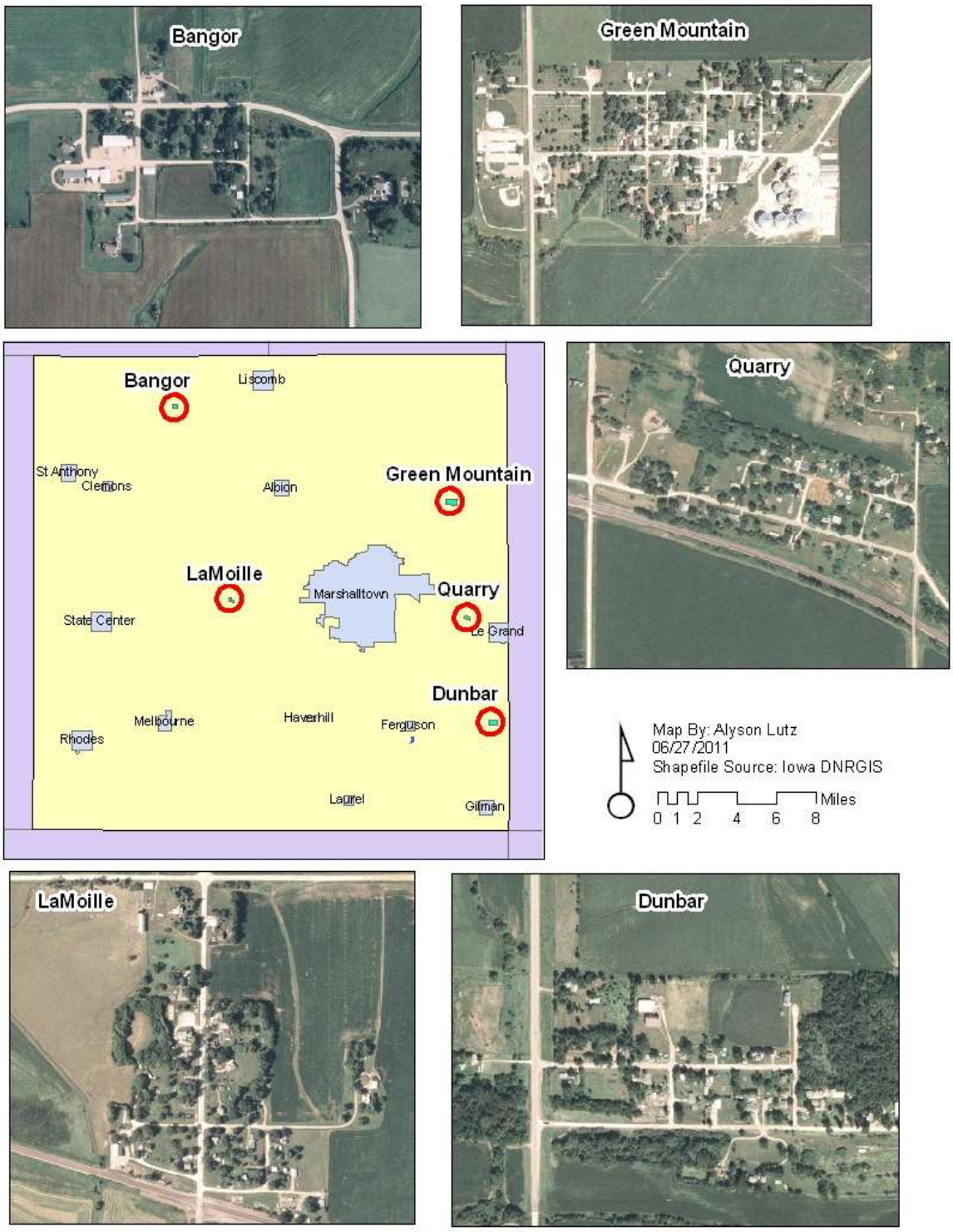
The only urban city in Marshall County is considered Marshalltown (25,559 people). This city is located in the east central part of the county. Marshalltown may have the only urban population due to the fact that Marshalltown Community College and the largest school district in the county (Marshalltown Community School District) are present in the City. These two educational entities, combined, populate 12% of the county with a total of 2,201 students. Also, several manufacturing and processing companies are present in town such as Lennox Manufacturing and JBS Swift which provide many jobs.

Keep in mind that though the 2010 Census data has been released, this specific analysis has not been calculated with the new population data as the breakdown of information is not available.

Based on Marshall County's history, though, the county will remain more urban than rural in terms of human settlement patterns.

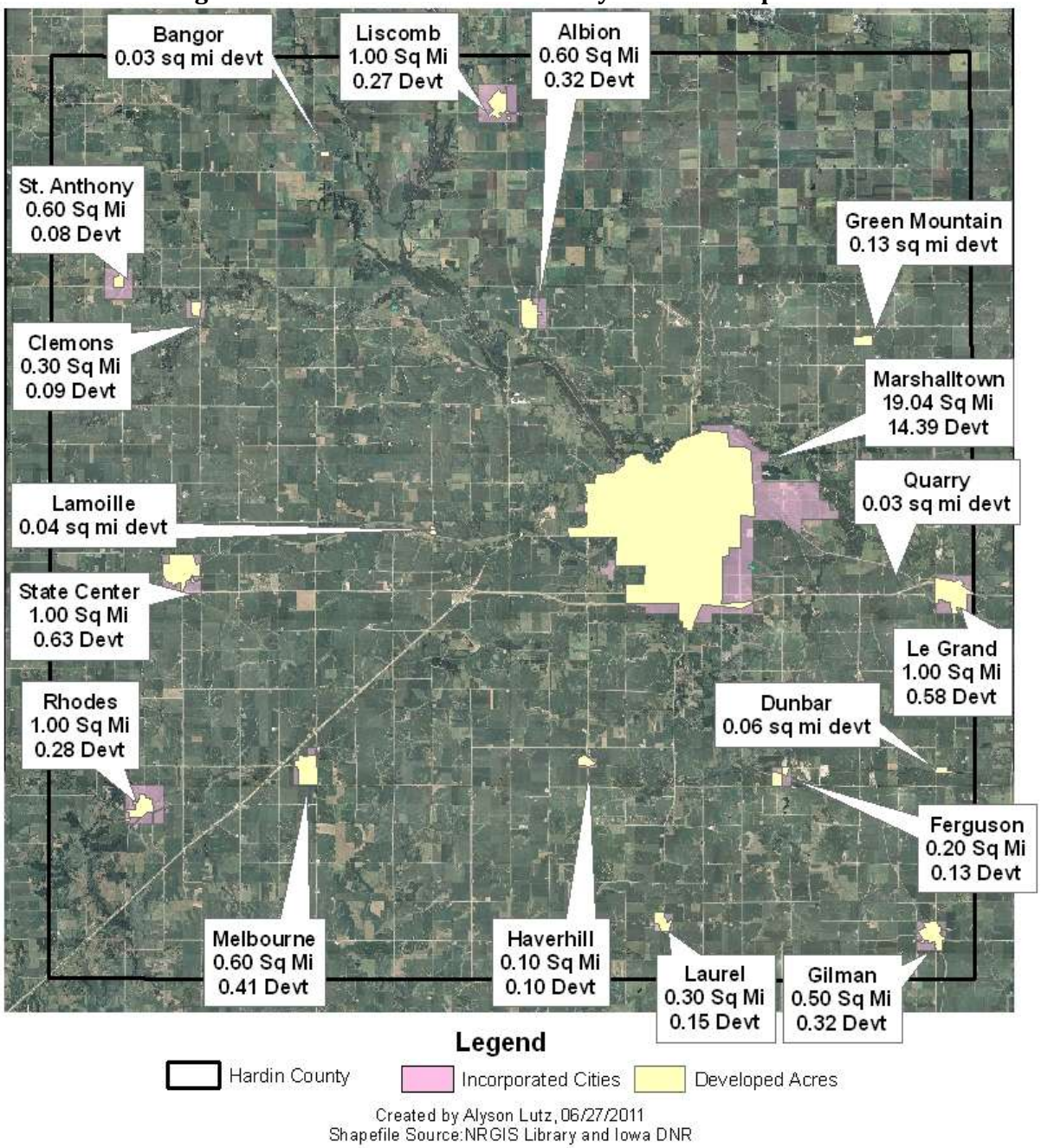
In the rural areas of the county, there are five unincorporated cities: Bangor, Dunbar, Green Mountain, LaMoille, and Quarry. Together, their area totals less than one square mile.

Figure 3.1.3: Marshall County Unincorporated Development



Overall, 3 percent (18.04 square miles) of Marshall County is developed land according to these calculations. The majority of the development, as seen in Figure 3.1.4, is located in the center of each incorporated city. Most of the cities have more than half of their total land developed. The cities are scattered around the county. The five unincorporated areas of Bangor, Dunbar, Green Mountain, Lamoille, and Quarry are also scattered throughout the county, and are somewhat near incorporated cities, providing resources or an alternate rural Iowa lifestyle for residents. The biggest cities in Marshall County, Marshalltown and State Center, are situated in the east central and west central parts of the county near or on the routes of major Iowa highways.

Figure 3.1.4: Current Marshall County Land Development



Note: This map provides a rough estimate of the development acres in the county because exact calculations are currently unavailable.

Population and Demographics

Current and Past Trends

According to the State Data Center of Iowa, the population of Marshall County in the 2010 Census was 40,648. Of this total, 33,196 people live in the incorporated cities of the County leaving the remaining 7,452 people in the unincorporated areas of Marshall County. This means 82% of the Marshall County population is under regulation by county government, and the remaining 18% is under the regulation of the jurisdiction in which they reside.

Table 3.1.2: Population Trend 2000 to 2010

				2000 to 2010	
Area	**2010 Census**	**2005 Estimate**	**2000 Census**	**Numeric change**	**Percent change**
State of Iowa	3,046,355	2,949,450	2,926,324	120,031	4.1%
Marshall County	40,648	39,020	39,311	1,337	3.4%
Albion	505	566	592	-87	-14.7%
Clemons	148	146	148	0	0.0%
Ferguson	126	122	126	0	0.0%
Gilman	509	568	600	-91	-15.2%
Haverhill	173	162	170	3	1.8%
Laurel	239	264	266	-27	-10.2%
Le Grand	938	952	883	55	6.2%
Liscomb	301	270	272	29	10.7%
Marshalltown	27,552	25,697	26,009	1,543	5.9%
Melbourne	830	787	794	36	4.5%
Rhodes	305	291	294	11	3.7%
St Anthony	102	187	109	-7	-6.4%
State Center	1,468	1,323	1,349	119	8.8%

Data Source: State Data Center of Iowa, 2011

Out of all Marshall County jurisdictions, Marshalltown is the largest city followed by State Center. The smallest city in Marshall County is St Anthony with a population of 102 people, in 2010. In the past decade, Marshall County and its jurisdictions have experienced a mixture of population increases and decreases. Marshall County and some of the larger communities coincide with the State of Iowa, which experienced a 4.1% population increase since 2000. Those with moderately sized populations had rather large population decreases of around 15%. The city with the largest population loss in terms of percentage is Gilman (-15.2%) while the other jurisdictions range from -6.4% to -14.7%. The largest loss in number of people also occurred in Gilman with a loss of 91 people between 2000 and 2010. The largest percentage increase was the City of Liscomb with a 10.7% increase of only 29 people. The largest numeric increase was the City of Marshalltown with 1,543 people, which is only a 5.9% increase for such a large town. Refer to Table 3.1.2 for the population changes in each jurisdiction.

Age

As a whole, Marshall County is aging at a steady rate. Comparing the county's change in population composition from 2000 to 2010, the amount of people aged 40 to 49 has been redistributed into the 50 to 59 range showing that population has stayed within the county. The largest percentage of population in the county has changed over 10 years. In 2000, 45-49 year old males held the highest percentage in the county but by 2010, 0 to 4 year old males was the highest percentage, a good sign, showing population growing inside the county. Refer to Figures 3.1.5-6.

Figure 3.1.5: Marshall County Population Pyramid 2000

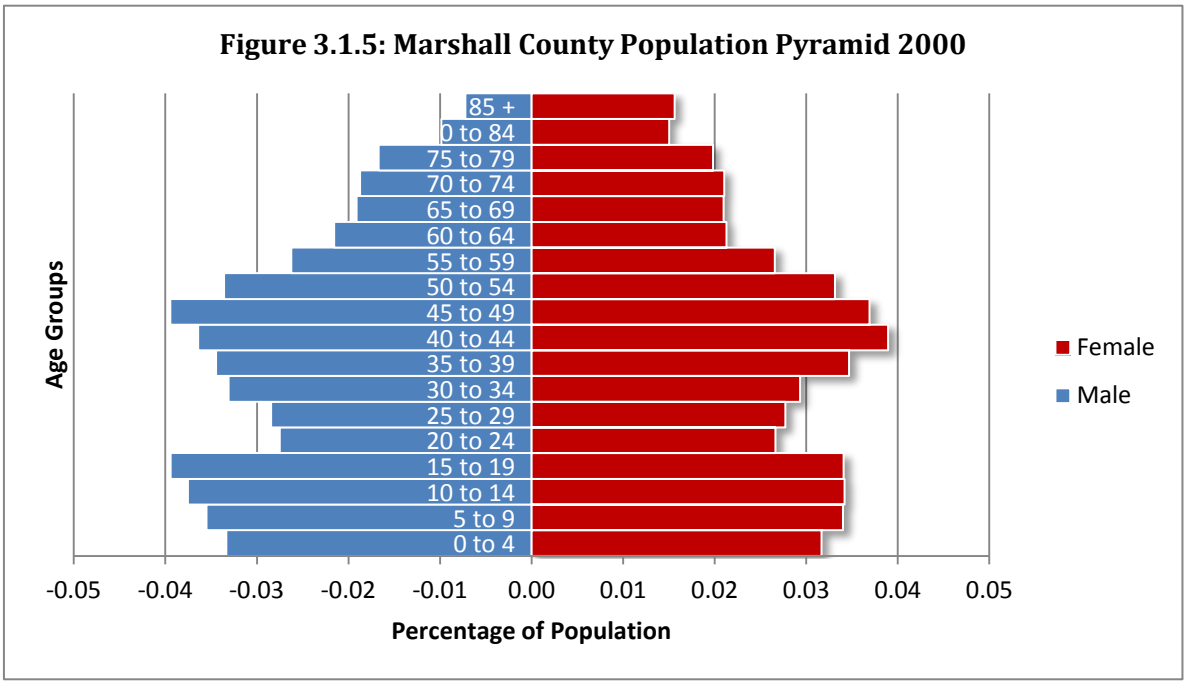
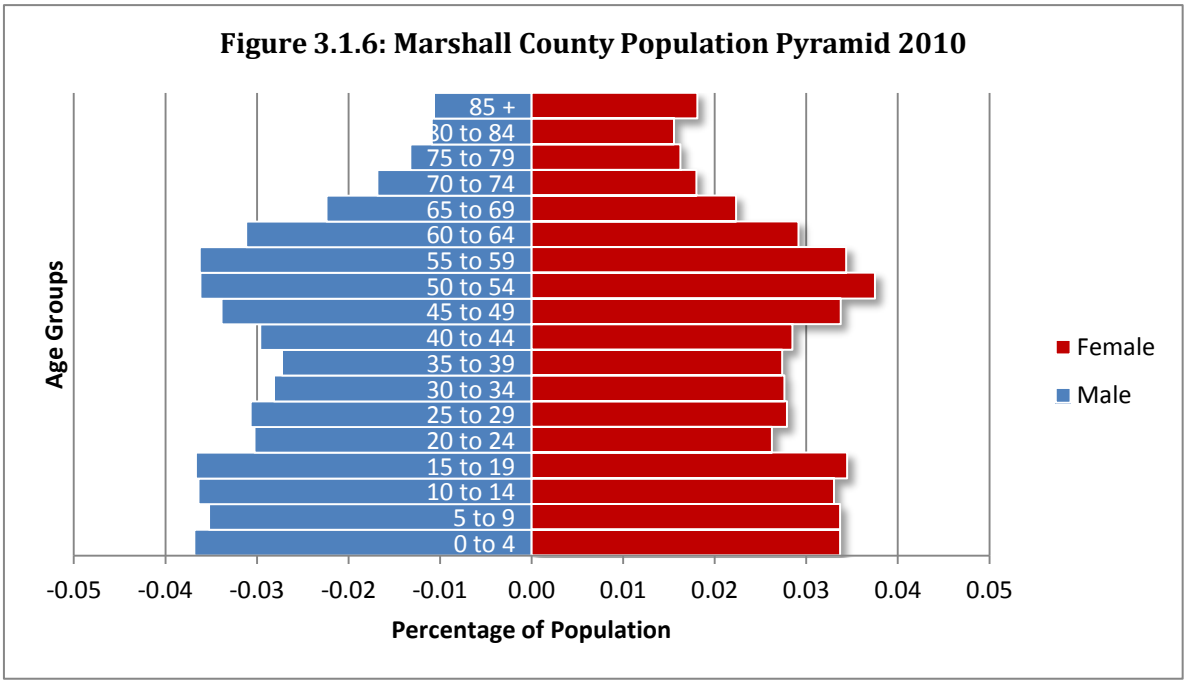


Figure 3.1.6: Marshall County Population Pyramid 2010



Data Source: State Data Center of Iowa, 2009

Like many counties in Iowa that are primarily rural, Marshall County's population distribution does not resemble the ideal pyramid shape. Some counties have an issue retaining the young adult population. Generally, the population between the ages of 25 and 34 is small compared to the rest of the population. Though this is the case in Marshall County, it is not as small as other more rural counties. There is actually an increase in population of that age group over this 10 year period. This may be due to the higher education and job opportunities provided in Marshall County, and specifically, Marshalltown. Providing the lifestyle demanded by this segment of the population is often difficult for counties with smaller populations.

In 2010, Marshall County had a median age of 39.6 while the State of Iowa had a median age of 39.9. Compared to the state, the county has a younger population. Refer to Table 3.1.3 for a breakdown of median age by city in Marshall County.

Table 3.1.3: Marshall County Median Age in 2010

City	Median Age
Albion	43.0
Clemons	43.2
Ferguson	51.0
Gilman	42.5
Haverhill	36.5
Laurel	43.5
Le Grand	42.4
Liscomb	40.2
Marshalltown	41.5
Melbourne	34.9
Rhodes	41.9
St Anthony	36.5
State Center	39.7

Data Source: State Data Center of Iowa, 2011

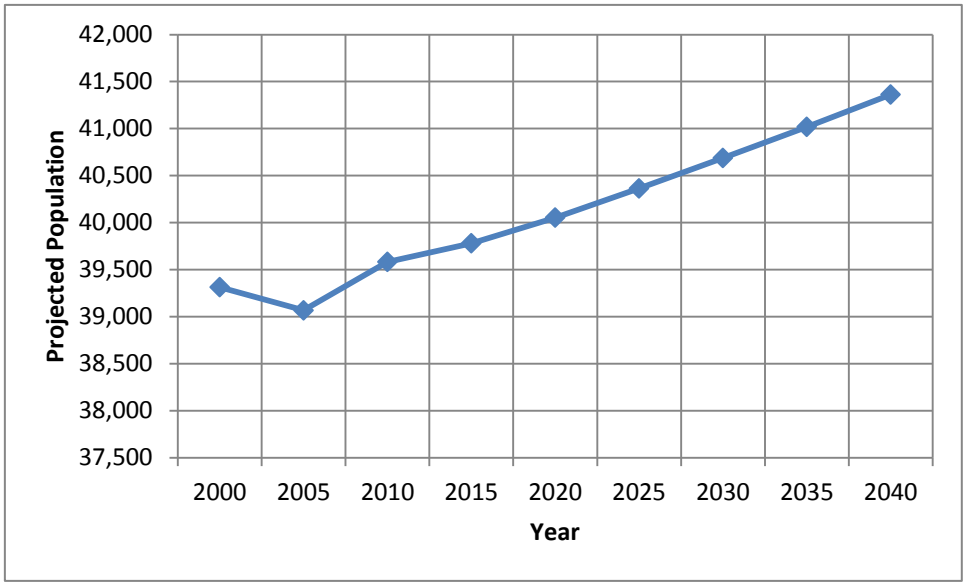
There is a range of 16.1 years in the median age in cities across Marshall County. Of all Marshall County cities, Ferguson has the highest median age of over 50 years old. There is a big gap before Laurel, in second, with 43.5 as the median age of residents. The City of Melbourne is the youngest with a median age of 34.9 years. Haverhill and St Anthony are next with a median age of 36.5. These cities having the youngest population may be due to the small sizes of the cities themselves. Haverhill and St Anthony are the smallest in the county with just 173 and 102 people, respectively.

As the county's population becomes older, more services oriented toward adults and seniors will be needed. Past planning efforts have mentioned providing more adult and senior services such as congregate meal sites and facilities for long-term care. Keep in mind that though the 2010 Census data has been released, this specific analysis has not been calculated with the new population data as the breakdown of information is not available.

Population Projection

According to a population projection completed by Woods and Poole in 2009, Marshall County's population, after a decrease between 2000 and 2005, will steadily increase as the year 2040 approaches. By 2040, Marshall County's population is predicted to be 41,362, which is an increase of 2,049 people or 5.2%. Currently, this projection seems to be slightly inaccurate, as Marshall County's 2010 census population is 40,648 people, more than the projected population for 2025 of 40,363. Refer to Figure 3.1.7.

Figure 3.1.7: Marshall County Population Projection 2000-2040



Data Source: State Data Center of Iowa (Woods & Poole Economics, Inc), 2009

A 5% population increase is not a big leap, but if the county will continue to grow at the rate it actually is, according to the 2010 Census, it is a good sign for the county, overall. An increase in population can increase the amount of federal and state funding the county will receive, which can support services and infrastructure investments, while a decrease may do the exact opposite. This predicted population increase is most likely due to more young adults coming to the county for higher education and employment opportunities.

Looking at the population pyramids, there is a noticeable increase of the brackets of individuals aged 20 to 24, 25-29, and 30 to 34 year olds in both the 2000 and 2010 pyramids. Though it is obvious that the brackets 40-49 stayed in the county, Marshall is still gaining the population brackets just beyond school age, and through child bearing years. Refer to Figures 3.1.5-6. A large or increasing population aged 25 to 29 means that more population growth through birth will occur in Marshall County so the young age cohorts may also increase, which affects school funding and the amount and quality of youth-oriented services and activities. Retaining the young adult population in Marshall County must be cultivated and maintained in order to retain or increase the county's population.

Housing Characteristics

Amount and Occupancy

According to the State Data Center of Iowa, Marshall County had 11,393 owner-occupied housing units and approximately 4,145 rental housing units being occupied in 2010. Refer to Table 3.1.4 below for the total number of housing units in each jurisdiction.

Table 3.1.4: Number of Housing Units in Marshall County in 2010

Jurisdiction	Number of Housing Units
Marshall County	16,831
Albion	220
Clemons	66
Ferguson	59
Gilman	253
Haverhill	68
Laurel	122
Le Grand	401
Liscomb	127
Marshalltown	11,171
Melbourne	354
Rhodes	138
St Anthony	50
State Center	630

Data Source: State Data Center of Iowa, 2011

Logically, the ranking for the highest to lowest number of housing units coincides with the population ranking for the cities. Marshalltown has the largest population and the largest share of Marshall County's housing stock while St Anthony has the smallest population and smallest share of Marshall County's housing stock.

Out of all housing units in Marshall County, 7.7% were vacant in 2010. This is about the same as the state, which had 91.9% of its housing occupied. The homeowner vacancy rate, though, is higher in Marshall County than the entire State of Iowa so a higher share of Marshall County's housing units is vacant or for sale.

Table 3.1.5: Housing Occupancy in 2010

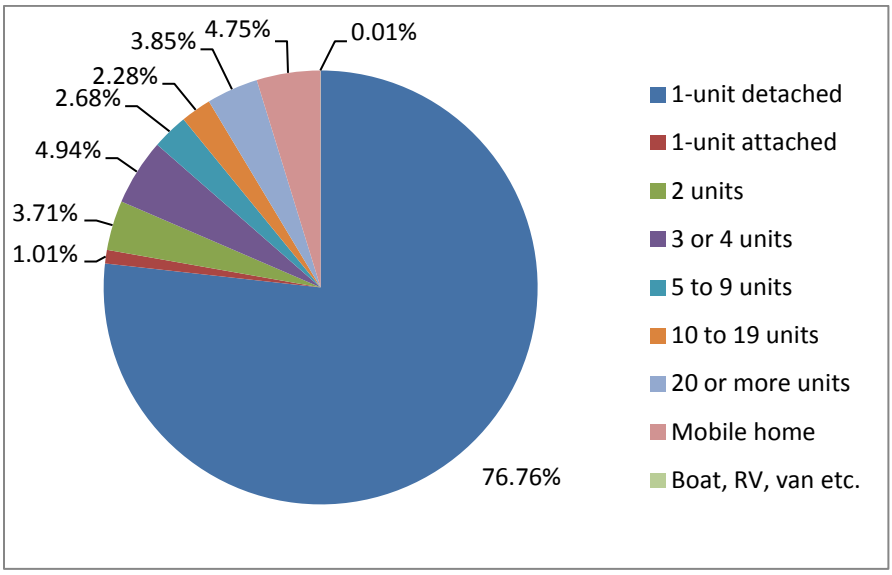
	Marshall County	**State of Iowa**
Percent Occupied Housing	92.3%	91.9%
Homeowner Vacancy Rate	2.3	2.1
Rental Housing Vacancy Rate	5.4	6.0

Data Source: State Data Center of Iowa, 2011

Type of Housing Available

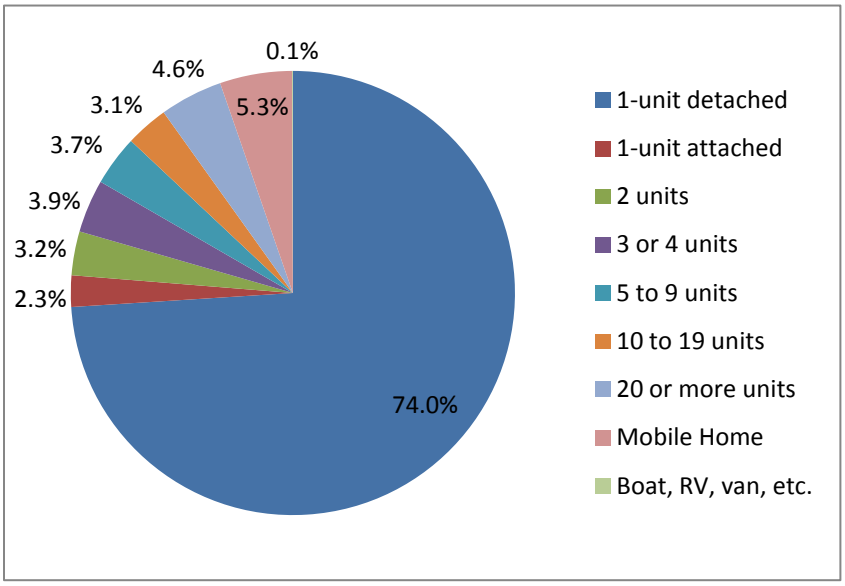
As shown in Figures 3.1.8, the type of housing in Marshall County is dominantly 1-unit detached homes (homes that do not share common walls) while mobile transportation like Boats, RVs, and Vans make up the smallest share of the county's housing.

Figure 3.1.8: Marshall County Housing by Type in 2000



Data Source: State Data Center of Iowa, 2011

Figure 3.1.9: Iowa Housing by Type in 2000



Data Source: State Data Center of Iowa, 2011

Marshall County has only a slightly larger share of 1-unit detached housing units than the State of Iowa. On the other hand, Marshall has 1% less multiple-unit housing structures than the state so Marshall County does not severely affordable multiple-unit housing options.

Often times, young adults who cannot yet afford a home or senior citizens who no longer want to care for a large home, live in multi-unit housing like apartments, condominiums or duplexes. Providing housing for young adults may not be such an issue since this segment of the population is relatively small, but this type of housing may be needed for the larger, increasing adult and senior population in Marshall County.

Age and Condition

According to the State Data Center of Iowa, in 2000, the median year built for Iowa's housing stock was 1959 while Marshall County had 1955 as the median year built. Overall, Marshall County has an older housing stock.

Another indication of an aged housing stock is the percentage of housing units built in 1939 or earlier. Some Marshall County cities have an extremely high percentage of these aged units. Over 61% of the homes in Rhodes and 59% of homes in Clemons were built before 1940. St Anthony also has a high percentage that accounts for over half of the city's housing stock. Le Grand has the smallest percentage (18.7%) of older homes. Refer to Table 3.1.6.

Table 3.1.6: Marshall County Housing Units Built in 1939

Jurisdiction	Percentage
Marshall County	36.3
Albion	31.4
Clemons	59.1
Ferguson	41.7
Gilman	35.7
Haverhill	30.8
Laurel	36.9
Le Grand	18.7
Liscomb	46.3
Marshalltown	35.4
Melbourne	34.7
Rhodes	61.9
St Anthony	56.6
State Center	32.1

Data Source: State Data Center of Iowa, 2011

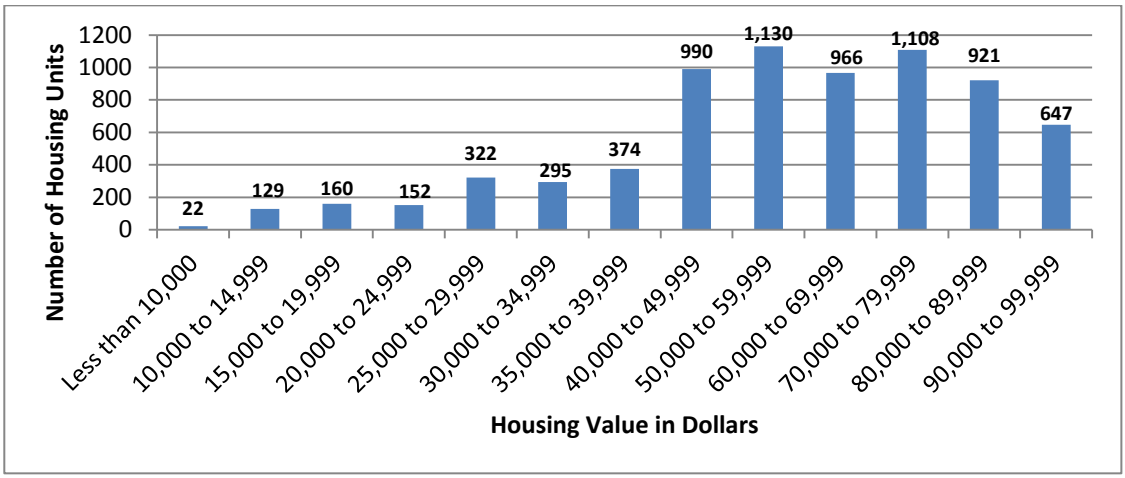
Since about 36% of all housing units in Marshall County have been built in 1939 or earlier, there is a possibility of some common issues associated with an older housing stock. Anything from electrical to structural issues could be a problem in homes across the county. In terms of hazard mitigation, some older housing may not be able to withstand natural hazards such as windstorms, tornados, or severe winter weather. Quality of construction and maintenance are a big factor in how much damage older housing will sustain during severe weather events.

The condition of housing throughout Marshall County varies tremendously. There is housing built recently in excellent condition but also older homes that are still in good condition considering their age. On the other end of the spectrum, there is abandoned or extremely dilapidated housing. The majority of the housing in Marshall County falls between these extremes. The housing in Marshall County is generally older but relatively well maintained.

Housing Values

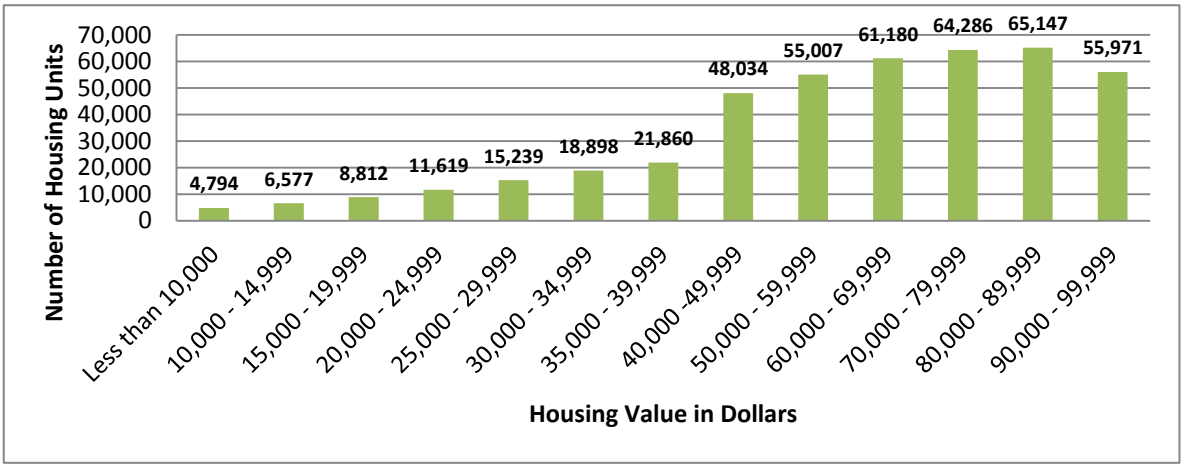
There is a trend in housing value of owner occupied units in Marshall County. Of the 7,216 owner occupied housing units under $100,000, 80% have a housing value over $40,000 as illustrated in Figure 3.1.10. The highest percent of housing units is the $50,000 - $59,999 range with 16% of the county's units.

Figure 3.1.10: Marshall County Owner-occupied Housing Values in 2000



Compared to the state level (Figure 3.1.11), Marshall County has rather low majority housing value range ($50,000 - $59,999) comprising their biggest percent of owner occupied units. The state's highest percentage category is the $80,000 - $89,999 range with 9.94%.

Figure 3.1.11: Iowa Owner-occupied Housing Values in 2000



Data Source for both charts: State Data Center of Iowa, 2011

Comparing Marshall County to Iowa, the state shows a progressive upward trend from the 'Less than $10,000' range to its peak at $80,000 - $89,999. Marshall County, on the other hand, has distinct low numbers in values up to $39,000 then a large majority of housing with values above $40,000. Keep in mind that though the 2010 Census data has been released, this specific analysis has not been calculated with the new housing data as the breakdown of information is not available.

When looking at the median value of owner-occupied housing in Marshall County, the value is not much lower than Iowa, which had a median value at $82,500, according to the State Data Center of Iowa. A comparison to the lowest housing value in the county, the City of St Anthony, shows Iowa's median housing value is almost $57,000 higher than the housing in this jurisdiction. Refer to Table 3.1.7.

Table 3.1.7: Median Owner-occupied Housing Values and Gross Rent for Renter-occupied Housing in 2000

Jurisdiction	Median Housing Value	Median Gross Rent
Marshall County	$71,200	$458
Albion	$52,000	$428
Clemons	$27,900	$356
Ferguson	$26,900	$406
Gilman	$55,500	$306
Haverhill	$70,000	$681
Laurel	$55,000	$329
Le Grand	$67,400	$360
Liscomb	$56,300	$394
Marshalltown	$68,800	$464
Melbourne	$68,400	$392
Rhodes	$55,000	$331
St Anthony	$25,600	$475
State Center	$75,200	$458

Data Source: State Data Center of Iowa, 2011

State Center, Haverhill, and Marshalltown (in this order) by far have the largest median housing values in Marshall County. The cities with the lowest housing values in Marshall County have a third of the value of the houses in State Center, Haverhill, and Marshalltown. This is a huge range of values across the county.

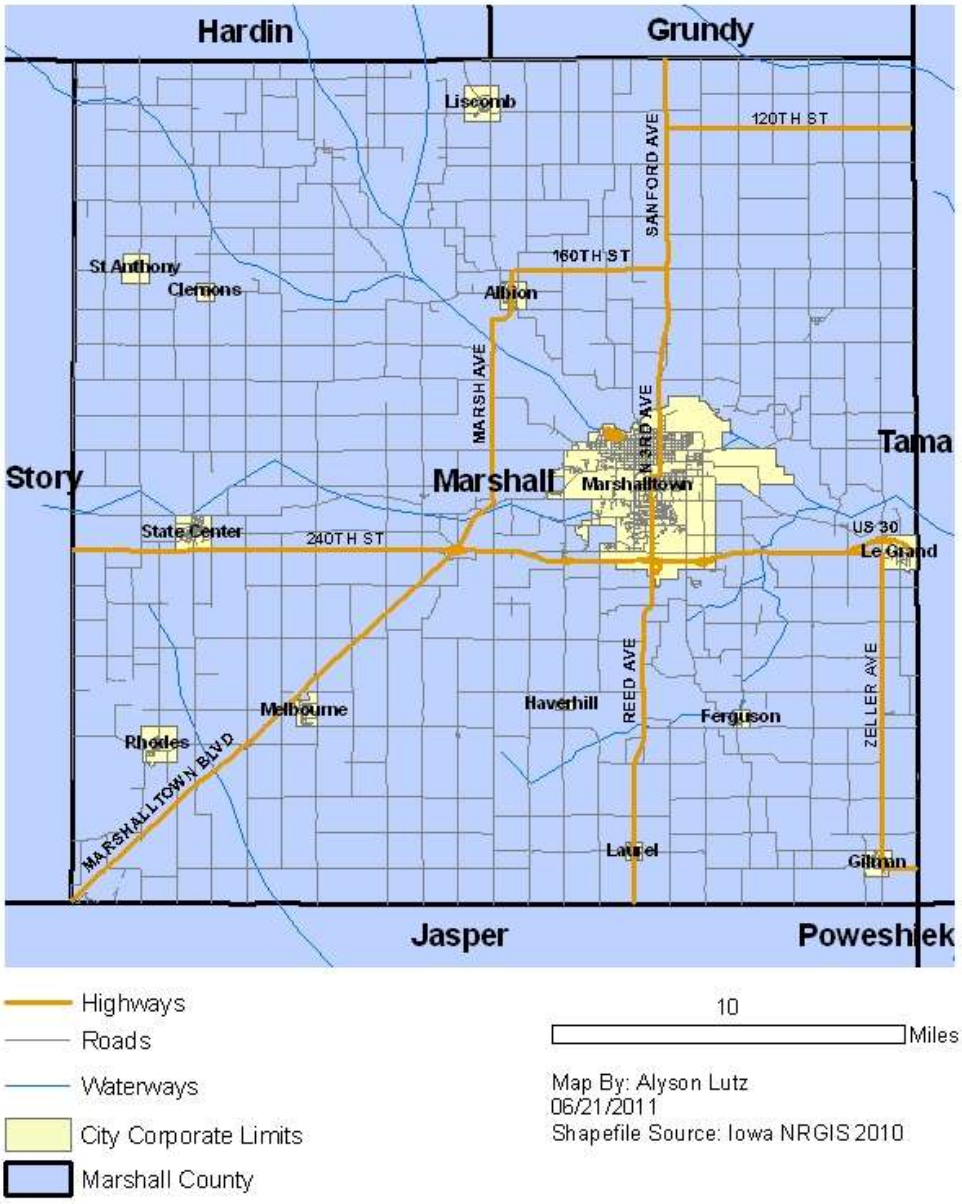
Looking at the median gross rent for tenants of rental properties in Marshall County, the lowest median rent can be found in Gilman ($306) while the highest rents can be found in Haverhill ($681) and St Anthony ($475). This is interesting considering; St Anthony has the lowest median housing value but one of the highest median gross rent in the county. Compared to the state, Marshall County's rental market is more expensive or about the same. Iowa's median gross rent in 2000 was $470 according to the State Data Center of Iowa. Across Marshall County, there is over a $375 range in the median gross rent paid by tenants so there is somewhat of a substantial variation in rental costs across the county.

Keep in mind that though the 2010 Census data has been released, this specific analysis has not been calculated with the new housing data as the breakdown of information is not available.

Transportation

The automobile is the main mode of transportation in Marshall County. U.S. Highway 30, which runs east and west, and U.S. Highway 330, which runs northeast and southwest, intersect halfway between Marshalltown and State Center. Iowa 146 runs north south and ends at Highway 30 making a route through Le Grand and Gilman. Iowa 14 runs north south through the entire county going through Marshalltown and Laurel. US Interstate 80 can be reached by all of these north-south routes. These routes are also connected to all parts of the county by paved or crushed rock roads.

Figure 3.1.12: Marshall County Highways and Roads



Several Marshall County cities are located along main Union Pacific Railroad lines. Scheduled airline transportation is available at Cedar Rapids, Des Moines, and Waterloo, all of which are within 60 to 70 miles of the county seat of Marshalltown. Marshalltown and Melbourne each have small municipal airports. Charter and Coach Bus transportation is available on Interstate 35, running through Story County, which neighbors Marshall County. Bus connections for east-west routes are available in Des Moines.

Peoplerides, a transit service operated by the Region 6 Planning Commission, serves all of Marshall and three other Region 6 member counties with both regular routes and scheduled trips. Motor freight lines serve trading centers in the county. There are eight trucking companies that operate in Marshall County.

The Marshalltown's city bus service, the Marshalltown Municipal Transit System, has 5 regular routes offering service Monday through Friday 8:00 a.m.-4:00 p.m to 4 quadrants of town, plus the work development center.

A regional trail plan was completed by Region 6 Planning for Hardin, Marshall, Tama, and Poweshiek Counties. This plan includes a major extension of the recreation trails in Marshalltown that will run from the northeast corner of Marshalltown to the southeast corner of Tama County. This trail extension is planned for after the year 2012.

Other transportation planning in the county includes the Passenger Transportation Plan, which is written and annually updated by the Region 6 Planning Commission. This plan covers the current public transportation services available in the region (Tama, Hardin, Marshall, and Poweshiek counties) along with the transportation needs that are not being fulfilled. The needs identified for the region include:

- Need affordable public transportation options
- Need transportation options for rural and long distance commuters
- Need attractive transportation options to reduce energy dependence
- Need transportation options for individuals who are no longer capable of driving safely
- Need affordable transportation options for evening and weekend services
- Need coordinated long distance education transportation options

These needs were identified through public meetings and a survey along with an analysis of current transportation services in relation to where grocery, medical clinics, and other essential services are located. Plans and potential projects for filling these needs are also addressed in the transportation plan.

Economic Conditions

Individual Economic Indicators

Some evidence of Marshall County's economic stability can be seen in its income, poverty status, crime rates and education. All of these factors can have a positive or negative effect on the county's economy, depending on where the statistics lie. The per capita income for Marshall County in 2009 was $23,000. This is $2,060 lower than the State's $25,060. In 2009, the Marshall County median income was again close in range to the state's median household income, with $45,190 versus $48,065, a $2,875 difference.

Poverty is an economic factor that has the potential to have a negative effect on people's perception of an area. According to the US Census Bureau, in 2009, 43.6 million people lived in poverty in the United States. This is a rate of 14.3%. The State Data Center of Iowa contributes that at the state level, Iowa has 342,309 people living in poverty out of its 3,046,355 residents. This is a rate of 11%. Marshall County makes up 1.2% of the state's population in poverty with 4,759 people. Marshall County has a population of 40,648. With 4,759 people living in poverty, this means that 12% of the county is in poverty.

Crime rates have an effect on an area's economic value because people want to live and work in a place they feel will be safe for their loved ones. Marshall County has relatively low violent crime with 1 forcible rape and 15 aggravated assaults in 2009. (Federal Bureau of Investigation, 2011) Property crimes including burglary, larceny theft, motor vehicle theft, and arson totaled 142 in 2009. Compared to the State of Iowa as a whole, Marshall accounts for .2% of violent crimes and .2% of property crimes. If each of Iowa's 99 counties had an equal share of crime, their percentage would each be 1.01%. This is not the case in Iowa because there are metropolitan and non-metropolitan counties in which urban centers may experience a great amount of crime while rural areas will experience significantly less and perhaps none at all.

Educational attainment in Marshall County can be found in the two private Catholic school buildings serving kindergarten through 6th grade, four community school districts as well as the Iowa Valley Community College and Marshalltown Community College. The 3 state universities are all located two hours or less from Marshalltown, the county seat of Marshall County. A total of 7,333 children were enrolled in the East Marshall, GMG, Marshalltown, and West Marshall Community School Districts in the 2010-2011 school year. (Iowa Department of Education, 2011) Of the Marshall County population that is 25 years or older, 37.2% have a high school degree or its equivalent. From this group, 17% received a bachelor's degree or higher education.

Economy

According to the Marshall Economic Development Impact Committee (MEDIC), of the largest employers in the county, there is one major government employer, the Marshalltown Community School District, and nine major non-government employers. Refer to Table 3.1.8 for all major employers in the county.

Table 3.1.8: Major Employers in Marshall County

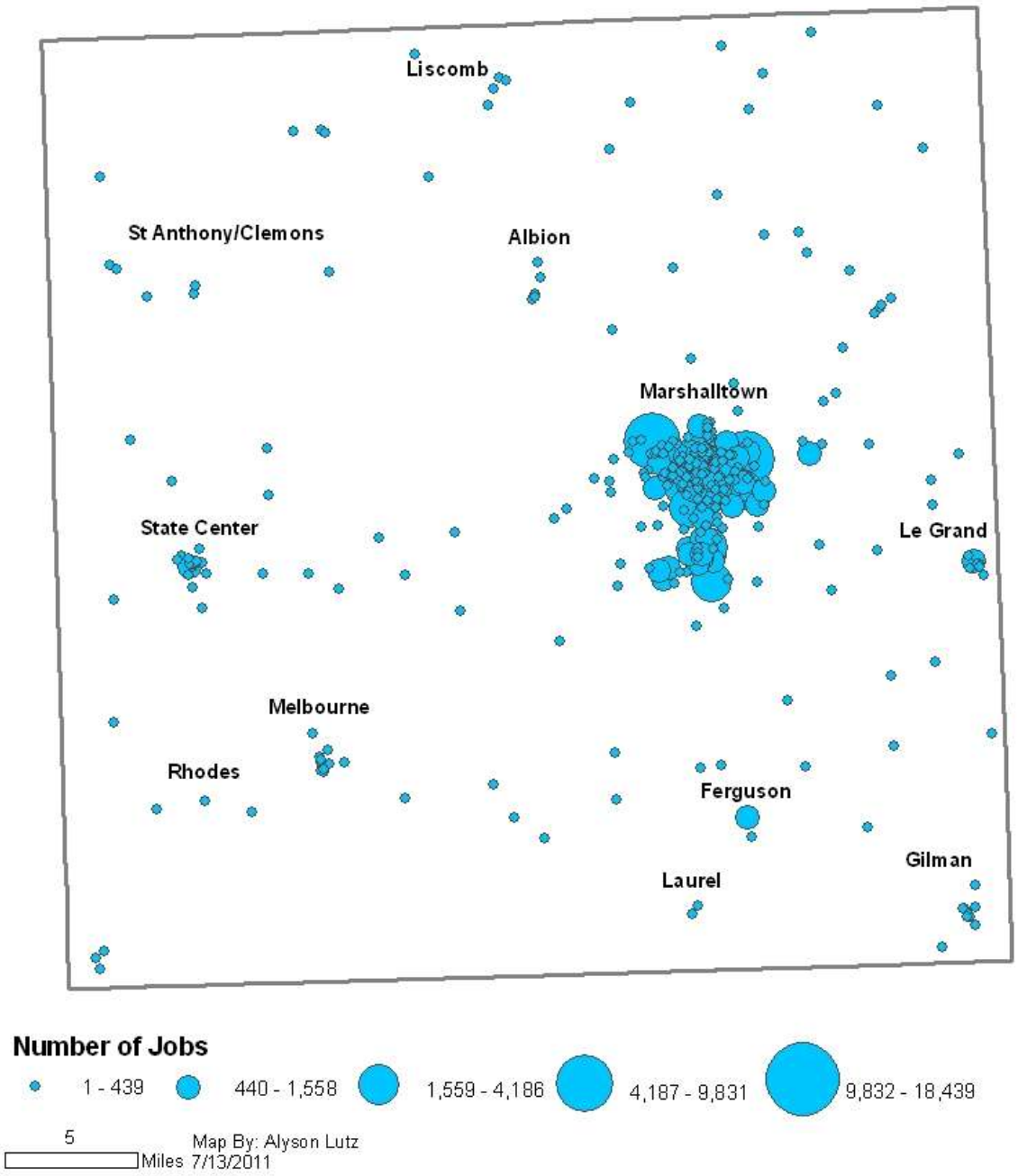
Major Government Employers	Employees
Marshalltown Community School District	1,002
Major Employers	
JBS Swift Location	2,300
Emerson Process Management Fisher Division	1,200
Iowa Veterans Home	1,000
Lennox Manufacturing, Inc	800
Marshalltown Medical & Surgical Center	715
Hy-Vee	340
Wal-Mart	325
Marshalltown Community College	245
McFarland Clinic P.C.	223

Data Source: Mid Iowa Growth Partnership, 2011

In Marshall County, non-governmental organizations provide the most jobs. Refer to Figure 3.1.13 on the next page for a visual distribution of jobs in Marshall County.

It should be mentioned that employment in Marshall County is not limited to just county residents. A recent labor shed study (2008) by MEDIC, found that Marshall County attracts employees from outside the county as far north as Allison, as far south as Pella, as far east as La Porte and Belle Plain, and as far west as Madrid. The study also found that those who are willing to change employment in the Marshall County labor shed area are willing to commute an average of 26 miles one way for employment. So the number of employees for the county's major employers may not include just Marshall County residents but also people from the neighboring counties.

Figure 3.1.13: Job Distribution in Marshall County in 2009



Data Source: U.S. Census Bureau, On the Map tool, 2009

The job distribution map confirms that the larger cities in Marshall County are also the major employment centers of the county. Marshalltown and State Center are the cities with the highest concentrations of employment, with Le Grand and Ferguson not far behind.

Economic Development

Marshall County is fortunate to have an organization devoted strictly to the county's economic development success, the Marshall Economic Development Impact Committee (MEDIC). They provide community information, such as demographics & economic statistics, major employers, labor market information, and transportation information. They also provide listings of available properties and sites for building and businesses. Information for job seekers and employers reaches out to the personal portion of the economy, while Small Business Development Assistance is available to help small business owners get up and running.

Another economic development effort in Marshall County is spearheaded by the Region 6 Planning Commission. The Comprehensive Economic Development Strategy (CEDS Plan), which includes Tama, Hardin, Marshall, and Poweshiek counties, is written and maintained by Region 6 along with several programs for assisting economic development in the county. The CEDS cites ten major economic goals:

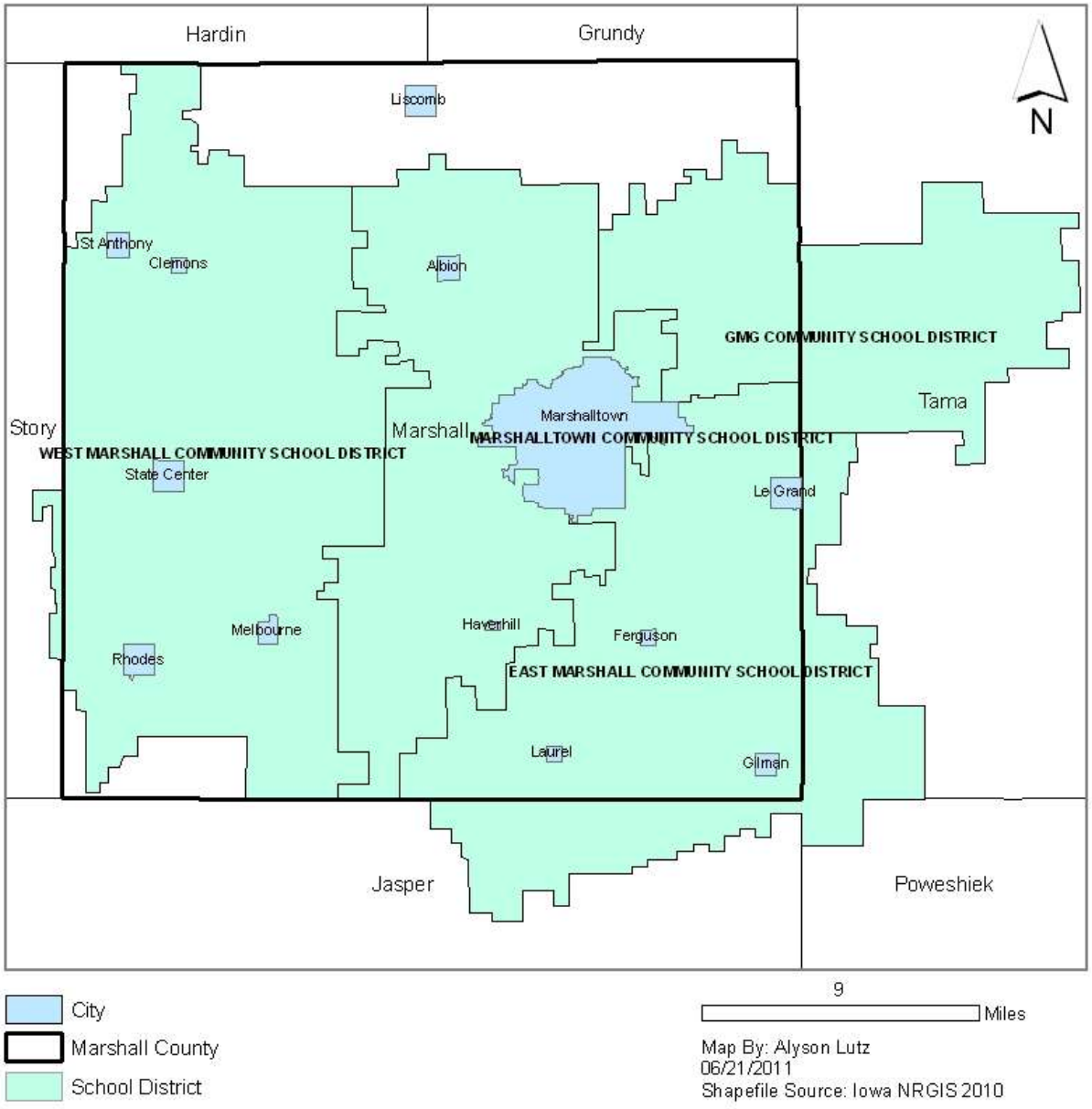
1. Preservation and restoration of natural environment
2. Create healthy, active lifestyles supported by "walkable" communities
3. Develop attractive, safe, and efficient "world class" multi-modal regional transportation system (i.e. highway, rail, pedestrian, and recreation)
4. Reduce blight and improve the appearance of communities
5. Support local food systems
6. Develop fun, vibrant, and welcoming communities
7. Assist cities and counties with "smart growth" plans, policies, and trainings
8. Promote an energy efficient region
9. Develop regional renewable clean energy sources
10. Support existing businesses, develop new businesses, and attract businesses from the outside area

Many of these goals can be tied to hazard mitigation like preservation and restoration of the natural environment, reducing blight, and supporting existing and new businesses.

Educational Opportunities

There are four public school districts in Marshall County: East Marshall, Green Mountain-Garwin, Marshalltown, and West Marshall Community School District. Refer to Figure 3.1.14.

Figure 3.1.14: Marshall County School Districts



Along with general education, college level and continuing education courses can be taken through Marshalltown Community College and Iowa Valley Community College. Online classes are also available from any college or university. Iowa's major universities are all less than 2 hours from Marshall County.

Cultural Resources

Outdoor Recreation

Many parks have been established throughout the county. Rivers and creeks in rural areas of the county provide opportunities for outdoor recreational activities, such as hunting, fishing, and primitive camping.

The Marshall County Conservation Board (MCCB) states on its website, "Programs administered and services provided by the MCCB are related to natural resource management. Most of the public lands in the county are managed for wildlife, compatible recreation, and conservation education. The MCCB has more than 2,000 acres of land on 27 locations for camping, picnicking, fishing, canoeing, hiking, bicycle trails, forest areas, or native prairie. Some areas are designated wildlife refuge and others are open for public hunting." (Marshall County Conservation Board, 2011)

Besides recreational opportunities, there are also educational opportunities. The MCCB naturalist conducts environmental education programs for school groups and the general public. In 2008 contact was made with nearly 6,000 people at 210 programs. The MCCB also publishes Seasons, a quarterly newsletter, as well as brochures about specific conservation areas.

For more information, visit their webpage at:
http://www.co.marshall.ia.us/departments/conservation/.

The County's recreation areas and basic information are listed on the next page in Table 3.1.9.

Table 3.1.9: Outdoor Recreation Areas in Marshall County

Marshall County Conservation Board
2349 - 233rd Street
Marshalltown, IA 50158
(641) 752-5490
Email: mccb@co.marshall.ia.us

	ACRES	Picnic Area	Picnic Shelter	Electricity	Drinking Water	Restrooms	Handicapped Access	Tent Camping	Trailer Camping	Forest Area	Interpretive Trail	Hiking Trail	Bicycling	Trail Riding	Prairie Area	Boat Ramp	Canoeing	Fishing	Hunting	Under Natural Area	Wildlife Exhibits	Observatory	Sledding/Tobogganing	Ice Fishing	X-C Skiing	Snowmobiling	Ice Skating	Conservation Ctr	Wildlife Observation
❑ IOWA RIVER GREENBELT AREAS:																													
ARNEY BEND WILDLIFE AREA	203								•		•			•		•	•	•	•						•				•
FOREST RESERVE	85					•		•	•						•	•	•	•	•										•
GRAMMER GROVE WILDLIFE AREA	121	•	•	•	•	•		•	•	•	•		•	•		•	•		•						•				•
JESSE F. FURROW, Sr. ACCESS AREA	6								•						•	•	•												•
IOWA RIVER WILDLIFE MNGMT. AREA	485								•					•					•	•										•
MAG HOLLAND ACCESS AREA	80								•							•	•	•	•	•										•
THREE BRIDGES PARK	13	•				•			•	•	•				•	•	•		•						•				•
SANDLAKE	95					•	•		•						•	•	•						•						•
MARETTA SAND PRAIRIE PRESERVE	229								•	•				•					•	•										•
TIMMONS GROVE NORTH									•		•						•		•	•										•
TIMMONS GROVE SOUTH	199	•	•	•	•	•		•	•	•		•				•	•	•		•					•	•				•
❑ OTHER CONSERVATION/REC. AREAS																														
BANGOR SQUARE PARK	1	•	•			•																								
BEAR GROVE FOREST AREA	23								•										•	•										•
C.D. COPPOCK PARK	10								•											•					•					•
DILLON PARK	1	•	•			•																								
FRENCH GROVE WILDLIFE AREA	28	•				•		•		•		•								•										•
GREEN CASTLE RECREATION AREA	116	•	•	•	•	•	•			•		•				•						•	•	•	•	•	•		•	•
GREEN CENTURY FARM WILDLIFE AREA	35								•											•										•
GRIMES FARM	160	•	•	•	•	•	•		•		•	•		•											•			•		•
HEART OF IOWA NATURE TRAIL	45	•	•			•			•		•	•	•							•					•	•				•
LOG CABIN HISTORICAL SITE	0.5	•							•																					
RHODES TIMBER WILDLIFE AREA	60								•											•										•
VAN CLEVE PARK	4	•	•			•								•																
WEHRMAN PRAIRIE	8													•						•										
WICKERSHAM FOREST AREAS	17								•											•										•
HENDRICKSON MARSH (IA DNR)	601													•	•	•	•		•	•										•
STEWART BIRD SANCTUARY	22								•											•										•
HWY 330 TRAIL (AM, DISC. TRAIL)											•	•																		
HOLLINGSWORTH TIMBER	6								•					•						•										•

Source: Marshall County Conservation Board, 2011

All of these outdoor recreation areas are considered in this plan regardless of what institution maintains the area, because they are located within the boundaries of Marshall County and emergency response from the County may be needed should a disaster occur. The two major issues in outdoor recreation areas is the park's ability to provide shelter during hazard events and how to prevent damage to property within the park and also the park's natural assets.

The most important issue in outdoor recreation areas throughout Marshall County is shelter for park visitors during hazard events like windstorms, hail, and tornadoes. In most parks, the only refuges provided are open picnic shelters or none at all. This is not sufficient during severe weather. Shelters engineered for high winds and flying debris need to be included in park facilities to ensure the safety of park visitors.

A regional trail plan was completed by Region 6 Planning for Poweshiek, Hardin, Tama, and Marshall Counties. This plan includes a major extension of the recreation trails that will run from the northwest portion of Marshall County to the southeast corner of Tama County. This trail extension is planned for after the year 2012.

A featured park in Marshall County is the Grimes Farm and Conservation Center, a 160+ acre parcel of land, donated by Leonard and Mildred Grimes in 1991, to the Marshall County Conservation Board and the Iowa Natural Heritage Foundation.

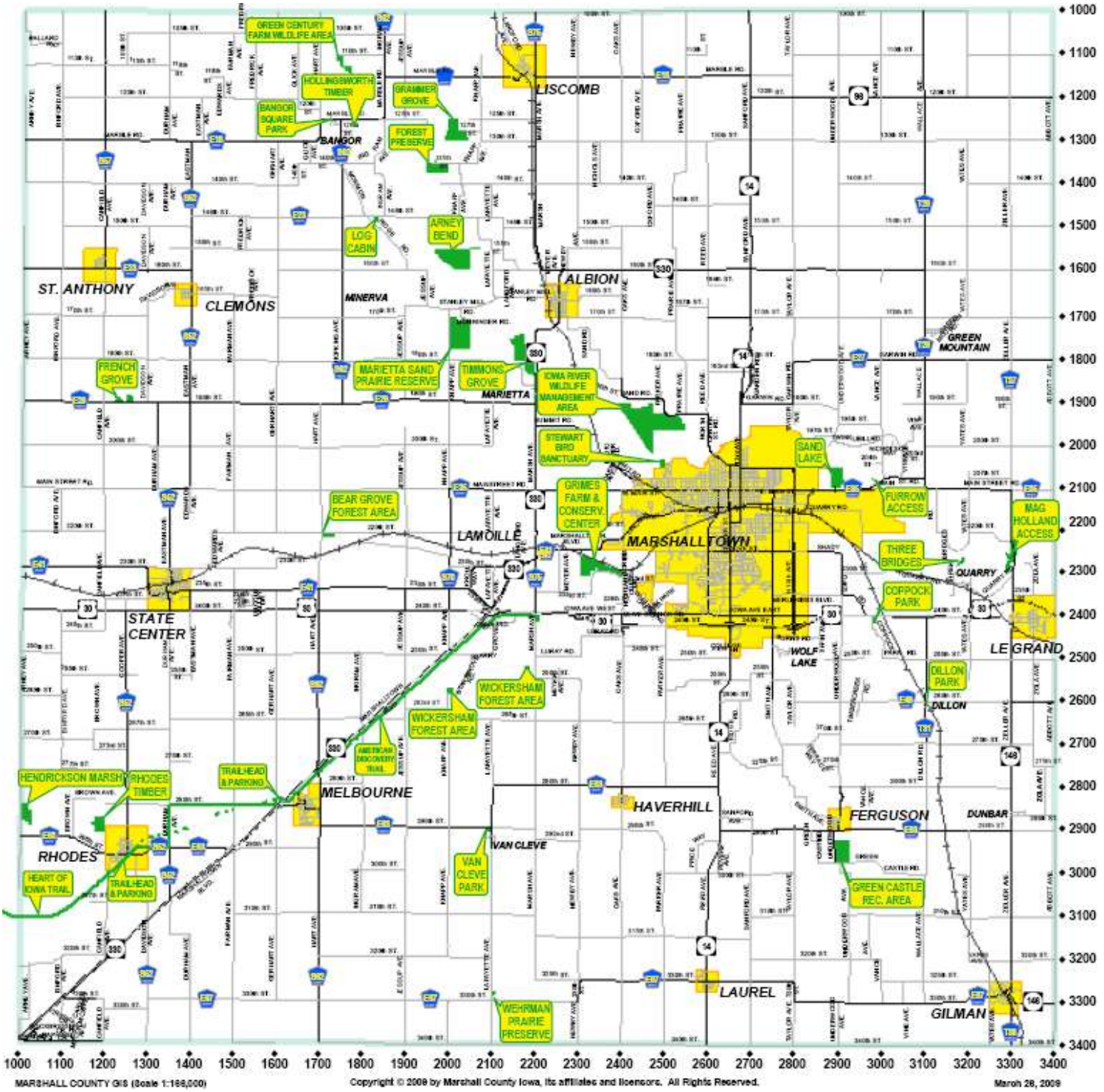
According to the Friends of Grimes Farm website, in 1964, "Leonard and Mildred Grimes purchased the farm from Jon Batesole and began to restore the land using conservation practices and sustainable farming. — More than 350 sixth grade students from Marshalltown began visiting the Grimes Farm annually as part of their conservation unit, a field trip that has continued every year since then."

There is some opportunity for recreation in the form of the bicycle path which connects Grimes Farm to the Linn Creek recreation areas in Marshalltown. It makes up parts of both the Linn Creek Greenbelt Parkway and the American Discovery Trail. Annually, in the summer, there is a Grimes Farm 5K run. Another special feature of this nature area is Mildred's Tower, named after Mildred Grimes. It was donated in the fall of 2009, as an observation/lookout tower on the highest hilltop on Grimes Farm and on one of the highest hilltops in Marshall County. The tower offers a view of the Linn Creek Valley and of the rolling farms and hillsides for miles around. The Conservation center has exhibits, displays and a classroom. For more information visit http://www.grimesfarm.com/.

Mildred's Tower (Left), Grimes Farm 5K Run (Right), Photos by Friends of Grimes Farm

Below, in Figure 3.1.15 is the Marshall County Conservation Map which highlights in green the conservation areas of the county.

Figure 3.1.15: Outdoor Recreation Areas in Marshall County



Source: Marshall County Conservation Board, 2011

Historic Sites

Besides outdoor recreation, Marshall County Iowa has many more cultural offerings in the form of historic sites. A few sites in the Marshall County jurisdiction have been listed on the National Register of Historic Places website at http://www.nationalregisterofhistoricplaces.com/. These include:

- Binford, Thaddeus, House, aka City Federation of Women's Club in Marshalltown, added 1984. This was a significant architecture/engineering structure in Italianate style from 1875-1899, and 1850-1874, functioning as a single domestic dwelling and continuing its life as a social and civic structure today.

- Dobbin Round Barn in State Center added 1986. This was a significant architecture/engineering building for a historic event between 1900 and 1924, functioning as an animal facility and continuing today in an agriculture/subsistence use.

- Edel, Matthew, Blacksmith Shop and House in Haverhill, added 1983. This was a significant industrial building between 1875 and 1899, functioning as a commerce/trade store as well as a dwelling. It is vacant at present day.

- Glick-Sower House, aka Sower, Susie, Historical House in Marshalltown, added 1987. This engineering /gothic revival architecturally noteworthy structure was significant between 1850 and 1874, and 1875 - 1899, functioning as a domestic single dwelling. It is currently being restored.

- Le Grand Bridge, in Le Grand, over backwater of the Iowa River, added 1998. This bridge was a significant engineering structure from 1990-1924. Though it was used for road-related transportation, it is impassable today.

- Marshall County Courthouse in Marshalltown, added 1972. This Classical Revival style building was significant in the period of 1875-1899 for its architecture and use as a government courthouse which it continues to function as today.

- Marshalltown Downtown Historic District in Marshalltown, added 2002. This Italianate, Romanesque style downtown was significant in the areas of Architecture, Commerce, Politics/Government, and Transportation, in the time periods of 1950-1974, 1925-1949, 1900-1924, 1875-1899, and 1850-1874. This downtown continues those and many more uses today.

- Minerva Creek Bridge over Minerva Creek in Clemons, added 1998. This Stark, N.M., and Company build was significant from 1900 to 1924 as a road related transportation bridge; it is still used as such today.

- Quarry Bridge, over the Iowa River in Marshalltown, added 1998. This steel and iron bridge was significant in the period of 1875-1899 as a road-related transportation bridge, which it continues to function as today.

- State Center Commercial Historic District in State Center, added 2002. This Late 19th & 20th Century Revivals/Prairie School style downtown was significant in the areas of Architecture, Community Planning and Development, and Commerce, in the time periods of 1925-1949, 1900-1924, 1875-1899, and 1850-1874. This district continues those and many more uses today.
- Sunday, Robert H., House, aka Cassidy House, in Marshalltown added 1988. This house, designed by Frank Lloyd Wright, was significant between 1950 and 1974 functioning as a private residence which it continues to function as today.
- Watson's Grocery in State Center, added 1998. This architecturally significant building was important in the time periods of 1925-1949, 1900-1924, and 1875-1899 as a commerce and trade specialty store. Presently, it is a recreation and cultural museum.
- Whitehead, C. H., House in Marshalltown, added 1979. This architecturally significant building was important from 1900-1924 as a private residence which it continues to function as today.
- Willard, Leroy R., House in Marshalltown, added 1976. This Bungalow/Craftsman style building was significant between 1900 and 1924 as a private dwelling which is being worked on presently.

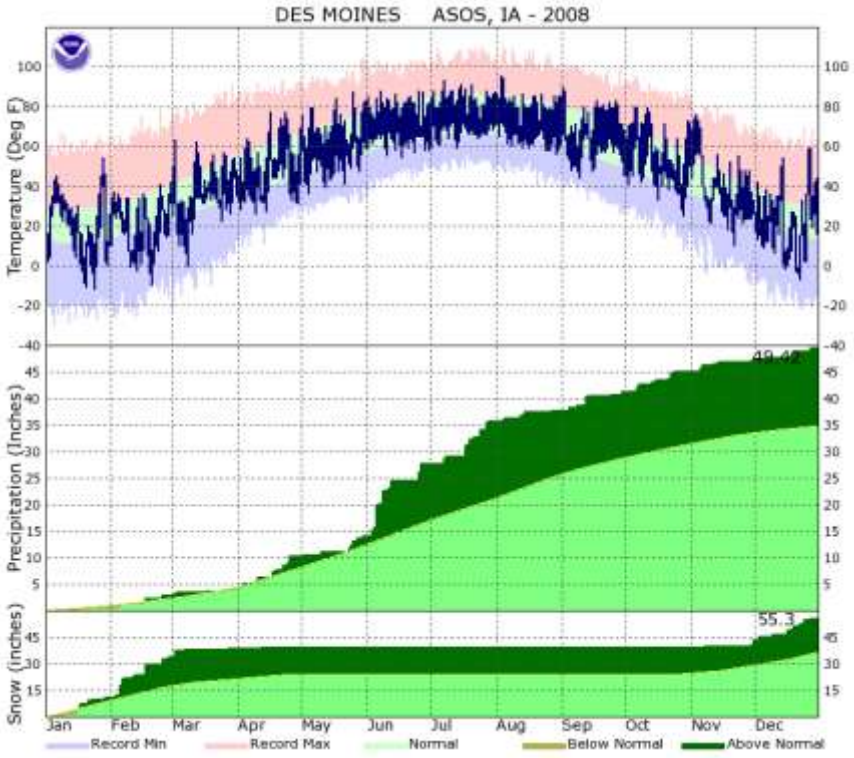
Climate

Marshall County is cold in winter, with an average temp of 22 degrees and average lows of 13 degrees. It is moderately hot with occasional cool spells in summer, with an average 72 degrees and average highs of 83 degrees. Precipitation during the winter frequently occurs in snowstorms. During the warm months, it is chiefly showers, which often are heavy, and occur when warm, moist air moves in from the south. About 70% of the annual total of 34 inches, occur from April to September, which includes the growing season for most crops.

The chart in Figure 3.1.16 graphically depicts monthly and yearly observed maximum, minimum, and precipitation recorded by the automated surface observing station (ASOS) located at the Des Moines International Airport. Additionally, it also depicts normal and record temperature only.

In 2008, the highest temperatures for the area occurred in July and August. No new record temperatures were recorded for this year. The most precipitation and largest amount of snow was received in December, and these levels exceeded what is normal for this time of year. Snow reached a level of 55.3 inches, and overall precipitation reached almost 50 inches.

Figure 3.1.16: Des Moines International Airport ASOS in 2008



Data Source: National Oceanic and Atmospheric Association, 2008

Marshall County frequently experiences severe weather events throughout all the seasons. In the winter, the county experiences severe winter storms while weather events like severe thunderstorms, hail, and lightning affect the county in the spring. In the summer season, tornados and extremely high temperatures prove to be dangerous while more storms and early snow can affect the county in the fall.

Agriculture

The National Agricultural Statistics Service as a part of the United States Department of Agriculture conducts "The Census of Agriculture" every five years. This survey covers practically every aspect of U.S. agriculture. Some examples include: production and supplies of food and fiber, prices paid and received by farmers, farm labor and wages, farm finances, chemical use, and changes in the demographics of U.S. producers.

In 2007, the Census of Agriculture counted 2,204,792 farms in the United States. Marshall County had 928 farms which lie on 324,270 acres of land; this accounts for 88 percent of the surface land in the county and is one percent of the 92,856 farms in the State of Iowa. Farms on average are larger in Marshall County, at 349 acres, than the statewide average of 311 acres. For the most part, hogs and pigs are the largest number of any animal sold on Marshall County farms with 279,835 hogs and pigs across 35 farms. On the crop side, corn for grain is the biggest seller with 29,061,113 bushels coming off of 161,542 acres from 537 farms. Average sales per farm of agricultural products in Marshall County were $204,537 in 2007.

According ISU Extension, the total ag contribution to the Marshall County economy is 4,196 jobs, representing 17.6% of Marshall County's total economic activity workforce of 23,858. These ag-related jobs are in the fields of crop and livestock production, ag processing, and ag support.

3.2 Jurisdiction Descriptions and Capabilities

Unincorporated Marshall County

Government

The county seat for Marshall County is the City of Marshalltown, which is located in the east central portion of the county. The Marshall County Board of Supervisors has three positions; there is a chairman, vice chairman, and a member, all of whom serve the county at large. The county is not divided up into specific districts based on location. Regular Board of Supervisors meetings are held every other Tuesday morning in the Marshall County Courthouse.

The county government comprises several individual positions, departments, and organizations. These include both elected and appointed positions: 911 Communications Center, Assessor, Attorney, Auditor, Board of Supervisors, Community Services, Conservation Board, Courts, Emergency Management, Engineer, Geographic Information Services, Information Services, Planning & Zoning, Public Environmental Health, Public Health & MMSC Home Care Plus, Recorder, Sheriff, Treasurer, Veteran's Affairs, Marshall County Coalition for Youth, and CFY Development. The Marshall County website— http://www.co.marshall.ia.us/ —lists the current individuals filling positions as well as important notifications, events, and meeting minutes.

Marshall County Courthouse in Marshalltown

Image Source: Marshall County Courthouse, 2010

Land Use and Planning

A comprehensive land use plan was written and adopted by the Planning and Zoning Commission and Board of Adjustments of Marshall County in 1995 and later updated in 2004. The plan shall be reviewed every ten years so the next update will come in 2013. The Comprehensive Plan for Marshall County contains objectives for the following areas: Residential Infill, Residential Expansion, Residential Reserve, Commercial Infill, Commercial Expansion, Commercial Reserve, Industrial Infill, Industrial Expansion, Industrial Reserve, Critical Resource, Critical Resource Area Overlay, Agricultural/Residential, Agriculture, and Temporary Transportation Reserve Areas. Its policy basis centers around the following initiatives: Preserve Agricultural Lands for Agricultural Production; Preserve and Provide for Recreational Areas, Forests, Wetlands, Streams, Lakes and Aquifers; Provide for Housing, Commercial, Industrial, Transportation and Recreation Needs; Promote the Efficient Use and Conservation of Energy Resources; and Promote the Creation and Maintenance of Wildlife Habitats. The Statement of Intent says, "The Marshall County Development Plan serves as a basis for managing growth and development in the unincorporated area of Marshall County." (Marshall County Planning and Zoning, 2004) Much of the general planning work is contracted out to the Region 6 Planning Commission or other organizations.

Zoning

Iowa Code, 335.2 states that agricultural uses are not subject to zoning unless located in the floodplain. Consequently, state agricultural interests are protected but special considerations must be taken if the agricultural use is located in the floodplain. Special requirements may need to be enforced in order to prevent crop and livestock loss, erosion, increased chemical run-off, or other events that may result due to being located in the floodplain.

Flood prone areas in the unincorporated portions of the county may present an issue. Areas not identified as a floodplain but are prone to flooding events are not subject to zoning so little control can be exercised in regulating the use of this land.

It is also important to note that county zoning *only* applies to the unincorporated areas in the county. The zoning ordinance enforced by the county does not apply to incorporated cities so the jurisdictions included in this plan are not subject to county zoning. This is stated in Iowa Code 335.3. Marshall County's last update to their zoning ordinance was dated January 1, 1997.

Furthermore, Iowa Code Chapter 335 states that the objective of zoning regulation should encompass not just protecting the health and general welfare of the public, but also "securing safety from fire, flood, panic, and other dangers" (Iowa Code 335.5). This section of the Iowa Code is important, because it requires the county to take hazards both natural and man-made into consideration when creating and enforcing zoning regulations.

To review Iowa Code Chapter 335 and all other chapters, the Code can be accessed online at http://www.legis.state.ia.us/IowaLaw.html.

Marshall County has an Official Zoning Map for the county available in the Recorder's office. There are ten zoning districts in the ordinance. To view these, go to the county planning and zoning page, http://www.co.marshall.ia.us/departments/zoning.

Subdivision Regulation

Another land use regulation tool in Marshall County is the Platting Subdivision Ordinance, last updated in 2004, and effective, January 1, 2005. This ordinance provides rules, regulations, and standards to guide land subdivision in the County's unincorporated areas. The only considerations for hazard mitigation in this ordinance relate to information and form requirements for subdivision plats. The following statement can be found in Marshall County's subdivision ordinance:

> The showing of the approximate boundaries of areas of known flood levels or storm water overflow, areas covered by water, wetlands, and wooded areas. The showing of the boundaries of flood plain, flood hazard area or floodway lines for areas that have been included in any official floodplain reports from the Iowa Department of Natural Resources, or the National Flood Insurance Program of the Federal Emergency Management Agency. (Marshall County Planning and Zoning, 2004)

Building Codes

Currently the county does not enforce any county specific building codes. Only the standard State of Iowa buildings codes are enforced. The State's building code can be found on the Iowa Department of Public Safety website (http://www.dps.state.ia.us/). Certain jurisdictions do have their own building codes, while other communities choose not to enforce building codes. These will be discussed in each jurisdiction's section to follow.

With the relatively recent (March 1, 2009) state requirement of electrical permits, there will be more oversight in building quality in Marshall County. A permit is required in unincorporated areas for new electrical installations in residential, commercial, and industrial properties. This requirement is a major step in enforcing and maintaining building quality in Marshall County.

Floodplain Management

There are several floodplains in Marshall County. Of the 14 municipal jurisdictions in the planning boundary, 7 are completely mapped and 7 are not mapped, including Gilman, Haverhill, Laurel, Liscomb, Melbourne, Rhodes, and St Anthony. The portions of jurisdictions located in a flood hazard area are substantial compared to the size of each jurisdiction.

Four out of the fourteen municipal Region 6 member jurisdictions, including Albion, Clemons, Marshalltown, and Marshall County, are participating in NFIP. Amongst them, there are 38 policies with a total of $7,662,200 worth of insurance in force, as of 05/31/2009. There have been 6 total paid losses worth $31,110.85, total.

Other Mitigation Activities

Other hazard mitigation activities could include the CodeRED system, which is a high-speed emergency notification system that sends warning messages to certain areas in the county or the

entire county through telephone. Officials are able to deliver hazard warnings or public safety messages. County residents can choose to participate in this system by registering their land line or cell phone through a web link. Marshall County chooses not to participate in the CodeRED system because it is too expensive to maintain.

Utilities and Services in Unincorporated Marshall County

All essential and basic services are available to those who live in unincorporated Marshall County. A wide variety of public but mostly private organizations provide these services. Below, all of the services and providers are listed.

- **Electricity:** Alliant Energy, Consumer's Energy, and City of State Center
- **Natural Gas:** Alliant Energy, individual LP's
- **Water:** Marshall County Rural Water, Albion Water, Gilman Water, Liscomb Water, Marshalltown Water, Melbourne Water, Rhodes Water, St Anthony Water, State Center Water, and Central Iowa Water Association
- **Phone Service:** Windstream/Mediacom, Heart of Iowa, Minerva Valley, and Partner Communications
- **Cable/Internet Provider:** Windstream/Mediacom, Heart of Iowa, Minerva Valley, and Partner Communications
- **Emergency Medical Service:** Depending on where the medical emergency occurs, a predetermined emergency medical response department will respond to the emergency. Local First Responders, and MAPS (Marshalltown Area Paramedic Service)
- **Law Enforcement:** Marshall County Sheriff's Office, Marshalltown/Rhodes(covers Melbourne as well)/State Center Police
- **Fire Protection:** Albion Fire Department, Clemons Fire Department (covers St Anthony), Ferguson Fire Department, Gilman Fire Department, Haverhill Fire Department, Laurel Fire Department, Le Grand Fire Department, Liscomb Fire Department, Marshalltown Fire Department, Melbourne Fire Department, Rhodes Fire Department, and State Center Fire Department
- **Hazardous Materials Assistance:** Des Moines Fire Department
- **Fuel:** Casey's in Albion, Tom's Tire in Gilman, Good Luck, Inc and Cissy's III in Le Grand, Mid Iowa Coop in Marshalltown and Conrad serving Liscomb, Hy-Vee/3 Kum & Go's/ T P Plaza/ Casey's/BP/County Shop Coop in Marshalltown, Randawha's Travel Center in Melbourne, and FS Fuel/Casey's/Cissy's in State Center
- **Grocery Store:** Casey's in Albion, Good Luck, Inc and Cissy's III in Le Grand, Hy-Vee and Fareway in Marshalltown, Randawha's Travel Center in Melbourne, and Hoemtown Foods/ Casey's/Cissy's in State Center
- **Solid Waste Removal:** City of Le Grand, City of Marshalltown, City of Rhodes, Stone Sanitation, Moler Sanitation, Ferch Sanitation, and Al's ENT
- **Landfill:** Marshall County Landfill
- **Recycling:** Stone Sanitation, Moler Sanitation, Ferch Sanitation, Al's ENT, and private contracts
- **Public Transit:** Peoplerides, Taxi/Marshalltown Municipal Transit (bus) in Marshalltown

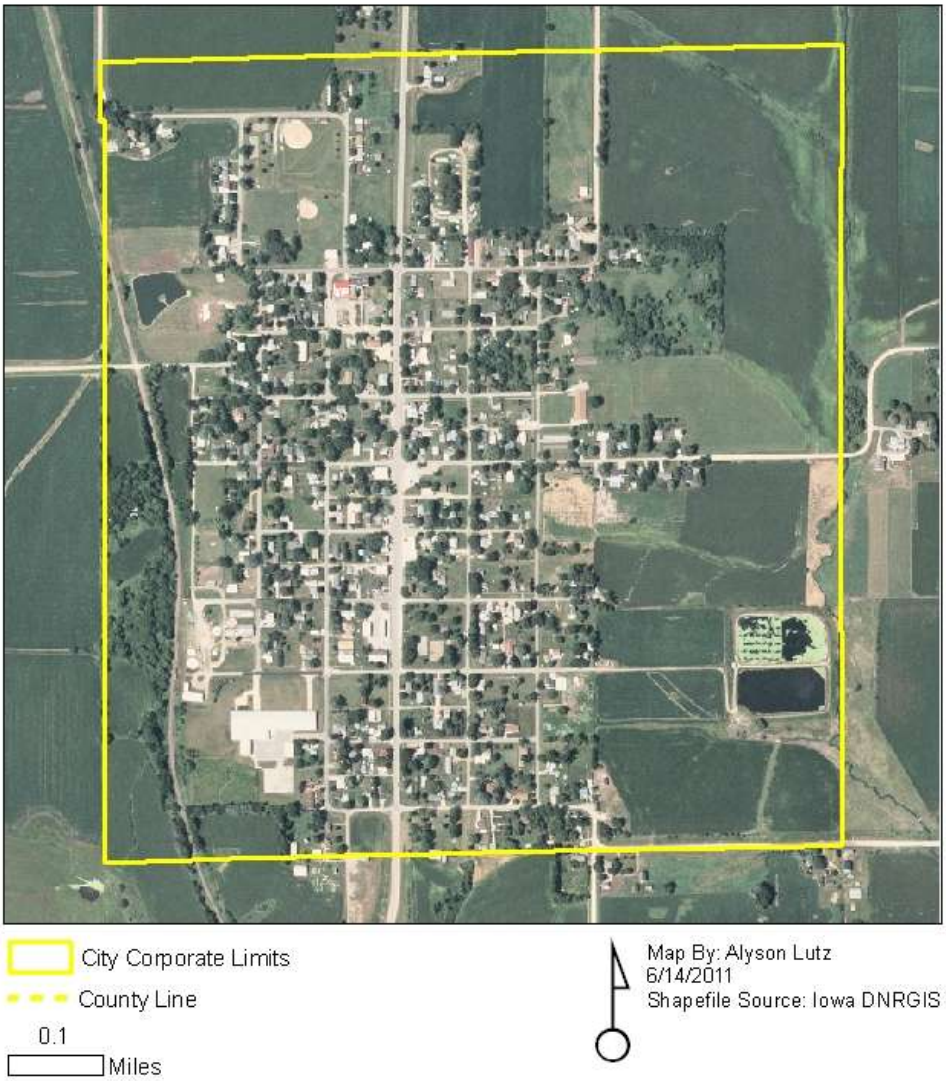
As indicated in the service list above, some services are provided to unincorporated areas by nearby cities. This is true for mainly fire protection and emergency medical services.

City of Albion

Overview

Albion is located in the north central portion of Marshall County. The town is in the crux of IA 330 as it curves north east/southwest. Iowa Highway 14 runs north/south east of town. Albion is 7 miles north of U.S. Highway 30.

Figure 3.2.1: Albion, Iowa



Some history of Albion was provided by City Clerk, Karen Betts;

Albion is the oldest community in Marshall County, platted in 1852. The city was originally called Lafayette, but the name changed to Albion in 1858 because there was already a 'Lafayette' in Iowa at the time.

In 1855 the Iowa Central Newspaper was printed in Albion and it was the first newspaper in Marshall County. It was also the only newspaper published in a 100 mile radius.

Albion was the home to the first institution of higher learning in the county - Iowa Luther College – which later became the Albion Seminary.

The first County fair billed as an 'Agricultural Exhibition' was held in Albion in 1857 and again in 1859.

Albion businesses in 1878 included; a cement brick factory - two buildings still stand that were built using bricks from the factory, a stage coach stop- stories have been passed down for generations that this building and the building across the street had a tunnel between them which moved individuals in the underground railroad, a boot & shoe shop, 2 wagon shops, and 2 barb wire fence shops.

There are also a number of residents in this time period who hold patents mostly for wire, posts, etc.

Utilities and Services

All basic services are available in the City of Albion except a medical clinic. The city provides water, emergency medical service, fire, and a library so all other services are provided by either the County or private companies.

Table 3.2.1: Albion Utilities and Services

Service	Provider
Electricity	Alliant Energy
Gas	Alliant Energy
Water	City of Albion
Phone Services	Heart of Iowa - Union
Cable/Internet Provider	Heart of Iowa
Emergency Medical Service	City of Albion First Responders
Law Enforcement	Marshall County Sheriff
Fire Protection	City of Albion Fire Department
Warning System	Siren w/ backup set off by fire dept/EMS/Council
HazMat Assistance	Des Moines Fire Department
Fuel Station	Casey's
Grocery/Convenience	Casey's
Solid Waste Removal	Moler Sanitation
Landfill	Marshall County Landfill
Library	Albion Municipal Library
Recycling	Moler Sanitation
Public Transit	Peoplerides
Medical Clinic	None – use McFarland Clinic in Marshalltown

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents, though some have basic training. This service is provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance.

City Government and Regulation

The City of Albion is governed by a mayor and five-member city council that holds regular meetings on the third Monday of the month. To attract development, as a hazard mitigation related regulation, the city does not enforce building codes beyond the standard Iowa building codes. By not enforcing the strict building codes, new development in the community is more affordable than in other communities. The city also does not have a formal zoning ordinance to enforce land use aside from floodplain management. According to Iowa Homeland Security information, Albion is participating in the NFIP but does not have any policies in place.

Technical and Fiscal Resources

The City of Albion operates like many small cities in Iowa. The mayor, council, city clerk, and maintenance staff handle the city's daily and long-term operations. Short-term and long-term planning needs like grant writing and management and plan preparation are usually handled by the local council of governments.

There are multiple ways the City of Albion could finance a hazard mitigation project. This city in particular maintains its own water system so fees for this service are available to finance projects. The financing resources available to the City of Albion are below.

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (paid back using sewer fees, water fees, road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in Albion, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

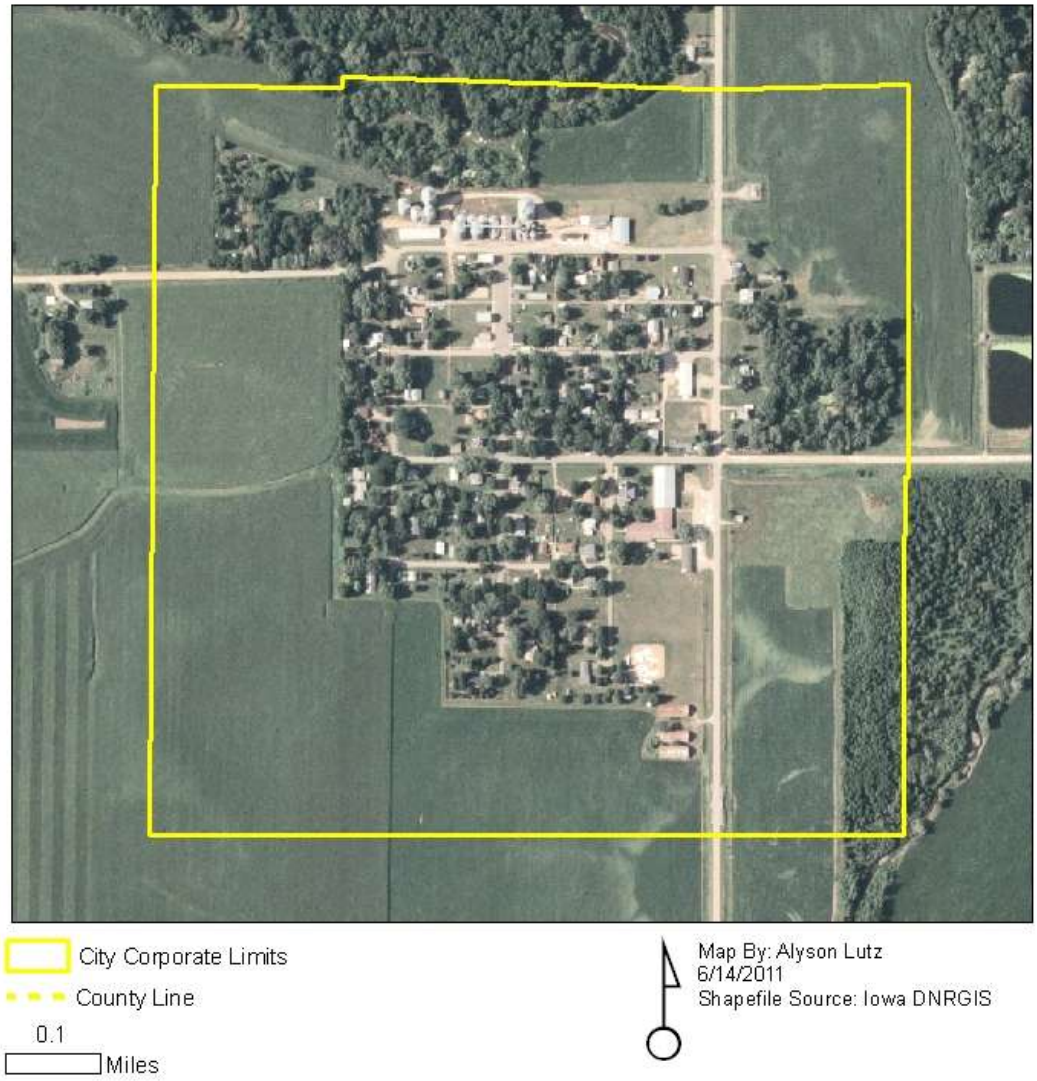
In summer 2011, Albion was granted money from State of Iowa CDBG for a well project.

City of Clemons

Overview

The City of Clemons is located in the northwest portion of Marshall County. County Hwy S52 runs along its east side while U.S. Highway 65 is about 10 miles west of town.

Figure 3.2.2: Clemons, Iowa



Some history of Clemons, Iowa, according to Darlene Clemons Berchtold,

> "The first permanent resident of the site of Clemons Grove (Clemons) was Robert Elder and family in 1851. The area was first referred to as "Elder's Grove". In 1853 William M. Clemons, who was married to Robert Elder's sister, Nancy, made a trip to Iowa to purchase land. The land he wanted and bought was the farm established by Robert Elder. On Aug. 11, 1854, the William M. Clemons family arrived. On Oct. 27, 1882, a plat of the original town of Clemons Grove was filed by William M. Clemons, proprietor. The original plat consisted of only 3 blocks and today is the North three blocks of town. Clemons has also been called Billy Town because of all the William Clemons who have lived there."

Utilities and Services in Clemons

Most services are available in Clemons except a warning system, fuel station, grocery/convenience store, and library. Clemons only provides its own first responders and volunteer fire department; all other services are contracted to private companies or the County. See Table 3.2.2 for providers.

Table 3.2.2: Clemons Utilities and Services

Service	Provider
Electricity	Alliant
Gas	Private providers
Water	Rural Water
Phone Services	Minerva Valley
Cable/Internet Provider	Minerva Valley
Emergency Medical Service	First Responders with ambulance but no assist
Law Enforcement	Marshall County Sheriff
Fire Protection	Volunteer Fire Department
Warning System	None
HazMat Assistance	Des Moines Fire Department
Fuel Station	None
Grocery/Convenience Store	None
Solid Waste Removal	Stone Sanitation
Landfill	Marshall County Landfill
Library	None
Recycling	Stone Sanitation
Public Transit	Peoplerides
Medical Clinic	Use McFarland in Marshalltown

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents, though some have basic training. This service is provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance.

City Government and Regulation

The city is governed by a mayor and 5-member city council that maintains and enforces the city's code of ordinances. Regular council meetings are held the second Wednesday of every month.

The city does not enforce building codes beyond the standard Iowa building codes. The city is passing a formal zoning ordinance to enforce land use aside from floodplain management.

A very popular city regulation related to hazard mitigation involves maintaining a floodplain management ordinance, which allows city residents to participate in the National Flood Insurance Program (NFIP). The floodplain management ordinance applies to the areas identified in city's floodplain map as having a 1% chance of flooding each year. Currently, Clemons is participating in the NFIP and has 1 policy in place, as of 05/31/2009, with $34,400 of insurance in force.

Technical and Fiscal Resources

The City of Clemons operates like many small cities in Iowa. The mayor, council, city clerk, and part-time maintenance staff handle the city's daily and long-term operations. Short-term and long-term planning needs like grant writing and management and plan preparation are handled by the local council of government, the Region 6 Planning Commission. The City of Clemons is a member of the Commission and uses their services and expertise.

There are multiple ways the City of Clemons could finance a hazard mitigation project. This city does not maintain any of its own utilities so fees for these services are not available to finance projects. Resources available to the City of Clemons are below.

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (paid back using road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in Clemons, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

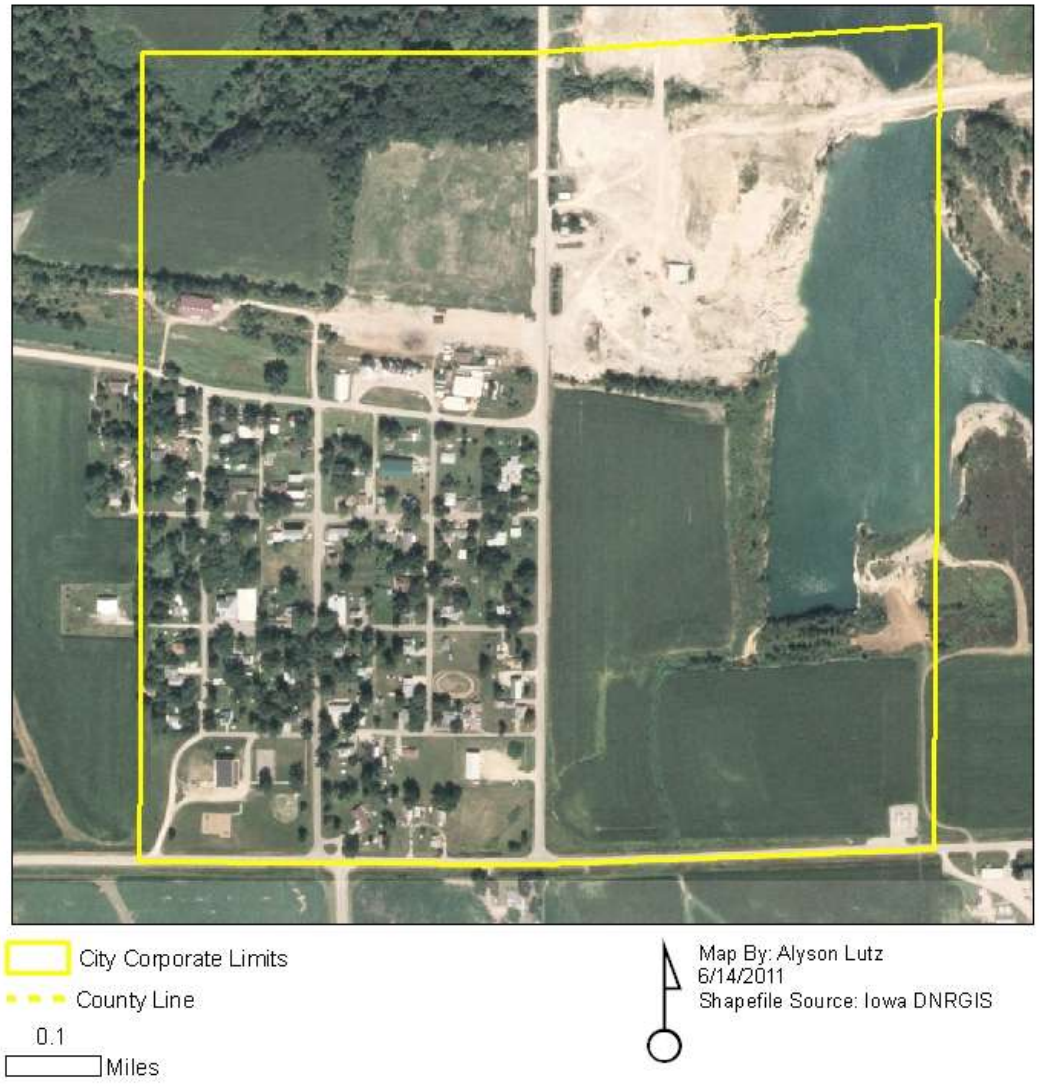
Clemons has not received any money in the past several years for hazard mitigation projects.

City of Ferguson

Overview

Ferguson is located in southeast portion of the county on County Hwy E63. Iowa 14 is less than 3 miles to the west and Iowa 146 just 4 miles to the east.

Figure 3.2.3: Ferguson, Iowa



Ferguson, Iowa was incorporated on December 4, 1906. The highest ancestry percentage in the city is German with 29.4% followed by Norwegian at 10.3%.

Utilities and Services

All basic services are available in Ferguson, except emergency medical, fuel, food, and a medical clinic. Residents must go to other communities for these services. Ferguson even provides its own water utility to residents while all others are contracted to private companies or the County.

Table 3.2.3: Ferguson Utilities and Services

Service	Provider
Electricity	Alliant Energy
Gas	LP from different providers
Water	City of Ferguson
Phone Services	Heart of Iowa
Cable/Internet Provider	Heart of Iowa
Emergency Medical Service	None – use Haverhill or Laurel
Law Enforcement	Marshall Co Sheriff
Fire Protection	Ferguson Fire Department
Warning System	Warning siren with no back up set off by the Mayor
HazMat Assistance	Des Moines Fire Department
Fuel Station	None
Grocery/Convenience	None
Solid Waste Removal	Le Grand Sanitation
Landfill	Marshall County Landfill
Library	28 E agreement with Marshalltown
Recycling	Le Grand Sanitation
Public Transit	Peoplerides
Medical Clinic	Use McFarland in Marshalltown

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents, though some have basic training. This service is provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance. Ferguson's fire department does provide onsite training for initial response.

City Government and Regulation

The City of Ferguson is governed by a mayor and five-member city council that holds regular meetings the first Monday of each month. The City maintains and enforces a code of ordinances.

To attract development as a hazard mitigation related regulation, the city does not enforce building codes beyond the standard Iowa building codes. By not enforcing the strict building codes, new development in the community is more affordable than in other communities. The city also does not have a formal zoning ordinance to enforce land use aside from floodplain management. Ferguson is participating in the National Flood Insurance Program as of October 13, 2010 according to Iowa Homeland Security information.

Technical and Fiscal Resources

The city manager, mayor, council, city clerk, and maintenance staff handle the city's daily and long-term operations. Also, many people in the Ferguson community are active in organizations, city projects, and various initiatives. Ferguson is also a member of the Region 6 Planning Commission and uses their services and expertise.

There are multiple ways the City of Ferguson could finance a hazard mitigation project. This city in particular provides its own water utility so it has those fees to use for projects. The other financing resources available to the City of Ferguson are below.

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (paid back using sewer fees, water fees, road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in Ferguson, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

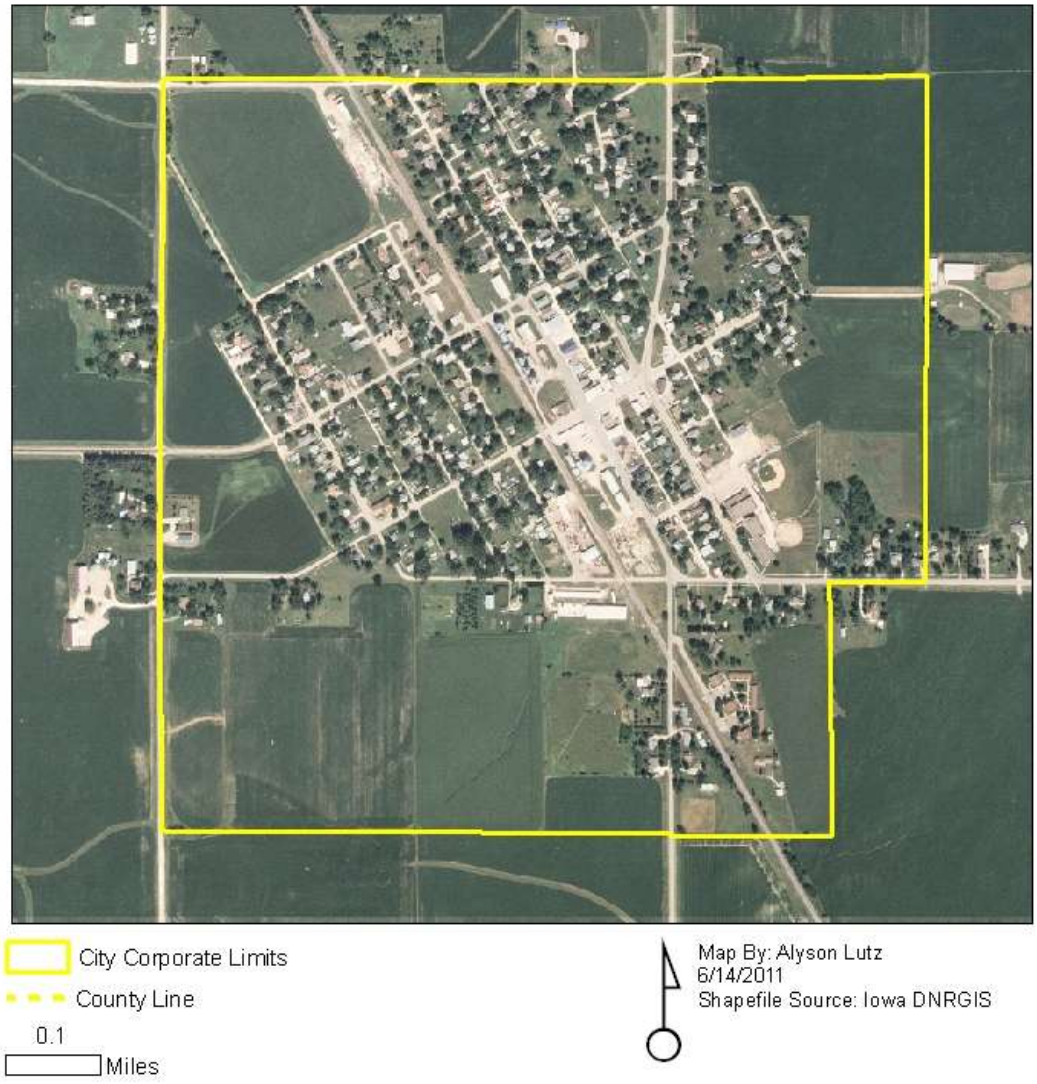
In 2008, Ferguson was granted Federal FEMA money for flood recovery, specifically lagoon treatment.

City of Gilman

Overview

The City of Gilman is located in the very southeast corner of Marshall County. Iowa 146 runs through town from the north and exiting to the east.

Figure 3.2.4: Gilman, Iowa



Gilman, Iowa was founded in 1876. In its early years the town had a brick and tile factory, an opera house, a railroad depot and a bank, according to city representatives.

Utilities and Services

Several utilities and basic services are available in Gilman. Water is provided by the City, as well as safety services including fire protection and emergency response. Even social opportunities are available in the form of the city's library. All other services are provided by private companies or Marshall County.

Table 3.2.4: Gilman Utilities and Services

Service	Provider
Electricity	Alliant
Gas	Propane gas
Water	City of Gilman
Phone Services	Partner Comm
Cable/Internet Provider	Partner Comm
Emergency Medical Service	Gilman Fire and rescue/MMSC
Law Enforcement	Marshall County Sheriff
Fire Protection	Gilman Fire Department
Warning System	Warning siren with backup power, set off at communications center
HazMat Assistance	Des Moines Fire Department
Fuel Station	Tom's Tire
Grocery/Convenience	Coming Soon
Solid Waste Removal	Stones – Le Grand's station
Landfill	Marshall County Landfill
Library	Gilman City Library
Recycling	Stones – Le Grand's station
Public Transit	Peoplerides
Medical Clinic	None – use MMSC in Marshalltown or GRMC in Grinnell

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents, though some have basic training. This service is provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance.

Government and Regulation

Gilman is governed by a mayor and five-member city council that holds regular meetings on the second Monday of the month.

To attract development as a hazard mitigation related regulation, the city does not enforce building codes beyond the standard Iowa building codes. By not enforcing the strict building codes, new development in the community is more affordable than in other communities. The city does however have zoning codes for commercial and residential to enforce land use aside from floodplain management.

According to Iowa Homeland Security information, Gilman is not participating in the National Flood Insurance Program.

Technical and Fiscal Resources

The City of Gilman operates like many small cities in Iowa. The mayor, council and city clerk handle the city's daily and long-term operations. Short-term and long-term planning needs like grant writing and management and plan preparation are usually handled by the local council of governments, the Region 6 Planning Commission. The City of Gilman is a member of the Commission and uses their services and expertise.

There are multiple ways the City of Gilman could finance a hazard mitigation project. This city in particular does not maintain its own utilities besides a water system so there are not many fees from these services available to finance projects. The resources available to the City of Gilman are below:

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (paid back using road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in Gilman, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

In 2007, Gilman was granted money from the Federal Highway Administration's Surface Transportation Program to repave their Main Street.

City of Haverhill

Overview

The City of Haverhill is located in the south central portion of the county. County Highway E63 runs east-west just north of town and Iowa 14 is just 1 mile east of town

Figure 3.2.5: Haverhill, Iowa

A big part of Haverhill's history is its people; many Emslanders settled in the area and enriched the culture by doing so. According to www.emslanders.com, Emslanders are 19th century German emigrants who came to America from the part of Hannover known today as Emsland, Niedersachsen, and settled in the mid-western United States.

Utilities and Services

Though Haverhill is one of the smallest cities in Marshall County, most services are available to residents. No utilities are maintained by the City so those services along with waste removal, food and fuel services, medical clinics, and social offerings are found in nearby cities of Marshalltown and Le Grand. Safety services, however, are provided by the City and Marshall County.

Table 3.2.5: Haverhill Utilities and Services

Service	Provider
Electricity	Alliant
Gas	Alliant
Water	Central Iowa Water Association
Phone Services	Heart of Iowa
Cable/Internet Provider	Heart of Iowa
Emergency Medical Service	First Responders
Law Enforcement	Marshall County Sheriff
Fire Protection	Haverhill Volunteer Fire Department
Warning System	None
HazMat Assistance	Des Moines Fire Department
Fuel Station	None
Grocery/Convenience	None
Solid Waste Removal	Le Grand Sanitation
Landfill	Marshall County Landfill
Library	None
Recycling	Le Grand Sanitation
Public Transit	Peoplerides
Medical Clinic	Use MMSC & McFarland Clinic in Marshalltown

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents, though some have basic training. This service is provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance.

City Government and Regulation

Haverhill is governed by a mayor and five-member city council that holds meetings on the second Monday of the month. The City does not enforce building codes beyond State of Iowa building code requirements but they do have a zoning code.

According to Iowa Homeland Security information, Haverhill is not participating in the National Flood Insurance Program.

Technical and Fiscal Resources

The City of Haverhill operates like many small cities in Iowa. The city manager, mayor, council, city clerk, and maintenance staff handle the city's daily and long-term operations. The City of Haverhill is a member of the Region 6 Planning Commission and uses their services.

There are multiple ways the City of Haverhill could finance a hazard mitigation project. This city in particular does not maintain its own utilities so fees for these services are not available to finance projects. The financing resources available to the City of Haverhill are below.

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (paid back using sewer fees, water fees, road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in Haverhill, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

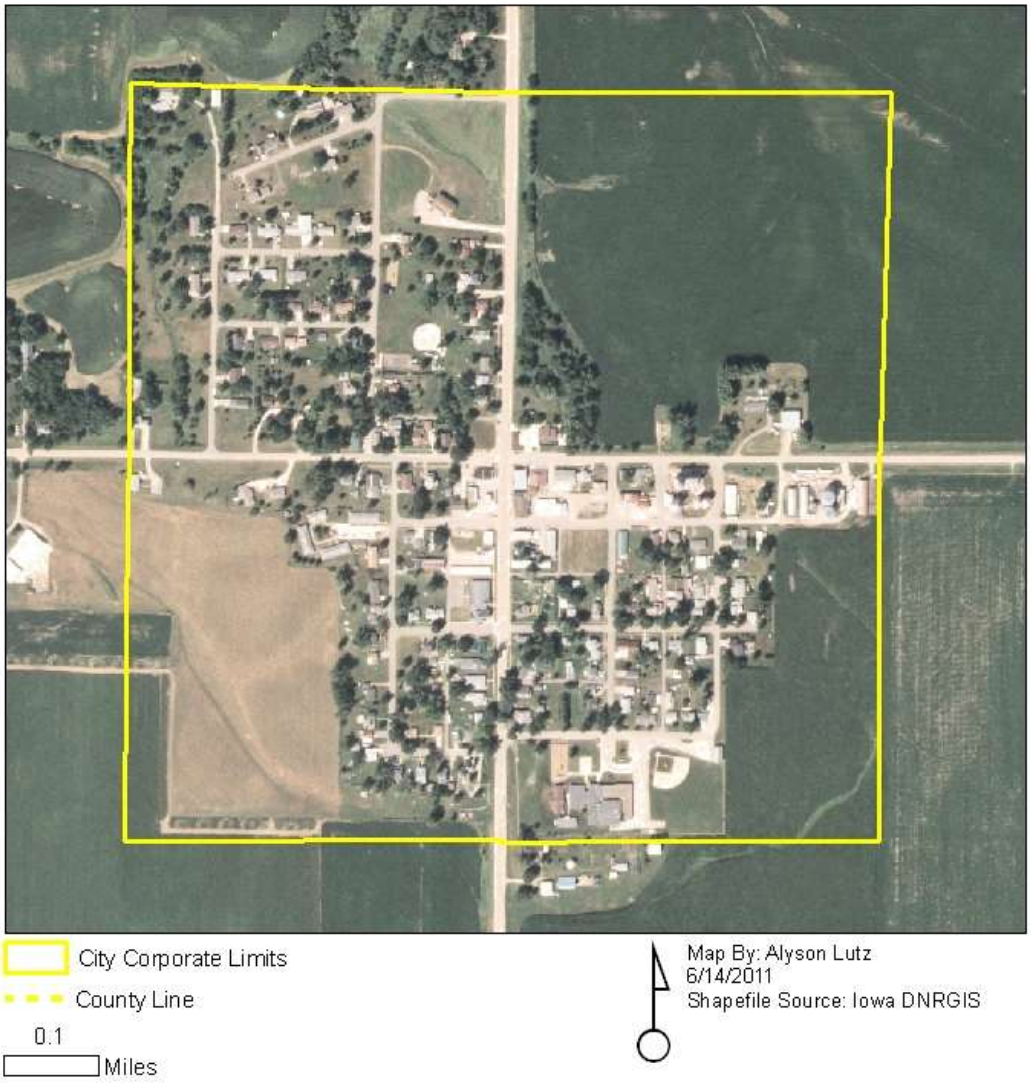
In the past several years, Haverhill has not been granted money for any hazard mitigation projects.

City of Laurel

Overview

Laurel is located at the intersection of County Hwy E65 and IA 14. Laurel is just 8 miles south of U.S. Highway 30.

Figure 3.2.6: City of Laurel



In regards to ancestry, 32% of Laurel residents report German heritage, and 12% report Irish**.**

Utilities and Services

All utilities are available in Laurel with solid waste/landfill/recycling being provided by private companies or the county, and safety services provided by the City and Marshall County. All basic services are available to Laurel residents except grocery, and fuel.

Table 3.2.6: Laurel Utilities and Services

Service	Provider
Electricity	Alliant
Gas	LP
Water	Central Iowa Water Association
Phone Services	Heart of Iowa Coop
Cable/Internet Provider	Heart of Iowa Coop
Emergency Medical Service	MMSC in Marshalltown or GRMC in Grinnell
Law Enforcement	Marshall County Sheriff's Office
Fire Protection	Laurel Volunteer Fire Department
Warning System	None
HazMat Assistance	Des Moines Fire Department
Fuel Station	None
Grocery/Convenience	None
Solid Waste Removal	Stone's Sanitation Services
Landfill	Marshall County Landfill
Library	Laurel Public Library
Recycling	Stone's Sanitation Services
Public Transit	Peoplerides
Medical Clinic	McFarland in Marshalltown or Grinnell

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents, though some have basic training. This service is provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance.

City Government and Regulation

Laurel is governed by a mayor and 5-member city council that maintains the city's Code of Ordinances. The mayor and council hold regular meetings on the second Monday of the month. The City does not have or enforce building codes but it does enforce a zoning code.

According to information from Iowa Homeland Security, the City is not participating in the National Flood Insurance Program.

Technical and Fiscal Resources

The City of Laurel operates like many small cities in Iowa. The mayor, council, city clerk, and maintenance staff handle the city's daily and long-term operations. The City of Laurel is a member of the Region 6 Planning Commission and uses their services and expertise for certain activities like grant and plan writing.

There are multiple ways the City of Laurel could finance a hazard mitigation project. This city in particular does not maintain any of its utilities so there are no fees from these services available for finance projects. The financing resources available to the City of Laurel are below.

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in Laurel, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

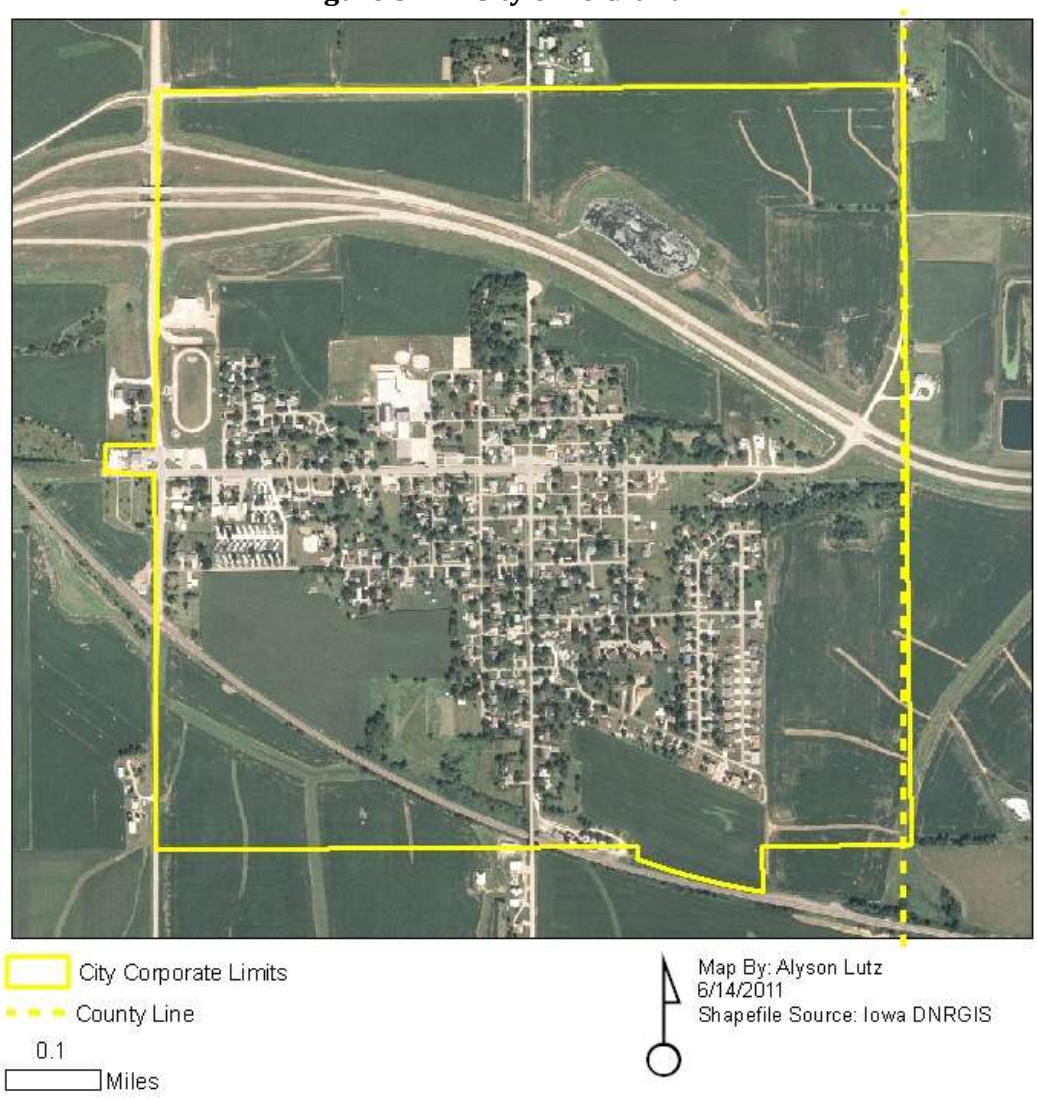
In 2007, the city received Federal FEMA as well as State of Iowa Public Assistance money for mitigation projects such as cleanup after winter and spring storms.

City of Le Grand

Overview

Le Grand is located directly south of Highway 30 in the far east central portion of the county. It is situated very close to the Marshall/Tama County border.

Figure 3.2.7: City of Le Grand



History of Le Grand, Iowa can be found in the Le Grand Pioneer Heritage Public Library:

Mr. Joseph Davidson came to the Le Grand area in 1847 and was the first permanent white settler in Marshall County.

Mark Webb and James Allman were the first to lay out the Le Grand Village in 1852. They named the village after Le Grand Byington. Byington was an Iowa City lawyer who had assisted them on their way to Le Grand. In 1853 the post office was established, with James Allman as postmaster.

Some of the "firsts" include: first doctor – T.V.W. Young; first death – James Allman; first birth – either Frank Knode or Matilda Allman; first school was started by Elizabeth Allman and held in her home; first school building in 1857, first brick store in 1870, owned by Benedict & Willets and occupied by Willetts & White grocers and Dr. Reiterman's drugstore.

The Chicago & NorthWestern Railway was constructed on the South edge of Le Grand in 1862-1863. A large grain elevator was built at the railroad station in 1870.

In the years after initial settlement, Le Grand continued to grow and prosper and was incorporated in 1891. According to the state censuses, Le Grand's population in 1900 was 408, the highest population until the late 1960s. The population was 338 in 1920, 320 in 1920 and 382 in 1930. Le Grand township also showed the highest population in 1900 with 1,712; the second most populous township after Marshall.

US 30 was routed through the center of Le Grand in 1954. The Lincoln Highway that began in 1913 as the "Coast to Coast Rock Highway" made its way to Marshall County in 1924 and Marshall County paving began on March 25, 1925. On June 12, 1926 the pavement was completed to the Tama County Line and is noted by a concrete marker on the Old Lincoln Highway southeast of Le Grand. (http://www.Le Grand.lib.ia.us/)

Utilities and Services

The City of Le Grand does not provide any utilities directly to residents. Safety services are provided by the City except law enforcement, which is provided by Marshall County. Le Grand also has its own sanitation company that provides service to many other cities in Marshall County. The only service unavailable in town is a medical clinic. Residents must travel to Marshalltown for this service.

Table 3.2.7: Le Grand Utilities and Services

Service	Provider
Electricity	Alliant
Gas	Alliant
Water	Central Iowa Water Association
Phone Services	Windstream/Mediacom
Cable/Internet Provider	Windstream/Mediacom
Emergency Medical Service	Le Grand First Responders/MMSC
Law Enforcement	Marshall County Sheriff
Fire Protection	Le Grand Fire Dept
Warning System	Warning siren with backup set off by Fire or Maintenance
HazMat Assistance	Des Moines Fire Department
Fuel Station	Good Luck, Inc, Cissy's III
Grocery/Convenience	Good Luck, Inc., Cissy's III
Solid Waste Removal	Le Grand/Stone/Area Sanitation
Landfill	Marshall County Landfill
Library	Le Grand Pioneer Heritage Library
Recycling	Le Grand/Stone/Area Sanitation
Public Transit	Peoplerides
Medical Clinic	McFarland Clinic in Marshalltown

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents, though some have basic training. This service is provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance.

City Government and Regulation

Le Grand is governed by a mayor and 5-member city council that maintains and enforces the City's Code of Ordinances. On the second Tuesday of each month, the mayor and council hold a meeting. Le Grand's Code includes building and zoning codes. Le Grand has been a participant in the NFIP since September 1, 1987.

Technical and Fiscal Resources

The City of Le Grand operates like many small cities in Iowa. The mayor, council, city clerk, and maintenance staff handle the city's daily and long-term operations. Short-term and long-term planning needs like grant writing and management and plan preparation are usually handled by the local council of government, the Region 6 Planning Commission. The City of Le Grand is a member of the Commission.

There are multiple ways the City of Le Grand could finance a hazard mitigation project. Le Grand does not provide any services to its residents so fees from these cannot be used toward debt incurred for projects. The financing resources available to the City of Le Grand are below.

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (utility fees, road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in Le Grand, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

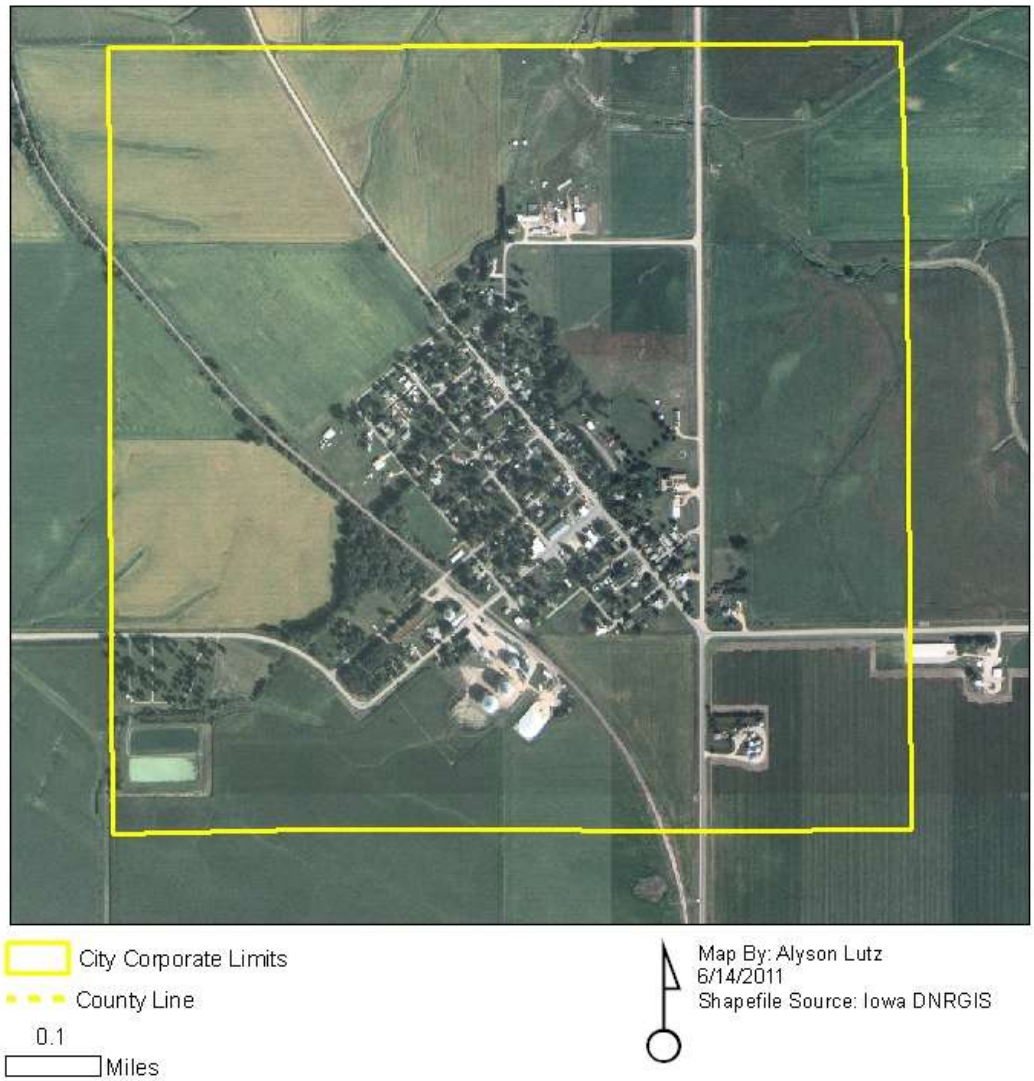
Le Grand received State Revolving Fund money in 2008 for water distribution lines, curb stops, and some hydrants.

City of Liscomb

Overview

Liscomb is located at the intersection of County Hwy S75 and E18/Marble Road in north central Marshall County. It is approximately 30 miles to the west of U.S. Interstate 35, which runs north/south.

Figure 3.2.8: City of Liscomb



In regards to ancestry, 36.8% of Laurel residents report German heritage, and 15% report Irish.

Utilities and Services

The City of Liscomb provides water to residents. Emergency services are also provided by the City except law enforcement, which is provided by Marshall County. Liscomb does not have a fuel station, grocery/convenience store, library, or medical clinic. Residents must travel to Marshalltown or Conrad for these services.

Table 3.2.8: Liscomb Utilities and Services

Service	Provider
Electricity	Alliant
Gas	Alliant
Water	City of Liscomb
Phone Services	Heart of Iowa
Cable/Internet Provider	Heart of Iowa
Emergency Medical Service	Liscomb First Responders and MMSC in Marshalltown
Law Enforcement	Marshall County Sheriff
Fire Protection	Liscomb Volunteer Fire Dept
Warning System	Warning siren with no backup, set off by fire dept
HazMat Assistance	Des Moines Fire Department
Fuel Station	Mid-Iowa Coop or out of town – Marshalltown, Albion
Grocery/Convenience	Out of town – Marshalltown, Albion, Conrad
Solid Waste Removal	Moler/Ferch
Landfill	Marshall County
Library	Out of town – Conrad Public Library
Recycling	Moler/Ferch
Public Transit	Peoplerides
Medical Clinic	Out of town - McFarland/MMSC in Marshalltown

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents, though some have basic training. This service is provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance.

City Government and Regulation

Liscomb is governed by a mayor and 5-member city council that maintains and enforces the City's Code of Ordinances. On the second Monday of each month, the mayor and council hold a meeting. Liscomb's Code does not include a building or zoning code.

The Liscomb does not participate in the NFIP according to information from Iowa Homeland Security.

Technical and Fiscal Resources

The City of Liscomb operates like many small cities in Iowa. The mayor, council, city clerk, and maintenance staff handle the city's daily and long-term operations. Short-term and long-term planning needs like grant writing and management and plan preparation are usually handled by the local council of government, the Region 6 Planning Commission. The City of Liscomb is a member of the Commission.

There are multiple ways the City of Liscomb could finance a hazard mitigation project. Liscomb only maintains the city's water system so fees from utilities are not plentiful but can be used toward debt incurred for projects. The financing resources available to the City of Liscomb are below.

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (utility fees, road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in Liscomb, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

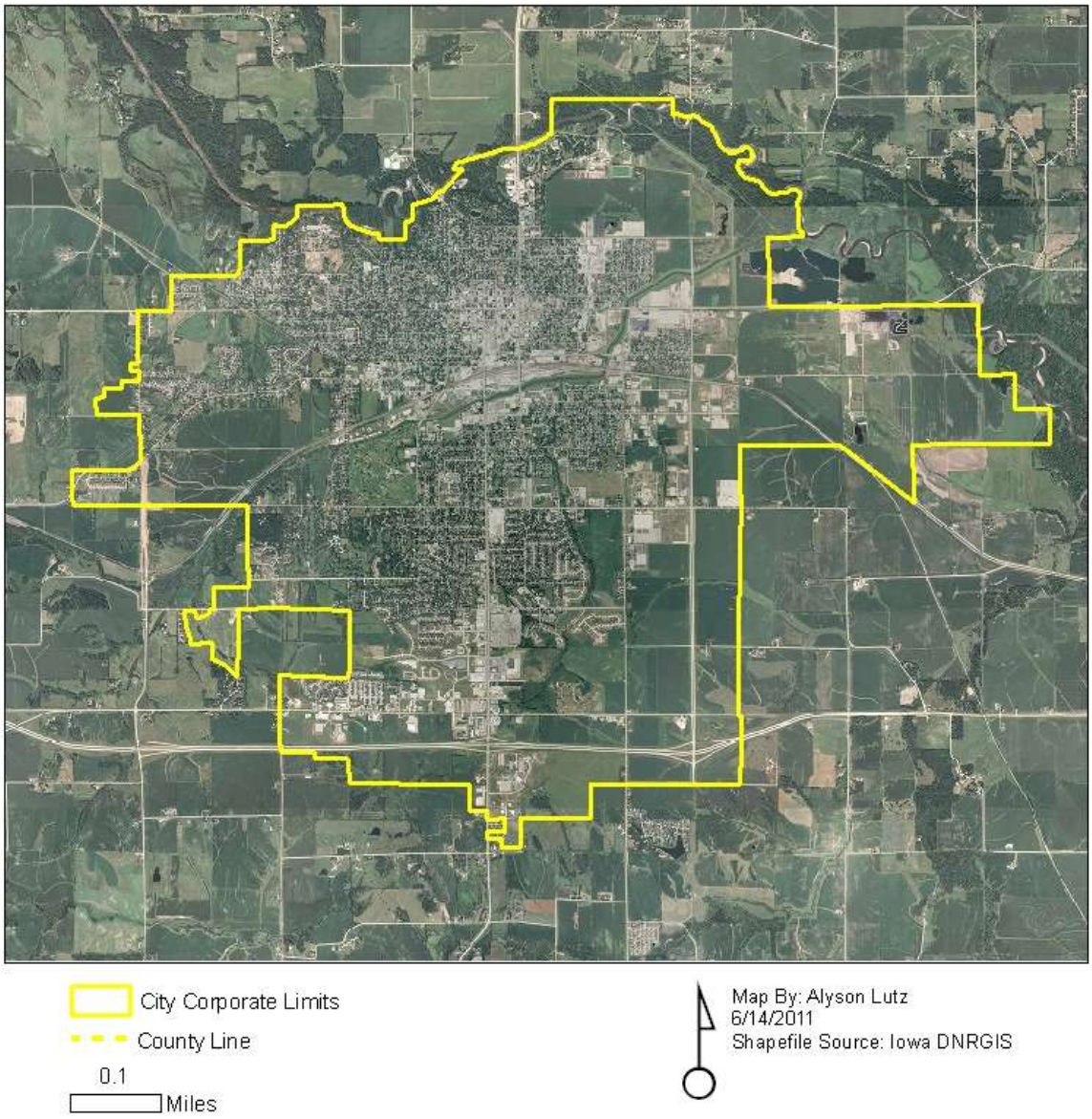
In 2007, Liscomb was granted State of Iowa CDBG money for water mains throughout town. For the years 2007 to present Liscomb has received USDA money for fire department equipment like turnout gear, pagers, base radio, and air packs.

City of Marshalltown

Overview

Marshalltown is very well connected from its location in east central Marshall County at the point where IA-14 and Highway 30 intersect. The City is only 40 miles from Ames and Interstate 35. It is also only 5 miles from Highway 330 which angles southwest directly to the Des Moines area.

Figure 3.2.9: City of Marshalltown



Some history of the City of Marshalltown can be found on their Community Link profile:

> Nine years after the Sac and Fox tribes signed a treaty with the U.S. government opening up the rich and fertile soil of what is now Marshall County, Henry Anson decided to build a town on the divide between Linn Creek and the Iowa River. It was the summer of 1851. Anson called his settlement Marshall and built a cabin on what is now Main Street. The name was changed to Marshalltown in 1862.
>
> A visionary with great dreams for his town, Anson hoped Marshalltown would become the capital city of Iowa because of its central location. Marshalltown grew during the decade before the Civil War, and, by the mid 1850s, Anson had donated land for a county courthouse. Citizens raised money for the courthouse, and, after a struggle to secure the title of county seat from the village of Marietta, Marshalltown became the official county seat in 1863.
>
> A Potawatomi chief named Johnny Green (Che Muese) helped early settlers get established in the wilderness in and around Henry Anson's young town. When Green died in 1868, he was buried on a high bluff overlooking the Des Moines River by members of his tribe and the grateful citizens of Marshalltown. Today, a large monument stands on the grounds of the Iowa Veterans Home in tribute to the Native American leader. The years following Green's death were building years for the fledgling town; the railroad finally reached the settlement from the east, bringing with it a host of light industries. As America entered the Industrial Revolution, Marshalltown went from a post-war prairie settlement to a boomtown.
>
> By the dawn of the 20th century, Marshalltown was an established city of more than 10,000 residents and the home to many industries that developed into major national and international companies, such as Fisher Controls, Lennox Industries and Marshalltown Trowel (now the Marshalltown Company). Henry Anson didn't live to see his town become a bustling city, but his presence is still felt in Marshalltown, now home to 26,000 residents. Anson Park, Anson Middle School and Anson Street are all named in his honor.
>
> Located on the square in the heart of Marshalltown, the Marshall County Courthouse is an historical treasure, visible for miles. Designed by the same architect who conceived the Iowa State Capitol Building, the courthouse was constructed during the years between 1884 and 1886. The building has retained its original exterior, while restoration of the interior featured renovation of the courtroom, law library and the grand stairway with wrought-iron decorations. (Community Link, 2010)

Utilities and Services

The City of Marshalltown has the access to all services for its residents. The city specifically provides water, solid waste removal, safety services, and a library. All other services including recycling must be purchased by private companies. Marshalltown has the only hospital in the county and one of two clinics in the county.

Table 3.2.9: Marshalltown Utilities and Services

Service	Provider
Electricity	Alliant
Gas	Alliant
Water	City of Marshalltown
Phone Services	Multiple private providers
Cable/Internet Provider	Mediacom
Emergency Medical Service	Marshalltown Area Paramedic Service
Law Enforcement	Marshalltown Police Department
Fire Protection	Marshalltown Fire Department
Warning System	Warning Siren with backup, set off by Communications Center
HazMat Assistance	Des Moines Fire Department
Fuel Station	Marshall County shop and coop and commercial providers
Grocery/Convenience	Hy Vee and Fareway
Solid Waste Removal	City of Marshalltown
Landfill	Marshall County Landfill
Library	Marshalltown Public Library
Recycling	Private contractors
Public Transit	Peoplerides, Taxi, and Marshalltown Municipal Transit Bus
Medical Clinic	McFarland and MMSC

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents; however, the city fire department has basic hazardous materials training. This service is also provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance.

City Government and Regulation

Marshalltown is governed by a mayor and 5-member city council that maintains and enforces the City's Code of Ordinances. On the second and fourth Monday of each month, the mayor and council hold a meeting. Marshalltown's Code includes building and zoning codes which are enforced.

The City of Marshalltown is a participant in the NFIP according to information from Iowa Homeland Security. As of 05/31/2009, the community has 29 policies in place with $5,882,600 worth of insurance in force. There have been 6 paid losses worth $31,110.85.

Technical and Fiscal Resources

The City of Marshalltown is a large city for Iowa and therefore has more resources and staff than smaller cities in the county. The city consists of BLANK departments, including: City Administrator, City Attorney, City Clerk, Finance Department, Fire Department, Housing and Community Development, Human Resources, Library, Mayor, Parks and Recreation, Police Department, Public Works, and Water Pollution Control Plant. The mayor, council, city clerk, and maintenance staff handle the city's daily and long-term operations. Short-term and long-term planning needs like grant writing and management and plan preparation are usually handled by the planning and engineering departments with some applications handled by the local council of governments, the Region 6 Planning Commission. The City of Marshalltown is a member of the Commission.

There are multiple ways the City of Marshalltown could finance a hazard mitigation project. Marshalltown maintains the city's water system so fees from that utility can be used toward debt incurred for projects. The financing resources available to the City of Marshalltown are below.

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (utility fees, road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in Marshalltown, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

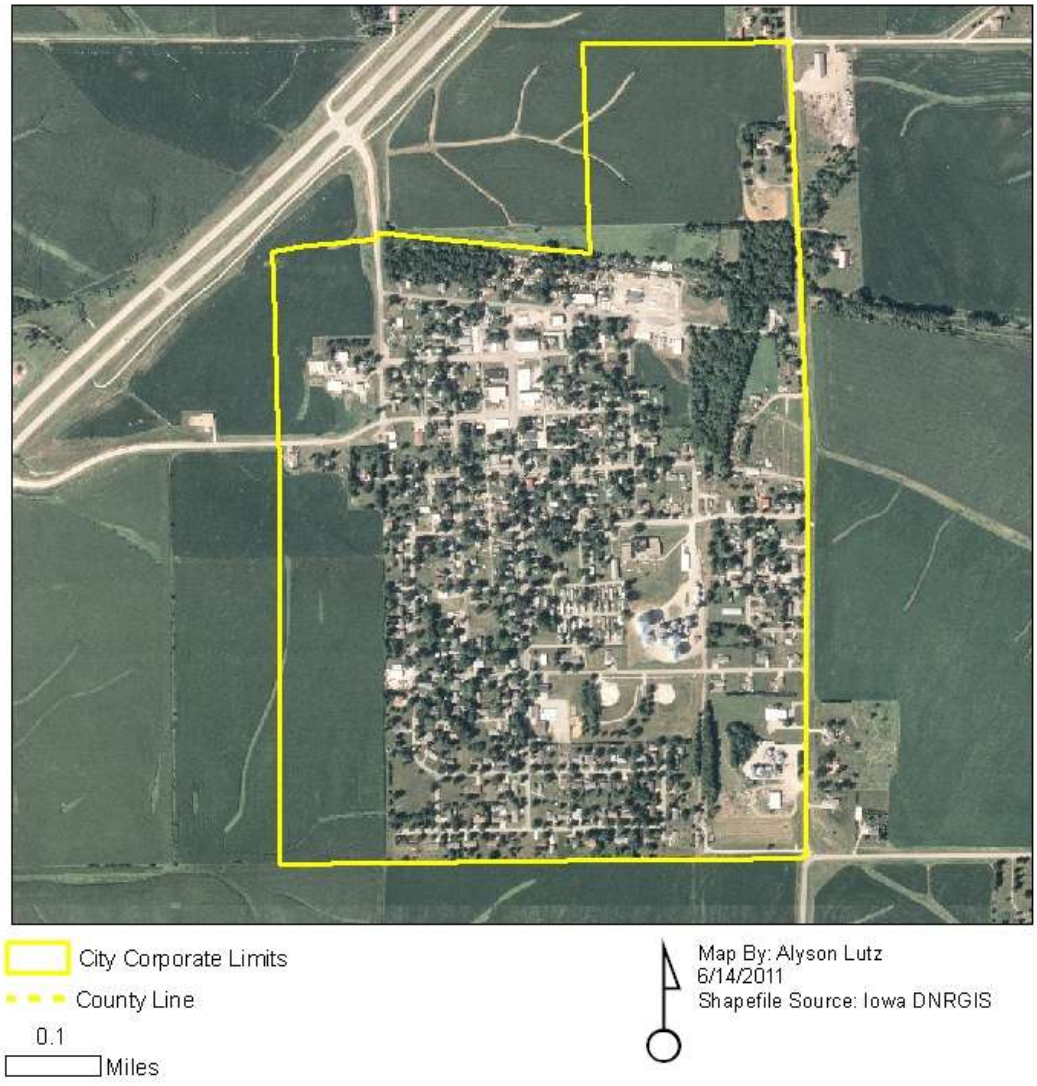
In the past few years Marshalltown has received Federal and State FEMA funding to repair a diffusion pipe on the bike trail as a mitigation project. In a water pollution control effort, they also received State of Iowa funds for basement pump repairs.

City of Melbourne

Overview

Melbourne is located in the southwest corner of the county, just northeast of Rhodes. This is at the crux of where Iowa Highway 330 and County Road S62 intersect. This location is ideal for getting on Iowa 330 to Des Moines or getting on Highway 30 to travel to Ames or Cedar Rapids.

Figure 3.2.10: City of Melbourne



Some history of Melbourne was provided by City Clerk, Marilyn Purdy from Melbourne, Iowa Centennial History:

Soon after the Civil War several pioneers made their appearance in this area. In 1855 W. L. M. Wensel came west and entered 560 acres of land in Logan Twp., Marshall County, IA. He then returned to PA and his brick manufacturing business. After the war, in 1866, he came back to farm the land he had acquired ten years previously.

On February 23, 1882, the Milwaukee Land Co. filed the Town Plat of Melbourne at the Marshall County Court House, covering approximately 45 acres of open prairie and bounded on the N. by the Milwaukee Rt. Of Way – on the S. by (and including) 3rd Street, on the E. by 4th Avenue and on the W. by the 1/4 Sec. line. The town park stretched along the western border with 3 access roads into town from the west, north and east. A. J. & C. F. Emert, Geo. M. Knodle and A. F. Coppersmith purchased sub-divisions 1-2 and 3 from Mr. Wensel.

The town plat was drawn with consideration of the Wisconsin, Iowa and Nebraska Ry. - which later became the Chicago, Great Western. Their tracks were laid through Melbourne late in 1882, despite the difficulties with the Milwaukee, who forced a crossing over their tracks causing the building of the trestle. The dispute was formally settled in 1885.

At the peak of traffic in and through Melbourne, 8 local passenger trains, 4 local freights and several through-passenger and freights held at least 20 persons busy handling passengers, freight, mail and telegrams in and out of town, between depots, and from depots tolumber yard, grain elevators, stock yards, coal dealers, shops, stores, hotels and to different homes and cafes.

The Milwaukee road deemed it necessary to make its line double-track in 1912-1914. In 1932 the track was again made single line due to other forms of transportation. The continued decrease of traffic caused the abandonment of the tracks in 1980.

Amos Bonham purchased land north of the Milwaukee track in 1887 where he subsequently built his brick and tile factory. In 1882, the land company offered, as a free gift, a number of town lots to encourage the establishment of business ventures. In December of 1882, W. L. M. Wensel purchased lots 1 thru 5 on the west side of Main street. Wensel supposedly built the first building in town, a saloon located on one of his five lots. Eventually all five lots were occupied by one frame building, divided into six stores and called the Wensel Block.

Jacob Leibslie conducted a harness shop on his lot. Jacob Hurner ran a blacksmith shop on Blk. 7, next to the alley, and Woods Bros. had a wagon shop in the west side of the harness shop. D. C. Baker operated the Grain Elevator and the Lumber Yard by the Milwaukee tracks and the first Post Office. Pettys and Rogers constructed a building to house their general store, the first in town which later became the St. Joe Hotel. Herman Wulke purchased land and built a large hardware store on the east end of Main. St.

Monday and Tuesday, April 27-28, 1903, Melbourne suffered the worst disaster in the town's history; a conflagration that consumed the entire business district, comprising the east and west halves of Main (except the southernmost building on each side) and also the south portion of Blks.

2 & 3 bordering Main Street. The origin of the great fire is not known, although there was some speculation that a spontaneous combustion of either drugs or oils was responsible.

By the 1960's there were rumblings from the state that small schools were not "doing the job" and that reorganization of schools would soon be mandatory to provide the standard of education our children. The west part of Marshall County voted to become the West Marshall Community School. May of 1962 saw the last class graduate from the Melbourne High School.

The city has become a bedroom community since Highway 330 was widened to a 4-lane. It is only 15 minutes to Marshalltown, 30 minutes from Ames and 45 minutes from Des Moines. (Melbourne, Iowa Centennial History, 1982)

Utilities and Services

The City of Melbourne provides water utilities to its residents. All other utility services are contracted to public and private companies. Safety services are provided by the City. As for other services, Melbourne has a fuel station and convenience store. Residents must travel to State Center or Marshalltown for medical services.

Table 3.2.10: Melbourne Utilities and Services

Service	Provider
Electricity	Alliant Energy and Consumer's Energy
Gas	Alliant
Water	City of Melbourne
Phone Services	Partner Communications
Cable/Internet Provider	Partner Communications
Emergency Medical Service	First responders, MAPS
Law Enforcement	Shared Police chief with Rhodes
Fire Protection	Melbourne Fire Dept
Warning System	None
HazMat Assistance	Des Moines Fire Department
Fuel Station	Randawha's Travel Center
Grocery/Convenience	Randawha's Travel Center
Solid Waste Removal	Stone Sanitation
Landfill	Marshall County Landfill
Library	Melbourne Public Library
Recycling	Stone Sanitation
Public Transit	Peoplerides
Medical Clinic	Use State Center or Marshalltown McFarland Clinic

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents, though some have basic training. This service is provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance.

City Government and Regulation

Melbourne is governed by a mayor and 5-member city council that maintains and enforces the City's Code of Ordinances. On the second Monday of each month, the mayor and council hold a meeting. Melbourne's Code includes building codes and a zoning code which are enforced. The City of Melbourne does not participate in the NFIP according to information from Iowa Homeland Security, but they are looking into the possibility.

Technical and Fiscal Resources

The City of Melbourne operates like many small cities in Iowa. The mayor, council, city clerk, and maintenance staff handle the city's daily and long-term operations. Short-term and long-term planning needs like grant writing and management and plan preparation are usually handled by the local council of government, the Region 6 Planning Commission. The City of Melbourne is a member of the Commission.

There are multiple ways the City of Melbourne could finance a hazard mitigation project. Melbourne provides its own water utility services so fees from that can be used toward debt incurred for projects. The financing resources available to the City of Melbourne are below.

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (utility fees, road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in Melbourne, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

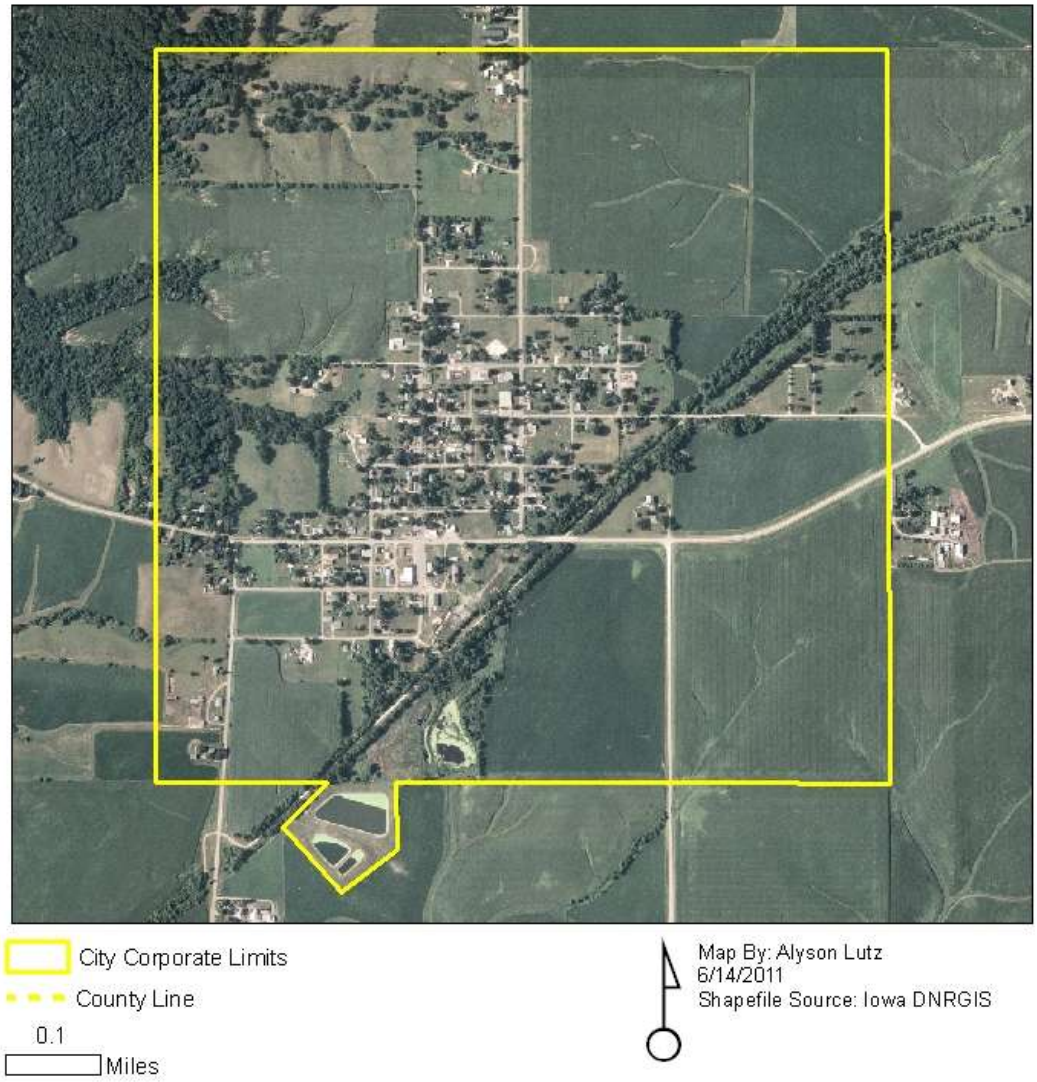
Melbourne has applied for CDBG State funding in October 2011 for a sewer lagoon mitigation project.

City of Rhodes

Overview

The City of Rhodes is located in the southwestern corner of Marshall County, just southwest of Melbourne. County Highways E63 and S52 intersect in town. Rhodes is also located less than 3 miles to the west of Iowa 330.

Figure 3.2.11: Rhodes, Iowa



Some history of Rhodes, Iowa from the Central Iowa Genealogical Society:

By 1853, Conway Rhodes, born in Ohio but recently of Illinois, secured large amount of land and on August 29, 1856, platted the town of Rhodes, which was then called Edenville, a name it held until 1928, and even then some residents refused to accept the change.

As most residents were Methodists, it wasn't long before a temperance movement was started, by the following: F.T. Woolston, John and Susan Jaroleman, Charles and Jane Price, Hannah Scotten, and although successful for a time eventually the movement died out. However, the idea remained and in the 1880'S a political appointee celebrated to excess and fell flat on Main Street. It seems he fell only because the earth shook beneath his feet. A detailed story appeared in the Marshall County Statesman concerning the earthquake in Rhodes. Then as now, politics resulted in a new appointee.

Rhodes is the only town remaining in Eden township. There were other small settlements such as Round Grove, which centered around rural churches, but, they soon disappeared. Once a thriving community containing all the business of much larger towns, Rhodes suffered the exodus of young people, and is now a bedroom community for larger communities that can offer jobs.

Utilities and Services in Rhodes

Most basic services are available in Rhodes. Water, emergency medical, and fire protection are provided by the City while all others are contracted to private companies or the County. Medical clinic and library services are in other cities in the county. Services and providers are listed below in Table 3.2.11.

Table 3.2.11: Rhodes Utilities and Services

Service	Provider
Electricity	Alliant
Gas	Alliant and LP
Water	City of Rhodes
Phone Services	Partner Communications
Cable/Internet Provider	Partner Communications
Emergency Medical Service	EMC
Law Enforcement	Marshall County Sheriff
Fire Protection	City of Rhodes Volunteer Fire Dept
Warning System	Siren with backup, set off by the fire department
HazMat Assistance	Des Moines Fire Department
Fuel Station	None – use Melbourne station
Grocery/Convenience Store	None – use Melbourne station
Solid Waste Removal	City of Rhodes
Landfill	Marshall County Landfill
Library	Use Melbourne Public Library
Recycling	None
Public Transit	Peoplerides
Medical Clinic	Use State Center Clinic or Marshalltown

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents, though some have basic training. This service is provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance.

City Government and Regulation

The city is governed by a mayor and 5-member city council that maintains and enforces the city's code of ordinances. Regular council meetings are held the first Monday of every month.

The city does not enforce building codes beyond the standard Iowa building codes in order to attract development. By not enforcing the strict building codes, new development in the community is more affordable than in other communities. The city also does not have a formal zoning ordinance to enforce land use aside from floodplain management.

A very popular city regulation related to hazard mitigation involves maintaining a floodplain management ordinance, which allows city residents to participate in the National Flood Insurance Program (NFIP). The floodplain management ordinance applies to the areas identified in city's floodplain map as having a 1% chance of flooding each year. Rhodes has been a member of the NFIP since October 13, 2010.

Technical and Fiscal Resources

The City of Rhodes operates like many small cities in Iowa. The mayor, council, and city clerk handle the city's daily and long-term operations. Short-term and long-term planning needs like grant writing and management and plan preparation are handled by the local council of governments, the Region 6 Planning Commission. The City of Rhodes is a member of the Commission and uses their services and expertise.

There are multiple ways the City of Rhodes could finance a hazard mitigation project. This city in particular maintains its own water system so fees for this service are available to finance projects. Other resources available to the City of Rhodes are below.

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (paid back using road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in Rhodes, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

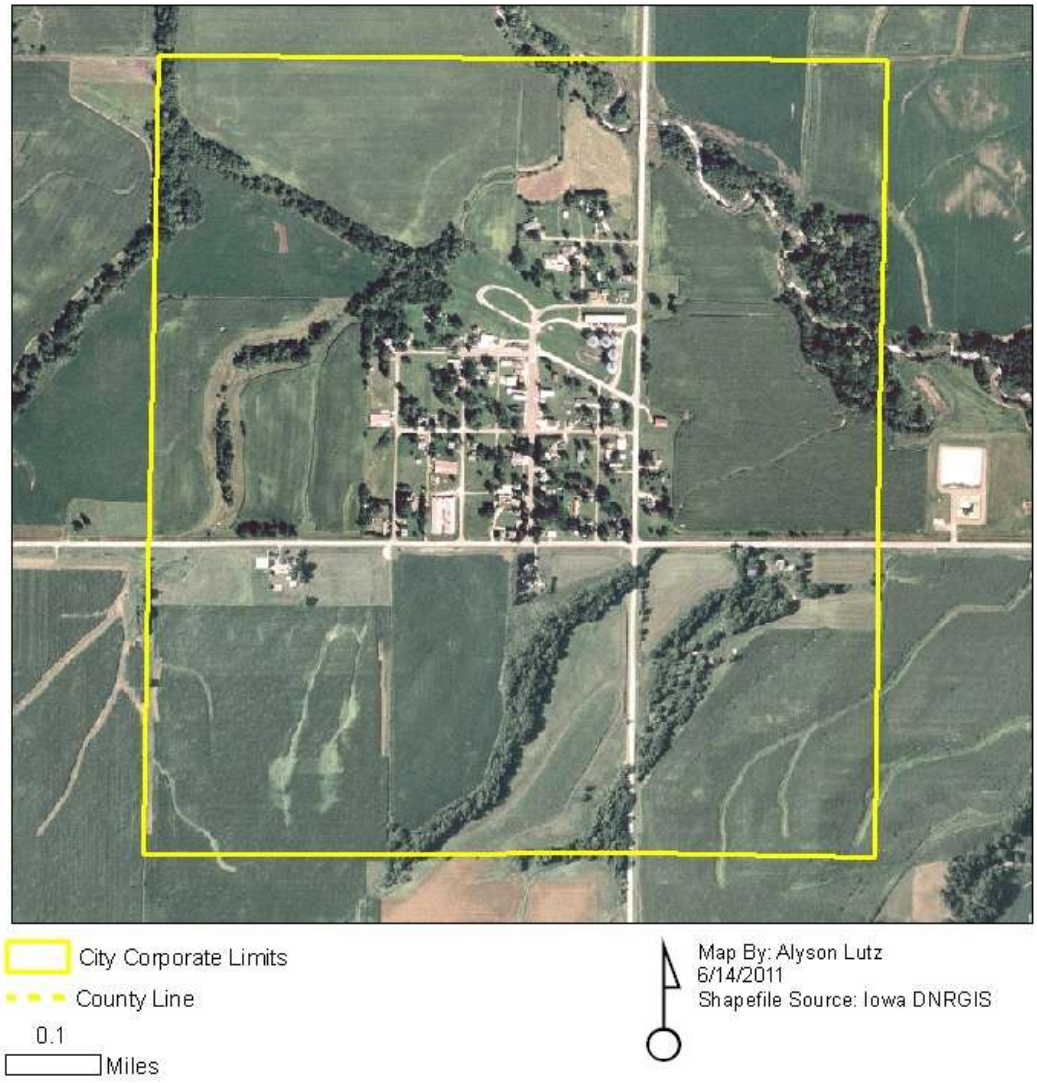
In June 2011, Rhodes was granted money from the State of Iowa CDBG program for sewer improvements.

City of St Anthony

Overview

St Anthony is located in the northwestern portion of Marshall County. County Highways S57 and E23 run along the perimeter of town. St Anthony is located 3 miles west of Clemons with whom it shares many services.

Figure 3.2.12: St Anthony, Iowa



In regards to ancestry, 15.6% of St Anthony residents report German ancestry, and 13.8% report Norwegian.

Utilities and Services

Not all basic services are available in the City of St Anthony except sanitation and utilities. The city uses City of Clemons first responders for emergencies along with the county sheriff. For medical, library or fuel and gas, St Anthony residents must travel elsewhere.

Table 3.2.12: St Anthony Utilities and Services

Service	Provider
Electricity	Alliant Energy
Gas	Alliant Energy
Water	Central Iowa Rural Water
Phone Services	Minerva Valley
Cable/Internet Provider	Minerva Valley
Emergency Medical Service	Clemons first responders
Law Enforcement	Marshall County Sheriff
Fire Protection	Clemons first responders
Warning System	None
HazMat Assistance	Des Moines Fire Department
Fuel Station	None
Grocery/Convenience	None
Solid Waste Removal	Moler/Ferch Sanitation
Landfill	Marshall County Landfill
Library	None
Recycling	Moler/Ferch Sanitation
Public Transit	Peoplerides
Medical Clinic	None

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents, though some have basic training. This service is provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance.

City Government and Regulation

The City of St Anthony is governed by a mayor and five-member city council that holds regular meetings on the second Tuesday of the month. To attract development, as a hazard mitigation related regulation, the city does not have or enforce building or zoning codes other than the standard Iowa building codes. By not enforcing the strict building codes, new development in the community is more affordable than in other communities. According to Iowa Homeland Security information, St Anthony is not participating in the NFIP.

Technical and Fiscal Resources

The City of St Anthony operates like many small cities in Iowa. The mayor, council, city clerk, and maintenance staff handle the city's daily and long-term operations. Short-term and long-term planning needs like grant writing and management and plan preparation are usually handled by the local council of governments.

There are multiple ways the City of St Anthony could finance a hazard mitigation project. This city in particular does not maintain its own utilities so fees for those services are not available to finance projects. The financing resources available to the City of St Anthony are below.

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (paid back using sewer fees, water fees, road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in St Anthony, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

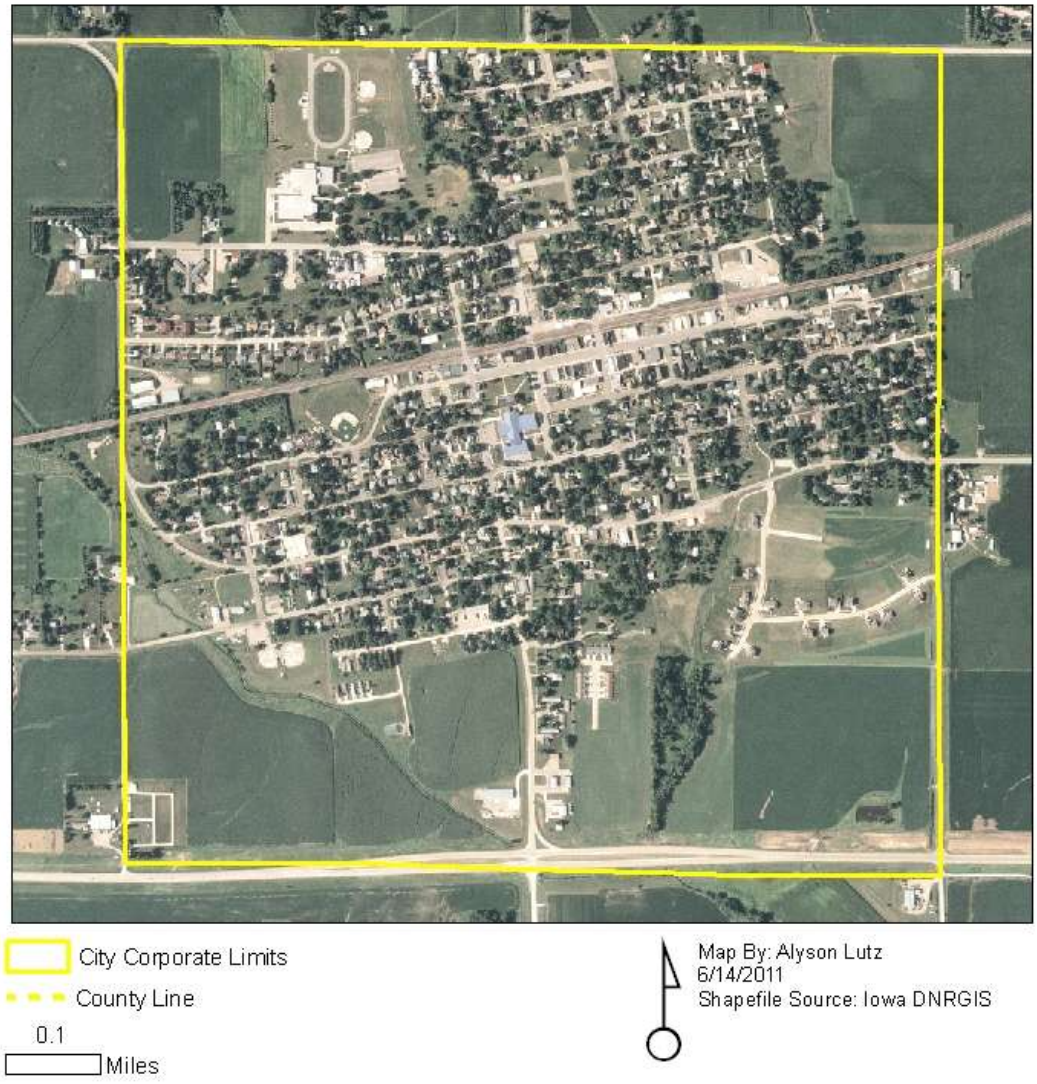
In the past couple years St Anthony has not received federal and state funding for mitigation projects.

City of State Center

Overview

The City of State Center is located in the west central portion of Marshall County. U.S. Highway 30 runs east/west just south of town.

Figure 3.2.13: State Center, Iowa



Landmarks in a community show the historic side of the city in which they reside. State Center has many of these special sites. The City has several historical businesses, buildings, and events in town including; the Rose Garden and Parade, a commercial historic district, the Gutekunst Public Library, Watson's Grocery Store Museum, a restored country school house and a restored 1950's era barbershop which is fully equipped.

Utilities and Services in State Center

All basic services are available in State Center. Electricity, water, and emergency response services are provided by the City while all others are contracted to private companies or the County. Services and providers are listed below in Table 3.2.13.

Table 3.2.13: State Center Utilities and Services

Service	Provider
Electricity	City of State Center
Gas	Alliant
Water	City of State Center
Phone Services	Partner Communications
Cable/Internet Provider	Partner Communications
Emergency Medical Service	Local first responders and MAPS
Law Enforcement	State Center Police Department
Fire Protection	State Center Fire and EMS
Warning System	Siren without backup, set off by Fire Department
HazMat Assistance	Des Moines Fire Department
Fuel Station	FS Fuel, Casey's, Cissy's
Grocery/Convenience Store	Hometown Foods, Casey's, Cissy's
Solid Waste Removal	Stone Sanitation, Al's ENT
Landfill	Marshall County Landfill
Library	Gutekunst Public Library
Recycling	Stone Sanitation, Al's ENT
Public Transit	Peoplerides
Medical Clinic	State Center Clinic

There are no fire departments in Marshall County with the capability of dealing with major hazardous materials incidents, though some have basic training. This service is provided by the Des Moines Fire Department, because that fire department has the needed training and equipment. The local fire department must decide whether or not to contact Des Moines's Fire Department for assistance.

City Government and Regulation

The city is governed by a mayor and 5-member city council that maintains and enforces the city's code of ordinances. Regular council meetings are held the third Wednesday of every month.

The city does not enforce building codes beyond the standard Iowa building codes. The city does have a formal zoning ordinance to enforce land use aside from floodplain management.

A very popular city regulation related to hazard mitigation involves maintaining a floodplain management ordinance, which allows city residents to participate in the National Flood Insurance Program (NFIP). The floodplain management ordinance applies to the areas identified in the city's floodplain map as having a 1% chance of flooding each year. State Center has a sanctioned NFIP membership as of August 13, 1977, and is currently not participating in NFIP.

Technical and Fiscal Resources

The City of State Center operates like many small cities in Iowa. The mayor, council, and city clerk handle the city's daily and long-term operations. Short-term and long-term planning needs like grant writing and management and plan preparation are handled by the local council of government, the Region 6 Planning Commission. The City of State Center is a member of the Commission and uses their services and expertise.

There are multiple ways the City of State Center could finance a hazard mitigation project. This city maintains its own electric and water utilities so fees for these services are available to finance projects. Resources available to the City of State Center are below.

- Grants
- General obligation bonds (up to 5% of City's valuation)
- Revenue bonds through publicly secured sources (paid back using road use tax, local option sales tax in accordance with approved referendum, revenue from certain enterprises, and tax increment financing)
- Capital improvements fund
- Special assessment taxes

Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa. For most projects in State Center, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

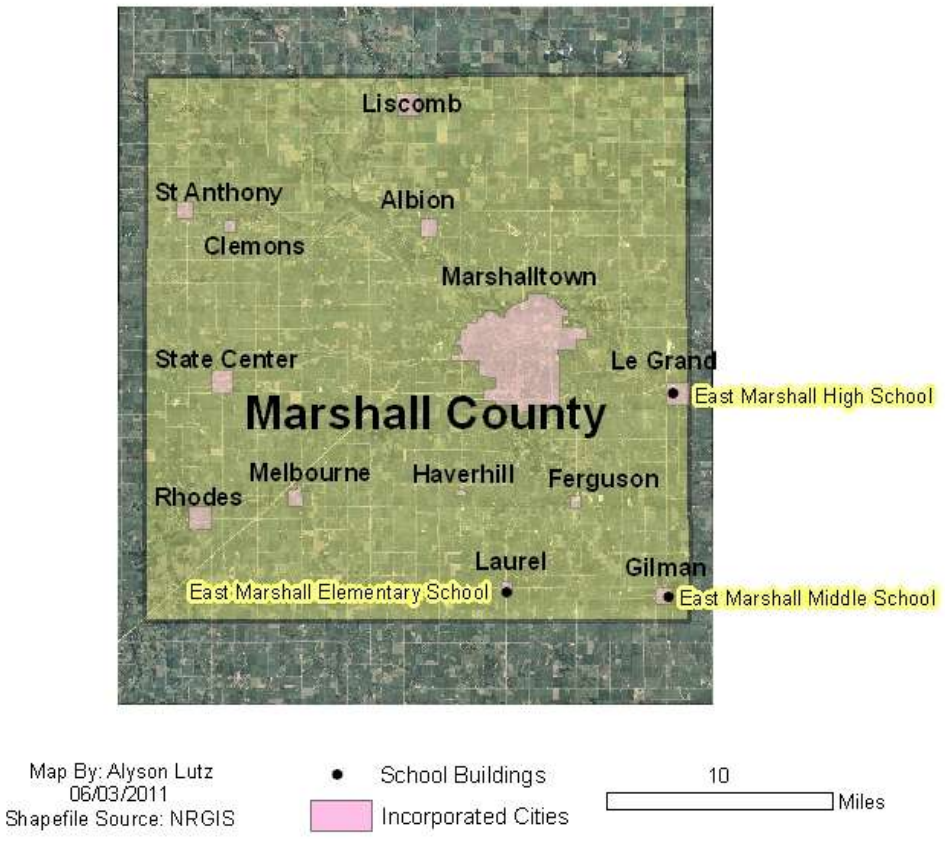
In the years 2009-2010, State Center received some State of Iowa IJobs money and a Challenge Grant to help complete their Brimhall building restoration, along with some local money sources. Currently in 2011, State Center is applying for another Challenge Grant to help fund their City Hall renovation project.

Marshall County School Districts

East Marshall Community School District

The East Marshall Community School District offices are located in Gilman, Iowa, a town in the very southeast corner of Marshall County. The schools are split amongst the cities of Laurel (Elementary), Gilman (Middle), and Le Grand (High). There are about 10 miles between Le Grand in the east central portion of the county and Laurel and Gilman, located in the southeast corner of the county. This district contains the East Marshall Elementary, Middle and High Schools with enrollments of 310, 273, and 298, respectively for the 2010-2011 school year. For more information, visit their website at http://www.e-marshall.k12.ia.us/.

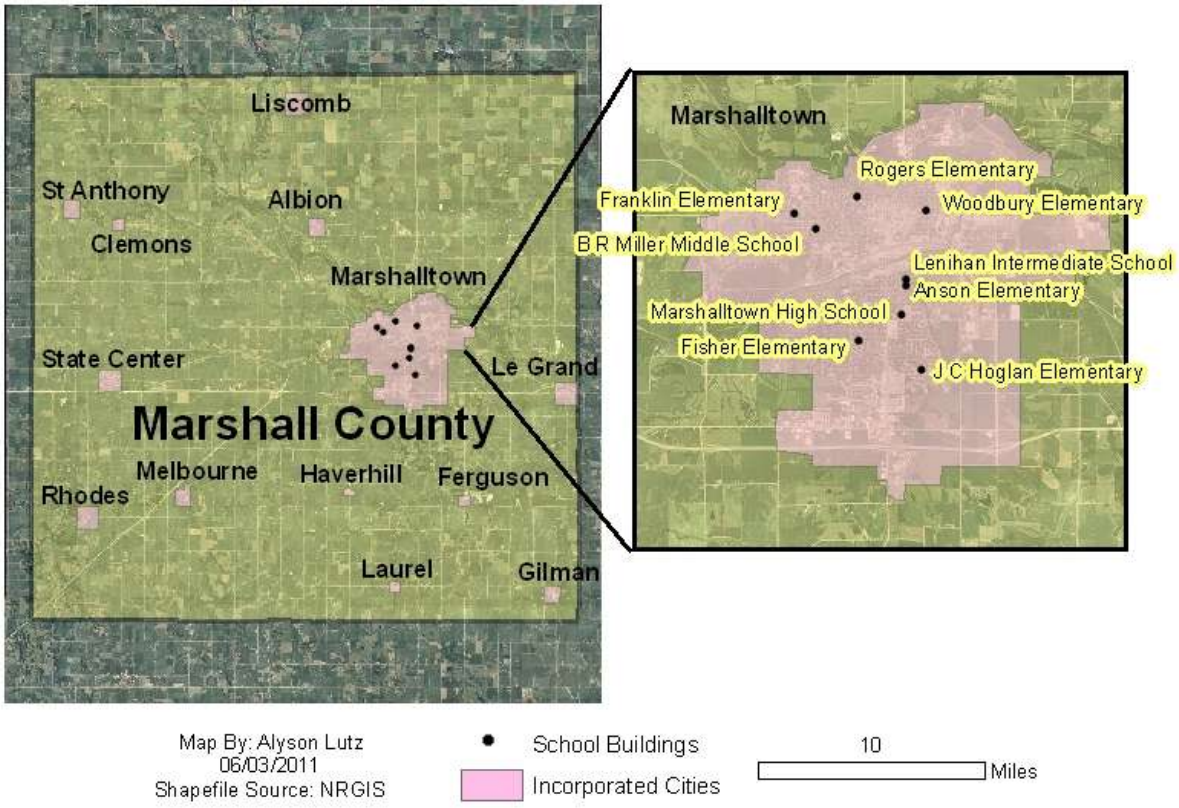
Figure 3.2.14: East Marshall Community School District Buildings



Marshalltown Community School District

The Marshalltown Community School District is the largest school district in the County and solely serves the City of Marshalltown, county seat of Marshall County. Enrollment for this school district is split between the high school, middle school, and 7 elementary schools with 1,561, 721, and 2,703, respectively for the 2010-2011 school year. This is a total of 4,985, for the district. For more information, visit their website at http://www.marshalltown.k12.ia.us.

Figure 3.2.15: Marshalltown Community School District Buildings



Government and Regulation

All of the school districts in Iowa are governed by a local school board that is elected by the public. School boards in Marshall County have either a five or seven-member board depending on how the district is divided. One member of the school board is chosen to be its president. Each school district's school board has several responsibilities and legal authorities. According to the Iowa Association of School Boards, some of the authorities include:

- Determine major educational goals and objectives, and implement a means of attaining the goals (mitigation through education)
- Adopt board policy which establishes the rules governing the operations of the school district (mitigation integrated into school policy)
- Utilize funds received through gifts, devises and bequests in the general or schoolhouse fund, unless limited by the terms of the grant (funding for mitigation projects)
- Insure against loss of property (major mitigation goal)
- Determine attendance centers for the district and the particular school each child will attend (determine the distance students must travel)
- Provide transportation services (transportation is extremely vulnerable to hazards)
- Incur indebtedness when authorized by the voters of the school corporation at an election (funding for mitigation projects)

This is not an exhaustive list of authority, but these are the authorities most relevant to hazard mitigation. Overall, the school board of the Marshall County school district can be extremely influential in the effectuation of hazard mitigation projects.

Aside from the school board, the superintendent and school district staff are extremely important to the operation of the school district. The superintendent is appointed by the school board and given the responsibility of running the daily and long-term operations of the school district. Along with each school building's principal, teachers, and staff, the superintendent is a key person in completing a hazard mitigation project.

Like all school districts in Iowa, each school building has emergency response plans in place. Emergency response activities like fire drills and student relocation during tornadoes or severe storms are practiced regularly. Many school buildings, though, do not have any prevention or mitigation measures in place.

Technical and Fiscal Resources

Each school district's school board, superintendent and staff, principals, teachers, and school staff are responsible for the district and each school building's daily and long-term operations. The public does have quite a bit of influence because it elects school board members and approves school tax levies in the community. Most planning efforts are handled within the school district and community unless recreational trails or hazard mitigation are involved. In those cases, the local council of government often gets involved.

Other Mitigation Activities

Each school district has plans and procedures for handling many hazards already like fire, tornado, severe weather, etc. The established procedures for these hazards are practiced on a regular basis through planned drills at school facilities. The Marshalltown Community School District received money in 2007 for Safe Routes to School. This program not only encourages kids to bike and walk to school, but helps school districts fund sidewalk and trail additions and improvements, which may help reduce traffic accidents involving pedestrians. A local social group in Marshalltown walked the community to assess need and sidewalks were paved or refinished accordingly. Recently in 2010, these were complete, 2 segments being around the Lenihan Intermediate School and Hoglan Elementary School. In 2008 Marshalltown CSD also attempted, in cooperation with the Community YMCA, a 'walking school bus'. Unfortunately, it had poor attendance and was discontinued.

4 Risk Assessment

44 CFR Requirement §201.5(c)(2): [The plan shall include] a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The goal of the risk assessment is to estimate the potential loss in Marshall County, including loss of life, personal injury, property damage, and economic loss from a hazard event. The risk assessment process allows communities in Marshall County to better understand their potential risk from natural hazards and provide a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events. (Adapted from the Neosho County, MO 2009 Multi-hazard Mitigation Plan)

4.1 Hazard Identification

Ultimately, the hazards chosen for the plan were determined by the Planning Team. First, Region 6 identified the hazards most likely to affect the county based on the 2010 Iowa Hazard Mitigation Plan, past disaster declarations in Iowa, research, and knowledge of the area.

Iowa has experienced 32 presidential declared disasters since 1990. The state's most recent disaster occurred in late summer of 2011, as severe storms and flooding affected 2 counties on the eastern Iowa border, granting them a Presidential Disaster Declaration as a result. Iowa's disaster declarations are listed below.

Table 4.1.1: Disaster Declarations in Iowa 1990-2011

Date Declared	Disaster Type
08/30/2011	Severe Storms and Flooding
08/24/2011	Severe Storms, Straight-Line Winds, And Flooding
06/27/2011	Flooding
5/5/2011	Severe Storms, Tornadoes
7/29/2010	Severe Storms, Flooding, Tornadoes
7/27/2010	Severe Storms and Flooding
3/2/2010	Severe Winter Storms
2/25/2010	Severe Winter Storms
8/13/2009	Severe Storm
5/27/2008	Severe Storms, Tornadoes, Flooding
1/4/2008	Severe Winter Storm
9/14/2007	Severe Storms, Flooding
5/25/2007	Severe Storms, Flooding, Tornadoes
3/30/2007	Snow
3/14/2007	Severe Winter Storms
9/10/2005	Hurricane Katrina Evacuation
5/25/2004	Severe Storms, Tornadoes, Flooding
6/19/2002	Severe Storms, Flooding
5/2/2001	Severe Storms, Flooding
7/22/1999	Severe Storms, Flooding
5/21/1999	Severe Storms, Flooding, Tornadoes
7/2/1998	Severe Weather, Tornadoes, Flooding
11/20/1997	Severe Snow Storms
8/21/1996	Flooding
6/24/1996	Flooding
7/9/1993	Flooding, Severe Storm
4/26/1993	Flooding, Severe Storm
10/2/1992	Flooding, Severe Storm
12/26/1991	Ice Storm
7/12/1991	Flooding, Severe Storm
9/9/1990	Flooding, Severe Storm
5/26/1990	Flooding, Severe Storm

Data Source: Iowa Homeland Security, April 2011

According to Iowa's presidential disaster declaration history, severe storms, severe winter storms, tornadoes, and flooding are the hazards that most frequently reach disastrous levels. Marshall County was not included in all of these disaster declarations. According to available data, Marshall County was included in nine disaster declarations since 1990. These disasters involved the hazards listed as reaching disastrous levels most often. Its most recent disaster declaration was for straight-line winds on July 11 that affected 4 horizontally adjacent counties across central Iowa.

To start narrowing down the number of hazards, Region 6 started with the list of hazards that includes all those identified in Iowa's 2010 hazard mitigation plan. For this 2010 update, the list of 23 (of 24) manmade hazards was consolidated into 7 more generalized hazard categories. This consolidation can be seen in Table 4.1.2.

Table 4.1.2: Consolidated Man Made Hazards

2010 Hazard	*2007 Hazards*
Human Disease	Human Disease Incident; Pandemic Human Disease
Hazardous Materials	Fixed Hazardous Materials; Pipeline Transportation; Transportation Hazardous Materials
Infrastructure Failure	Communication Failure; Energy Failure; Structural Failure; Structural Fire
Transportation Incident	Air Transportation; Highway Transportation; Railway Transportation; Waterway Incident
Terrorism	Enemy Attack; Biological Terrorism; Agro-Terrorism; Chemical Terrorism; Conventional Terrorism; Cyber Terrorism; Radiological Terrorism; Public Disorder
Radiological	Fixed Radiological Incident; Transportation Radiological Incident

Source: 2010 Iowa Hazard Mitigation Plan

Animal/Crop/Plant Disease was the only man made hazard not consolidated with other hazards. The list of natural hazards stayed the same with 16 total. Region 6 decided that all hazards from the comprehensive list (Table 1.1) had a possibility of affecting the county, so the list provided to the planning team is the same as the entire list of hazards identified by the 2010 State Plan. The hazards that were considered a general threat are listed in Table 4.1.3.

Table 4.1.3: Probable Marshall County Hazards

Natural Hazards	Man-made Hazards
Drought	Animal/Crop/Plant Disease
Dam Failure	Hazardous Materials Incident
Earthquake	Human Disease
Extreme Heat	Infrastructure Failure
Expansive Soils	Radiological
Flash Flood	Terrorism
Grass or Wildland Fire	Transportation Incident
Hailstorm	
Landslide	
Levee Failure	
River Flood	
Severe Winter Storm	
Sink Holes	
Thunderstorm and Lightning	
Tornado	
Windstorm	

At the countywide meetings, the Planning Team was asked to agree or disagree with the list of hazards in Table 4.1.3. The entire list of possible hazards was provided so Planning Team members could add hazards to the list. Members were also able to eliminate hazards if they could provide sufficient reasoning. Hazards not on the list were also welcome to be added. The final list of hazards for Marshall County is found on the next page.

The final list of hazards for Marshall County includes all except two of the natural hazards suggested by Iowa's State Hazard Mitigation Plan. The two hazards removed from the list are expansive soils and landslides, because they are not an issue in Marshall County.

44 CFR §201.6(c)(2)(i): *[The risk assessment shall include a] description of the type… of all natural hazards that can affect the jurisdiction…*

The following table lists all the natural hazards along with all of the manmade hazards that could possibly affect Marshall County. Definitions are included so there is consistency in how each hazard is understood in the context of this plan.

Table 4.1.4: Marshall County Hazards and Definitions

Hazard	Definition
Drought	Lack of precipitation for a long period of time
Dam Failure	A break in or threat from any water retention fixture
Earthquake	Shaking or vibrating of the earth
Extreme Heat	Temperatures in excess of 100 degrees Fahrenheit or 3 days of 90+ degrees
Flash Flood	Flooding with little or no warning where water levels rise at a fast rate
Grass or Wildland Fire	Uncontrolled fire that threatens life and property
Hailstorm	Balls or irregularly shaped lumps of ice fall with rain
Levee Failure	Loss of structural integrity of a wall, dike, berm, or elevate soil by erosion, piping, saturation, or under seepage causing water to inundate normally dry areas.
River Flood	Rising or overflowing of a body of water onto adjacent land
Severe Winter Storm	Severe winter weather conditions that affect day-to-day activities
Sinkholes	Collapsed land surface
Thunderstorms and Lightning	Heavy rains, high speed winds, tornadoes, hail
Tornado	Rotating column of air with wind speeds that can exceed 200 miles per hour
Windstorm	Extreme winds associated with severe storms
Animal/Crop/Plant Disease	Medical, health, or sanitation threat to wildlife or domestic animals
Hazardous Materials Incident	Accidental release of chemical substances or mixtures that presents danger to the public health or safety
Human Disease	A medical, health, or sanitation threat to the general public (such as contamination, epidemics, plagues, and insect infestation
Infrastructure Failure	Communication Failure, Energy Failure, Structural Failure, and Structural Fire; including an extended interruption, widespread breakdown, or collapse (part or all) of any public or private infrastructure that threatens life and property
Radiological	An incident resulting in a release of radiological material in transport or at a fixed facility to include power plants, hospitals, laboratories and the like
Terrorism	Enemy attack, biological terrorism, agro-terrorism, chemical terrorism, conventional terrorism, cyber terrorism, radiological terrorism, and public disorder
Transportation Incident	Air transportation, highway transportation, railway transportation, and waterway incident

The natural hazards suggested by both FEMA and the State Hazard Mitigation Plan that are not being included in this particular plan are expansive soils, landslides. Expansive soils are not found in Marshall County and are not considered further in this Plan. Also, the lack of major elevation changes within Marshall County does not constitute a landslide threat to the people and property of Marshall County. Like expansive soils, landslides are not considered further in this Plan.

Across Marshall County, there is variance in what hazards can affect particular jurisdictions. Some communities do not have major transportation routes and others are not susceptible to sinkholes. Marshall County is just one percent of Iowa's land area, but even in such a relatively small area, hazards vary in their coverage. Refer to Table 4.1.5 for the hazards identified for each jurisdiction in Marshall County.

Table 4.1.5: Marshall County Hazard Boundaries

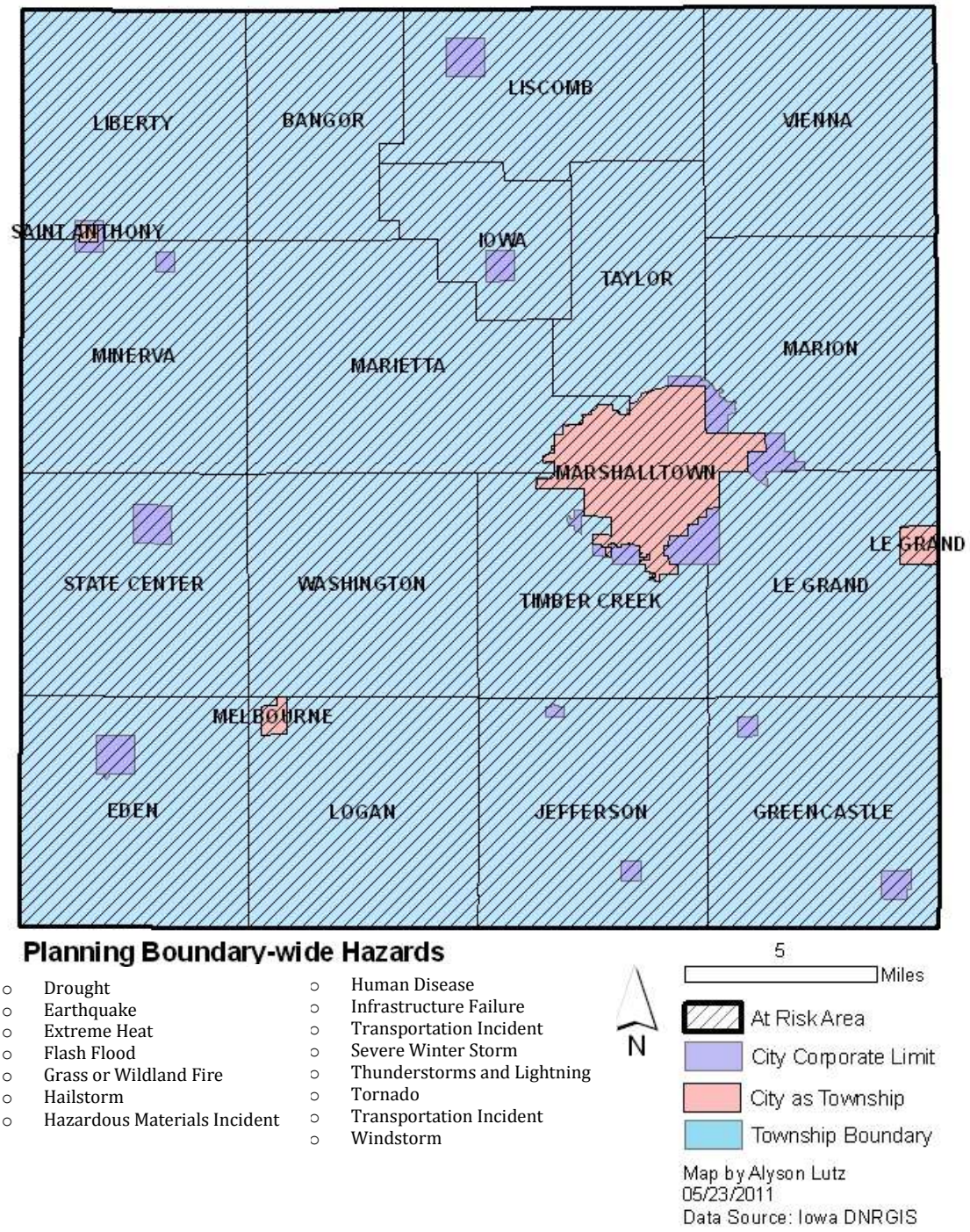
Hazard	Jurisdictions	Source(s) of Identification
Tornado	All Jurisdictions	Local knowledge 2010 Iowa Hazard Mitigation Plan NCDC Data Past Disaster Declarations
River Flood	Albion Clemons Ferguson Gilman Laurel Le Grand Liscomb Marshalltown Rhodes St Anthony State Center Unincorporated Marshall County East Marshall School District* Marshalltown School District*	Local knowledge 2010 Iowa Hazard Mitigation Plan NCDC Data FEMA FIRM Maps Past Disaster Declarations
Severe Winter Storm	All Jurisdictions	Local knowledge 2010 Iowa Hazard Mitigation Plan NCDC Data Past disaster declarations
Hazardous Materials Incident	All Jurisdictions	Local knowledge 2010 Iowa Hazard Mitigation Plan Marshall County EMC Data
Radiological	Le Grand Unincorporated Marshall County East Marshall School District	Local knowledge 2010 Iowa Hazard Mitigation Plan Marshall County EMC Data
Dam Failure	Gilman Le Grand Marshalltown Rhodes Unincorporated Marshall County East Marshall School District* Marshalltown School District*	2010 Iowa Hazard Mitigation Plan Iowa DNR Data
Hailstorm	All Jurisdictions	Local knowledge 2010 Iowa Hazard Mitigation Plan NCDC Data
Animal/Crop/Plant Disease	Unincorporated Marshall County	Local knowledge 2010 Iowa Hazard Mitigation Plan
Terrorism	Marshalltown Unincorporated Marshall County Marshalltown School District	Local knowledge 2010 Iowa Hazard Mitigation Plan Marshall County EMC Data
Drought	All Jurisdictions	2010 Iowa Hazard Mitigation Plan

Extreme Heat	All Jurisdictions	Local knowledge 2010 Iowa Hazard Mitigation Plan NCDC Data
Flash Flood	All Jurisdictions*	Local knowledge 2010 Iowa Hazard Mitigation Plan NCDC Data
Grass/Wildland Fire	All Jurisdictions	Local knowledge 2010 Iowa Hazard Mitigation Plan NCDC Data
Windstorm	All Jurisdictions	Local knowledge 2010 Iowa Hazard Mitigation Plan NCDC Data
Infrastructural Failure	All Jurisdictions	Local knowledge 2010 Iowa Hazard Mitigation Plan Marshall County EMC Data
Transportation Incident	All Jurisdictions	Local knowledge 2010 Iowa Hazard Mitigation Plan Iowa DOT Data
Levee Failure	Marshalltown Unincorporated Marshall County Marshalltown School District*	Local knowledge 2010 Iowa Hazard Mitigation Plan Marshall County EMC Data
Sinkholes	Albion Ferguson Le Grand Liscomb Marshalltown Unincorporated Marshall County East Marshall School District* Marshalltown School District*	Local knowledge 2010 Iowa Hazard Mitigation Plan Iowa DNR Data Marshall County EMC Data
Human Disease	All Jurisdictions	Local knowledge 2010 Iowa Hazard Mitigation Plan Marshall County EMC Data Newspaper Records
Earthquake	All Jurisdictions	Local knowledge 2010 Iowa Hazard Mitigation Plan Marshall County EMC Data
Thunderstorms and Lightning	All Jurisdictions	Local knowledge 2010 Iowa Hazard Mitigation Plan NCDC Data

*The East Marshall and Marshalltown School Districts are identified as being affected by River Flooding, Flash Flooding, Dam Failures, Sinkholes, and Levee Failure (Marshalltown only) because they identified with their cities' chosen hazards. No buildings in either district are have been affected by these hazards, individually. None of the buildings in either district are located in a flood plain.

Maps are also a valuable tool for displaying which jurisdictions are affected by hazards. The following pages include maps that depict each hazard's coverage among the jurisdictions in the planning boundary.

Figure 4.1.1: Planning Boundary-wide Hazards



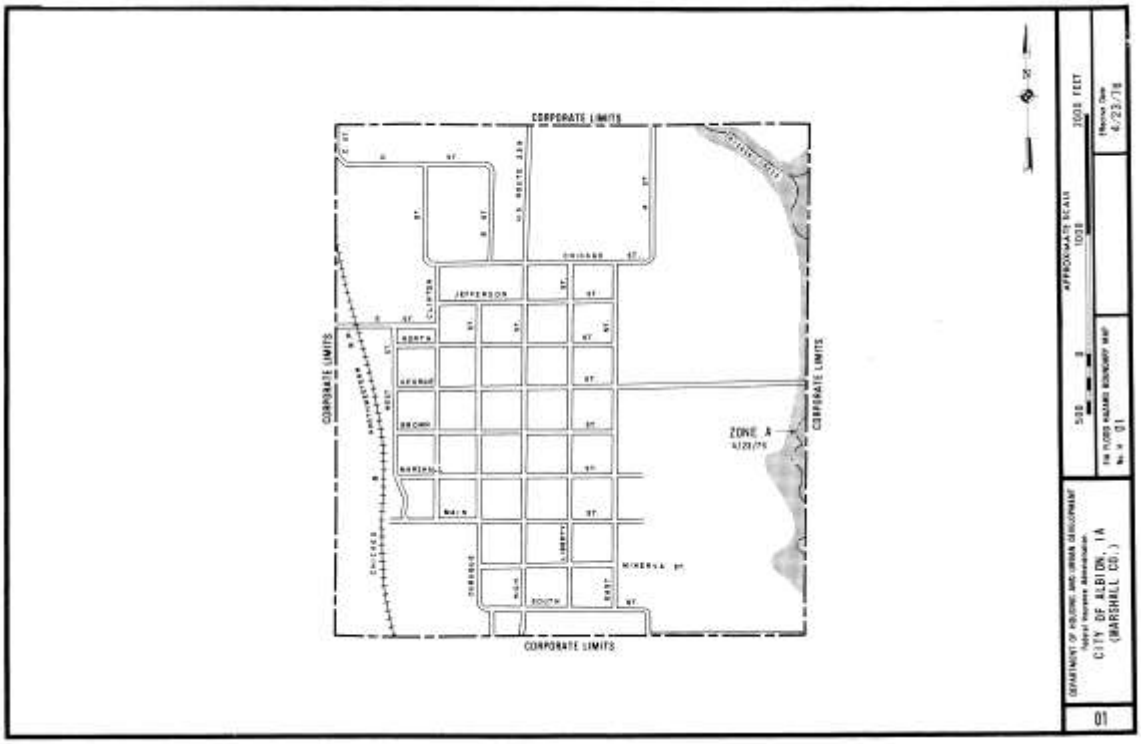
Special Flood Hazard Areas

A GIS overlay of a flood plain map was performed by the County GIS Coordinator. In the flood boundary, 72 structures were estimated to be present (ranging from small outbuildings to residences to commercial buildings). A large majority were along the Iowa River and Linn Creek which run through Marshalltown. Most other water bodies run through rural areas of the county, therefore not being a major threat to high concentrations of buildings, rather farmland and associated buildings. During the 5 years in-between plans, the Planning Team will investigate to confirm that this is the case, and valuations, if available, can be determined.

The Flood Insurance Rate Maps (FIRMs) below depict the Special Flood Hazard Areas in Marshall County, which indicate the areas that have 1% chance of flooding each year. A portion of each Marshall County jurisdiction is located in a Special Flood Hazard Area. As far as FEMA mapping is concerned, these are the only communities that have any flood plain mapping completed. There are no records for the cities of Gilman, Haverhill, Laurel, Liscomb, Melbourne, Rhodes, St. Anthony, or State Center. The specific boundaries of flooding for each jurisdiction will be discussed in the flood section of this plan.

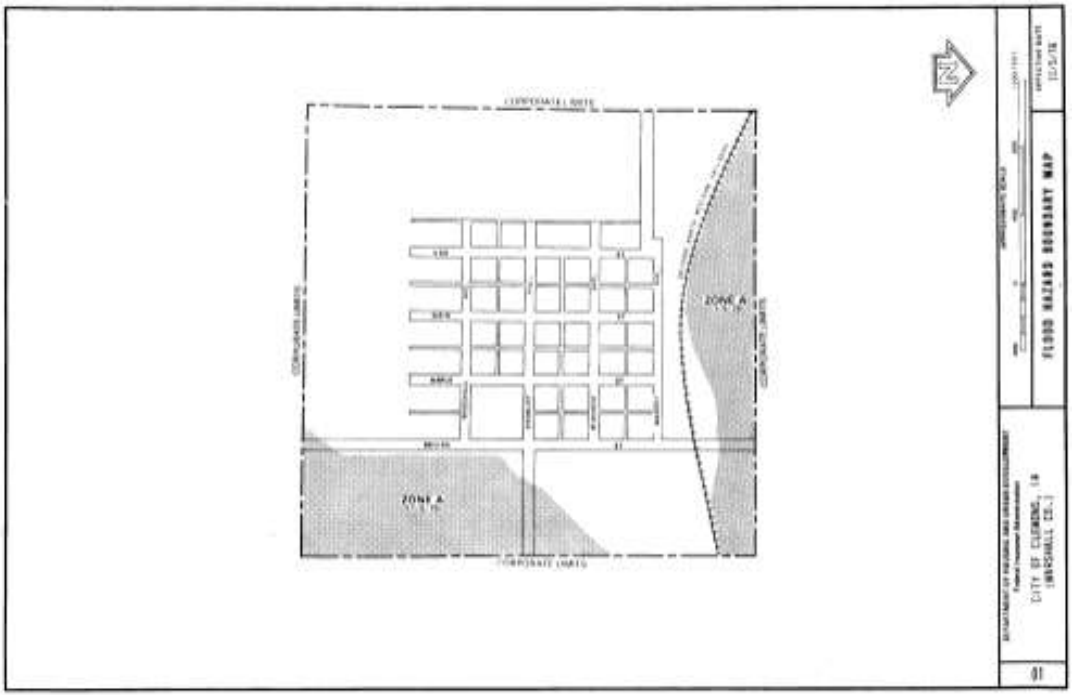
Figure 4.1.2: Special Flood Hazard Areas

City of Albion

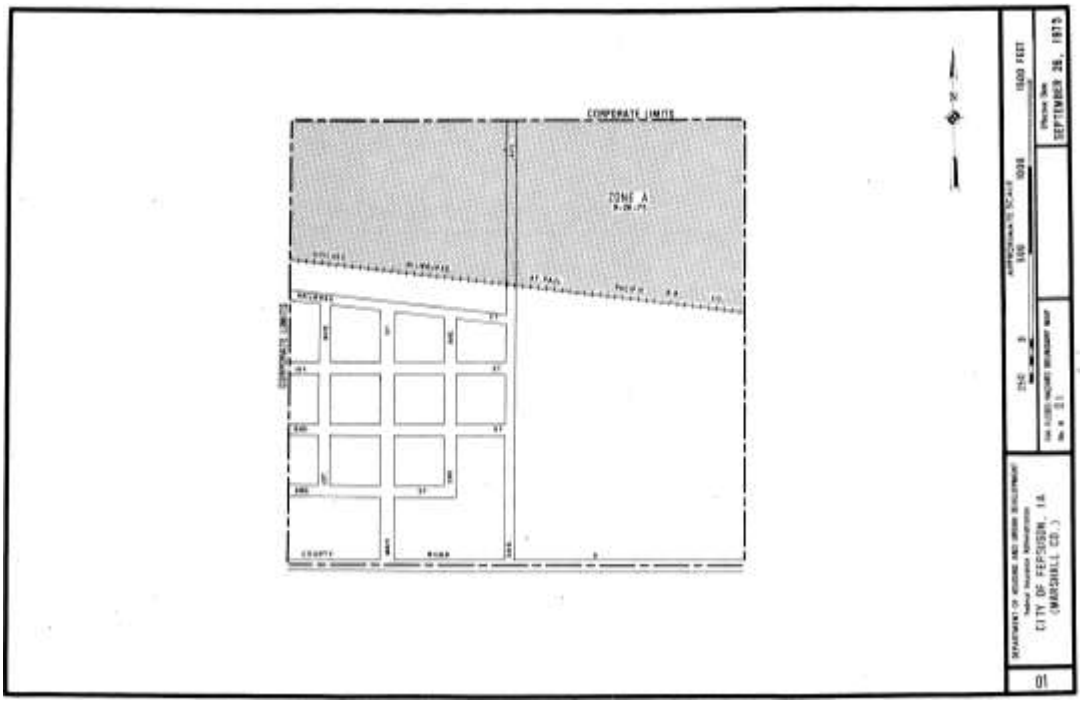


Data Source for all FIRMs: FEMA Map Service Center,2010

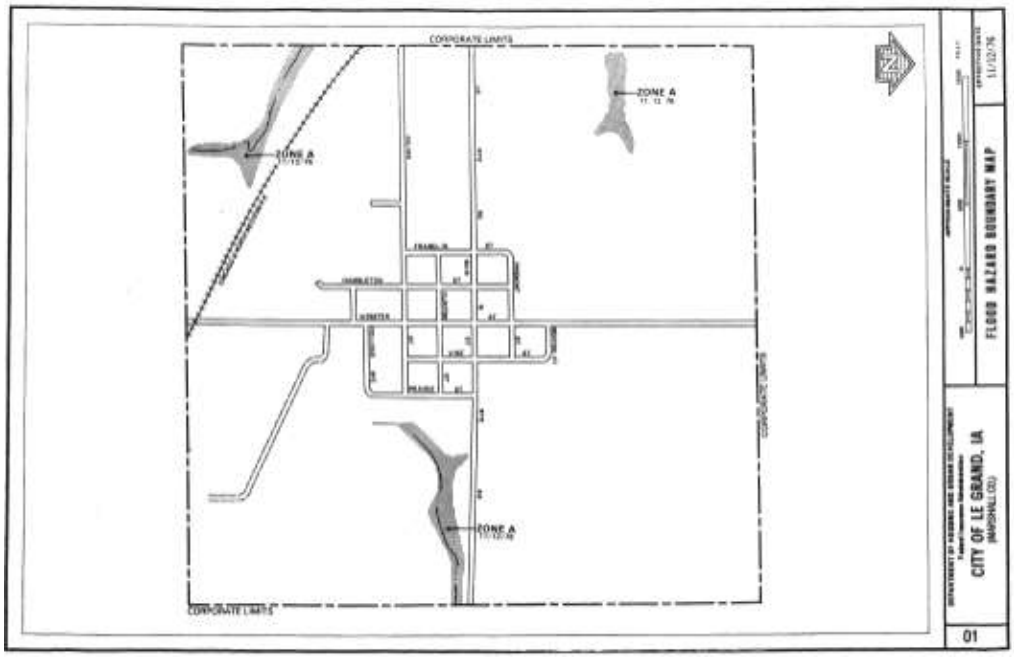
City of Clemons



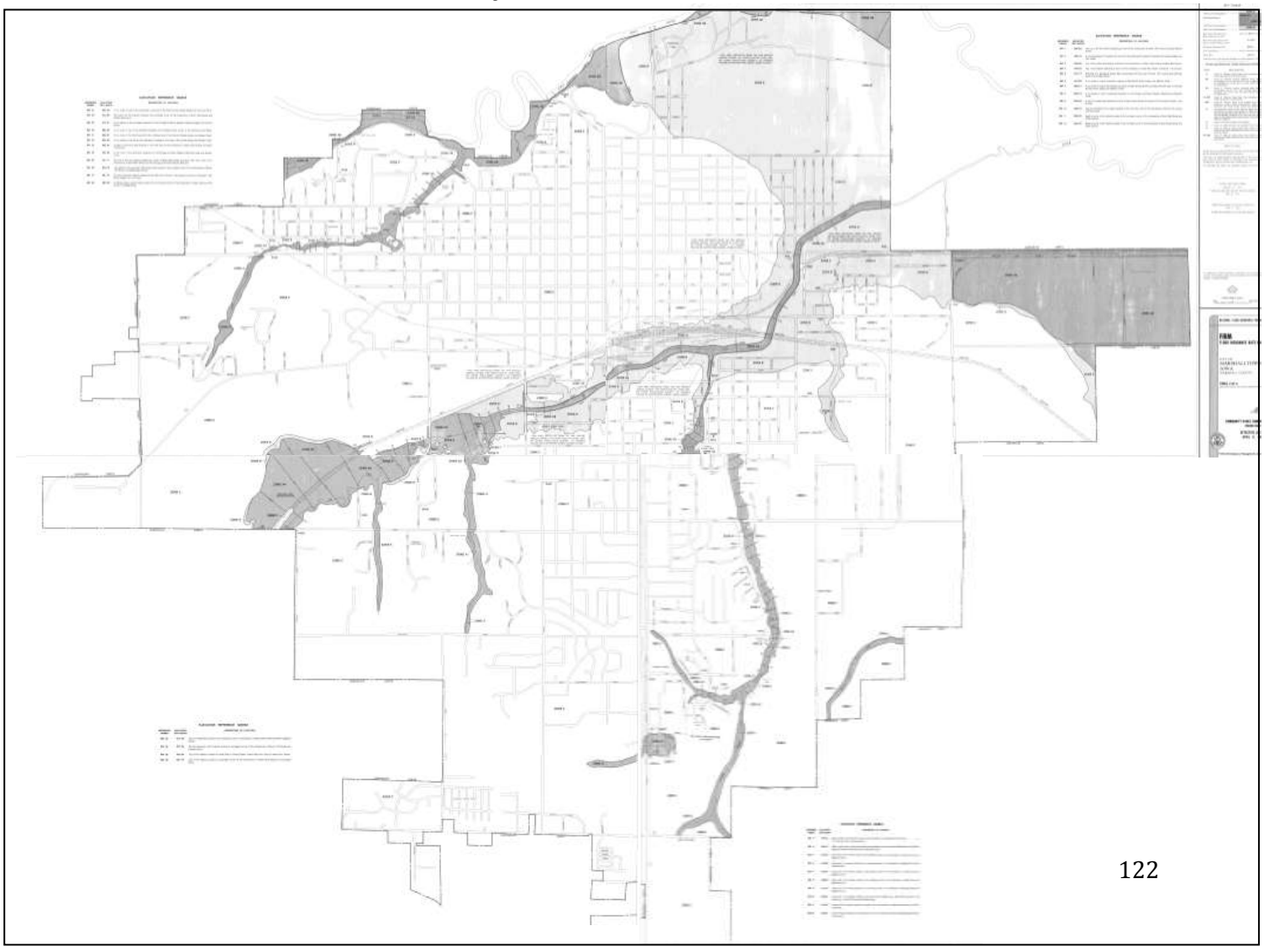
City of Ferguson



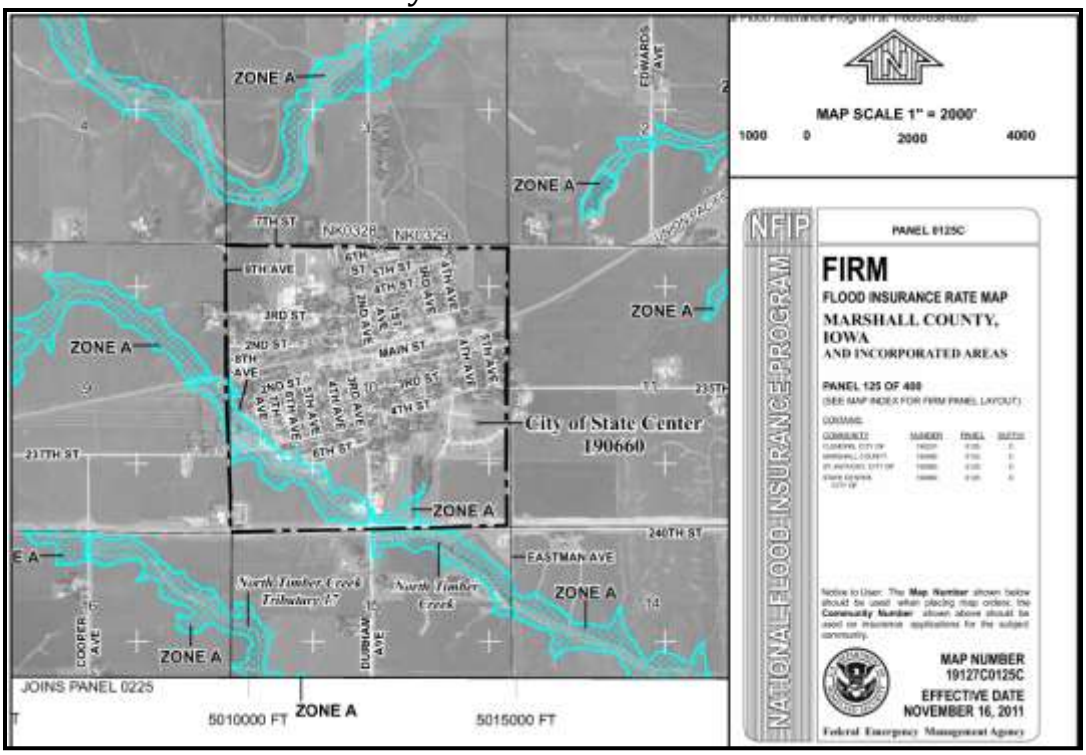
City of Le Grand



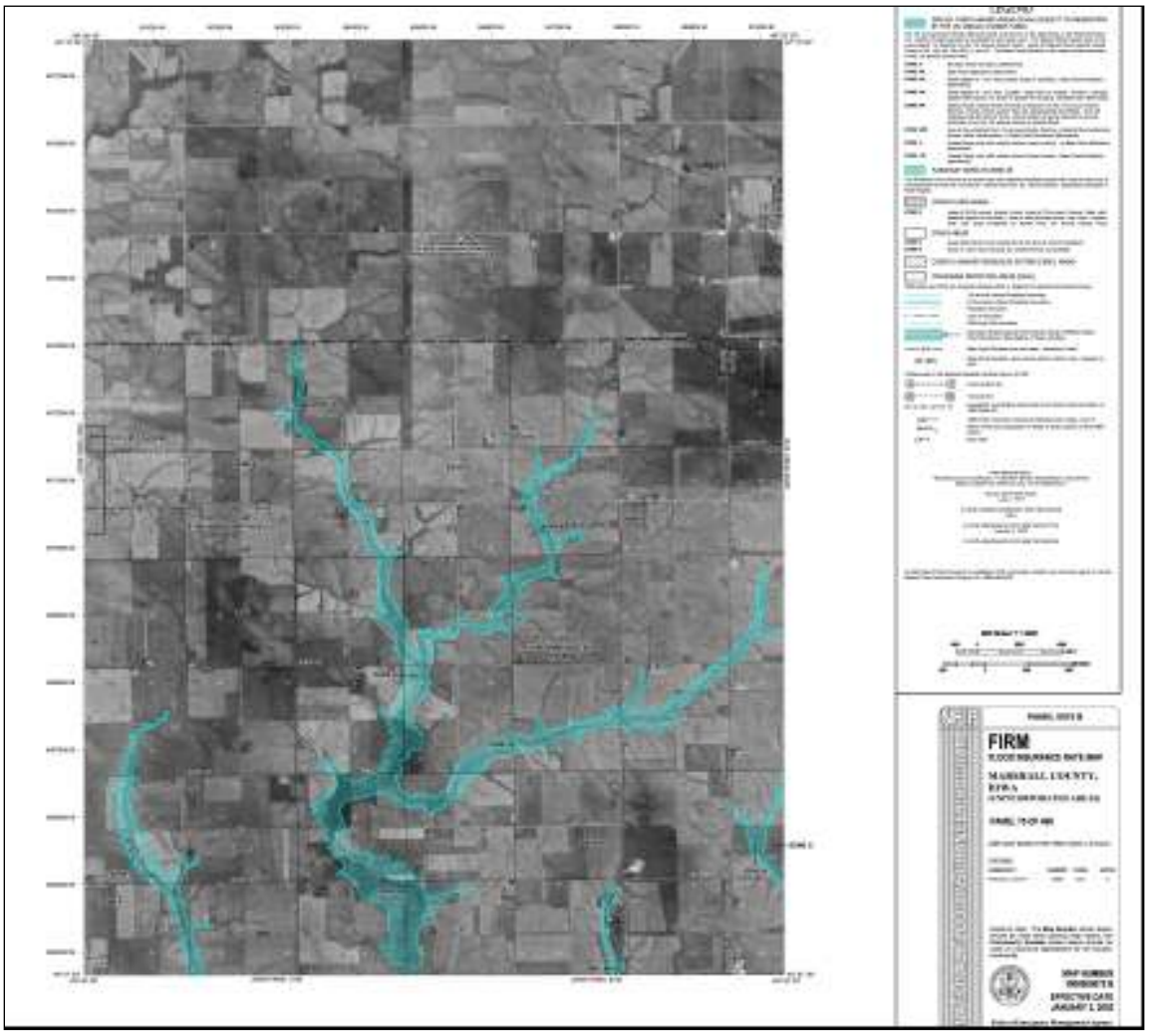
City of Marshalltown



City of State Center



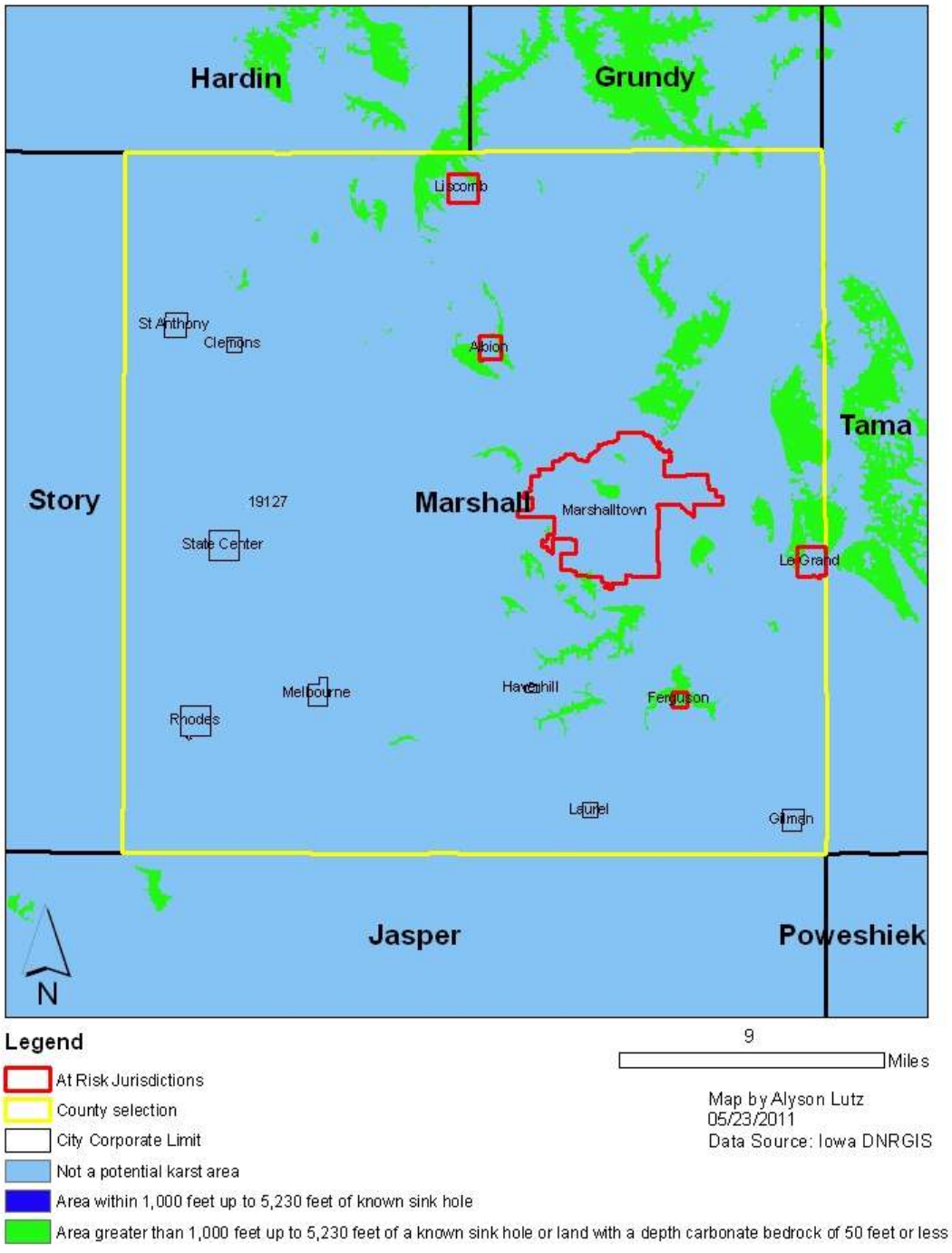
Marshall County



Sink Holes

Karst describes soils as an indicator of possible sink holes. The map below shows areas that are either near or vulnerable to the sinkhole hazard. There are seven cities in Marshall County that are vulnerable in terms of sink holes with large portions of the rural county also being vulnerable to this hazard, mostly in the east.

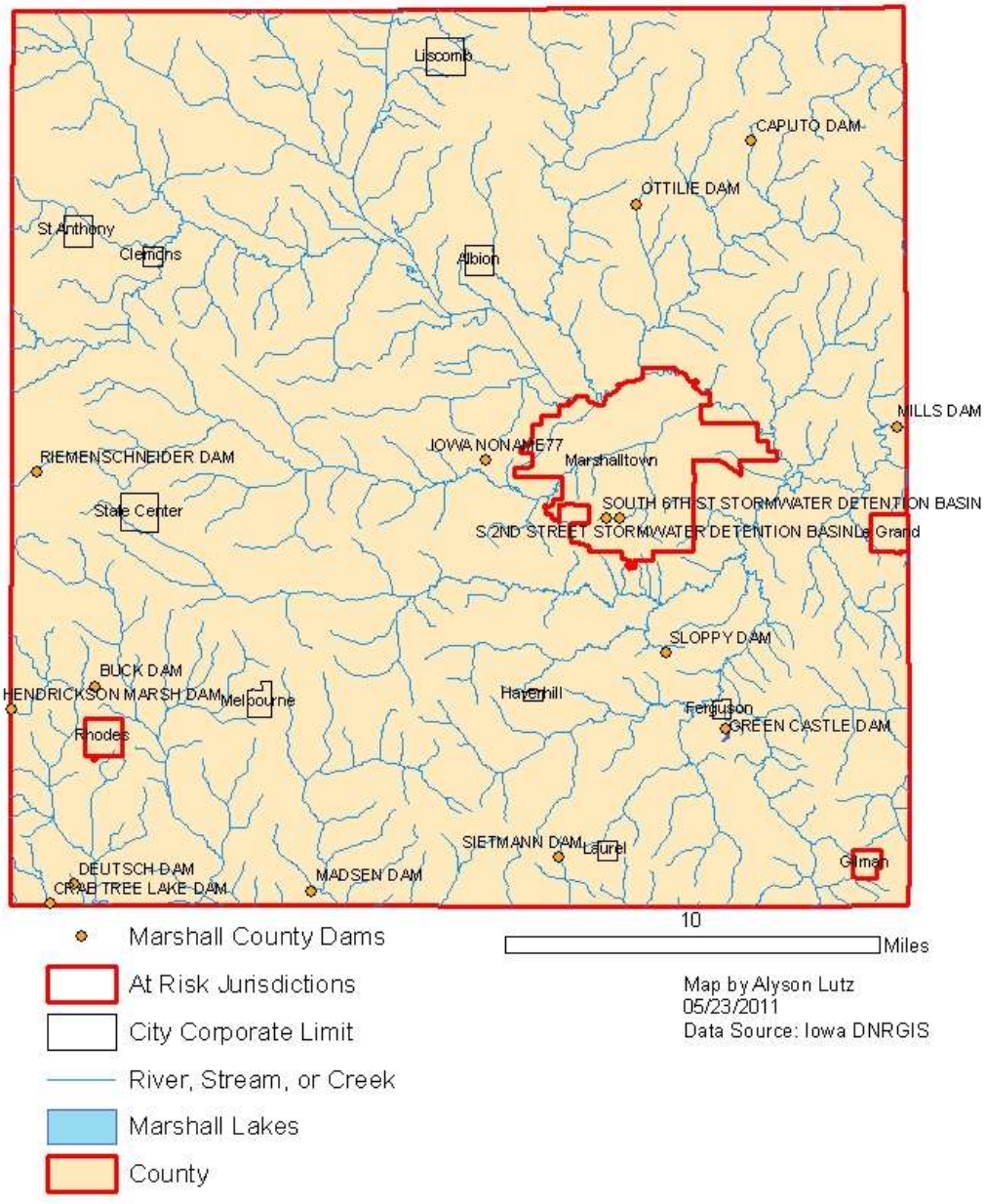
Figure 4.1.3: Sink Holes



Infrastructure Failure

There are 15 dams located on the waterways of Marshall County, 2 of which are in the corporate city boundaries of Marshalltown. All of the dams in Marshall County will likely only cause minor damage if breeched. The Green Castle Dam is located on the north side of Green Castle Lake, and can possibly cause loss of life to unincorporated residents living in the area. A lake is a body of water not to be underestimated; generally all areas near and downstream from a failed dam can be adversely affected by a dam failure. In this case, the city closest downstream is Gilman, about 6 miles away. Just in case this hazard may occur, the jurisdictions that are downstream from a dam were identified to be within dam failure hazard boundaries.

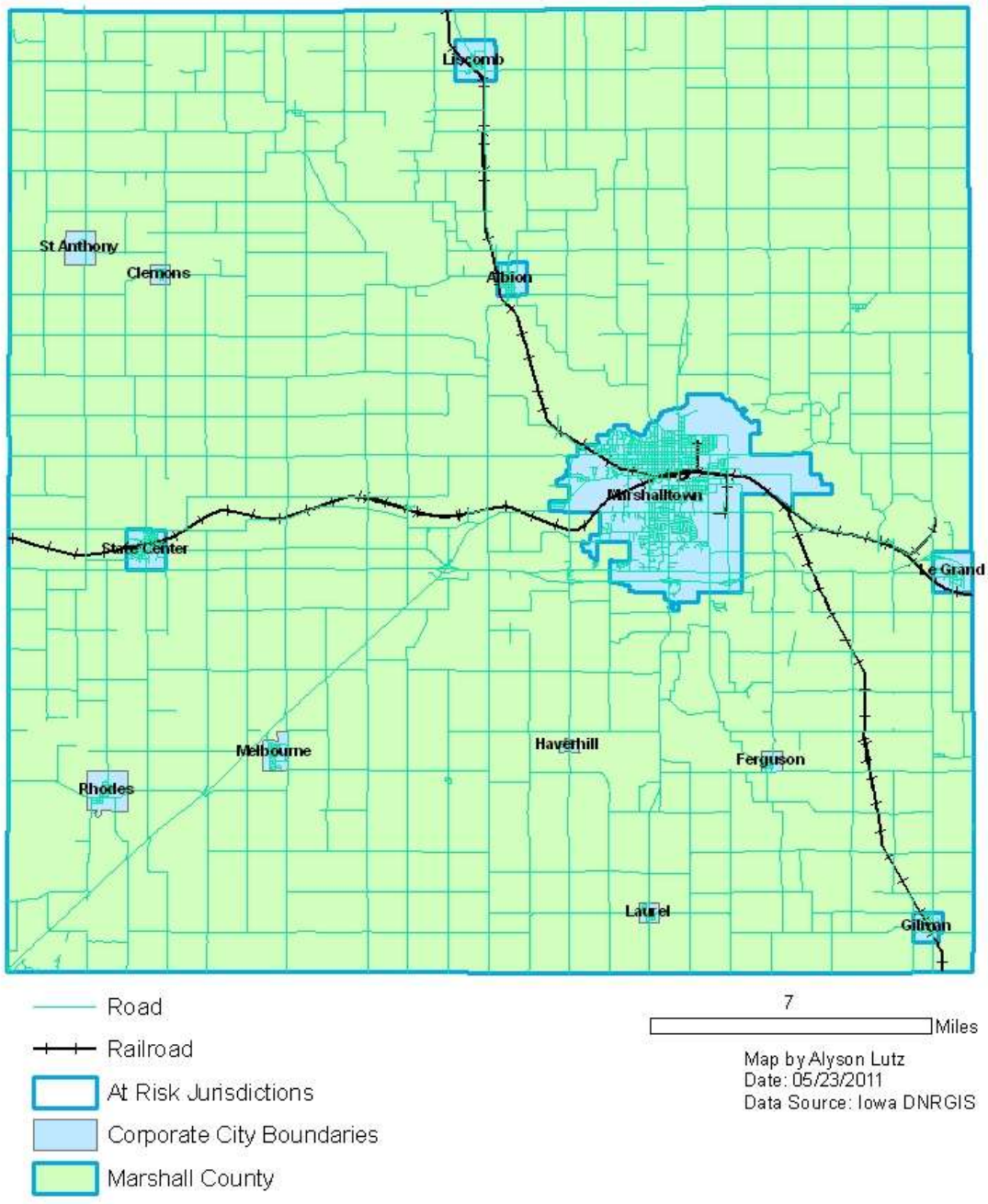
Figure 4.1.4: Dam Failure



Transportation Incidents

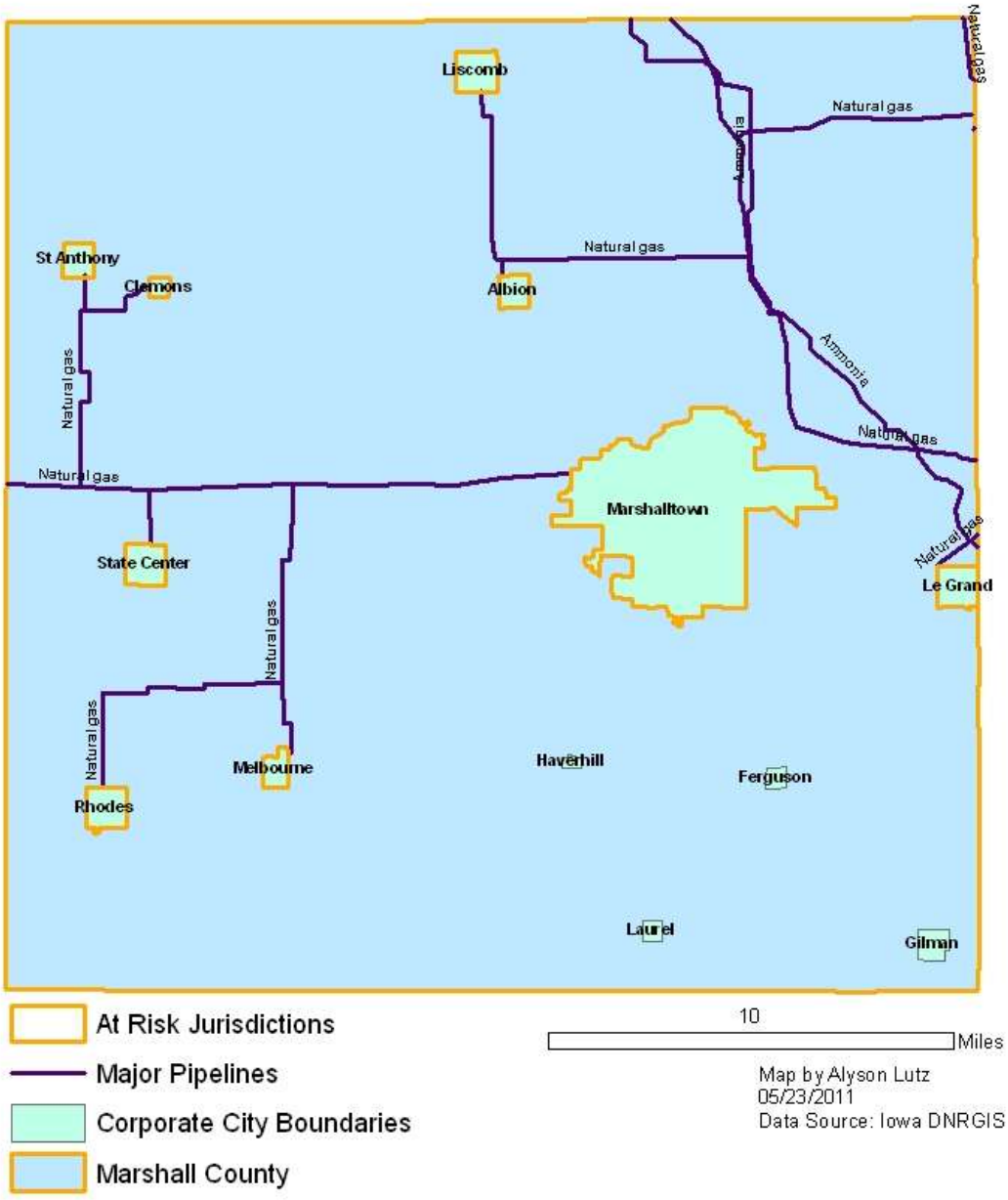
A Union Pacific rail line runs north-south from the most north central point of Marshall county to the very southeast corner. This line goes through the cities of Liscomb, Albion, Marshalltown, and Gilman. Another Union Pacific rail line runs east-west through the center of the county, intersecting State Center, Marsahlltown, and Le Grand. Only the jurisdictions along the rail line should be at risk for a rail transportation incident. Overall, six of fourteen municipal jurisdicitons are at risk for a rail transportation incident. Unincorporated Marshall County is listed, but only the immediate surroundings of the rail line throughout the county are most at risk.

Figure 4.1.5: Rail Lines of Marshall County



Major pipelines run through or by most jurisdictions in Marshall County with the exception of Ferguson, Gilman, Haverhill, and Laurel. At least for natural gas lines, looking at the natural gas utility service availability in the county is an indicator besides this map. All of the lines that run through the county are natural gas with just one ammonia line.

Figure 4.1.6: Pipelines of Marshall County

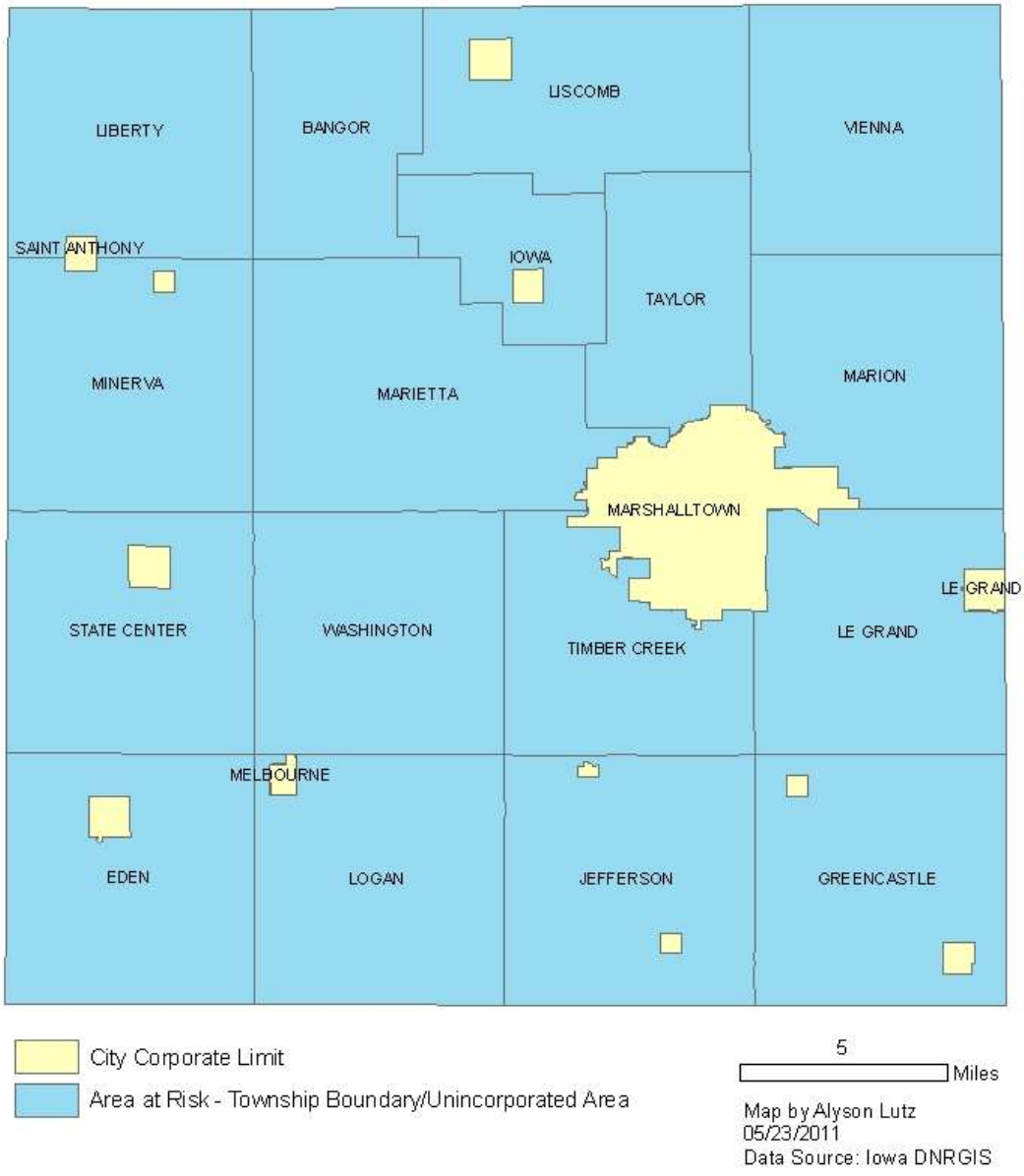


As seen in Table 4.1.2, Railway Transportation Incident and Pipeline Transportation Incident are now included in the Transportation Incident man made hazard.

Animal/Crop/Plant Disease

Marshall County identified Animal/Crop/Plant Disease as a potential hazard. The most at risk areas are in the unincorporated portion of the county, which is more rural with livestock and wildlife. The incorporated cities of the county are much less likely to be affected by this hazard since there is very little, if any, livestock located within city corporate limits.

Figure 4.1.7: Animal/Crop/Plant Disease



4.2 Profiles

44 CFR Requirement §201.6(c)(2)(i): [The risk assessment shall include] a description of the location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

All hazards that could possibly affect Marshall County were profiled. This was done through review of the Iowa Hazard Mitigation Plan, past events and declared disasters, reviewing data from Marshall County Emergency Management, and other research.

The actual profiles of each possible hazard are based on the format used by Iowa's 2010 hazard mitigation plan. The following information for hazards in Marshall County is addressed:

- Definition of the hazard
- General description of the hazard
- Historical occurrence of the hazard
- Probability of the hazard occurring in the future
- Magnitude/Severity of the hazard's potential impact on human life and property
- Warning time before the hazard occurs
- Duration of the hazard's affect on the area

The hazard scoring and ranking method from Iowa's 2010 plan is also used and included in the hazard profiles in the following pages. Refer to pages 170-171 for an explanation of the score for each element of the hazard profiles. The total score for each hazard is at the bottom of its profile. The higher the score, the higher priority the hazard is in Marshall County. The hazards will be formally ranked in the next step of the planning process.

Note that the hazards are listed first by type, natural or man-made, then alphabetically so the order does not indicate any sort of ranking. The hazards will be ranked in the next step of the planning process.

Dam Failure [A break in, or imposed threat from, any water retention fixture which may endanger population downstream of the containment area]

Description

Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation, and recreation. Flooding, operating error, poor construction, lack of maintenance, damage due to burrowing animals, vandalism, terrorism, and earthquakes can cause dam failure. Dams are classified into three categories based on the potential risk to people and property should a failure occur: High Hazard – if the dam was to fail, lives would be lost and extensive property damage could result; Moderate Hazard – failure could result in loss of life and significant property damage; and Low Hazard – failure results in minimal property damage only. The classification may change over time because of development downstream from the dam since it construction. Older dams may not have been built to the standards of its new classification. Dam hazard potential classifications have nothing to do with the material condition of a dam, only the potential for death or destruction due to the size of the dam, the size of the impoundment, and the characteristics of the area downstream of the dam. The Iowa Department of Natural Resources tracks all dams in the State of Iowa with a height of at least 25 feet or a total storage of at least 50 acre feet of water. The inventory excludes dams less than 6 feet high regardless of storage capacity and dams less than 15 acre feet of storage regardless of height.

Probability (1)

There are no major dam failures to report for Marshall County. The probability of a major dam failure occurring in or affecting Marshall County is low.

Magnitude/Severity (2)

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.

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.

According to the Iowa DNR's Natural Resources Geographic Information System (NRGIS) Library, there are two dams located within the city limits of Marshalltown. Failure at these Veenstra Kimm Dams, both on the Anson Creek, can affect the City of Marshalltown and some unincorporated areas which are downstream and around Anson Creek.

There are 2,442 inventoried dams located in Iowa. Of these, 63 are high hazard, 160 are categorized as significant hazard, and 2,219 are classified as low-hazard dams. The severity of damage could range from property damage, if a small subdivision impoundment failed, all the way to multiple deaths, injuries, and extensive property damage if a large high-hazard dam, such as the Saylorville

Reservoir, failed upstream from Des Moines. None of the dams in Marshall County are considered high hazard, though there are two "significant" dams, the Crab Tree Lake Dam and Green Castle Dam.

Warning Time (4)

A dam failure can be immediate and catastrophic leaving little or no time to warn those downstream of the imminent hazard. 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.

Duration (4)

Response to the effects of a dam failure are extensive and require wide-ranging recovery efforts for reconstruction of the original flood control structures.

Total Score: 11

Drought [A prolonged period of prolonged lack of precipitation producing severe dry conditions]

Description

There are three types of drought conditions that are relevant to Iowa: meteorlogic drought, which refers to precipitation deficiency; hydrological drought, which refers to declining surface water and groundwater supplies; and agricultural drought, which refers to soil moisture deficiencies. Droughts can be spotty or widespread and last from weeks to a period of years. A prolonged drought can have a serious economic impact on a community. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortage may occur if agricultural production is damaged or destroyed by a loss of crops or livestock. While droughts are generally associated with extreme heat, drought can and do occur during cooler months.

Probability (2)

According to the National Climactic Data Center, Iowa has had 20 periods of drought from 1980-2009. The most common trend was the consistency of drought periods during the month of August. While some may have been more severe than others, agricultural areas were impacted much more than the metropolitan areas where impacts were indirect.

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.

Magnitude/Severity (3)

Those dependent on rain would be the most vulnerable during a drought. This means that agriculture, agribusiness, and consumers would be impacted. A drought limits the ability to produce goods and provide services. Because citizens draw their drinking water from groundwater sources, a prolonged severe drought may impact all citizens if there were to be a dramatic drop in the water

table. Fire suppression can also become a problem due to the dryness of the vegetation and possible lack of water.

A drought would likely affect most of Marshall County and Iowa if not the entire Midwest. Because of the dependence on precipitation and water, the agricultural areas would be most adversely impacted. Even though the agricultural areas would be most adversely impacted, the entire county would likely feel at least some impact.

Drought in the U.S. seldom results directly in the loss of life. Deaths associated with drought are usually related to a heat wave. Drought more directly affects agricultural crops, livestock, natural vegetation, and stream flows that include fish and aquatic vegetation. Impacts are costly to the economy, environment, and general population.

Warning Time (1)

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 occurrences of atmospheric 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. An area may already be in a drought before it is 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.

Duration (4)

According to Iowa's drought history, most droughts that affect Iowa occur for at least a month at a time.

Total Score: 10

Earthquake [Any shaking or vibration of the earth caused by the sudden release of energy that may impose a direct threat on life and property]

Description

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.

Probability (1)

Iowa as a whole has experienced the effects of only a few earthquakes in the past two centuries. The epicenters of 13 earthquakes have been located in the state. The majority have been along the Mississippi River, and none have been in central Iowa. The last earthquake to occur in Iowa was in the southwestern Iowa town of Shenandoah in 2004. Since the early 1800s, 9 earthquakes have occurred outside of Iowa but have impacted areas in the state. The most recent quakes were in the

1960s and occurred in Illinois and Missouri. While more than 20 earthquakes have occurred in or impacted Iowa in the past 200 years, they have not seriously affected Iowa.

According to the National Climatic Data Center, there have been no earthquakes in Marshall County.

Seismologists attempt to forecast earthquake size and frequency based on data from previous events. In the New Madrid Fault Zone, this analysis is difficult because there are few historic moderate to large earthquakes, and the active faults are too deeply buried to monitor effectively. 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 or fear.

Magnitude/Severity (1)

Most of Iowa is located in Seismic Zone 0, the lowest risk zone in the United States. Most structures in Iowa are not built to earthquake standards, but because of the relatively low magnitude of the possible quake, property damage would likely be minor foundational damage. The most vulnerable structures are those built on poorly consolidated substrate, especially floodplain materials.

In general, peak ground acceleration (PGA) is a measure of the strength of ground movements. More specifically, the PGA measures the rate in change of motion relative to the established rate of acceleration due to gravity. According to the United States Geological Services, for Marshall County, the peak acceleration with a 2% probability of exceeding in 50 years is 2% g, which means the County is under a very small threat in regards to earthquakes. Also, most of Iowa is located in Seismic Zone 0, which is the lowest risk zone in the United States.

The strongest earthquake in Iowa occurred in Davenport in 1934 and resulted in only slight damage. Estimated effects of a 6.5 Richter magnitude earthquake along the New Madrid Fault Zone suggests Iowans 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. If an earthquake were to occur, it would more than likely be felt in all of Marshall County.

Warning Time (4)

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.

Duration (2)

Due to the limited effects to Iowa, response to the occurrence of an earthquake would likely be in support of nearby States utilizing mutual aid agreements, in-State response would likely be very limited.

Total Score: 8

Extreme Heat [Temperatures, including heat index, in excess of 100 degrees Fahrenheit or three successive days of 90+ degrees Fahrenheit. A head 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. 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.

Probability (3)

The record high temperature of 110 for Des Moines was recorded in 1936. During July 1936, 12 record setting days topped 100 degrees in Des Moines. The record high temperatures for Des Moines are above 90 degrees Fahrenheit beginning in March and lasting through October.

According to the National Climatic Data Center, two extreme heat events have occurred in Marshall County since 1995. The event in 1995 affected the entire State of Iowa and resulted in three deaths and $3.8 million in property damage. The last extreme heat event to affect Marshall County on August 5, 2001 resulted in one death.

Based on historical information, Iowa will likely experience about 26 days a year with temperatures above 90 degrees. There is a very good change 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.

Magnitude/Severity (3)

Elderly people, small children, chronic invalids, those on certain medications or drugs (especially tranquilizers and anticholinergics), and persons with weight and alcohol problems are particularly susceptible to heat reactions. Healthy individuals working outdoors in the sun and heat are vulnerable as well. Individuals and families with low budgets as well as inner city dwellers can also be susceptible due to poor access to air-conditioned housing.

Most of the County and 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 has broad and far-reaching sets of impacts. These include significant loss of life and illness, economic costs in transportation, agriculture, production, energy, and infrastructure. 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). Livestock and other animals are adversely impacted by extreme heat. High temperatures at the wrong time inhibit crop yields as well. 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 blackouts. 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.

Warning Time (1)

As with other weather phenomena, periods of extreme heat are predictable within a few degrees within three days or so. 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 when the heat index is expected to exceed 105 degrees Fahrenheit for at least two consecutive days.

Duration (3)

The definition of an extreme heat event is an occurrence of 90+ degree weather for a minimum of 3 days. The State Hazard Mitigation Team (SHMT) evaluated this hazard as likely to exceed one week in duration based on a review of past extreme heat events in the State of Iowa.

Total Score: 10

Flash Flood [A flood event occurring with little or no warning where water levels rise at an extremely fast rate]

Description

Flash flooding results from intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area. 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 water moves 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.

Probability (3)

Flash floods are the most common and widespread of all-natural disasters except fire. In Iowa, as much as 21" of rain has fallen in a 24-hour period. According to the National Climatic Data Center, twelve flash flood events have affected Marshall County in the past 25 years. These flash floods occurred mostly in Marshalltown with a few in State Center and some which affected the entire county. Including these flash flood events, there have been 95 flooding events total since 1993 resulting in $189.64 million in property damage and $310.95 million in crop damage but no deaths or injuries were reported.

Flash flooding has a high probability of happening in all communities. As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Urbanization increases runoff two to six times over what would occur on natural terrain. As more development occurs, the amount of runoff produced also increases. Unless measures are taken to reduce the amount of runoff (or slow its movement), flash floods will continue to occur and possibly increase. Also having sewer systems that cannot handle large amounts of water in a short period of time results in flash floods.

Magnitude/Severity (1)

Flash floods occur in all fifty states in the United States. Particularly at risk are those in low-lying areas; close to dry creek beds or drainage ditches; near water; or downstream from a dam, levee, or storage basin. People and property in areas with insufficient storm sewers and other drainage infrastructure can also be put at risk because the drains cannot rid the area of the runoff quickly enough.

Nearly half of all flash flood fatalities are auto-related. Motorists often try to traverse water-covered roads and bridges and are swept away by the current. Six inches of swiftly moving water can knock persons off their feet and only two feet of water can float a full-sized automobile. Recreational vehicles and mobile homes located in low-lying areas can also be swept away by water.

Areas in a floodplain, downstream from a dam or levee, or in low-lying areas can be impacted. People and property located in areas with narrow stream channels, saturated soil, or on land with large amounts of impermeable surfaces are likely to be impacted in the event of a significant rainfall. Unlike areas impacted by a river/stream flood, flash floods can impact areas a good distance from the stream itself. Flash flood prone areas are not particularly those areas adjacent to rivers and streams. Streets can become swift moving rivers, and basements can become deathtraps because flash floods can fill them with water in a manner of minutes. All Marshall County communities are prone to flash flooding.

Flash floods are the number one weather-related killer in the United States. They can quickly inundate areas thought not to be flood-prone. Other impacts can include loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock damage, and interruption of business. Hazards of fire, health and transportation accidents, and contamination of water supplies are likely effects of flash flooding situations. In Iowa, there have been 644 flash flood events since 1993, and there have been five deaths and eight injuries.

Warning Time (4)

Flash floods are somewhat unpredictable, but there 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 time can be increased. The National Weather Service forecasts the height of floods crests, the data, and time the flow is expected to occur at a particular location.

Duration (2)

The response to the effects of flash flooding in Iowa is short in duration due to the nature of the hazard.

Total Score: 10

Grass or Wildland Fire [An uncontrolled fire that threatens life and property in either a rural or wooded area and is beyond normal day-to-day response capabilities]

Description

Grass and wildland fires can occur when conditions are favorable such as during periods of drought when natural vegetation would be drier and subject to combustibility.

Probability (4)

There is nearly 100% chance that there will be a grass fire in each county in the state each year.

Magnitude/Severity (1)

While wildfires have proven to be most destructive in the Western States, they have become an increasingly frequent and damaging phenomenon nationwide. People choosing to live in wildland settings are more vulnerable to wildfires, and the value of exposed property is increasing at a faster rate than population. Iowa is less vulnerable to wildfires because of the extremely large percentage of land that is developed. Grass fires are often more easily contained and extinguished before there is damage to people or developed property. Fires often burn large portions of field crops in the fall when the crops are dry and the harvesting equipment overheats or throws sparks. This can be quite costly to the farmer in terms of lost production.

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 grass fire within a matter of minutes. The extent is dependent upon conditions such as land use/land cover, moisture, and wind. Grass fires are equally likely to affect Marshall County communities where there is dense or high vegetation. Rural areas are much more likely to experience grass or wildland fire issues.

Most grass fires burn only the grasses, crops, or other low land cover. Injuries and deaths from fighting the fire most often occur by natural causes such as heart attack or stroke. Property damage is usually limited to grass, small trees, etc. Occasionally a house or outbuilding can be damaged or destroyed.

Warning Time (3)

As mentioned above, 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.

Duration (2)

The majority of Iowa wildfires occur in short duration in areas of brush and forest lands with approximately half of the fires being prescribed fires and controlled burns supervised by trained experts.

Total Score: 10

Hailstorm [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]

Description

Hail is produced by many strong thunderstorms. Strong rising currents of air within a storm carry water droplets to a height where freezing occurs. Ice particles grow in size until they are too heavy to be supported by the updraft. Hail can be as small as 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.

Probability (4)

According to the National Climatic Data Center, there have been 89 hail events in Marshall County since 1985. The size of hail ranges from 0.75 inches in diameter to 3 inches. In total, no injuries or deaths were reported. The sum total of all the property damage from these hail events is $657 thousand. The resulting crop damage is $460 thousand.

Data on probability and frequency of occurrence of hailstorms is limited, but research indicates at any given point in Iowa, it can expect on average two to three hailstorms in a year.

Magnitude/Severity (1)

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.

The land area affected by individual hail events is not much smaller than that of the parent thunderstorm, an average of 15 miles in diameter around the center of the storm. Any area in Marshall County can be affected by this hazard.

Hailstorms cause nearly $1 billion 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.

Warning Time (4)

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 television network weather departments. Warnings in the 20 to 30 minute range are usually available prior to the occurrence of the storm.

Duration (2)

The occurrence of hailstorms is short term in nature and usually limited to less than 6 hours per event.

Total Score: 11

Levee Failure [Loss of structural integrity of a wall, dike, berm, or elevate soil by erosion, piping, saturation, or under seepage causing water to inundate normally dry areas]

Description

Levees constructed of compacted clay with a high plasticity tend to crack during cycles of long dry spells. During heavy rainfalls that follow the dry spells, water fills the cracks and fissures. In addition to increasing the hydrostatic forces, the water is slowly absorbed by the clay. The effect of the absorbed water is an increase in the unit weight of the clay as well as a decrease in its shear strength. This results in simultaneous increase of the slide (driving) forces and a decrease of the resisting (shear strength) forces. Furthermore, the cyclic shrink/swell behavior of the cracked clay zone results in a progressive reduction of the shear strength of the clay, perhaps approaching its residual strength. It also results in deepening of the cracked clay zone, which may eventually reach a depth of 9 ft or more, especially for clays with a plasticity index greater than 40. The end result may be sloughing failure following a heavy rainfall. It is believed that fast removal of the runoff water from the interconnected network of cracks could alleviate this surface instability problem.

Probability (1)

There are two levees in Marshall County. They are both located in the City of Marshalltown, one along the Iowa River and one on Linn Creek. The levees were constructed in 1977 and have not yet had any failures. Both of the levees are 9 miles long. They protect 165.76 acres of the community. The level of protection, though, is for 1% annual chance year flood boundaries. The levees are inspected every year by the Levee Corps of Engineers.

The rate of failure of a levee or floodwall is difficult to predict, and sudden failure is a possibility. Proper design and construction can limit the probability of a levee failure. Development in the watershed can raise flood levels and make a levee designed and constructed under previous characteristics inadequate for current runoff conditions.

Magnitude/Severity (2)

People, property, and utilities in the floodplain are most at risk. Levees and floodwalls give a false sense of security. People feel that levees will protect them and their property against and future flooding. While is usually true, the hazard is only temporarily contained.

Floodwaters breaching a levee are usually contained in the historic floodplain. Interestingly enough, levee failure in one area may prevent flooding in another area. A levee breach or overtopping occurring along one segment may drop the level of water along other segments of the stream. For initial overtopping, the overriding concern is choosing the least hazardous location for initial inundation of the interior. The least hazardous location could be a golf course, an oxbow lake, a pond area, undeveloped area such as agricultural land, or a downstream reach.

Water bursting through a narrow levee breach is moving much faster than the floodwaters in the main channel. The breaking out of this front of water and its fast flow can cause more destruction to structures behind the levee than flood water in the main channel would have caused. A failed levee continues to cause damage long after it breaks. The breach allows large volumes of water to enter formerly dry areas, forming temporary lakes. Such lakes do not go away immediately, because the lake is blocked from returning to the main channel by levee segments that were not destroyed. Consequently, water level drops along the main river days before it drops behind breached levees. Often, pumps behind the levees are needed to remove flood waters that breach the levees. This alleviates some of the impacts associated with levee failures. Sudden failure in an urban setting could cause a catastrophe. In an urban setting the severity and duration may be important for health reasons, but in an agricultural area for economic reasons. Impacts would be similar to those experienced during a river or flash flood.

Warning Time (2)

The amount of warning time depends on the type of levee failure. Local flood warning systems can help in determining the maximum water surface and the timing of a flood situation. Hours or days of warning may be available for high water that may overtop levees, but this does not provide complete security from a rupture in the levee itself. A sudden failure of a portion of the levee may send floodwaters gushing from this break within seconds. Normally, occupants of the floodplain can be warned about potential levee breaches or breaks when high water encroaches upon the levee.

Duration (4)

The effects of a levee failure and its association with river flooding are extensive and require substantial response efforts.

Total Score: 9

River Flood [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

A flood is a natural event for rivers and streams. Excess water from snowmelt, rainfall, or storm surge accumulates and overflows onto the banks and adjacent floodplains. Floodplains are lowlands, adjacent to rivers, lakes, and oceans that are subject to recurring floods. Hundreds of floods occur each year, making it one of the most common hazards in all of the United States. They can occur at any time of the year, in any part of the country, and at any time of day or night. Most injuries and deaths occur when people are swept away by flood currents, and most property damage results from inundation by sediment-filled water.

Several factors determine the severity of floods, including rainfall intensity (or other water source) and duration. A small amount of rain can also result in floods in locations where the soil is saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas.

Topography and ground cover are also contributing factors for floods. Water runoff is greater in areas with steep slopes and little or no vegetative ground cover.

Probability (4)

According to the NCDC, since 1950, Marshall County has experienced 95 river flood events with no deaths or injuries reported. The total property damages that resulted from these events total nearly $190 million, and the crop damages total about $310 million.

The most recent and major floods in Iowa since 2008 occurred in the Summer of 2010. In both these years, the unincorporated town of Minerva, just east of Clemons took the majority of the flooding. According to the National Climatic Data Center (NCDC), over the course of eight days in 2008, during three separate events, Minerva experienced $205,000 worth of property damage and $250.5 million in crop damage. The most costly flood damage to Marshall County happened during one of these events on June 1st, alone causing $250 million in crop damages and $100,000 in property damages. In 2010, over the course of four days and two events, Minerva experienced $260,000 in property damage and over $2.5 million in crop damages. All of this flooding comes from the Iowa River and mostly in agricultural land, as evident by the losses recorded.

Considering that there were several damages to Marshall County from the floods in the summer of 2008, flooding is very likely to occur in the county's cities and unincorporated areas. The chance of human injury is low, however possibilities of property and/or crop damage is certain.

Magnitude/Severity (3)

The vulnerability from river flooding is quite delineated. Much work in the area of flood hazard mapping has allowed many communities to restrict development in hazardous areas, but

development does in fact exist in many areas susceptible to flooding so structures and people who live and work in buildings that are in or located near the floodplain are at risk.

The Federal Emergency Management Agency has delineated the probable extent of the 1% annual chance floodplain in most areas. These Flood Insurance Rate Maps (FIRMs) show properties affected by the floods that have at least 1% chance of occurring in any particular year. Generally, these areas are in the floodplain or adjacent areas. As an estimate made from visual study of FEMA FIRMs, we can derive that 23% of the land in Marshall County is in or could be affected by the floodplain, with an understanding that there is no information for Gilman, Haverhill, Laurel, Liscomb, Melbourne, Rhodes, or St. Anthony. A small portion of the land in Marshall County's incorporated cities is within the 1% annual chance floodplain, and a great deal of land outside the city corporate limits is also within the floodplain. Most of the jurisdictions included in this plan are considered at risk.

Flooding impacts include potential loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock losses; and interruption of businesses. Hazards of fire, health and transportation accidents; and contamination of water supplies are likely effects of flooding situations as well.

Warning Time (2)

Gages along streams and rain gages through 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 radios.

Duration (4)

The response to the effects of river flooding in Iowa are extensive and required many days to adequately respond to the needs of Cities and Counties.

Total Score: 13

Severe Winter Storm [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]

Description

Winter storms are common during 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 ¼ mile or less, and white-out conditions. Heavy snows of

more than six inches in a 12-hour period or freezing rain greater than ¼ inch accumulation causing hazardous conditions in the community can slow or stop the flow of vital supplies as wells 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.

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.

Probability (4)

Since 1993, Iowa has had 3,636, heavy snow, ice storm, or extreme wind chill events. There are many accounts of large numbers of deaths due to cold and blizzards in Iowa's history. While we are not as vulnerable as the early settlers, there are recent accounts of multiple deaths from snowstorms and extreme cold around the state.

According to the National Climatic Data Center, Marshall County has been affected by 50 snow and ice events since 1993. A total of six deaths and no injuries were reported due to these snow and ice events. Also, property damage reached a total of $55.64 million, and crop damage, a total of $65 million.

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. From 1983 to 1998, Des Moines averaged nearly 50 days a year with falling snow. 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. A snowfall of 6 inches or more from one storm only occurs in 49% of Iowa winters, while a large winter storm of 10 inches or more will occur about once every three years.

Magnitude/Severity (3)

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 percent of winter-related deaths occur in automobiles and about 25 percent 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 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 like shoveling snow, digging out vehicles, 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 drivers. Citizens' use of kerosene heaters and other alternative forms of heating may create other hazards such a structural fires and carbon monoxide poisoning.

Winter storms are quite vast and would likely impact multiple counties. Certain areas may experience local variations in storm intensity and quantity of snow or ice. 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. Overall, any area of Marshall County can be affected.

Immobilized transportation, downed trees and electrical wire, building and communication tower collapse, and bodily injury or 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. 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.

An ice coating at least ¼ 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, loss of water, and subsequent evacuations during sub-zero temperatures.

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, causing pipes to freeze and possibly burst.

Cold temperature impacts on agriculture are frequently discussed in terms of frost and freeze impacts early or late in growing seasons and on unprotected livestock. The cost of snow removal, repairing damage, and loss of business can have large economic impacts on a community.

Warning Time (2)

The National Weather Service has developed effective weather advisories that are promptly and widely distributed. Radio, television, 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 a day in advance. Several notifications made by the National Weather Service include winter storm warning, blizzard warning, winter weather advisory, and a frost/freeze advisory.

Duration (4)

Severe winter storms in Iowa and the response to these declared events are tied to multiple storms necessitating large expenses to cities for snow removal and road service. The associated losses and dangers of electrical outages to rural areas further compounds the duration of responding to major storm events.

Total Score: 13

Sinkholes [Land surface that is collapsed into subsurface voids]

Description

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by ground water circulating through them. As the rock dissolves, spaces and caverns develop underground. Sinkholes are dramatic because the land usually stays intact for a while until the underground spaces just gets too big. If there is not enough support for the land above the spaces then a sudden collapse of the land surface can occur. These collapses can be small or they can be huge and can occur where a house or road is on top.

Karst refers to geologic, hydrologic, and landscape features associated with the dissolution of soluble rocks, such as carbonates and evaporites. A common feature of karst landscapes are sinkholes, which form when the land surface collapses into subsurface voids formed in the slowly dissolving rock.

In Iowa, carbonate rocks form the uppermost bedrock over roughly the eastern half of the state, and are mantled with a variable thickness of glacial and other unconsolidated materials. Where these unconsolidated materials are less than 50 feet, and particularly less than 25 feet thick, sinkholes may occur.

New sinkholes have been correlated to land-use practices, especially from ground-water pumping and from construction and development practices. Sinkholes can also form when natural water-drainage patterns are changed and new water-diversion systems are developed. Some sinkholes form when the land surface is changed, such as when industrial and runoff-storage ponds are created. The substantial weight of the new material can trigger an underground collapse of supporting material, thus causing a sinkhole.

The overburden sediments that cover buried cavities in the aquifer systems are delicately balanced by ground-water fluid pressure. The water below ground is actually helping to keep the surface soil in place. Ground-water pumping for urban water supply and for irrigation can produce new sinkholes in sinkhole-prone areas. If pumping results in a lowering of ground-water levels, then underground structural failure, and thus, sinkholes, can occur.

Probability (1)

There are three areas in Iowa where large numbers of sinkholes exist: (1) within the outcrop belt of the Ordovician Galena Group carbonates in Allamakee, Clayton, and Winneshiek counties; (2) in Devonian carbonates in Bremer, Butler, Chickasaw, and particularly Floyd and Mitchell counties; and (3) along the erosional edge of Silurian carbonates in Dubuque and Clayton counties. According to the Iowa Department of Natural Resources, there are no significant sink holes in Marshall County.

In Marshall County, Albion, Ferguson, Le Grand, Liscomb, and Marshalltown are all susceptible to the sinkhole hazard though only a fraction of each jurisdiction is in the hazard area extent. Unlike other counties in Region 6's Jurisdiction, there are several large rural areas in the eastern townships that are susceptible to sink holes but like other counties, there is no history of this issue (according to Marshall County Emergency Management) so the probability of a sinkhole occurring is very low.

Magnitude/Severity (1)

If a sinkhole were to form, people and structures located on or near the sink hole are the most at risk for injury, death, and property damage. People can be injured while the sinkhole is forming as well as after by falling into the open sinkhole. People, buildings, and infrastructure can basically be swallowed by a sink hole.

There are three areas in Iowa where large numbers of sinkholes exist: (1) within the outcrop belt of the Ordovician Galena Group carbonates in Allamakee, Clayton, and Winneshiek counties; (2) in Devonian carbonates in Bremer, Butler, Chickasaw, and particularly Floyd and Mitchell counties; and (3) along the erosional edge of Silurian carbonates in Dubuque and Clayton counties. The only areas that are at risk for this hazard are unincorporated portions of Marshall County and portions of some jurisdictions. For these jurisdictions, the worst case scenario would be if a sink hole actually developed in these areas, but the sink hole would more than likely not be large.

Sinkhole impacts included potential loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock losses; and interruption of businesses. Hazards of fire, health, and transportation accidents; and contamination of water supplies are likely effects. Much of this depends on the location and size of a sinkhole.

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 implications for groundwater quality.

Warning Time (4)

Sinkholes are a geological hazard that forms over time. A community can only be aware of their potential to develop a sink hole but often cannot be warned before a sinkhole forms.

Duration (3)

The response tied to sinkholes is related to securing the immediate threat to life and property including immediate reroute of traffic from the affected infrastructure and search and rescue in the case of structural collapse.

Total Score: 9

Thunderstorm and Lightning [Atmospheric imbalance and turbulence resulting in heavy rains, winds reaching or exceeding 58 mph, tornadoes, or surface hail at least 0.75 inches in diameter]

Description

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 or higher, microburst, lightning, hailstorms, and flooding.

The National Weather Service considers a thunderstorm severe if it produces hail at least ¾ 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 creates thunder.

Probability (4)

According to the National Climatic Data Center, Marshall County has experienced 102 thunderstorm, lightning, and high wind events since 1986. Out of these events, no deaths and no injuries occurred. The total property damage from these storms was $1.3 million, and the crop damage totals $369,000. The high winds ranged from speeds of zero mph to nearly 82 knots. Also, according to the NCDC, there are four lightning events for Marshall County between 1/1/1986 and 1/1/2011. All of the reported events occurred in separate Marshall County jurisdictions.

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 thunderstorm 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).

Magnitude/Severity (1)

People 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. Floods and flash floods are the number one cause of weather related deaths in the U.S.

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. 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 vulnerable to the impacts of thunderstorms.

Thunderstorms and lightning have the ability to span a large area like all of Marshall County but in most cases it affects smaller areas and moves across the county over time. It is possible for the entire county to be affected by a large thunderstorm and lightning event that moves across the entire county but this hazard can also be more isolated and only affect certain areas.

Like tornadoes, thunderstorms and lightning can cause death, serious injury, and substantial property damage. Severe thunderstorms can bring a variety of associated hazards with them including straight-line winds in excess of 100 mph. Straight-line winds are responsible for most thunderstorm damage. High winds can damage trees, homes (especially mobile homes), and businesses and can knock vehicles off of the road. 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. One or more severe thunderstorms occurring over a short period can lead to flooding and cause extensive damage, power and communication outages, and agricultural damage.

Warning Time (2)

Some thunderstorms can be seen approaching, while others hit without warning. The National Weather Service issues severe thunderstorm watches and warnings as well as statements about severe weather and localized storms. These messages are broadcast over NOAA Weather Alert Radios and area television and radio stations. Advances in weather prediction and surveillance have increased warning times. The resolutions of radar and Doppler radar have increased the accuracy of storm location and direction. Weather forecasting and severe weather warnings issued by the National Weather Service usually provide residents and visitors alike adequate time to prepare. Isolated problems arise when warnings are ignored.

Duration (1)

The immediate response related to severe thunderstorm and lightning events are more aptly associated with the cascading effects of multiple events occurring over a short amount of time in

the case of flash and river flooding, and in particularly severe thunderstorm events in the case of tornados. Response to thunderstorm events is relatively minor in scope.

Total Score: 8

Tornado [A violent, destructive, rotating column of air taking the shape of a funnel-shaped cloud that progresses in a narrow, erratic path—rotating wind speeds can exceed 200 mph and travel across the ground at average speeds of 25 to 30 mph]

Description

A tornado is a violent whirling wind characteristically accompanied by a funnel shaped cloud extending down from a cumulonimbus cloud. A tornado can be a few yards to about a mile wide where it touches the ground. An average tornado, however, is a few hundred yards wide. It can move over land for distances ranging from short hops to many miles, causing great damage wherever it descends. The funnel is made visible by the dust sucked up and by condensation of water droplets in the center of the funnel. The rating scale used to rate tornado intensity is the Enhanced Fujita Scale.

Probability (4)

In the U.S., Iowa is ranked third in the number of tornadoes per 10,000 square miles. From 1950-2010, Iowa averaged 47 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.
According to the National Climatic Data Center, in Marshall County, there has been one funnel cloud since 1986, but 18 tornadoes reported. From these events, no deaths or injuries have occurred. The intensity of these tornadoes ranges from FO to F4. The total property damage throughout the county totaled about $26 million, and the crop damage was about $46,000.

Historically, 40 - 50 tornadoes are confirmed in Iowa per year. Developed areas occupy a growing portion of Iowa and stand a highly likely chance of having a tornado occur in any given year. Looking at historical data, tornadoes do not occur every year in Marshall County. The years that the county does have a tornado, though, sometimes have multiple tornadoes, such as in the years of 1989, 1998, 2004, and 2008. For Marshall County, a record number of tornadoes occurred in 2004, with 2 in State Center at the same time.

Magnitude/Severity (3)

Those most at risk from tornadoes include people living in mobile homes, campgrounds, and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to twisters. The elderly, very young, and the physically and mentally handicapped are most vulnerable because of the lack of mobility to escape the path of destruction. People who may not understand watches and warnings due to language barriers are also at risk.

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. 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. The most damaging tornado that is likely to occur is an F3, which is based on historical tornado events in Marshall County.

The severity of damage from tornadoes can be very high. 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. 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.

Warning Time (4)

Tornadoes strike with an incredible velocity. Wind speeds may approach 300 mph and the storm can travel across the ground at more than 70 mph. These winds can uproot trees and structures and turn harmless objects into deadly missiles, all in a matter of seconds. The advancement in weather forecasting has allowed watches to be delivered to those in the path of these storms up to hours in advance. The best lead-time for a specific severe storm and tornado is about 30 minutes. Tornadoes have been known to change paths very rapidly, thus limiting the time in which to take shelter. Tornadoes may not be visible on the ground due to blowing dust or driving rain and hail.

Duration (3)

The response to a tornado event is tied to responding to the immediate threat to life and property immediately following the tornado event and in the shelter of affected families and individuals.

Total Score: 14

Windstorm [Extreme winds associated with severe winter storms, severe thunderstorms, downbursts, and very steep pressure gradients]

Description

Extreme winds other than tornadoes are experienced in all regions of the United States. It is difficult to separate the various wind components that cause damage from other wind-related natural events that often occur with or generate windstorms.

Probability (4)

Large-scale extreme wind phenomena are experienced over every region of the United States. Historically, high wind events are associated with severe thunderstorms and blizzards. It is often difficult to separate windstorms and tornado damage when winds get above 70 knots.

In Marshall County, according to the National Climatic Data Center, there are about 37 high wind events that were separated from either a thunderstorm or extreme wind chill. These windstorms occurred between 1993 and 2010, and were the only storms reported since 1950. The wind speeds

during these windstorms ranged from less than one knot to 72 knots. Two deaths and 13 injuries were reported during these windstorm events. The total amount of property damage from these windstorms is about $54 million, and the total crop damage is about $385,000.

Based on historical data, Marshall County should expect at least one windstorm each year, but because it is difficult to separate a windstorm from other hazard events such as a thunderstorm there may be occurrences of high winds that may not necessarily be considered a windstorm.

Magnitude/Severity (1)

Those most at risk from windstorms include people living in mobile homes, campgrounds, and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to windstorms. The elderly, very young, and the physically and mentally handicapped are most vulnerable because of the lack of mobility to escape the path of destruction. People who may not understand watches and warnings due to language barriers are also at risk.

Unlike tornadoes, windstorms may have a destructive path that is tens of miles wide. 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. Wind speeds can reach up to 70 knots or greater during a windstorm event so a major event is possible.

The severity of damage from windstorms can be very high. 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. Injury or death related to windstorms most often occurs when buildings collapse; people are hit by flying objects or are caught trying to escape the windstorm in a vehicle. Crop damage is often associated with windstorms, laying down crops, breaking stalks, and twisting plants, reducing the yield and making it difficult to harvest.

Warning Time (3)

Wind speeds may approach 120 miles per hour and the storm can travel across the ground at more than 30 mph. These winds can uproot trees and structures and turn harmless objects in to deadly missiles, all in a matter of seconds. The advancement of weather forecasting has allowed watches to be delivered to those in the path of these storms up to hours in advance. The best lead-time for a specific severe storm is about 30 minutes.

Duration (2)

The response tied to high wind events is one directly related to the immediate protection of vulnerable populations from the direct threat to life and property. Response time is limited to event duration and immediate impact.

Total Score: 10

Animal/Crop/Plant Disease [A medical, health, or sanitation threat to the wildlife or domestic animals like contamination, epidemics, plagues, and insect infestation]

Description

Infectious diseases introduced onto an operation can have a devastating effect on cash flow and equity. Major animal diseases include foot and mouth disease, rinderpest, African swine fever, classical swine fever, brucellosis, lumpy skin disease, and others. Adverse effects of infectious diseases can occur at the farm or industry level. Some diseases may severely limit or eliminate animal marketing options (for example: to slaughter only). In the future producers may be responsible for potential pathogen contamination of the food supply or environment. Negative effects may be short- or long-term depending on the nature of the pathogen and level of concern among producers and consumers. Presence of some pathogens can also affect market access for high priority in day-to-day management decisions.

Probability (3)

Every year the Iowa Department of Agriculture and Land Stewardship (IDALS) conduct numerous animal disease investigations. IDALS, under the direction of the state plant regulatory official works with Iowa's universities and industries to conduct regular crop/plant pest surveillance. In the evaluation of the probability of a serious animal/plant/crop disease incident was that an event has a low probability of occurrence in any given year.

Statewide, the most recent Animal/Crop/Plant Disease was the West Nile Virus (WNV). First indentified in New York City and carried by birds and mosquitoes, the disease spread to four states in 1999 and to 12 states and the District of Columbia in 2000. WNV causes severe neuralgic infections humans, horses, and other mammal species. As of early 2003, the disease has been found in nearly all states east of the Rocky Mountains, including Iowa where 15 confirmed human cases, 113 birds, and 1,039 horses have tested positive. The rabbit calicivirus disease was first found in 2000, but the infected rabbits were quarantined. Since then, there have been no major breakouts in the state.

According to Marshall County Emergency Management, there have not been any incidents of animal disease outbreaks. There are, however, frequent crop disease and infestation outbreaks in the county in crops and plants.

As the nation's number one producer of corn, soybeans, eggs, and hogs, Iowa farmers and producers know the importance of securing America's food supply. With hundreds of thousands of head of livestock produced and transported in Iowa each year, Iowa could be a rich environment for a disease epidemic to take hold if precautions such as vaccinations and handling procedures are not rigorously followed.

According to Mike Stegmann, Marshall County Conservation, there are sure to be crop related diseases, fungus, molds, insect outbreaks that occur regularly every year and are treated by the farming community.

Recently discovered in Northeast Iowa, though not in Marshall County yet, is the Emerald Ash Borer. This insect threatens to destroy every ash tree across the landscape. In some communities, ash trees compose 50-70+% of the trees. Stegmann says this may be just like when Dutch Elm disease went through 60-70 years ago.

An Emerald Ash Borer (EAB) website, created and run by the University of Michigan Extension describes the ash border as metallic green and about 1/2-inch long. They expect that it probably came from Asia in wood packing material. An implication of their infestation is the effect on firewood in some states not being moved because of a quarantining effort. These quarantines are in place to prevent infested ash firewood, logs or nursery trees from being transported and starting new infestations. Some signs of EAB damage are canopy dieback, Epicormic shoots (sprouts growing from roots and trunk), bark splitting, serpentine galleries, D-shaped exit holes, and increased woodpecker activity/damage.

Stegmann also described some plant diseases new to the county that "…are potentially destructive/invasive to native vegetation and can take over entire landscapes." Some of the species include Purple Loostrife, Garlic Mustard, Leafy Spruge and Poison Hemlock. They can spread rapidly in some instances. A concern is that people do not have a clue as to which plants are good or bad so they can be infected because of improper knowledge of the plant.

Magnitude/Severity (2)

U.S. agriculture is very vulnerable to the introduction of a foreign animal disease. Outbreaks can be inadvertently introduced by contaminated material carried by an international traveler or by the importation of infected animals and animal products. Foreign animal disease could enter the U.S. vectored by wild animals, insects, or migratory birds or they could be intentionally introduced to cause severe economic problems or to target human health.

State and federal animal health programs have been very successful in preventing or limiting the scope and magnitude of animal emergencies. However, because threats to animal health are always changing and because the animal population is mobile, the possibility always exists for a local, regional, or statewide animal health emergency to occur. Unincorporated Marshall was identified as the jurisdiction most at risk for this hazard. Most livestock is located outside city corporate limits in Marshall County.

Animal health emergencies can take many forms: disease epidemics, large-scale incidents of feed and water contamination, extended periods without adequate water, harmful exposure to chemical, radiological, or biological agents, and large-scale infestations of disease-carrying insects or rodents, to name a few. One of the principal dangers of disease outbreaks they can rapidly overwhelm the animal care system. Perhaps the greatest animal health hazard would be the intentional release of a foreign animal disease agent to adversely impact a large number of animals. Such a release would likely not be an act of sabotage.

Warning Time (2)

The private practitioner is the first line of defense and will undoubtedly be the first to witness the symptoms of Animal/Crop/Plant Diseases. The United States Department of Agriculture monitors reports submitted by veterinarians and labs to identify patterns. The department is proactive in providing information to the agricultural community on medical concerns. Conditions related to scope and magnitude can escalate quickly and area resources can be drained of vets, medications, and vaccinations rather quickly.

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.

Duration (4)

Response and recovery from serious infestation or disease are lengthy, with many producers likely to never be able to return to business, in addition, crop infestations/animal diseases can reoccur, causing repeated losses in subsequent years.

Total Score: 11

Hazardous Materials Incident [Accidental release of chemical substances or mixtures that presents danger to the public health or safety]

Description

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. As many as 500,000 products pose physical or health hazards and can be defined as "hazardous chemicals." Each year, over 1,000 new synthetic chemicals are introduced and transported across the county via semi truck and train. Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous materials incidents generally affect a localized area, and the use of planning and zoning can minimize the area of impact.

Probability (4)

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. Railways are another source for hazardous materials releases. 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.

The SHMT analysis evaluated the probability that a high impact occurrence of a hazardous materials incident has a 10% - 20% probability to occur in any given year. A high impact

occurrence is one defined as an environmental emergency by the Environmental Protection Agency. An environmental emergency is a sudden threat to the public health or the well being of the environment, arising from the release or potential release of oil, radioactive materials or hazardous chemicals into the air, land, or water.

According to Marshall County Emergency Management, the county has hazardous materials incidents every year. Because of the location of major highways and railroads through Marshall County, most incidents are transportation related. Intentional dumping, accidental spills, and improper disposal are also occurrences in the county.

Magnitude/Severity (1)

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.

Most of the hazardous materials incidents are localized and are quickly contained or stabilized by highly trained fire departments and hazardous materials teams. Marshall County has an agreement with the Des Moines Fire Department for hazmat response because their firemen are trained for hazardous materials incidents. The Des Moines Fire Department provides HazMat Ops and HazMat Recertification training to emergency responders. Depending on the characteristic of the hazardous 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. All jurisdictions are at risk for this hazard.

Many injuries and fatalities due to transport of hazardous materials are related to the collision itself rather than the product released. Immediate dangers from hazardous materials include fires and explosions. The release of some toxic gases may cause immediate death, disablement, or sickness if absorbed through the skin, injected, ingested, or inhaled. Contaminated water resources may be unsafe and unusable, depending on the amount of contaminant. Some chemicals cause painful and damaging burns if they come in direct contact with skin. 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. Loss of livestock and crops may lead to economic hardships within the community. The occurrence of a hazardous materials incident many times shuts down transportation corridors for hours at a time while the scene is stabilized, the product is off-loaded, and reloaded on a replacement container.

Warning Time (4)

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.

Duration (3)

Response to a hazardous materials release is generally limited to the immediate effects of a release of dangerous materials and their threat to life and property. However, due to the laws surrounding hazardous materials and the duty of the public to inform and protect citizens from the effects of hazardous materials in their vicinity, response is expanded for environmental emergencies.

Total Score: 12

Human Disease [A medical, health, or sanitation threat to the general public (such as contamination, epidemics, plagues, and insect infestation)]

Description

Public health action to control infectious diseases in the 21st century is based on the 19th century discovery of microorganism as the cause of many serious diseases like cholera and tuberculosis. Disease control has resulted from improvements in sanitation and vaccination programs. Scientific and technologic advances have played a major role in each of these areas and are the foundation for today's disease surveillance and control systems. Scientific findings also have contributed to a new understanding of the evolving relation between humans and microbes. As of January 1, 2000, a total of 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.

Probability (2)

From 1900-2000, there were three (3) influenza pandemics, all about 30 years apart. This seems to follow the same trend with the next occurrence to affect Iowa beginning in 2009 with the H1N1 influenza virus causing 659 hospitalizations with lab confirmed H1N1 since 9/1/09 and resulting in 41 fatalities. Typically people who become ill are the elderly, the very young and people with chronic medical conditions and high risk behaviors. Approximately 22% of Iowa's population is considered high risk.

Public health agencies work to protect Iowans from infectious diseases and preserve the health and safety through disease surveillance; investigation of acute outbreaks; education and consultation to county, local, and private health agencies on infectious diseases; immunization and vaccine

guidelines; treatment after animal bites; and vaccines for international travel. While this reduces the number of cases, it does not eliminate them. Historically pandemics occur every 30 years.

The Iowa Department of Public Health track epidemiological statistics in Iowa. Their data indicate no major epidemics of diseases that have high percentages of loss of life or severe illness. Each year, there are many cases of the diseases on the national notification list.

In an August 28, 2009 article in the Times Republican newspaper, it was confirmed by Tina Coleman, Director of Marshall County Public Health that 2 confirmed cases of H1N1 existed in Marshall County. By September 1, 2009, KCCI in Des Moines reported that Marshall had up to five confirmed cases of the H1N1 influenza.

Magnitude/Severity (2)

Public health agencies also work to reduce the impact of communicable diseases in Iowa and to eliminate the morbidity associated with these diseases. Prevention and care services target chlamydia, syphilis, gonorrhea, HIV/AIDS, and tuberculosis. 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.

Because of our highly mobile society, these diseases can move rapidly across the state and across the nation within days, weeks, or months. Many of the diseases on the national notification list result in serious illness if not death. Some are treatable, other only the symptoms are treatable.

Warning Time (1)

The private practitioner is the first line of defense and will undoubtedly be the first to witness the symptoms of human disease epidemics. The Iowa Department of Public Health and the U.S. Center for Disease Control (CDC) 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.

Duration (4)

Response to highly infectious diseases occurs continuously, although the direct effects of a pandemic influenza can occur for months at a time as evident with the H1N1 influenza in August of 2009.

Total Score: 9

Infrastructure Failure [Communication Failure, Energy Failure, Structural Failure, and Structural Fire; including an extended interruption, widespread breakdown, or collapse (part or all) of any public or private infrastructure that threatens life and property]

Description

This hazard encompasses the following consolidated hazards: Communication Failure, Energy Failure, Structural Failure, and Structural Fire. This includes an extended interruption, widespread breakdown, or collapse (part or all) of any public or private infrastructure that threatens life and property.

Probability (2)

No widespread communications failures have occurred in Iowa. Local incidents due to weather conditions, equipment failure, excavation incidents, and traffic accidents have been reported, but outages have usually been resolved in a timely manner. Widespread communications losses are unlikely due to backup systems and redundant system designs. Local communications failures are likely to affect small areas of the county.

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. An energy shortage of that magnitude has not affected Iowa in recent years.

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 operation and environmental loads, such as fire, excessive vibrations, explosion, high-energy piping failures, missiles, and earthquakes. With the possible exception of misuse, accidental or environmental loads, the causes of failure may be found in deficiencies in design, detailing, material, workmanship, or inspection. With the aging structures in the county along with problems with new materials, structural failures will continue to occur. Efforts to inspect and maintain 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.

Structural fires are almost a daily occurrence in some communities. Nearly all are quickly extinguished by on-site personnel or local fire departments.

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 fire will continue to occur. During colder months, clogged chimneys and faulty furnaces and fire places can increase the probability of structural fires.

According to Marshall County Emergency Management, there haven't been any known communication failures in the past 5 years.

Marshall County Emergency Management explains; the county has power outages several times a year. Most are caused by weather events including; strong winds, lightning, ice, fallen trees, etc. They are mostly short lived and of little significance.

According to Marshall County Emergency Management, there have been no major structural failures in the last five years.

According to Marshall County Emergency Management, structural fires are common in houses and other buildings.

Magnitude/Severity (1)

Most communications failures would be limited to localized areas. In the event of a widespread communications failure, only portions of Marshall County would be impacted, but this highly unlikely due to the support of other jurisdictions and secondary communication devices.

Because Iowa is almost entirely 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 are also vulnerable.

The effects of energy shortage would be felt throughout Marshall County. If it were a major supply interruption type of incident local shortages could be quickly covered, because the distribution systems are very developed. An Energy Failure due to damaged infrastructure could affect a small or large are of the county, but this depends on what type and degree of damage that causes the loss.

There are many buildings in Marshall County that are very old 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 elements and the deterioration that results. Increases in the amount and weight of traffic they are expected to support increase their vulnerability to fail.

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 relatively extensive if the structure that failed was a multi-story building of a downtown or a tall communication tower. All Marshall County jurisdictions are at risk for this hazard. Dam failure and levee failure would affect a much larger area.

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, small, or otherwise inadequate water distribution infrastructure such as water mains and hydrants are also at significant risk. Problems vary from region to region, often as a result of climate, poverty, education, and demographics, but Iowa has about 13.4 fire deaths per million people. The fire death risk is nearly two times that of the average population for children 5 years of age or less.

With modern training, equipment, fire detection devices, and building regulations and inspections, most fire can be quickly contained and limited to the immediate structure involved. Certain circumstances, such as the involvement of highly combustible material 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. All Marshall County jurisdictions are at risk for structural fires.

Warning Time (4)

A communications failure would likely occur with little or no warning. It is usually impossible to predict a communications failure. Some communications may be shut down for a short while for improvements or maintenance. These disruptions are usually made during period of low demand and those who rely on them are given previous notice that the system will be out of service.
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 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. As for outages, there is no warning for this type of Energy Failure.

The actual failure of the structure would like 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.

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 structure.

Duration (3)

With the exception of structural fires which are largely handled by local response personnel, the response to the hazards of communication failure, energy failure, and structural failure are widespread in nature and are likely to required outside resources to assist the county in emergency response.

Total Score: 10

Radiological [An incident resulting in a release of radiological material in transport or at a fixed facility to include power plants, hospitals, laboratories and the like]

Description

Although the term “nuclear accident” has no strict technical definition, it generally refers to events involving the release of significant levels of radiation. Most commercial nuclear facilities in the United States were developed in the mid-1960s and are designed to withstand aircraft attack.

Therefore, they should withstand most natural hazards even though they may not have been specifically designed for those forces.

Probability (1)

Historically there has been zero significant releases of radiation from fixed facilities in the State of Iowa, or even the United States.

Iowa has one nuclear power plant located within its borders. Duane Arnold Energy Center (DAEC) is located near Palo in Linn County. Three other nuclear facilities border Iowa. Facilities are located across the Missouri River north of Omaha, NE, and south of Nebraska City, NE. Across the Mississippi River is the Quad Cities Nuclear Power Plant. Operators of facilities that use radioactive materials and transporters of radioactive waste are trained in the packaging, handling, and shipment of the radioactive waste; and, since they are closely regulated by the state, the likelihood of an incident is remote.

There are no facilities located in Marshall County but there is a hospital and medical and dental clinics that may have radioactive materials. Overall, though, there is no large source of radioactive materials located at fixed location in the county. Marshall County is located 3 counties west of Duane Arnold Energy Center, just outside the 50-mile radius 'Ingestion Pathway Zone'. According to Marshall County Emergency management, there have been no radiological incidents in Marshall County.

Transportation accidents are the most common type of incident involving radioactive materials because of the sheer number of radioactive shipments. Operators of facilities that use radioactive materials and transporters of radioactive waste are trained in the packaging, handling, and shipment of the radioactive waste; and, since they are closely regulated by a variety of federal, state, and local organizations, the likelihood of an incident is remote.

Magnitude/Severity (3)

Sources of radioactive materials include medical products, industrial products, nuclear power plant fuel, nuclear weapons, and radioactive waste from hospitals, laboratories, nuclear reactors, and military facilities. Both the Duane Arnold and the Fort Calhoun Nuclear Power Plants have completed construction of on-site storage facilities for spent nuclear fuel.

Depending on the level of exposure, radiation can cause loss of life and long and short term health effects. Time, distance, and shielding minimize radiation exposure to the body. Nuclear radiation above normal levels could be a health and safety consideration because of its ability to damage human cells' biologically.

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.

If the land and facilities cannot be used for weeks, months, or even years, the loss of production would be devastating. Economic impacts would be multi-sector and long-lasting, especially in and around the affected region.

The danger to the public is less than a wide array of other hazardous materials. Those working with or near sources of radiation are at a greater risk than the general citizens of the state. Those responding to a radiological incident should be trained in recognizing a radiological incident and minimizing exposure to radioactive materials.

Other than a transportation incident involving large amounts of high-level radioactive materials, radiation exposure will be limited to localized areas.

Time, distance, and shielding minimize radiation exposure to the body. Nuclear radiation above normal levels could be a health and safety consideration because of its ability to damage human cells' biologically as well as its long-lasting effect on the environment.

Warning Time (4)

Ionizing radiation cannot be detected with human senses. Detection instruments are needed to indicate the existence of radiation. Distance from the incident would dictate the amount of time needed to avoid exposure from damaging radiation.

A radiological incident in Iowa could result from an incident in handling or transporting radioactive materials. This accident could occur with little or no warning. Ionizing radiation cannot be detected with human senses. Detection instruments are needed to indicate the existence of radiation. Distance from the incident would dictate the amount of time needed to avoid exposure from damaging radiation.

Duration (4)

Responding to the effects of a radiological release in Iowa is extensive and will require resources and assistance from several Federal agencies to determine and evaluate the threat to life and the environment in the affected sub-areas.

Total Score: 12

Terrorism [enemy attack, biological terrorism, agro-terrorism, chemical terrorism, conventional terrorism, cyber terrorism, radiological terrorism, and public disorder]

Description

Use of multiple outlets to demonstrate unlawful force, violence, and/or threat against persons or property causing intentional harm for purposes of intimidation, coercion or ransom in violation of the criminal laws of the United States. These actions may cause massive destruction and/or extensive casualties.

Probability (1)

Iowa has not been immune to acts of terrorism or sabotage. The state has experienced many bomb threats in the distant and recent past. During the spring of 2002, 18 pipe bombs were found in five states stretching from Illinois to Texas, including Iowa. Six people were injured in the bombings in Iowa and Illinois.

Unfortunately, there will never be a way to totally eliminate all types of these clandestine activities. Persons inclined to cause death and destruction, are 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. Because Iowa serves as the breadbasket to the world, there is an increased risk of agro-terrorist activity.

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 wrong doing, or intentionally disrupt the political, social, and economic infrastructure of individual businesses, units of government, or nations.

The chemical terrorism history, fortunately, has been limited. No known acts of chemical terrorism have occurred, only threats and hoaxes.

Cyber-security and critical infrastructure protection are among the most important national security issues facing our country today, and they will only become more challenging in the years to come. Recent attacks on our infrastructure components have taught us that security has been a relatively low priority in the development of computer software and Internet systems. These attacks not only have disrupted electronic commerce, but also have had a debilitating effect on public confidence in the Internet.

Although Des Moines is the state capitol, county seat, and most populous city and thus a potential target in an all-out attack on the United States, it is unlikely that Iowa would be a primary target during enemy attack. The U.S. federal government monitors global political situations and provides security from international attacks. World events in recent years have greatly changed the nature of enemy attack/war. However, enemy attack is still a possibility due to international conflicts and the large number of weapons still in existence throughout the world.

Since there is almost no record of acts of nuclear terrorism, an approach other than the traditional approach to probability of occurrence is needed to estimate the probability of occurrence. Technical feasibility might also be realized. The threat is relatively low because it is relatively technical infeasible to construct such a weapon for terroristic uses.

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.

Although destructive civil disturbances are rare, the potential is always there for an incident to occur. This is even more true today, where television, radio, and the internet provide the ability to instantly broadcast information (factual or not), in real time, to the entire community. Often times that coverage helps to spread the incident to other, uninvolved or unaffected areas, exacerbating an already difficult situation. This also allow insightful people, previously not involved, to participate in the disturbance for no other reason than to riot, loot, burn, and destruct. Alcohol is often involved in public disorder, especially related to college campuses, sporting events, and concerts.

According to Marshall County Emergency Management, there have been no acts of terrorism in the county.

Magnitude/Severity (3)

Since the targets of attacks on critical infrastructure would likely include both facilities in the economy and those in the government. These critical infrastructures include information and communication systems; electrical power systems; gas and oil production, storage, and transportation systems; water supply systems; emergency services; and government services. Nearly every citizen, business, and organization depends on these for normal operation as well as safety and security. If not affected directly, the entire community would be vulnerable through indirect impacts.

While the entire State of Iowa would likely be affected in some way, areas near government buildings, military complexes, transportation, communication, and fuel facilities would experience the largest impacts. A full-scale attack in the foreseeable future is not likely; however, a limited attack could take place that could potentially threaten target areas. Given the tremendous destructive capability of even one nuclear weapon, the devastation that could occur would be far worse than anything ever experienced in this country.

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. The American public is not vaccinated for many of the agents used as weapons by terrorist groups. Iowa vaccinated volunteers against smallpox in 15 Iowa hospitals in 2003.

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.

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 no vaccines available to reduce the vulnerability from chemical agents.

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.

Security professionals argue that current approaches are inadequate. With companies increasingly using the Internet to connect to suppliers and customers, they say organizations place too much faith in technology to protect their data, and do not pay enough attention to security education and awareness. Inadequate security can facilitate access to critical computer systems, allowing them to be used to conduct attacks.

Our society is highly networked and interconnected. An attack could be launched from anywhere on earth and could cause impacts as small as a computer lab to as large as the world wide web.

Duration of exposure, distance from the source of radiation, and the amount of shielding between source and target determine exposure to radiation.

Initial effects will be localized to site of attack; depending on meteorological conditions, subsequent behavior of radioactive contaminants may be dynamic.

Given the technical infeasibility of radiological terrorism, the severity of an incident would primarily be isolated to the detonation of explosive materials; however the discovery of slightly elevated radiation levels would incite hysteria amongst the uninformed public.

Civil disturbances are often difficult for local communities to handle. There is a fine line between the Constitutional right of individuals and groups to assemble and air their grievances and the overall needs of the community provide essential services, ensure personal safety of citizens, prevent property damage, and facilitate normal commerce. Fortunately, most demonstrations and large public gatherings are held in a peaceful, responsible manner. However, there never seems to be a shortage of groups (drugs and alcohol are often involved) whose primary objective is to disrupt normal activities and perhaps even cause injury and property damage. People at risk are mainly willing participants and law enforcement officials. Innocent bystanders and their property can be at risk as well.

The social rage that causes civil unrest often comes from racism, poverty, lack of economic opportunity, and unemployment. Events usually affect a localized area of the community. Often times only a couple of blocks or streets are affected. The local government units are left to pick up the pieces in the aftermath, cleaning up the area, reestablishing services, repairing damaged public facilities infrastructure, and trying to restore some level of citizen and private investor confidence in the community.

Civil unrest often results in injuries, deaths, and property damage. Perhaps even more tragic has been the lingering negative impact and loss of investment in the communities ravaged by uprisings. Many riot areas do not fully recover from the damage, destruction, and negative image brought on by such events. Looting, burning, and sniping can occur during severe civil disturbances. Fire can sometimes burn uncontrolled because firefighters and equipment are unable to respond due to resistance from rioters.

Warning Time (4)

As mentioned above, the United States federal government monitors worldwide political and military activity. The citizens and states of the U.S. would be put on heightened alert during periods of intense political or military conflict. With Iowa's position in the interior of the U.S., there would likely be significant warning of an impending enemy attack.

In most incidents we would have no warning time. The only exception would be if someone called in a threat. 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.

Explosions are usually instantaneous; additional secondary devices may be used, lengthening the duration of the hazard until the attack site is determined to be clear.

Because of the networks (formal and informal) that exist to share intrusion attempts and impacts, warnings can be put out in advance to alert those in similar situations to take protective security recommendations such as updating virus detections software, making sure security patches are in

place, etc. Warning times can range from now warning to days. Because of highly evolved computer networks and data sharing, bugs, viruses, and worms can proliferate rapidly. Effects of hacking can be instantaneous.

Events that incite such activity can build up over hours, days, or years, and the violent disturbance is a culmination of the long-term situation. Civil disruptions can also escalate very rapidly following events where people are gathered such as sporting events, concerts, or speeches.

Duration (3)

The response to all sources of terrorism are extensive and will result in the need for outside resources and response from Federal agencies in both the investigation of a crime scene and in the response to the direct threats to life and property.

Total Score: 11

Transportation Incident [air transportation, highway transportation, railway transportation, and waterway incident]

Description

A transportation accident involving any mode of transportation that directly threatens life and which results in property damage and/or death(s)/injury(s) and/or adversely impacts a community's capabilities to provide emergency services.

Probability (4)

Since 1962 there have been 1,999 aviation incidents/accidents in the State of Iowa. Of these incidents/accidents, only 237 were fatal to one or more people, with a total of 530 fatalities in that timeframe. This does include the 111 fatalities occurred during the crash of United Flight 232 in Sioux City, Iowa in 1989.

The greater the number of landings and takeoffs, the greater the probability of a crash or accident. More and more people are utilizing air travel now than in the past. The trend of increasing numbers of people flying is likely to continue as will the crowdedness of airports and the skies above Iowa.

In 1996, there were more than 650,000 flights handled by FAA towers in Iowa. Despite the increase in the number of people using air travel, incidents that require response personnel and involve casualties are likely to continue to decrease in number due to increases in the quality of training, equipment, and safety.

Proper land use in the vicinity of 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.

Marshall County has two airports within its boundaries. The Marshalltown Municipal Airport is a full FBO (fixed-base-operator) located north of town. Whites is an airport outside of Melbourne, just 23 miles southwest of Marshalltown Municipal Airport.

According to National Transportation Safety Board, between the years of 1988 and 2007 there have been 7 accidents spread across 3 jurisdictions in Marshall County. A total of three fatalities resulted from two of these accidents.

According to the Iowa Department of Transportation, between 2001 and 2005, there were a total of 4,166 car crashes in Marshall County. Within these crashes, 1,791 injuries were sustained while 32 of these injuries were fatal.

Urban crashes outnumber rural crashes in Marshall County with 2,764 crashes occurring in urban areas between 2001 and 2005. The rural crashes during this period of time are just over half at a total of 1,402. Also, more rural crashes result in fatal injuries than urban crashes. Two urban crashes resulted in two fatal injuries while 22 rural crashes resulted in 30 fatal injuries.

Although traffic engineering, inspection of traffic facilities, land use management of areas adjacent to roads and highways, and the readiness of local response agencies have increased, highway incidents continue to occur. As the volume of traffic on the county's streets and highways increases, the number of traffic accidents will likely also increase. The combination of large numbers of people on the road, unpredictable weather conditions, potential mechanical problems, and human error always leaves open the potential for a transportation accident.

There are 78 railroad crossings in Marshall County. The miles of railroad track in the county combined with the large number of street and highway crossings makes the probability of highway/rail collision significant. Derailments are also possible, while a major derailment would occur less frequently.

According to Marshall County Emergency Management, train derailments happen on occasion but not often.

There have been no significant waterway incidents in Iowa. There have been numerous search and rescue events involving single person or small boats with only a couple people aboard. Small scale incidents on the state's lakes and rivers have resulted in loss of life from pleasure craft collisions and falls from vessels.

According to Marshall County Emergency Management, there have not been any waterway incidents to report for the county.

The only waterways navigable for commercial purposes are the Mississippi and Missouri Rivers so no large commercial carriers would be an issue. Otherwise, there are thousands of users of the Iowa River, streams, creeks, and lakes throughout the county each year that are at risk of incident.

Magnitude/Severity (1)

People aboard airplanes are the most vulnerable. Statistics from the National Transportation Safety Board and the airline industry show that the majority—over 75 percent—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.

As mentioned above, most accidents occur during takeoffs and landings. Accordingly, the spatial extent of the majority of incident would occur on airport grounds or adjacent areas. Compared to many other hazards, an air transportation incident would occupy a relatively small area. The extent to which the impacts could be felt would depend on the materials involved in an accident, the area of concern would be significantly larger than the area of an accident involving a small personal aircraft carrying stable materials. The largest share of accidents would likely affect an area the size of only a few city blocks.

Those who use the surface transportation system are most vulnerable. Travelers, truckers, delivery personnel, and commuters are at risk all time that they are on the road. During high traffic hours and holidays the number of people on the road in Marshall County is higher. This is also true before and after major gatherings such as sporting events, concerts, and conventions. Pedestrians and citizens of the community are less vulnerable but still not immune from the impacts of a highway incident.

Marshall County is crisscrossed by hundreds of miles of roads and highways. Highway incidents are usually contained to areas on the roadway or directly adjacent to the roadway. Very few highway incidents affect areas outside the traveled portion of the road and the right-of-way. Extensive segments of the transportation system can be impacted during significant weather events, such as a large snowstorm, when multiple separate accidents occur. The area of impact can extend beyond the localized area if the vehicle(s) is involved in transporting hazardous materials.

People and property in close proximity to the railway lines, crossing, sidings, switching stations, and loading/unloading points are most at risk. Those away from railroad track and facilities are vulnerable only to large-scale incidents including those in which hazardous materials are involved.

There are 78 railways crossings through the county, including 6 of 14 cities. 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 materials involved, the effect could reach areas up to 1-5 miles from the scene. 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.
Passengers of pleasure crafts are vulnerable to a waterway incident. Operators of barges are also vulnerable. The environment is vulnerable to potentially damaging materials aboard the numerous barges that normally operate year-round on the Mississippi and Missouri Rivers.

The maximum extent of a waterway incident would be limited. Impacts would not extend beyond the immediate incident scene. The only exceptions would include a search and rescue event that could expand downstream. In the case of hazardous materials being released to the waterway, the impact could expand considerably.

Warning Time (4)

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 on-site response personnel and alert mass casualty care providers of the possible event.

There is usually no warning of highway incidents. During snow storms and other weather events that may impede travel, travelers, response agencies, and hospitals alike can be notified of hazardous travel conditions.

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.

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 the water.

Duration (1)

Instances of transportation incidents, particularly rail, air, and waterway related hazards are likely to create more intensive response and resources to protect life and safety of those affected.

Total Score: 10

4.3 Hazard Ranking

Once the hazards for Marshall County were chosen and profiled, they were ranked against each other to determine which hazards can have the greatest impact on the county. The ranking was done according to the method used in the 2010 Iowa Hazard Mitigation Plan. The ranking method involves assigning a rating for probability, magnitude/severity, warning time, and duration. The framework for this method is below:

1. Probability reflects the likelihood of a hazard occurring again in the future, sometimes without regard to the hazard's historical occurrence. Assign a score accordingly.

Score	Description
1	Unlikely - Less than 10% probability in any given year (up to 1 in 10 chance of occurring)
2	Occasional - Between 11% and 20% probability in any given year (up to 1 in 5 chance of occurring)
3	Likely- Between 21% and 33% probability in any given year (up to 1 in 3 chance of occurring)
4	High Likely- More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring)

2. Magnitude / Severity is an assessment of severity in terms of injuries and fatalities, personal property, and infrastructure and the degree and extent with which the hazard affects the county. Assign a score accordingly.

Score	Description
1	Negligible - Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited - 10% to 25% of property severely damaged, shutdown of facilities and services for more than a week, and/or injuries/illnesses that do not result in permanent disability
3	Critical - 25% to 50% of property severely damaged, shutdown of facilities and services for a least 2 weeks, and/or injuries/illnesses that result in permanent disability
4	Catastrophic - More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths

3. Warning Time: Rating of the potential amount of warning time that is available before the hazard occurs. Assign a score accordingly.

Score	Description
1	More than 24 hours warning time
2	12 to 24 hours warning time
3	6 to 12 hours warning time
4	Minimal or no warning (Up to 6 hours warning)

4. Duration: A measure of the duration of time that the hazard will affect the county. Assign a score accordingly.

Score	Description
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

Table 4.3.1: Marshall County Hazard Ranking Results

Hazard	Probability	Magnitude/ Severity	Warning Time	Duration	Score
Tornado	4	3	4	3	14
River Flood	4	3	2	4	13
Severe Winter Storm	4	3	2	4	13
Haz Mat Incident	4	1	4	3	12
Radiological	1	3	4	4	12
Dam Failure	1	2	4	4	11
Hailstorm	4	1	4	2	11
Animal /Crop/Plant Disease	3	2	2	4	11
Terrorism	1	3	4	3	11
Drought	2	3	1	4	10
Extreme Heat	3	3	1	3	10
Flash Flood	3	1	4	2	10
Grass/Wildland Fire	4	1	3	2	10
Windstorm	4	1	3	2	10
Infrastructure Failure	2	1	4	3	10
Transportation Incident	4	1	4	1	10
Levee Failure	1	2	2	4	9
Sinkholes	1	1	4	3	9
Human Disease	2	2	1	4	9
Earthquake	1	1	4	2	8
Thunderstorms/Lightning	4	1	2	1	8

Note: We cannot assume that this ranking is accurate across the entire county. Hazard boundaries already indicate that areas are affected by different hazards. The vulnerability assessment will further refine what hazards should be considered in determining goals and mitigation actions for each jurisdiction.

According to the ranking method, higher scores coincide with a greater potential impact on the county. The hazards that have the greatest potential for affecting Marshall County are tornados, severe winter storms, and river floods. Other hazards rank very closely, too. In Marshall County, the high ranking hazards occur the most frequently and cause the most damage throughout the County.

The other hazards ranked lower may occur less frequently, but do not necessarily cause less damage. Hazards like sinkholes and earthquake are ranked low, but this makes them no less important. Their low ranking is mainly due to lack of historical data or knowledge. If one of these hazards were to occur, the results could be devastating.

Some hazards received the same score so they share an equal ranking. Among these shared rankings, major differences are present among the hazards. The first group, containing two of the top ranked hazards, includes river flood and severe winter storm, scored at 13. They scored the same number in all 4 categories. They both have a high probability and duration of effect on the county. They are moderately severe and do not give much warning time before they strike.

Next, Hazardous Materials Incident and Radiological Incident tied for the number three rank with matching scores of 12. These hazards are very similar in nature; however their scores are vastly different in the probability criteria. Radiological incidents have a lesser chance of occurring because the facility has strict standards on handling the materials and the facility is located just outside the 'ingestion pathway zone' for Marshall County. Hazardous materials roam free on the highways and can be subject to mobile incident.

Dam Failure, Hailstorm, Animal /Crop/Plant Disease, and Terrorism were tied for the number four rank with equal scores of 11. The main difference in how these four hazards were scored was by category. These hazards mostly have a low magnitude/severity, a very short warning time, and a long duration in terms of the effects on the county.

The fourth tied ranking is for fifth in which Drought, Extreme Heat, Flash Flood, Grass/Wildland Fire, Windstorm, Infrastructure Failure, and Transportation Incident scored a 10. In this grouping, the probability was mostly high with low scores only for drought and infrastructure failure. In terms of magnitude/severity, drought and extreme heat had higher scores since they can affect the entire county in one event while the others scored low since one incident is most likely to be isolated to a very small population or portion of the county. Warning time was split with low warning time for flashfloods, grass/wildland fires, windstorms, infrastructure failure, and transportation incident. Events like drought and extreme heat can be predicted and warned against over 24 hours in advance. Finally, duration of an event and its aftermath are much shorter for grass/wildland fire, flash floods, windstorms and transportation incidents than the other hazards in this group.

With a score of 9, in the fourth tied ranking group contains levee failures, sinkholes, and . human disease. Levee failure and human disease have a 1 point higher score for magnitude/severity and duration since sinkholes will happen mostly in rural areas of the county, and levee failures and human disease happening in an incorporated city will have a longer lasting aftermath both on the environment and residents. Sinkholes have a much shorter warning time than the other hazards since they can be warned against while rivers raise in the spring due to heavy winter snows, and disease cases are identified across the state and country.

The final (fifth) hazard grouping is earthquakes and thunderstorms and lightning with a score of 8. While an earthquake is implausible in central Iowa, if one were to occur there would be zero warning time. Earthquakes would also have a longer duration in terms of aftermath and cleanup efforts because it would most likely be felt throughout the county. On the other hand, thunderstorms happen several times a year and can be predicted days in advance.

4.4 Vulnerability Assessment

Requirement 44 CFR §201.6(c)(2)(ii): *[The risk assessment shall include] a description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.]*

Methodology

The vulnerability assessment further defines and quantifies populations, buildings, critical facilities, and other community assets at risk to natural and manmade hazards. This assessment was conducted based on the best available data and the significance of each particular hazard. Data to support the vulnerability assessment was collected from the following sources:

- Statewide GIS datasets compiled by state and federal agencies
- FEMA HAZUS-MH loss estimation software
- Asset mapping completed by each jurisdiction
- Existing plans and reports
- Local knowledge
- Public and Planning Team input

The vulnerability assessment also considers the varying degrees of vulnerability across the planning boundary for each hazard. Marshall County is extremely vulnerable to certain hazards while others may occur but are much less of a threat people and property. The effects of hazards can be very unique from one another so the unique effects each can have on the county will be considered.

4.4.1 Vulnerability

44 CFR §201.6(c)(2)(iii): *For multijurisdictional plans, the risk assessment must assess each jurisdiction's risk where they vary from the risks facing the entire planning area.*

Marshall County is not equally vulnerable to all of the hazards identified in this plan. There is a varying degree throughout the county, and this section of the plan will assess these differences. In the context of hazard mitigation, vulnerability is how open a jurisdiction is to damage from a particular hazard. Can a hazard potentially destroy the entire community, or damage just a few homes? Are people's lives in danger? These questions and several others are important to consider when assessing vulnerability.

The results from the hazard ranking in section 4.3 were used to help determine just how vulnerable Marshall County and its individual jurisdictions are to natural and manmade hazards. As a reminder, the ranking system considered the following hazard characteristics: probability, magnitude/severity, warning time, and duration.

During the scoring process, the highest score a hazard could possibly receive is 16, and no hazard received a score this high. The highest overall score among Marshall County hazards is 14. These scores were used to assign a vulnerability rating of high, medium, or low. Hazards that scored 14 to 16 are considered high-rated. Hazards that scored 10 to 13 are medium, and hazards 9 or below are considered low-rated. Refer to Table 4.4.1.1 for the rating each hazard received and which jurisdictions may potentially be affected.

As for the vulnerability rating, a high rating generally indicates that the hazard is a major threat to a jurisdiction. Its effects may be widespread and severe, which result in human loss and major property damage. Effects may vary among the high vulnerability hazards so a more detailed description of a hazard's potential effects will be discussed later in this section. Also, referring back to the detailed ranking score for each hazard will help distinguish the differences between all of the high-rated hazards.

A hazard with a medium rating is also a major threat to a jurisdiction, but its effects are on a smaller, less-severe scale. The details of these hazards will also be discussed, and referring back to Table 4.3.1 is helpful, too. The hazards rated "low," on the other hand, are those that do not pose a major threat to the jurisdiction. If they were to occur, more than likely, their effects would not be extremely widespread or very severe when compared to the high- and medium-rated hazards.

Table 4.4.1.1: Vulnerability across Marshall County

Hazard	Jurisdictions	Score	Priority
Tornado	All Jurisdictions	14	High
River Flood	Albion Clemons Ferguson Gilman Laurel Le Grand Liscomb Marshalltown Rhodes St Anthony State Center Unincorporated Marshall County East Marshall School District Marshalltown School District	13	Medium
Severe Winter Storm	All Jurisdictions	13	Medium
Hazardous Materials Incident	All Jurisdictions	12	Medium
Radiological	Le Grand Unincorporated Marshall County East Marshall School District	12	Medium
Dam Failure	Gilman Le Grand Marshalltown Rhodes Unincorporated Marshall County Marshalltown School District East Marshall School District	11	Medium
Hailstorm	All Jurisdictions	11	Medium
Animal /Crop/Plant Disease	Unincorporated Marshall County	11	Medium
Terrorism	Marshalltown Unincorporated Marshall County Marshalltown School District	11	Medium
Drought	All Jurisdictions	10	Medium
Extreme Heat	All Jurisdictions	10	Medium
Flash Flood	All Jurisdictions	10	Medium
Grass/Wildland Fire	All Jurisdictions	10	Medium
Windstorm	All Jurisdictions	10	Medium
Infrastructure Failure	All Jurisdictions	10	Medium
Transportation Incident	All Jurisdictions	10	Medium

Levee Failure	Marshalltown Unincorporated Marshall County Marshalltown School District	9	Low
Sinkholes	Albion Ferguson Le Grand Liscomb Marshalltown Unincorporated Marshall County East Marshall School District Marshalltown School District	9	Low
Human Disease	All Jurisdictions	9	Low
Earthquake	All Jurisdictions	8	Low
Thunderstorms/Lightning	All Jurisdictions	8	Low

Higher – Priority Hazards

Hazard: Tornado
Jurisdictions: All Jurisdictions
Score: 14

In the U.S., Iowa is ranked third in the number of tornadoes per 10,000 square miles. From 1950-2010, Iowa averaged 47 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.

According to the National Climatic Data Center, in Marshall County, there has been one funnel cloud since 1986, but 18 tornadoes reported. From these events, no deaths or injuries have occurred. The intensity of these tornadoes ranges from FO to F4. The total property damage throughout the county totaled about $26 million, and the crop damage was about $46,000. According to the 2010 State of Iowa Hazard Mitigation Plan, Marshall County's Annual Loss Estimation from Tornados is $522,033.33.

Those most at risk from tornadoes include people living in mobile homes, campgrounds, and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to twisters. The elderly, very young, and the physically and mentally handicapped are most vulnerable because of the lack of mobility to escape the path of destruction. People who may not understand watches and warnings due to language barriers are also at risk.

Five jurisdictions, Albion, Le Grand, Marshalltown, Melbourne, and State Center in Marshall County identified mobile home parks that may be extremely vulnerability during a tornado. According to Iowa Code 435.1, three or more mobile homes together make up a park. The other jurisdictions in Marshall County did not identify any manufactured or mobile homes that may be at risk.

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. 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. The most damaging tornado that is likely to occur is an F3, which is based on historical tornado events in Marshall County.

The severity of damage from tornadoes can be very high. 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. 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.

Medium – Priority Hazards

Hazard: River Flood
Jurisdictions: Albion, Clemons, Ferguson, Gilman, Laurel, Le Grand, Liscomb, Marshalltown, Rhodes, St Anthony, State Center, Unincorporated Marshall County, East Marshall School District, Marshalltown School District
Score: 13

According to the NCDC, since 1950, Marshall County has experienced 95 river flood events with no deaths or injuries reported. The total property damages that resulted from these events total nearly $190 million, and the crop damages total about $310 million. According to the 2010 State of Iowa Hazard Mitigation Plan, Marshall County's Annual Loss Estimation from Flooding is $29,307,529.41.

The most recent and major floods in Iowa since 2008 occurred in the Summer of 2010. In both these years, the unincorporated town of Minerva, just east of Clemons took the majority of the flooding. According to the National Climatic Data Center (NCDC), over the course of eight days in 2008, during three separate events, Minerva experienced $205,000 worth of property damage and $250.5 million in crop damage. The most costly flood damage to Marshall County happened during one of these events on June 1st, alone causing $250 million in crop damages and $100,000 in property damages. In 2010, over the course of four days and two events, Minerva experienced $260,000 in property damage and over $2.5 million in crop damages. All of this flooding comes from the Iowa River and mostly in agricultural land, as evident by the losses recorded.

Considering that there were several damages to Marshall County from the floods in the summer of 2008, flooding is very likely to occur in the county's cities and unincorporated areas. The chance of human injury is low, however possibilities of property and/or crop damage is certain.

The Federal Emergency Management Agency has delineated the probable extent of the 1% annual chance floodplain in most areas. These Flood Insurance Rate Maps (FIRMs) show properties affected by the floods that have at least 1% chance of occurring in any particular year. Generally,

these areas are in the floodplain or adjacent areas. As an estimate made from visual study of FEMA FIRMs, we can derive that 21% of the land in Marshall County is in or could be affected by the floodplain, with an understanding that there is no information for Gilman, Haverhill, Laurel, Liscomb, Melbourne, Rhodes, St. Anthony or State Center. A small portion of the land in Marshall County's incorporated cities is within the 1% annual chance floodplain, and a great deal of land outside the city corporate limits is also within the floodplain. Most of the jurisdictions included in this plan are considered at risk.

Flooding impacts include potential loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock losses; and interruption of businesses. Hazards of fire, health and transportation accidents; and contamination of water supplies are likely effects of flooding situations as well.

Hazard: Severe Winter Storm
Jurisdictions: All Jurisdictions
Score: 13

Since 1993, Iowa has had 3,636, heavy snow, ice storm, or extreme wind chill events. There are many accounts of large numbers of deaths due to cold and blizzards in Iowa's history. While we are not as vulnerable as the early settlers, there are recent accounts of multiple deaths from snowstorms and extreme cold around the state.

According to the National Climatic Data Center, Marshall County has been affected by 50 snow and ice events since 1993. A total of six deaths and no injuries were reported due to these snow and ice events. Also, property damage reached a total of $55.64 million, and crop damage, a total of $65 million. According to the 2010 State of Iowa Hazard Mitigation Plan, Marshall County's Annual Loss Estimation from Snow and Ice is $258,825.58.

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 percent of winter-related deaths occur in automobiles and about 25 percent 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 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 like shoveling snow, digging out vehicles, 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 drivers. Citizens' use of kerosene heaters and other alternative forms of heating may create other hazards such a structural fires and carbon monoxide poisoning.

Winter storms are quite vast and would likely impact multiple counties. Certain areas may experience local variations in storm intensity and quantity of snow or ice. 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. Overall, any area of Marshall County can be affected.

Immobilized transportation, downed trees and electrical wire, building and communication tower collapse, and bodily injury or 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. 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.

An ice coating at least ¼ 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, loss of water, and subsequent evacuations during sub-zero temperatures.

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, causing pipes to freeze and possibly burst.

Cold temperature impacts on agriculture are frequently discussed in terms of frost and freeze impacts early or late in growing seasons and on unprotected livestock. The cost of snow removal, repairing damage, and loss of business can have large economic impacts on a community.

Hazard: Hazardous Materials Incident
Jurisdictions: All Jurisdictions
Score: 12

According to Marshall County Emergency Management, the county has hazardous materials incidents every year. Because of the location of major highways and railroads through Marshall County, most incidents are transportation related. Intentional dumping, accidental spills, and improper disposal are also occurrences in the county.

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.

Most of the hazardous materials incidents are localized and are quickly contained or stabilized by highly trained fire departments and hazardous materials teams. Marshall County has an agreement with the Des Moines Fire Department for hazmat response because their firemen are trained for hazardous materials incidents. The Des Moines Fire Department provides HazMat Ops and HazMat Recertification training to emergency responders. Depending on the characteristic of the hazardous

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. All jurisdictions are at risk for this hazard.

Many injuries and fatalities due to transport of hazardous materials are related to the collision itself rather than the product released. Immediate dangers from hazardous materials include fires and explosions. The release of some toxic gases may cause immediate death, disablement, or sickness if absorbed through the skin, injected, ingested, or inhaled. Contaminated water resources may be unsafe and unusable, depending on the amount of contaminant. Some chemicals cause painful and damaging burns if they come in direct contact with skin. 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. Loss of livestock and crops may lead to economic hardships within the community. The occurrence of a hazardous materials incident many times shuts down transportation corridors for hours at a time while the scene is stabilized, the product is off-loaded, and reloaded on a replacement container.

Hazard: Radiological
Jurisdictions: Le Grand, Unincorporated Marshall County, East Marshall School District
Score: 12

Iowa has one nuclear power plant located within its borders. Duane Arnold Energy Center (DAEC) is located near Palo in Linn County. Three other nuclear facilities border Iowa. Facilities are located across the Missouri River north of Omaha, NE, and south of Nebraska City, NE. Across the Mississippi River is the Quad Cities Nuclear Power Plant. Operators of facilities that use radioactive materials and transporters of radioactive waste are trained in the packaging, handling, and shipment of the radioactive waste; and, since they are closely regulated by the state, the likelihood of an incident is remote.

There are no facilities located in Marshall County but there is a hospital and medical and dental clinics that may have radioactive materials. Overall, though, there is no large source of radioactive materials located at fixed location in the county. Marshall County is located 3 counties west of Duane Arnold Energy Center, just outside the 50-mile radius 'Ingestion Pathway Zone'. According to Marshall County Emergency management, there have been no radiological incidents in Marshall County.

Transportation accidents are the most common type of incident involving radioactive materials because of the sheer number of radioactive shipments. Operators of facilities that use radioactive materials and transporters of radioactive waste are trained in the packaging, handling, and shipment of the radioactive waste; and, since they are closely regulated by a variety of federal, state, and local organizations, the likelihood of an incident is remote.

Sources of radioactive materials include medical products, industrial products, nuclear power plant fuel, nuclear weapons, and radioactive waste from hospitals, laboratories, nuclear reactors, and

military facilities. Both the Duane Arnold and the Fort Calhoun Nuclear Power Plants have completed construction of on-site storage facilities for spent nuclear fuel.

Depending on the level of exposure, radiation can cause loss of life and long and short term health effects. Time, distance, and shielding minimize radiation exposure to the body. Nuclear radiation above normal levels could be a health and safety consideration because of its ability to damage human cells' biologically.

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.

Responding to the effects of a radiological release in Iowa is extensive and will require resources and assistance from several Federal agencies to determine and evaluate the threat to life and the environment in the affected sub-areas.

Hazard: Dam Failure
Jurisdictions: Gilman, Le Grand, Marshalltown, Rhodes, Unincorporated Marshall County, East Marshall School District, Marshalltown School District
Score: 11

There are no major dam failures to report for Marshall County. The probability of a major dam failure occurring in or affecting Marshall County is low. 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.

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.

According to the Iowa DNR's Natural Resources Geographic Information System (NRGIS) Library, there are two dams located within the city limits of Marshalltown. Failure at these Veenstra Kimm Dams, both on the Anson Creek, can affect the City of Marshalltown and some unincorporated areas which are downstream and around Anson Creek.

There are 2,442 inventoried dams located in Iowa. Of these, 63 are high hazard, 160 are categorized as significant hazard, and 2,219 are classified as low-hazard dams. The severity of damage could range from property damage, if a small subdivision impoundment failed, all the way to multiple deaths, injuries, and extensive property damage if a large high-hazard dam, such as the Saylorville Reservoir, failed upstream from Des Moines. None of the dams in Marshall County are considered high hazard, though there are two "significant" dams, the Crab Tree Lake Dam and Green Castle Dam.

Hazard: Hailstorms
Jurisdictions: All Jurisdictions
Score: 11

According to the National Climatic Data Center, there have been 89 hail events in Marshall County since 1985. The size of hail ranges from 0.75 inches in diameter to 3 inches. In total, no injuries or deaths were reported. The sum total of all the property damage from these hail events is $657 thousand. The resulting crop damage is $460 thousand. According to the 2010 State of Iowa Hazard Mitigation Plan, Marshall County's Annual Loss Estimation from Hail is $69,937.50.

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.

The land area affected by individual hail events is not much smaller than that of the parent thunderstorm, an average of 15 miles in diameter around the center of the storm. Any area in Marshall County can be affected by this hazard.

Hailstorms cause nearly $1 billion 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.

The occurrence of hailstorms is short term in nature and usually limited to less than 6 hours per event.

Hazard: Animal/Crop/Plant Disease
Jurisdictions: Unincorporated Marshall County
Score: 11

According to Mike Stegmann, Marshall County Conservation, there are sure to be crop related diseases, fungus, molds, insect outbreaks that occur regularly every year and are treated by the farming community.

Recently discovered in Northeast Iowa, though not in Marshall County yet, is the Emerald Ash Borer. This insect threatens to destroy every ash tree across the landscape. In some communities, ash trees compose 50-70+% of the trees. Stegmann says this may be just like when Dutch Elm disease went through 60-70 years ago.

An Emerald Ash Borer (EAB) website, created and run by the University of Michigan Extension describes the ash border as metallic green and about 1/2-inch long. They expect that it probably came from Asia in wood packing material. An implication of their infestation is the effect on firewood in some states not being moved because of a quarantining effort. These quarantines are in place to prevent infested ash firewood, logs or nursery trees from being transported and starting new infestations. Some signs of EAB damage are canopy dieback, Epicormic shoots (sprouts

growing from roots and trunk), bark splitting, serpentine galleries, D-shaped exit holes, and increased woodpecker activity/damage.

Stegmann also described some plant diseases new to the county that "…are potentially destructive/invasive to native vegetation and can take over entire landscapes." Some of the species include Purple Loostrife, Garlic Mustard, Leafy Spruge and Poison Hemlock. They can spread rapidly in some instances. A concern is that people do not have a clue as to which plants are good or bad so they can be infected because of improper knowledge of the plant. According to the 2010 State of Iowa Hazard Mitigation Plan, Marshall County's Annual Loss Estimation from Crop loss is $667,967.88.

U.S. agriculture is very vulnerable to the introduction of a foreign animal disease. Outbreaks can be inadvertently introduced by contaminated material carried by an international traveler or by the importation of infected animals and animal products. Foreign animal disease could enter the U.S. vectored by wild animals, insects, or migratory birds or they could be intentionally introduced to cause severe economic problems or to target human health.

State and federal animal health programs have been very successful in preventing or limiting the scope and magnitude of animal emergencies. However, because threats to animal health are always changing and because the animal population is mobile, the possibility always exists for a local, regional, or statewide animal health emergency to occur. Unincorporated Marshall was identified as the jurisdiction most at risk for this hazard. Most livestock is located outside city corporate limits in Marshall County.

Animal health emergencies can take many forms: disease epidemics, large-scale incidents of feed and water contamination, extended periods without adequate water, harmful exposure to chemical, radiological, or biological agents, and large-scale infestations of disease-carrying insects or rodents, to name a few. One of the principal dangers of disease outbreaks they can rapidly overwhelm the animal care system. Perhaps the greatest animal health hazard would be the intentional release of a foreign animal disease agent to adversely impact a large number of animals. Such a release would likely not be an act of sabotage.

Hazard: Terrorism
Jurisdictions: Marshalltown, Unincorporated Marshall County, Marshalltown School District
Score: 11

Although Des Moines is the state capitol, county seat, and most populous city and thus a potential target in an all-out attack on the United States, it is unlikely that Iowa would be a primary target during enemy attack. The U.S. federal government monitors global political situations and provides security from international attacks. World events in recent years have greatly changed the nature of enemy attack/war. However, enemy attack is still a possibility due to international conflicts and the large number of weapons still in existence throughout the world.

Since the targets of attacks on critical infrastructure would likely include both facilities in the economy and those in the government. These critical infrastructures include information and communication systems; electrical power systems; gas and oil production, storage, and transportation systems; water supply systems; emergency services; and government services. Nearly every citizen, business, and organization depends on these for normal operation as well as safety and security. If not affected directly, the entire community would be vulnerable through indirect impacts.

While the entire State of Iowa would likely be affected in some way, areas near government buildings, military complexes, transportation, communication, and fuel facilities would experience the largest impacts. A full-scale attack in the foreseeable future is not likely; however, a limited attack could take place that could potentially threaten target areas. Given the tremendous destructive capability of even one nuclear weapon, the devastation that could occur would be far worse than anything ever experienced in this country.

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. The American public is not vaccinated for many of the agents used as weapons by terrorist groups. Iowa vaccinated volunteers against smallpox in 15 Iowa hospitals in 2003.

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.

The response to all sources of terrorism are extensive and will result in the need for outside resources and response from Federal agencies in both the investigation of a crime scene and in the response to the direct threats to life and property.

Hazard: Drought
Jurisdictions: All Jurisdictions
Score: 10

According to the National Climactic Data Center, Iowa has had 20 periods of drought from 1980-2009. The most common trend was the consistency of drought periods during the month of August. While some may have been more severe than others, agricultural areas were impacted much more than the metropolitan areas where impacts were indirect.

According to the National Climatic Data Center (NCDC), Marshall County has experienced five drought events since 1985. The most recent drought was in 2003. The total property damage, from the five events, to Marshall County and the other areas (one being statewide) affected by the drought totals $645 million, and crop damaged reached a total of over $1 billion. No deaths or injuries were reported during any of these drought events. According to the 2010 State of Iowa Hazard Mitigation Plan, Marshall County's Annual Loss Estimation from drought is $2,681,156.15.

Those dependent on rain would be the most vulnerable during a drought. This means that agriculture, agribusiness, and consumers would be impacted. A drought limits the ability to produce goods and provide services. Because citizens draw their drinking water from groundwater sources, a prolonged severe drought may impact all citizens if there were to be a dramatic drop in the water table. Fire suppression can also become a problem due to the dryness of the vegetation and possible lack of water.

A drought would likely affect most of Marshall County and Iowa if not the entire Midwest. Because of the dependence on precipitation and water, the agricultural areas would be most adversely impacted. Even though the agricultural areas would be most adversely impacted, the entire county would likely feel at least some impact.

Drought in the U.S. seldom results directly in the loss of life. Deaths associated with drought are usually related to a heat wave. Drought more directly affects agricultural crops, livestock, natural vegetation, and stream flows that include fish and aquatic vegetation. Impacts are costly to the economy, environment, and general population.

Hazard: Extreme Heat
Jurisdictions: All Jurisdictions
Score: 10

The record high temperature of 110 for Des Moines was recorded in 1936. During July 1936, 12 record setting days topped 100 degrees in Des Moines. The record high temperatures for Des Moines are above 90 degrees Fahrenheit beginning in March and lasting through October.

According to the National Climatic Data Center, two extreme heat events have occurred in Marshall County since 1995. The event in 1995 affected the entire State of Iowa and resulted in three deaths and $3.8 million in property damage. The last extreme heat event to affect Marshall County on August 5, 2001 resulted in one death. According to the 2010 State of Iowa Hazard Mitigation Plan, Marshall County's Annual Loss Estimation from extreme heat is $3,000.00.

Elderly people, small children, chronic invalids, those on certain medications or drugs (especially tranquilizers and anticholinergics), and persons with weight and alcohol problems are particularly susceptible to heat reactions. Healthy individuals working outdoors in the sun and heat are vulnerable as well. Individuals and families with low budgets as well as inner city dwellers can also be susceptible due to poor access to air-conditioned housing.

Most of the County and 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 has broad and far-reaching sets of impacts. These include significant loss of life and illness, economic costs in transportation, agriculture, production, energy, and infrastructure. 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).

Livestock and other animals are adversely impacted by extreme heat. High temperatures at the wrong time inhibit crop yields as well. 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 blackouts. 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.

Hazard: Flash Flood
Jurisdictions: All Jurisdictions
Score: 10

Flash floods are the most common and widespread of all-natural disasters except fire. In Iowa, as much as 21" of rain has fallen in a 24-hour period. According to the National Climatic Data Center, twelve flash flood events have affected Marshall County in the past 25 years. These flash floods occurred mostly in Marshalltown with a few in State Center and some which affected the entire county. Including these flash flood events, there have been 95 total flooding events since 1993 resulting in $189.64 million in property damage and $310.95 million in crop damage but no deaths or injuries were reported. According to the 2010 State of Iowa Hazard Mitigation Plan, Marshall County's Annual Loss Estimation from Flooding is $29,307,529.41.

Flash floods occur in all fifty states in the United States. Particularly at risk are those in low-lying areas; close to dry creek beds or drainage ditches; near water; or downstream from a dam, levee, or storage basin. People and property in areas with insufficient storm sewers and other drainage infrastructure can also be put at risk because the drains cannot rid the area of the runoff quickly enough.

Nearly half of all flash flood fatalities are auto-related. Motorists often try to traverse water-covered roads and bridges and are swept away by the current. Six inches of swiftly moving water can knock persons off their feet and only two feet of water can float a full-sized automobile. Recreational vehicles and mobile homes located in low-lying areas can also be swept away by water.

Areas in a floodplain, downstream from a dam or levee, or in low-lying areas can be impacted. People and property located in areas with narrow stream channels, saturated soil, or on land with large amounts of impermeable surfaces are likely to be impacted in the event of a significant rainfall. Unlike areas impacted by a river/stream flood, flash floods can impact areas a good distance from the stream itself. Flash flood prone areas are not particularly those areas adjacent to rivers and streams. Streets can become swift moving rivers, and basements can become deathtraps because flash floods can fill them with water in a manner of minutes. All Marshall County communities are prone to flash flooding.

Flash floods are the number one weather-related killer in the United States. They can quickly inundate areas thought not to be flood-prone. Other impacts can include loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock damage, and interruption of business. Hazards of fire, health and transportation accidents, and contamination of water supplies are likely effects of

flash flooding situations. In Iowa, there have been 644 flash flood events since 1993, and there have been five deaths and eight injuries.

Hazard: Grass or Wildland Fire
Jurisdictions: All Jurisdictions
Score: 10

According to the National Climatic Data Center, there were no wildland or forest fire events reported in Marshall County. This does not account for small or contained grass fires that may not have been reported.

While wildfires have proven to be most destructive in the Western States, they have become an increasingly frequent and damaging phenomenon nationwide. People choosing to live in wildland settings are more vulnerable to wildfires, and the value of exposed property is increasing at a faster rate than population. Iowa is less vulnerable to wildfires because of the extremely large percentage of land that is developed. Grass fires are often more easily contained and extinguished before there is damage to people or developed property. Fires often burn large portions of field crops in the fall when the crops are dry and the harvesting equipment overheats or throws sparks. This can be quite costly to the farmer in terms of lost production.

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 grass fire within a matter of minutes. The extent is dependent upon conditions such as land use/land cover, moisture, and wind. Grass fires are equally likely to affect Marshall County communities where there is dense or high vegetation. Rural areas are much more likely to experience grass or wildland fire issues.

Most grass fires burn only the grasses, crops, or other low land cover. Injuries and deaths from fighting the fire most often occur by natural causes such as heart attack or stroke. Property damage is usually limited to grass, small trees, etc. Occasionally a house or outbuilding can be damaged or destroyed.

Hazard: Windstorm
Jurisdictions: All Jurisdictions
Score: 10

Large-scale extreme wind phenomena are experienced over every region of the United States. Historically, high wind events are associated with severe thunderstorms and blizzards. It is often difficult to separate windstorms and tornado damage when winds get above 70 knots.

In Marshall County, according to the National Climatic Data Center, there are about 37 high wind events that were separated from either a thunderstorm or extreme wind chill. These windstorms occurred between 1993 and 2010, and were the only storms reported since 1950. The wind speeds during these windstorms ranged from less than one knot to 72 knots. Two deaths and 13 injuries were reported during these windstorm events. The total amount of property damage from these windstorms is about $54 million, and the total crop damage is about $385,000. According to the

2010 State of Iowa Hazard Mitigation Plan, Marshall County's Annual Loss Estimation from Windstorms is $70,225.46.

Those most at risk from windstorms include people living in mobile homes, campgrounds, and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to windstorms. The elderly, very young, and the physically and mentally handicapped are most vulnerable because of the lack of mobility to escape the path of destruction. People who may not understand watches and warnings due to language barriers are also at risk.

Five jurisdictions, Albion, Le Grand, Marshalltown, Melbourne, and State Center in Marshall County identified mobile home parks and individual mobile homes that may be extremely vulnerability during a tornado. According to Iowa Code 435.1, three or more mobile homes together make up a park.

Unlike tornadoes, windstorms may have a destructive path that is tens of miles wide. 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. Wind speeds can reach up to 70 knots or greater during a windstorm event so a major event is possible.

The severity of damage from windstorms can be very high. 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. Injury or death related to windstorms most often occurs when buildings collapse; people are hit by flying objects or are caught trying to escape the windstorm in a vehicle. Crop damage is often associated with windstorms, laying down crops, breaking stalks, and twisting plants, reducing the yield and making it difficult to harvest.

The response tied to high wind events is one directly related to the immediate protection of vulnerable populations from the direct threat to life and property. Response time is limited to event duration and immediate impact.

Hazard: Infrastructure Failure
Jurisdictions: All Jurisdictions
Score: 10

No widespread communications failures have occurred in Iowa. Local incidents due to weather conditions, equipment failure, excavation incidents, and traffic accidents have been reported, but outages have usually been resolved in a timely manner. Widespread communications losses are unlikely due to backup systems and redundant system designs. Local communications failures are likely to affect small areas of the county.

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 operation and environmental loads, such as fire, excessive vibrations, explosion, high-energy piping failures, missiles, and earthquakes. With the possible exception of misuse, accidental or environmental loads, the causes of failure may be found in deficiencies in design, detailing, material,

workmanship, or inspection. With the aging structures in the county along with problems with new materials, structural failures will continue to occur. Efforts to inspect and maintain 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.

Structural fires are almost a daily occurrence in some communities. Nearly all are quickly extinguished by on-site personnel or local fire departments.

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 fire will continue to occur. During colder months, clogged chimneys and faulty furnaces and fire places can increase the probability of structural fires.

The effects of energy shortage would be felt throughout Marshall County. If it were a major supply interruption type of incident local shortages could be quickly covered, because the distribution systems are very developed. An Energy Failure due to damaged infrastructure could affect a small or large are of the county, but this depends on what type and degree of damage that causes the loss..

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 relatively extensive if the structure that failed was a multi-story building of a downtown or a tall communication tower. All Marshall County jurisdictions are at risk for this hazard. Dam failure and levee failure would affect a much larger area.

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, small, or otherwise inadequate water distribution infrastructure such as water mains and hydrants are also at significant risk. Problems vary from region to region, often as a result of climate, poverty, education, and demographics, but Iowa has about 13.4 fire deaths per million people. The fire death risk is nearly two times that of the average population for children 5 years of age or less.

With modern training, equipment, fire detection devices, and building regulations and inspections, most fire can be quickly contained and limited to the immediate structure involved. Certain circumstances, such as the involvement of highly combustible material 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. All Marshall County jurisdictions are at risk for structural fires.

With the exception of structural fires which are largely handled by local response personnel, the response to the hazards of communication failure, energy failure, and structural failure are widespread in nature and are likely to required outside resources to assist the county in emergency response.

Hazard: Transportation Incident
Jurisdictions: All Jurisdictions
Score: 10

According to the Iowa Department of Transportation, between 2001 and 2005, there were a total of 4,166 car crashes in Marshall County. Within these crashes, 1,791 injuries were sustained while 32 of these injuries were fatal.

Urban crashes outnumber rural crashes in Marshall County with 2,764 crashes occurring in urban areas between 2001 and 2005. The rural crashes during this period of time are just over half at a total of 1,402. Also, more rural crashes result in fatal injuries than urban crashes. Two urban crashes resulted in two fatal injuries while 22 rural crashes resulted in 30 fatal injuries.

Although traffic engineering, inspection of traffic facilities, land use management of areas adjacent to roads and highways, and the readiness of local response agencies have increased, highway incidents continue to occur. As the volume of traffic on the county's streets and highways increases, the number of traffic accidents will likely also increase. The combination of large numbers of people on the road, unpredictable weather conditions, potential mechanical problems, and human error always leaves open the potential for a transportation accident.

There are 78 railroad crossings in Marshall County. The miles of railroad track in the county combined with the large number of street and highway crossings makes the probability of highway/rail collision significant. Derailments are also possible, while a major derailment would occur less frequently.

Statistics from the national Transportation Safety Board and the airline industry show that the majority—over 75 percent—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.

Those who use the surface transportation system are most vulnerable. Travelers, truckers, delivery personnel, and commuters are at risk all time that they are on the road. During high traffic hours and holidays the number of people on the road in Marshall County is higher. This is also true before and after major gatherings such as sporting events, concerts, and conventions. Pedestrians and citizens of the community are less vulnerable but still not immune from the impacts of a highway incident.

Marshall County is crisscrossed by hundreds of miles of roads and highways. Highway incidents are usually contained to areas on the roadway or directly adjacent to the roadway. Very few highway incidents affect areas outside the traveled portion of the road and the right-of-way. Extensive segments of the transportation system can be impacted during significant weather events, such as a large snowstorm, when multiple separate accidents occur. The area of impact can extend beyond the localized area if the vehicle(s) is involved in transporting hazardous materials.

People and property in close proximity to the railway lines, crossing, sidings, switching stations, and loading/unloading points are most at risk. Those away from railroad track and facilities are vulnerable only to large-scale incidents including those in which hazardous materials are involved.

There are 78 railways crossings through the county, including 6 of 14 cities. 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 materials involved, the effect could reach areas up to 1-5 miles from the scene. 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.

Instances of transportation incidents, particularly rail, air, and waterway related hazards are likely to create more intensive response and resources to protect life and safety of those affected.

Lower – Priority Hazards

Hazard: Levee Failure
Jurisdictions: Marshalltown, Unincorporated Marshall County, Marshalltown Community School District
Score: 9

There are two levees in Marshall County. They are both located in the City of Marshalltown, one along the Iowa River and one on Linn Creek. The levees were constructed in 1977 and have not yet had any failures. Both of the levees are 9 miles long. They protect 165.76 acres of the community. The level of protection, though, is for 1% annual chance year flood boundaries. The levees are inspected every year by the Levee Corps of Engineers.

People, property, and utilities in the floodplain are most at risk. Levees and floodwalls give a false sense of security. People feel that levees will protect them and their property against and future flooding. While is usually true, the hazard is only temporarily contained.

Floodwaters breaching a levee are usually contained in the historic floodplain. Interestingly enough, levee failure in one area may prevent flooding in another area. A levee breach or overtopping occurring along one segment may drop the level of water along other segments of the stream. For initial overtopping, the overriding concern is choosing the least hazardous location for initial inundation of the interior. The least hazardous location could be a golf course, an oxbow lake, a pond area, undeveloped area such as agricultural land, or a downstream reach.

Water bursting through a narrow levee breach is moving much faster than the floodwaters in the main channel. The breaking out of this front of water and its fast flow can cause more destruction to structures behind the levee than flood water in the main channel would have caused. A failed levee continues to cause damage long after it breaks. The breach allows large volumes of water to enter formerly dry areas, forming temporary lakes. Such lakes do not go away immediately, because the lake is blocked from returning to the main channel by levee segments that were not destroyed. Consequently, water level drops along the main river days before it drops behind breached levees. Often, pumps behind the levees are needed to remove flood waters that breach the levees. This alleviates some of the impacts associated with levee failures. Sudden failure in an urban setting

could cause a catastrophe. In an urban setting the severity and duration may be important for health reasons, but in an agricultural area for economic reasons. Impacts would be similar to those experienced during a river or flash flood.

Hazard: Sinkholes
Jurisdictions: Albion, Ferguson, Le Grand, Liscomb, Marshalltown, Unincorporated Marshall County, East Marshall School District, Marshalltown School District
Score: 9

There are three areas in Iowa where large numbers of sinkholes exist: (1) within the outcrop belt of the Ordovician Galena Group carbonates in Allamakee, Clayton, and Winneshiek counties; (2) in Devonian carbonates in Bremer, Butler, Chickasaw, and particularly Floyd and Mitchell counties; and (3) along the erosional edge of Silurian carbonates in Dubuque and Clayton counties. According to the Iowa Department of Natural Resources, there are no significant sink holes in Marshall County.

In Marshall County, Albion, Ferguson, Le Grand, Liscomb, and Marshalltown are all susceptible to the sinkhole hazard though only a fraction of each jurisdiction is in the hazard area extent. Unlike other counties in Region 6's Jurisdiction, there are several large rural areas in the eastern townships that are susceptible to sink holes but like other counties, there is no history of this issue (according to Marshall County Emergency Management) so the probability of a sinkhole occurring is very low.

If a sinkhole were to form, people and structures located on or near the sink hole are the most at risk for injury, death, and property damage. People can be injured while the sinkhole is forming as well as after by falling into the open sinkhole. People, buildings, and infrastructure can basically be swallowed by a sink hole.

Sinkhole impacts included potential loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock losses; and interruption of businesses. Hazards of fire, health, and transportation accidents; and contamination of water supplies are likely effects. Much of this depends on the location and size of a sinkhole.

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 implications for groundwater quality.

Hazard: Human Disease
Jurisdictions: All Jurisdictions
Score: 9

The Iowa Department of Public Health track epidemiological statistics in Iowa. Their data indicate no major epidemics of diseases that have high percentages of loss of life or severe illness. Each year, there are many cases of the diseases on the national notification list.

In an August 28, 2009 article in the Times Republican newspaper, it was confirmed by Tina Coleman, Director of Marshall County Public Health that 2 confirmed cases of H1N1 existed in Marshall County. By September 1, 2009, KCCI in Des Moines reported that Marshall had up to five confirmed cases of the H1N1 influenza.

Public health agencies also work to reduce the impact of communicable diseases in Iowa and to eliminate the morbidity associated with these diseases. Prevention and care services target chlamydia, syphilis, gonorrhea, HIV/AIDS, and tuberculosis. 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.

Because of our highly mobile society, these diseases can move rapidly across the state and across the nation within days, weeks, or months. Many of the diseases on the national notification list result in serious illness if not death. Some are treatable, other only the symptoms are treatable.

Hazard: Earthquake
Jurisdictions: All Jurisdictions
Score: 8

Iowa as a whole has experienced the effects of only a few earthquakes in the past two centuries. The epicenters of 13 earthquakes have been located in the state. The majority have been along the Mississippi River, and none have been in central Iowa. The last earthquake to occur in Iowa was in the southwestern Iowa town of Shenandoah in 2004. Since the early 1800s, 9 earthquakes have occurred outside of Iowa but have impacted areas in the state. The most recent quakes were in the 1960s and occurred in Illinois and Missouri. While more than 20 earthquakes have occurred in or impacted Iowa in the past 200 years, they have not seriously affected Iowa.

In general, peak ground acceleration (PGA) is a measure of the strength of ground movements. More specifically, the PGA measures the rate in change of motion relative to the established rate of acceleration due to gravity. According to the United States Geological Services, for Marshall County, the peak acceleration with a 2% probability of exceeding in 50 years is 2% g, which means the County is under a very small threat in regards to earthquakes. Also, most of Iowa is located in Seismic Zone 0, which is the lowest risk zone in the United States.

The strongest earthquake in Iowa occurred in Davenport in 1934 and resulted in only slight damage. Estimated effects of a 6.5 Richter magnitude earthquake along the New Madrid Fault Zone suggests Iowans 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. If an earthquake were to occur, it would more than likely be felt in all of Marshall County.

Due to the limited effects to Iowa, response to the occurrence of an earthquake would likely be in support of nearby States utilizing mutual aid agreements; in-State response would likely be very limited.

Hazard: Thunderstorm and Lightning
Jurisdictions: All Jurisdictions
Score: 8

According to the National Climatic Data Center, Marshall County has experienced 102 thunderstorm, lightning, and high wind events since 1986. Out of these events, no deaths and no injuries occurred. The total property damage from these storms was $1.3 million, and the crop damage totals $369,000. The high winds ranged from speeds of zero mph to nearly 82 knots. Also, according to the NCDC, there are four lightning events for Marshall County between 1/1/1986 and 1/1/2011. All of the reported events occurred in separate Marshall County jurisdictions. According to the 2010 State of Iowa Hazard Mitigation Plan, Marshall County's Annual Loss Estimation from Lightning is $50,176.47 and from Thunderstorm, $98,882.35.

People 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. Floods and flash floods are the number one cause of weather related deaths in the U.S.

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. 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 vulnerable to the impacts of thunderstorms.

Five jurisdictions, Albion, Le Grand, Marshalltown, Melbourne, and State Center in Marshall County identified mobile home parks that may be extremely vulnerability during a tornado. According to Iowa Code 435.1, three or more mobile homes together make up a park. The other jurisdictions in Marshall County did not identify any manufactured or mobile homes that may be 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. Floods and flash floods are the number one cause of weather related deaths in the U.S.

Like tornadoes, thunderstorms and lightning can cause death, serious injury, and substantial property damage. Severe thunderstorms can bring a variety of associated hazards with them including straight-line winds in excess of 100 mph. Straight-line winds are responsible for most thunderstorm damage. High winds can damage trees, homes (especially mobile homes), and businesses and can knock vehicles off of the road. 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. One or more severe thunderstorms occurring over a short period can lead to flooding and cause extensive damage, power and communication outages, and agricultural damage.

4.4.2 Community Assets

44 CFR Requirement §201.6(c)(2)(ii)(A): *The plan should describe vulnerability in terms of types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area…*

This section covers the location and density of the population, structures, critical facilities, infrastructure, and other important assets in Marshall County that may be at risk of the natural and manmade hazards identified in the previous section.

Hazards designated as "planning boundary-wide" can affect all of the people, structures, critical facilities, infrastructure, and other assets identified in this section. As a reminder, the planning boundary-wide hazards include—in no particular order:

- Drought
- Earthquake
- Extreme Heat
- Flash Flood
- Grass or Wildland Fire
- Hailstorm
- Hazardous Materials Incident
- Human Disease
- Infrastructure Failure
- Transportation Incident
- Severe Winter Storm
- Thunderstorms and Lightning
- Tornado
- Transportation Incident
- Windstorm

The hazards that only affect certain jurisdictions and require more specific analysis include—in no particular order:

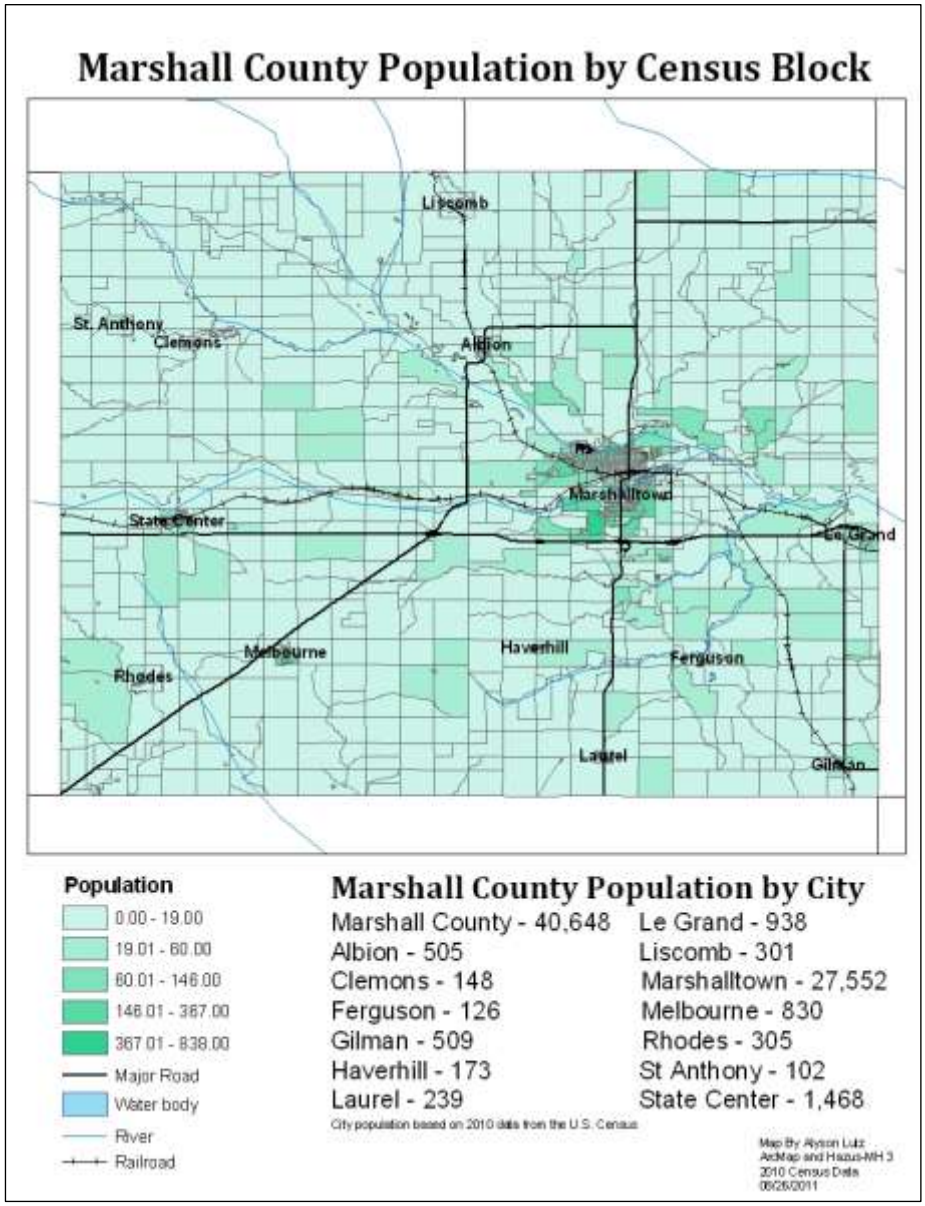
- Animal/Crop/Plant Disease—Unincorporated Marshall County
- Dam Failure—Unincorporated Marshall County, Gilman, Le Grand, Marshalltown, Rhodes, East Marshall CSD, Marshalltown CSD
- Levee Failure— Unincorporated Marshall County, Marshalltown, Marshalltown CSD
  Radiological— Unincorporated Marshall County, Le Grand, East Marshall CSD
- River Flooding— Unincorporated Marshall County, Albion, Clemons, Ferguson, Gilman, Laurel, Le Grand, Liscomb, Marshalltown, Rhodes, St Anthony, State Center, East Marshall CSD, Marshalltown CSD
- Sinkholes— Unincorporated Marshall County, Albion, Ferguson, Le Grand, Liscomb, Marshalltown, East Marshall CSD, Marshalltown CSD
- Terrorism – Unincorporated Marshall County, Marshalltown, Marshalltown CSD

Each hazard and the effect it can have on a jurisdiction will be discussed in the next section of this plan. This section is purely a summarization of the assets that are generally in danger when a hazard event occurs and their importance to the corresponding jurisdiction. There are quite a few similarities between jurisdictions, but there are also dozens of assets unique to each jurisdiction.

Human Assets

The people who live and visit Marshall County are the first priority for providing protection from natural and manmade hazards. One of the two main goals of hazard mitigation is to prevent human injury and death. Over 40,000 people live in Marshall County and thousands more visit and travel through the county regularly. Refer to Figure 4.4.2.1 below for the population distribution across Marshall County.

Figure 4.4.2.1: Marshall County Population by Jurisdiction and Census Block

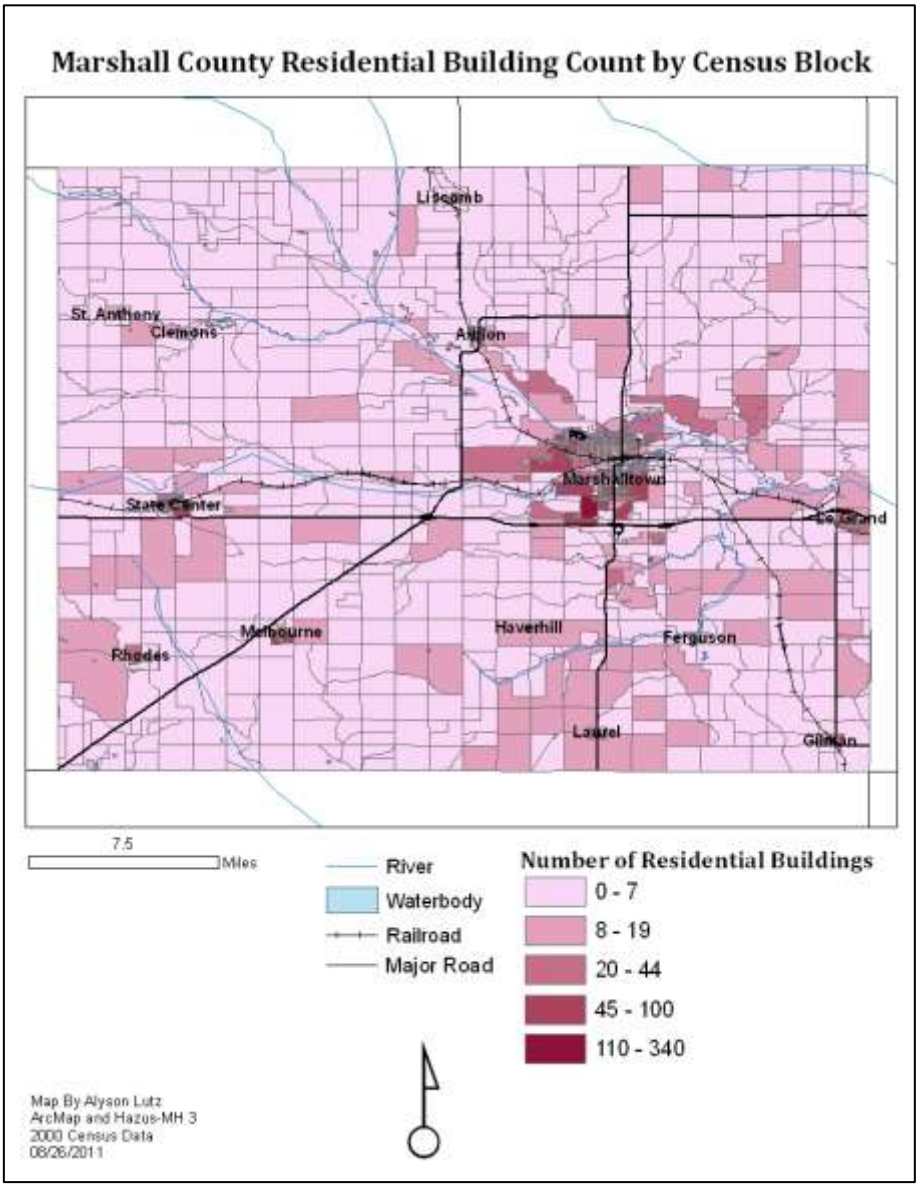


The largest concentration of people in Marshall County is in its incorporated cities. Marshalltown and State Center have the highest populations. The rest of the population is evenly spread among the smaller cities and the unincorporated areas throughout the county.

Structural Assets

The other main goal of hazard mitigation is to prevent property damage, which can be both dangerous and extremely expensive to repair. For the sake of analysis, Marshall County's structural assets were divided into five different use categories: residential, commercial, industrial, agricultural, and historic. Figure 4.4.2.2 below features residential structures.

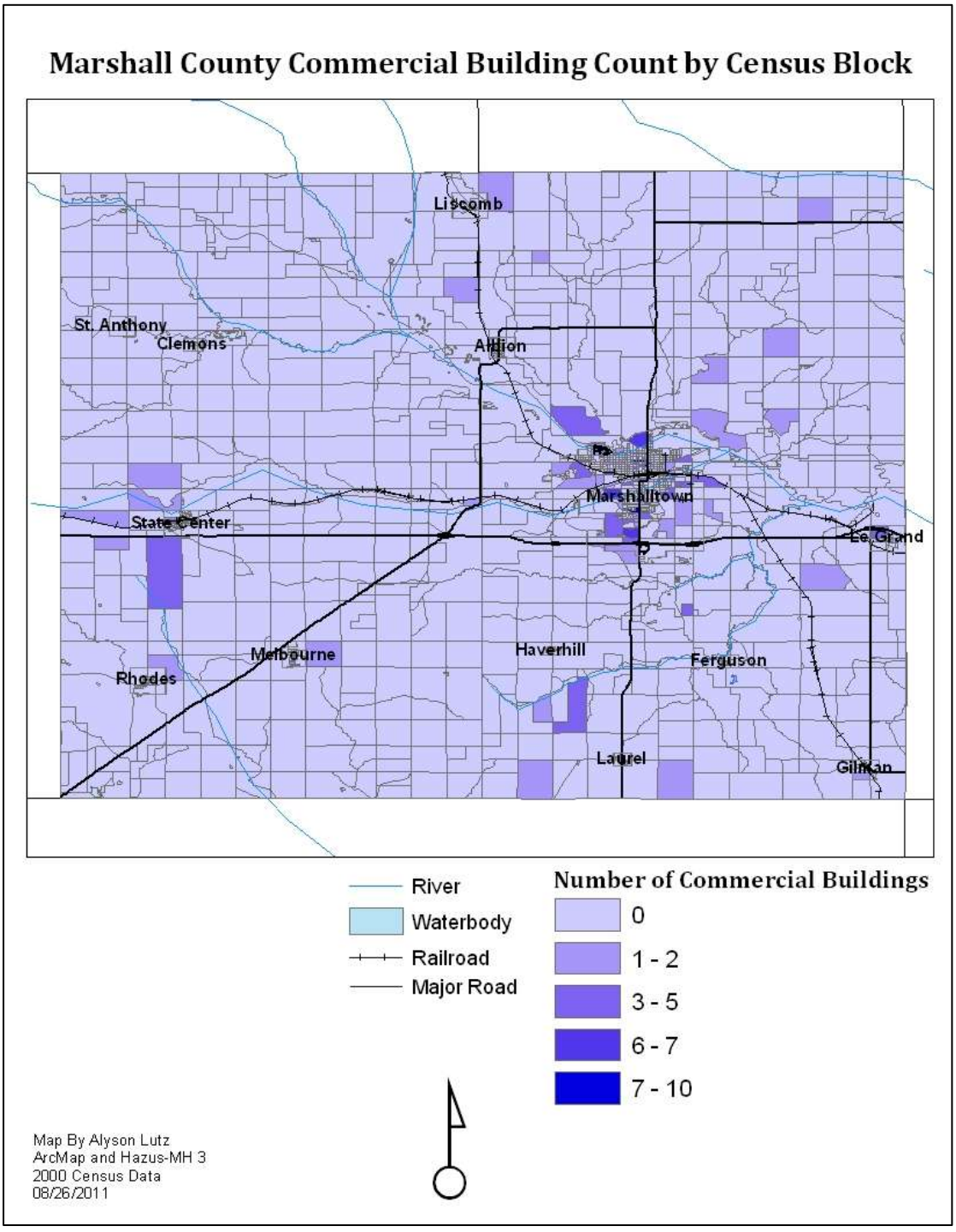
Figure 4.4.2.2: Marshall County Residential Building Count by Census Block



The pattern of residential development resembles the population distribution of the county since it is based on residence. The majority of residential structures are concentrated in the county's largest cities. Smaller concentrations can be found in the smaller cities of Marshall County and throughout the unincorporated areas. Overall, the majority of the structures in Marshall County are for residential use.

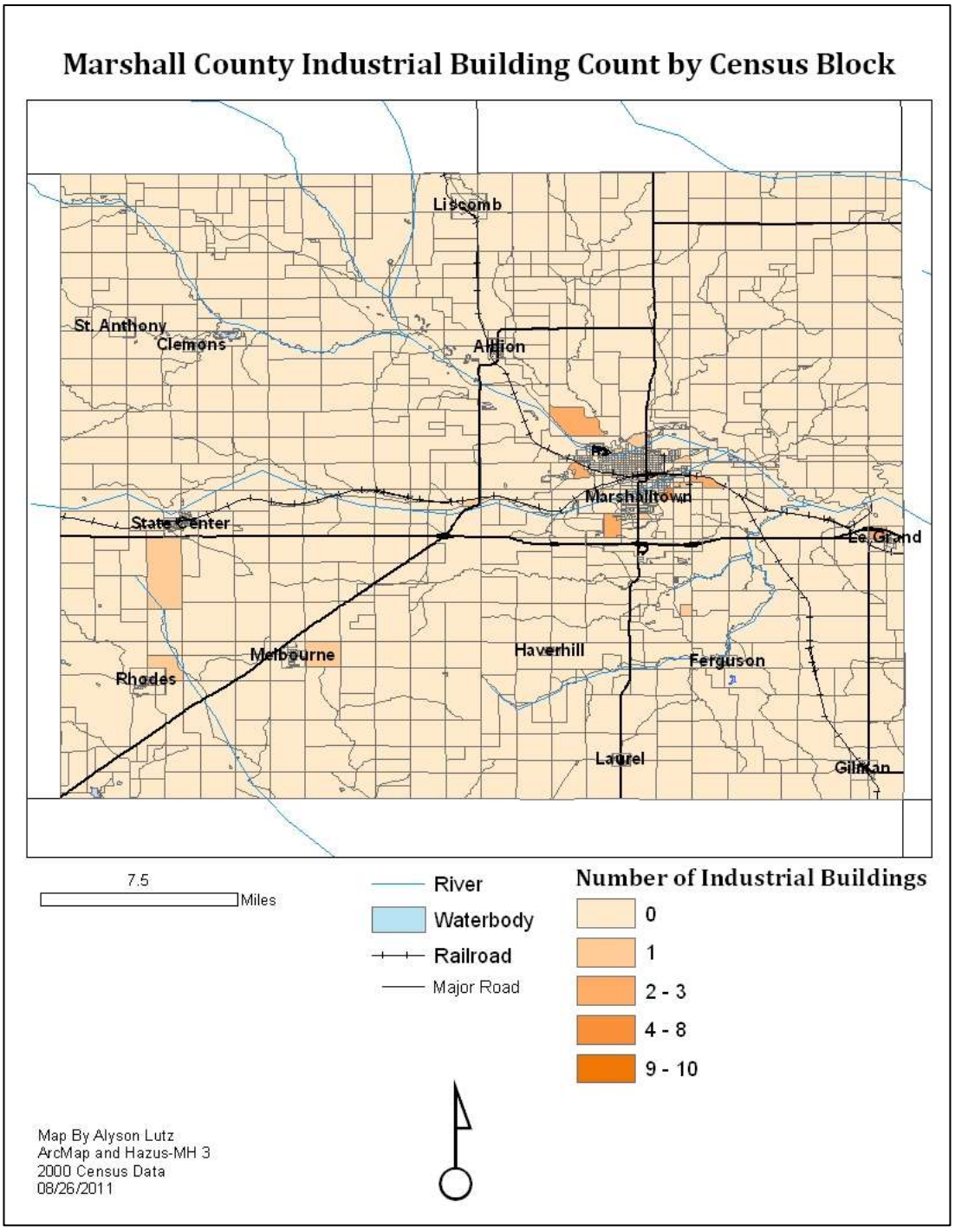
The second structure type, commercial, somewhat resembles the patterns of residential development. Most other commercial buildings are scattered in unincorporated portions of the county. The highest concentrations of buildings in one census block, though, is seven to ten so there are a few dense areas of commercial buildings. Generally, Marshall County's largest cities have higher concentrations but there are also denser areas in the unincorporated, city periphery.

Figure 4.4.2.3: Marshall County Commercial Building Count by Census Block



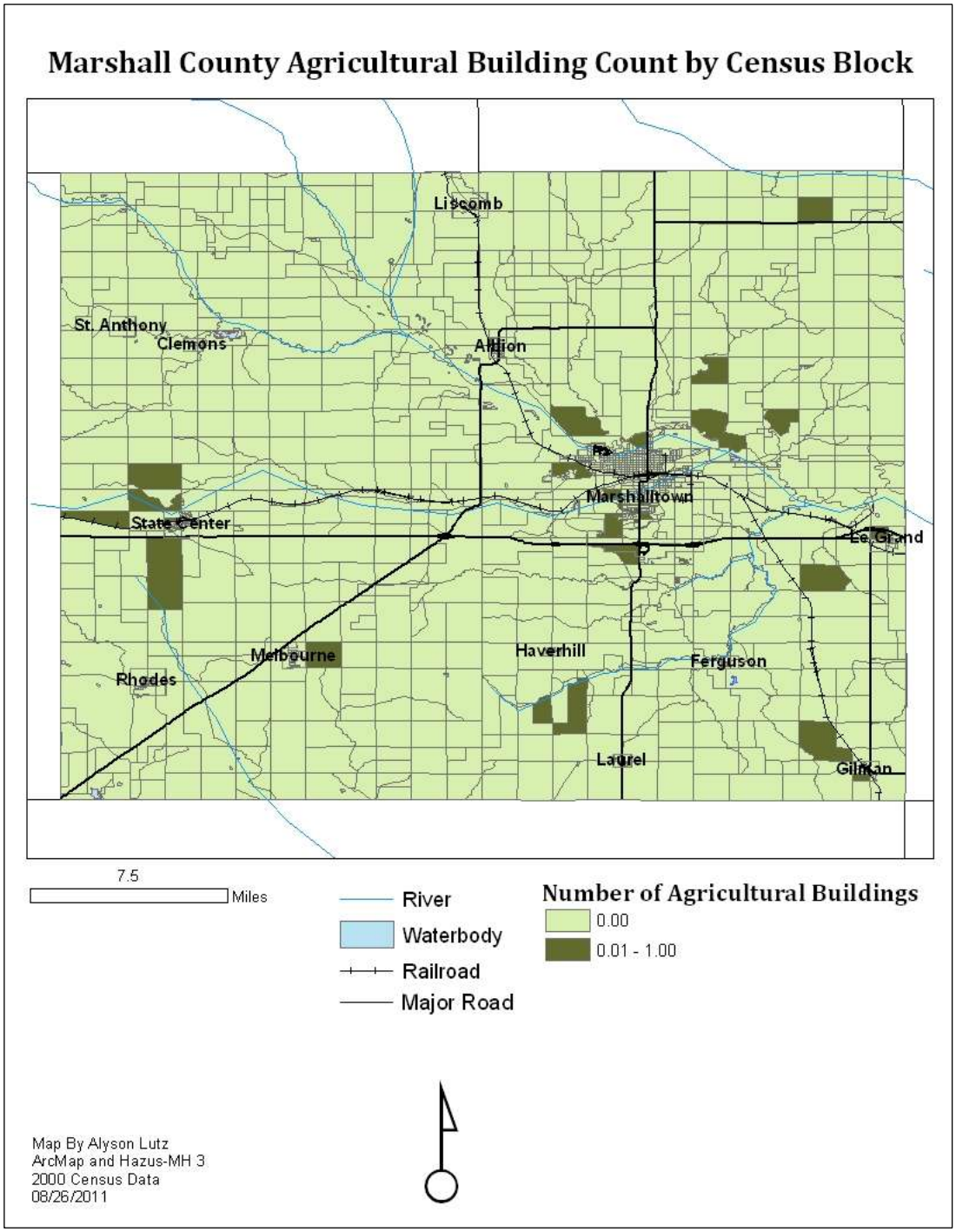
The concentration of industrial buildings is also not very dense with the highest concentration ranging from nine to ten buildings. Refer to Figure 4.4.2.4. There is just one area that stands out as the densest industrial area, that being Marshalltown. There are some other areas with 1 industrial building just outside city limits of county jurisdictions. Overall, Marshall County does not have a high concentration of these buildings in one area so the county's industrial economy does not seem to be extremely vulnerable.

Figure 4.4.2.4: Marshall County Industrial Building Count by Census Block



The distribution of Marshall County's agricultural buildings is scattered, somewhat like the commercial buildings. None of the areas are extremely dense because the highest range in number of buildings per census block is just one building. Most agricultural buildings are located outside of city corporate limits in the unincorporated areas of the county. Refer to Figure 4.4.2.5 for the location of agricultural buildings in Marshall County.

Figure 4.4.2.5: Marshall County Agricultural Building Count by Census Block



Historic Assets

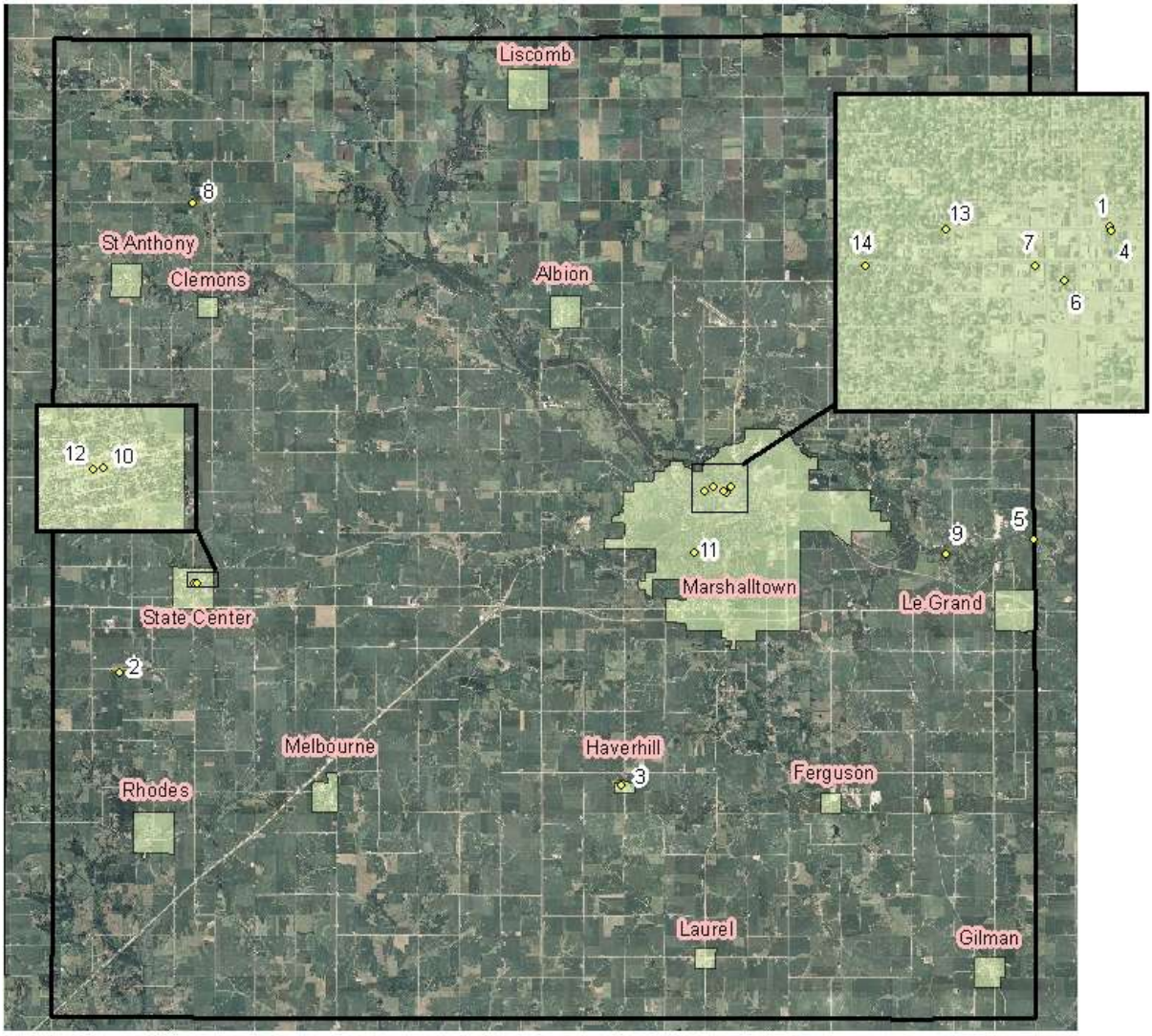
The 14 historic sites are spread across only some parts of Marshall County. There is one major cluster of historic sites in the city of Marshalltown, which can be seen in the call out in Figure 4.4.2.6 on the next page. This cluster contains a majority of the sites in the county. Because these historic sites are in such close proximity, they should have a high priority and consideration when it comes to protection from hazards. Many of these sites are used presently as critical facilities and therefore, maintain a high importance to the city.

In order to identify the locations of 14 registered historic sites in Marshall County, Geographic Information Systems software was used. The National Geographic Information System Library and the Iowa Department of Natural Resources provided aerial photos as well as county and incorporated city boundary shapefiles. The State Historic Society provided the points of the historic sites listed on the National Register of Historic Places. (http://www.nps.gov/nr/) The full list of Marshall County's historic sites is below:

1. Binford, Thaddeus, House, aka City Federation of Women's Club
2. Dobbin Round Barn
3. Edel, Matthew, Blacksmith Shop and House
4. Glick--Sower House, aka Sower,Susie,Historical House
5. Le Grand Bridge
6. Marshall County Courthouse
7. Marshalltown Downtown Historic District
8. Minerva Creek Bridge
9. Quarry Bridge
10. State Center Commercial Historic District
11. Sunday, Robert H., House, aka Cassidy House
12. Watson's Grocery
13. Whitehead, C. H., House
14. Willard, Leroy R., House

Refer to Figure 4.4.2.6. This map shows the location of each historic site with its corresponding number in the list above as its identifier.

Figure 4.4.2.6: Marshall County Historic Sites



Jurisdiction Identified Assets, Critical Facilities, and Vulnerable Populations

A community asset diagram was completed for each individual jurisdiction and the unincorporated areas of Marshall County. The schools were also included in this process by having school representatives participate in the asset mapping for the community in which their buildings are located. The assets particular to each jurisdiction can be found in the following pages.

Critical facilities and vulnerable populations were also identified for each jurisdiction. These facilities and populations are also important to identify for the purpose of determining hazard mitigation priorities. Knowing who is most vulnerable during a hazard event and what facilities are most important during and immediately after a hazard event is extremely valuable.

Critical facilities are defined as facilities that are extremely important to the health, safety, and welfare of the people of each jurisdiction. These facilities are especially important following hazard events. Examples of critical facilities include but are not limited to:

- Shelters
- Police, fire, ambulance stations
- City Hall
- Hospitals, medical clinics, nursing facilities
- Emergency operation centers
- Transportation facilities like roads, bridges, airports, etc.
- Infrastructure for water, wastewater, power, communications, etc.
- Power generation facilities
- Schools
- Businesses that provide necessities like food, fuel, hardware, and money

Every Marshall County jurisdiction is unique so the critical facilities identified for one jurisdiction may be very different from others. Critical facilities from other jurisdictions can be identified, too. An example is a grocery store or gas station. These facilities may not be located in a certain community but residents depend on that grocery store or gas station for their basic needs.

A vulnerable population includes people who may require special assistance or medical care. These people should be identified so their needs are a priority in the event of a disaster. Examples of vulnerable populations include but are not limited to:

- Elderly in their homes, assisted living, or nursing facility
- Disabled in their homes, assisted living, or nursing facility
- Young children in school or daycare

The elderly or disabled people in a jurisdiction may not be able to cope with a disaster as well as others. These people might require help getting to a shelter, boarding up broken windows, buying groceries, or contacting their family.

Albion

It is important to identify community assets, which may be infrastructure, buildings, activities, or institutions, because it helps residents decide what to protect from the harmful impacts of hazard events. The assets identified for Albion are below:

1	4H Club	15	Market off Main
2	Apartments	16	Old Hotel
3	Ball diamond	17	Old School Gym
4	Casey's	18	Park
5	Church	19	Raymon Donco
6	City Hall	20	Russell
7	City Truck	21	Sewer building
8	Dump Truck	22	Sharon's leather
9	Farmer's Market	23	State board park
10	Heart of Iowa Building	24	Tractor
11	Kathy's barn	25	Water Tower
12	Lift Station	26	Well house
13	Lion's Club	27	Wellness
14	Main Meter	28	Wireless booster antenna

The critical facilities for the community were also identified. These are the facilities in the community that are important to maintain the health, safety, and welfare of the residents and visitors of the Albion community. The critical facilities identified for Albion are below:

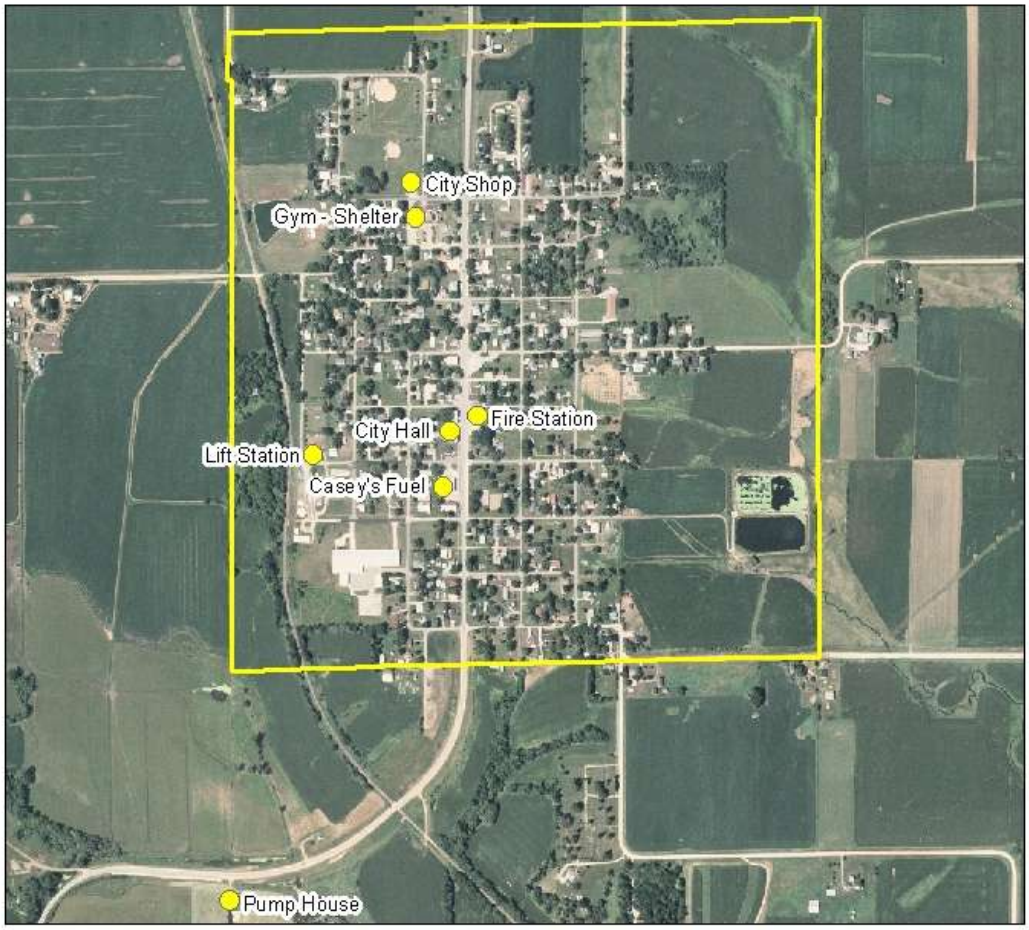
1. Fire station
2. City hall
3. Lift station
4. Pump house
5. Casey's fuel
6. Gym shelter
7. City shop

These seven facilities were identified for several reasons. The city hall serves as the city command post during disaster events. The lift station and pump house process water during hazard events to ensure the city has a clean water supply. The shelter protect people during hazard events, so it is pertinent to protect it. Refer to Figure 4.4.2.7 for each facility's location in Albion.

The vulnerable populations living in Albion were also identified. These are the people in the community who may require special assistance or medical care. Vulnerable populations are identified so their needs can be made a priority in the event of a disaster. The vulnerable populations living in the City of Albion are identified below.

1. Children in Daycare
2. Elderly population

Figure 4.4.2.7: Albion's Critical Facilities



Clemons

Clemons's assets were identified by the Planning Team members who volunteered to represent the city. The assets were identified through asset mapping activity at the first countywide hazard mitigation meeting. For this activity, three major asset areas were considered: environment, economy, and social. Clemons's assets are listed below.

1 Ball park
2 Bank
3 Church
4 City park
5 Community center
6 Elevator
7 Half of water tower repaired
8 Post Office
9 Private School
10 School
11 Volunteer Fire Dept

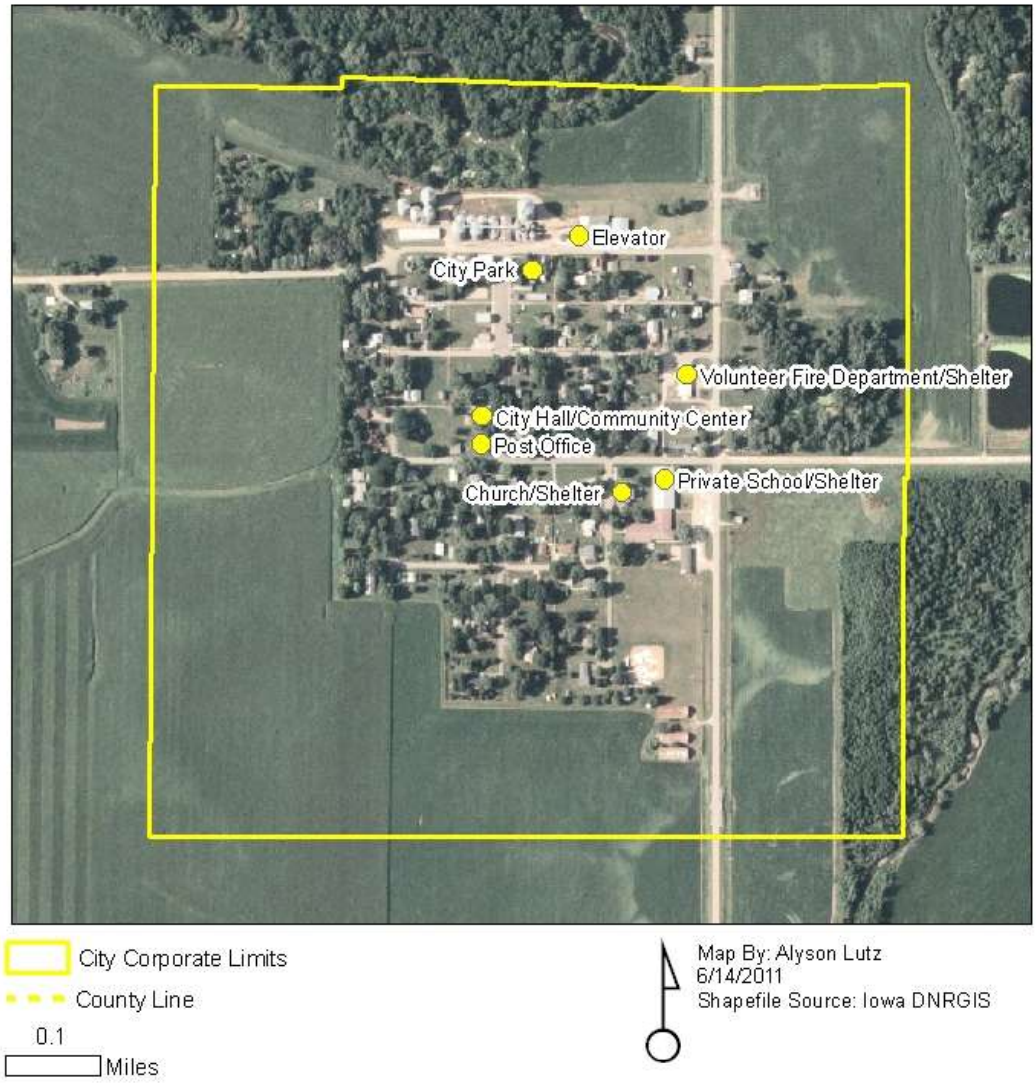
The city's critical facilities were also identified at this meeting but in a separate activity. A couple of the city's assets were also considered critical facilities. The facilities that need to function immediately following a hazard event are listed below.

1 Shelters
2 City hall/community center
3 Post office
4 Private school
5 Church
6 City park
7 Volunteer fire department
8 Elevator
9 Out of town school
10 Out of town bank
11 Out of town grocery store

All of these facilities are extremely important to Clemons during and after a hazard event. These eleven facilities were chosen for many reasons of which some are very obvious. The city hall/community center is a command post for City operations and protects important equipment that will most likely be needed immediately following a hazard event. Clemons identified some critical facilities outside its jurisdiction that the city uses on a daily basis such as an out of town bank and grocery store. For the location of Clemons's critical facilities, refer to Figure 4.4.2.8.

Clemons's representative also identified the vulnerable population of elderly people living in their homes. These are the people in the community who may need immediate assistance after a hazard event due to special circumstances. They may not have the mobility needed to respond quickly to hazard events.

Figure 4.4.2.8: Clemons's Critical Facilities



Ferguson

Ferguson's assets were identified by the Planning Team members who volunteered to represent the city. The assets were identified through asset mapping activity. For this activity, three major asset areas were considered: environment, economy, and social. Ferguson's assets are listed below.

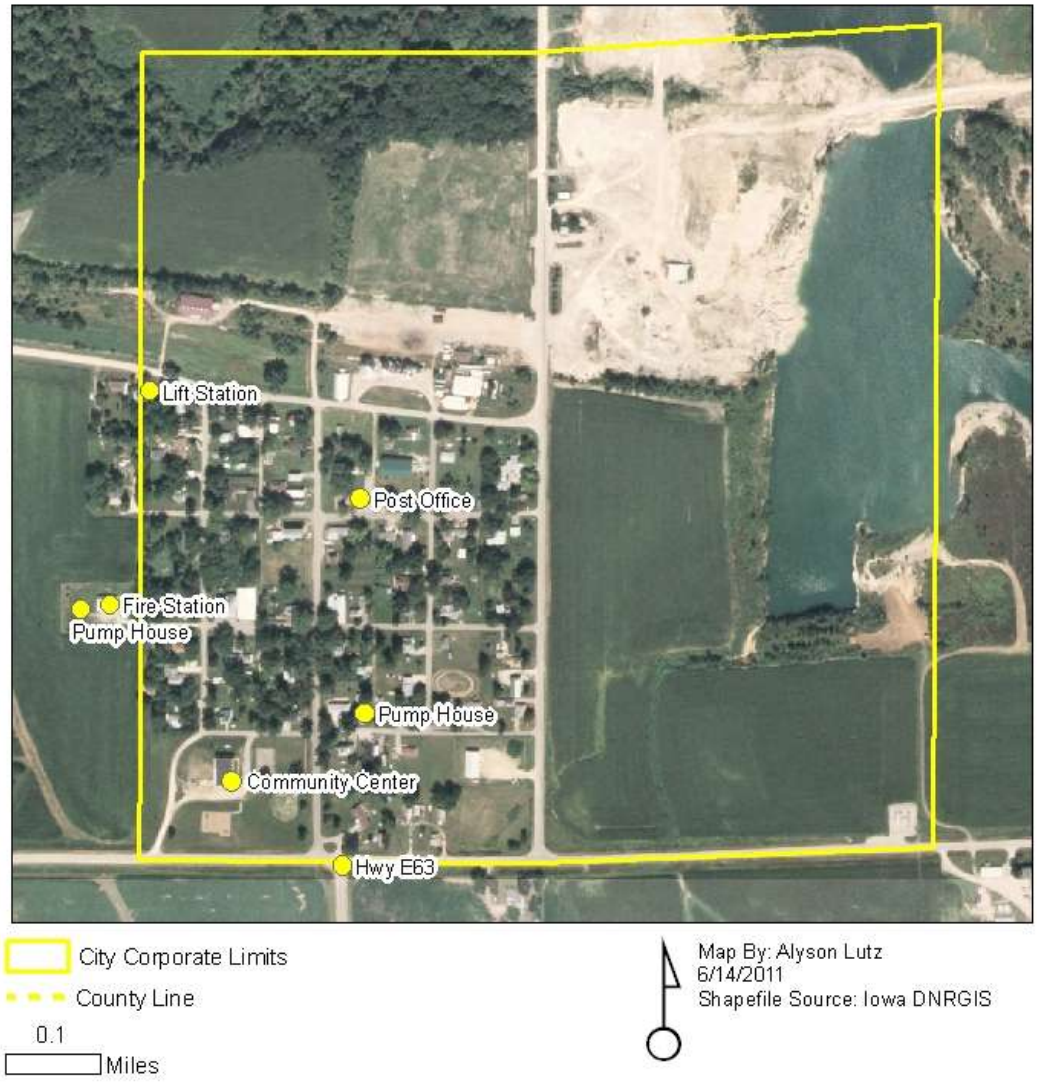
1 Apartment building
2 Ball field
3 Christmas party
4 Citywide picnic
5 Community center
6 Good streets
7 Grain storage
8 Green Castle Lake Park
9 Martin Marietta Quarry
10 New Concession stand
11 New fire station
12 Safety center
13 Upgrading sewer and water system

Just a few of the commonly identified critical facilities are located in Ferguson for it is a very small jurisdiction. Their critical facilities include:

1 Fire station
2 Community center
3 Pump houses 1 and 2
4 Highway E63
5 Post office
6 Lift station

Refer to Figure 4.4.2.9 for the location of critical facilities actually located in Ferguson. The only vulnerable populations identified for Ferguson are elderly in homes and residents at the outdoor ball field in a hazard event. These individuals may require priority assistance during and immediately following a hazard event.

Figure 4.4.2.9: Ferguson's Critical Facilities



Gilman

Gilman's assets were identified by the Planning Team members who volunteered to represent the city. The assets were identified through asset mapping activity at the first countywide hazard mitigation meeting. For this activity, three major asset areas were considered: environment, economy, and social. Gilman's assets are listed below.

1. Bar
2. Barbie's Bakery
3. Burchland Manufacturing
4. Cut and Curl
5. East Marshall School
6. Elevator
7. Fire and EMS
8. Low Income Housing
9. New warning system
10. Park
11. Phone and internet services
12. Post Office
13. School Ball Fields
14. Tom's Tire
15. Water Tower

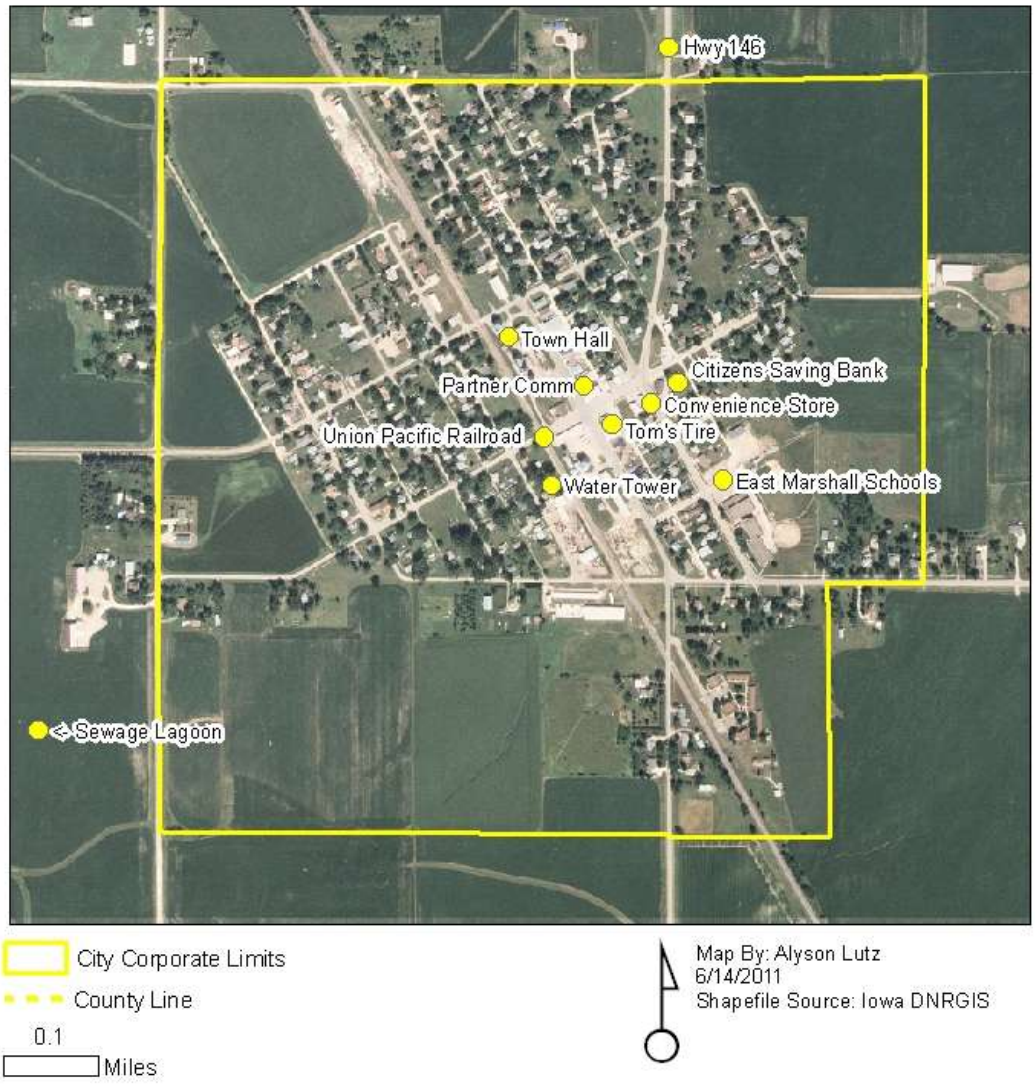
The critical facilities for the community were also identified. These are the facilities in the community that are important to maintain the health, safety, and welfare of the residents and visitors of the Gilman community. The critical facilities identified for Gilman are below.

1. Town hall
2. Highway 146
3. Water tower
4. Sewage lagoons
5. Partner Communications
6. East Marshall Schools
7. Citizens Saving Bank
8. Tom's Tire
9. Convenience store
10. UP Railroad

For the most part, Gilman has critical facilities that can be found in many other jurisdictions in the county; the Partner Communications coop, however, is a unique facility that brings jobs and possibly shelter to the community. The locations of Gilman's critical facilities can be viewed in Figure 4.4.2.10.

Vulnerable populations have also been identified for Gilman and include children at the East Marshall schools and people living in the town house apartments in town.

Figure 4.4.2.10: Gilman's Critical Facilities



Haverhill

Haverhill's representatives identified 12 major assets in the community. Some assets include agricultural assets, natural features, and social groups so there are not just physical assets but also social assets in this community. The complete list of assets from the asset mapping activity is below.

1. Babysitting service
2. Blacksmith Shop
3. Coop
4. Fire Dept
5. Haverhill Social Club
6. Houses
7. Lots of Farmers
8. Man's Best Friend
9. Park
10. Post Office
11. Shelter House
12. Storage

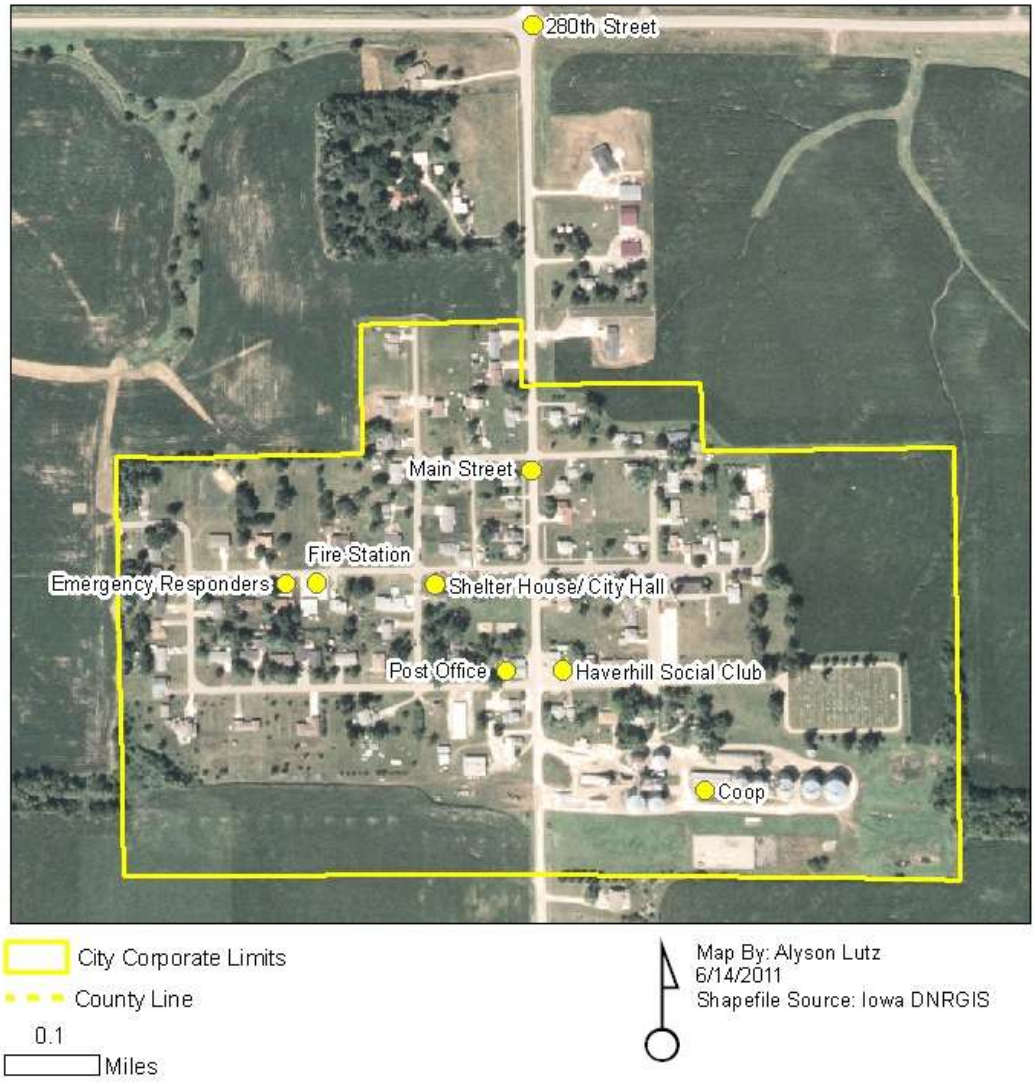
The critical facilities Haverhill identified are listed below. Refer to Figure 4.4.2.11 for the location of the critical facilities in Haverhill.

1. Shelter house/City hall
2. Fire station
3. Main Street
4. 280th Street
5. Co-op
6. Haverhill Social Club
7. Post office
8. Emergency responders

Of all the types of critical facilities that may be needed the quickest after a hazard event, fire rescue is much more time sensitive than social club events.

The vulnerable populations identified in Haverhill are the elderly in their own homes and children at daycare. These are commonly identified groups of people in Marshall County. Most cities have older residents and children in care centers. They do not have the mobility to respond quickly during a hazard event. Also, with the elderly being scattered throughout the community, it may be a challenge to reach all of them and meet their immediate needs during a hazard.

Figure 4.4.2.11: Haverhill's Critical Facilities



Laurel

Fourteen major assets were identified in Laurel. These assets include both commercial and social assets. The full list of identified assets is below:

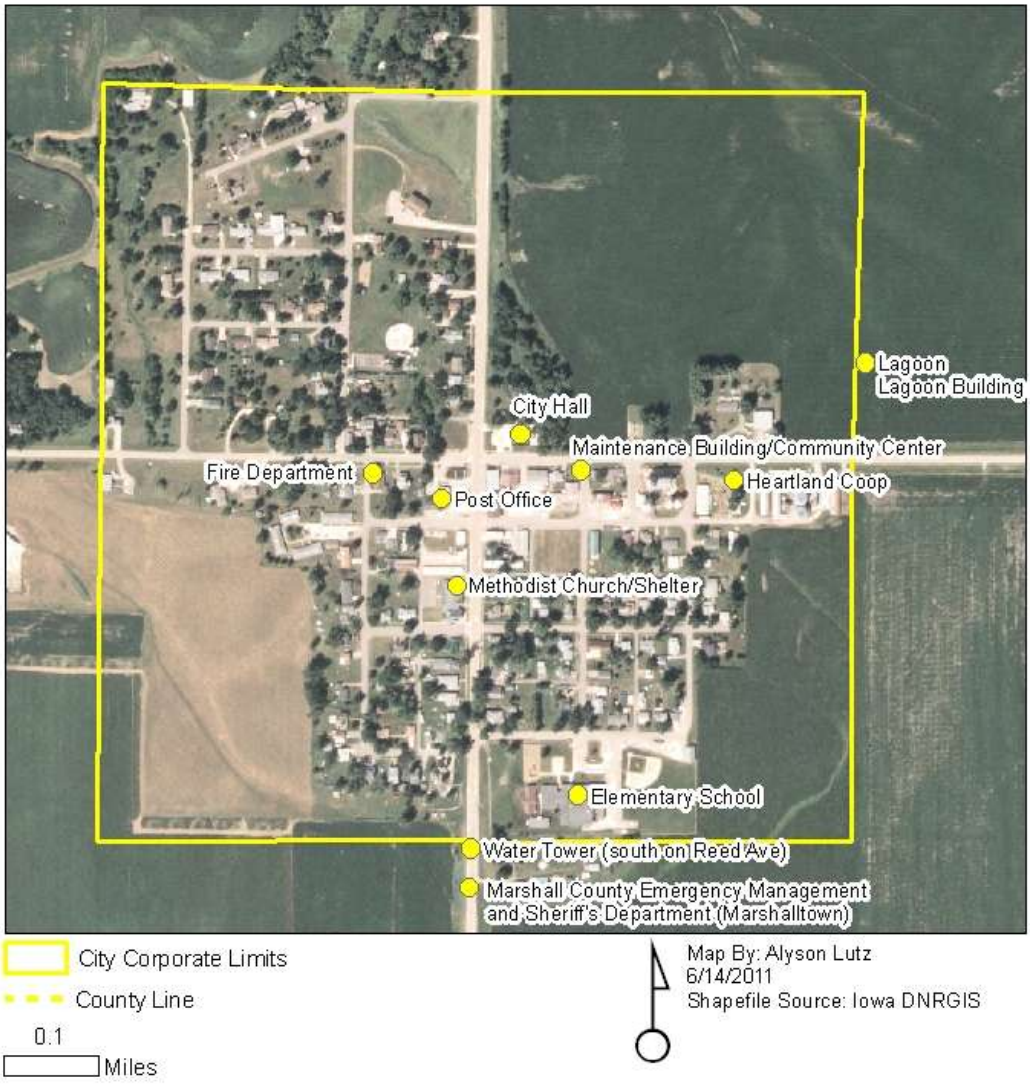
1 Antique shop
2 Appel Ball Park
3 Café
4 Elementary School
5 Fire Dept
6 Grain storage
7 Hair salon
8 Library
9 Phone Company
10 School ball park and play ground
11 Senior housing
12 USPS
13 Verg's Garage
14 Wilkenson Park

Laurel identified some critical facilities outside of the actual city. Marshall County Emergency Management and Sheriff's Department are critical for extra help and equipment Laurel may not have. Refer to Figure 4.4.2.12 for all of the critical facilities that were identified by the Laurel Planning Team representative, as well as their locations.

1 Lift station
2 Lagoon building/lagoon
3 Fire station
4 water tower
5 elementary school
6 Marshall Co Emergency Management
7 Marshall Co Sheriff's Department
8 Heartland Co-op
9 City Hall/maintenance building/community center
10 Post office
11 Methodist church (shelter)

The vulnerable populations living in Laurel were also identified. These are the people in the community who may require special assistance or medical care immediately following a hazard event. Vulnerable populations are identified so their needs can be made a priority in the event of a disaster. The vulnerable populations living in Laurel are much like most other communities in Marshall County, elderly in homes and children.

Figure 4.4.2.12: Laurel Critical Facilities



Le Grand

A large number of assets were identified in the Le Grand jurisdiction. Assets include mostly infrastructure and buildings but they also include social assets like the Friends Church and supply stores like the hardware store.

1 3 historic houses
2 Ag Land
3 Ball fields
4 Band shell
5 Bank
6 Car wash
7 Chicago Northwestern Railroad
8 Cissy's III Convenience Store
9 City buildings
10 City Park
11 Community Center
12 County Line Bar
13 East Marshall High School
14 Fire Station
15 Flood Plain Insurance
16 Friends Church
17 Holt Int'l Adoption Agency
18 Innovative Salon
19 Laundry Mat
20 Le Grand Farm Service
21 Le Grand Sanitation
22 Library
23 Lincoln Highway
24 Main Street Lions
25 Maintenance building
26 Mike's Auto Repair
27 Nelson Grain Coop
28 Neuroth Trucking
29 Old water plant
30 Park's Gas
31 Post Office
32 School bus barn
33 Sewer lagoons
34 Sunrise Café
35 Tennis Courts

Critical facilities are generally already identified as assets. All of the critical facilities that were identified by Le Grand Planning Team representatives are below. Refer to Figure 4.4.2.13 for facility locations in Le Grand.

1 Fire station
2 Sewer lagoons
3 City buildings (city hall)
4 Community center
5 East Marshall High School
6 Maintenance building
7 Water tower/distribution lines
8 School bus barn
9 Cissy's III
10 Sunrise café
11 Bank
12 Le Grand Friends Church

The vulnerable populations living in Le Grand were also identified. This city has the most unique set of vulnerable populations in the county, including:

1 Residents in the trailor court
2 Residents in leisure homes
3 Residents in low-income apartments
4 Community/Monet Center renters
5 Students in high school

These populations are identified so their needs can be made a priority in the event of a disaster. In some cases, like the trailer court residents, their housing is what's vulnerable for it may not be up to code and able to sustain intense weather hazards.

Figure 4.4.2.13: Le Grand's Critical Facilities

Liscomb

Liscomb's assets were identified by the Planning Team members who volunteered to represent the city. The assets were identified through asset mapping activity at the first countywide hazard mitigation meeting. For this activity, three major asset areas were considered: environment, economy, and social. Liscomb's assets are listed below.

1 2 bars
2 Car repair
3 Cemetery
4 City Parks
5 County road lead from town
6 Good in town roads
7 Hardin County Savings Bank
8 Historic items at community building
9 Iowa River
10 Liscomb Church of Christ
11 Mid-Iowa Coop
12 Mid-Iowa Coop,
13 New water mains
14 Out of town business
15 Peoplerides
16 School Bus
17 Treatment system in process of upgrade
18 Two parks
19 Water from rural water

All basic services are represented through the critical facilities in Liscomb. Their critical facilities include sources of food, money, shelter, emergency response, and medical care, though some of these are not present in the community. The full list of critical facilities is below. Refer to Figure 4.4.2.14 for the location of critical facilities actually located in Liscomb.

1 Community building/shelter
2 Fire department
3 Co-op - fuel
4 Water/sewer
5 Hospital – MMSC in Marshalltown
6 Food - Marshalltown and Conrad, IA
7 Bank

Elderly in homes and people living in trailers were identified as this jurisdiction's vulnerable population. These individuals may require priority assistance during and immediately following a hazard event.

Figure 4.4.2.14: Liscomb's Critical Facilities

Marshalltown

It is important to identify community assets, which may be infrastructure, buildings, activities, or institutions, because it helps residents decide what to protect from the harmful impacts of hazard events. The assets identified for Marshalltown by its representatives, as well as the Marshall County Services (most located in Marshalltown) Group are below:

1 211
2 911
3 Airport
4 Alliant
5 American Red Cross
6 Assisted Livg/Retirement Fac
7 Aquatic Center
8 Auto dealership
9 Banks
10 Bike Trail
11 Binford House
12 Blacksmith
13 Cable
14 Car Dealers
15 Central Iowa Fair
16 Churches
17 CIRSL
18 City Water
19 Community College & Dorms
20 Consumer Energy
21 Coops
22 County museum
23 Courthouse
24 CVB, MCT
25 Diversity
26 Downtown Marshalltown
27 Electrical Capacity
28 Emergency Services
29 Emerson
30 EMS
31 Excellent water system
32 Farm Implement Dealers
33 Fire
34 Fisher
35 Fisher Community Center
36 Glenwood
37 Golf courses
38 Grand Point
39 Grandview
40 Grimes Conservation Center
41 Grimes Farm
42 Highways 14, 30, 330
43 Historical Society
44 Hospice
45 Hospital/Medical Facilities
46 House of Compassion
47 Imagine 2011
48 Interface Solutions
49 Iowa River Basin
50 Iowa Workforce
51 I.V.H.
52 JBS
53 Job service
54 K&M
55 Lennox
56 Levy
57 Library
58 Local media
59 Low Rent Housing
60 Main Street
61 Malls
62 Marshalltown Company
63 Marshalltown Municipal Transit
64 Martha Ellen Tye Theater
65 Mechdyne
66 New South Side Menards
67 Newspapers
68 Orpheum
69 Parks
70 Parks and Rec
71 Peoplerides
72 Police
73 Public Health
74 Race Track
75 Railroad
76 River
77 Road Crews
78 RSVP
79 Salvation Army
80 Schools
81 School Buses
82 Senior Center
83 Service clubs
84 Sheriff
85 Southern Hills Apts
86 Susie Sewer
87 Sutherland Generating
88 Transportation Maintenance
89 Tree house
90 USA Staffing
91 Utilities
92 YMCA/YWCA
93 Zoning

The critical facilities for the community were also identified. These are the facilities in the community that are important to maintain the health, safety, and welfare of the residents and visitors of the Marshalltown community. The critical facilities identified for the Marshalltown are below:

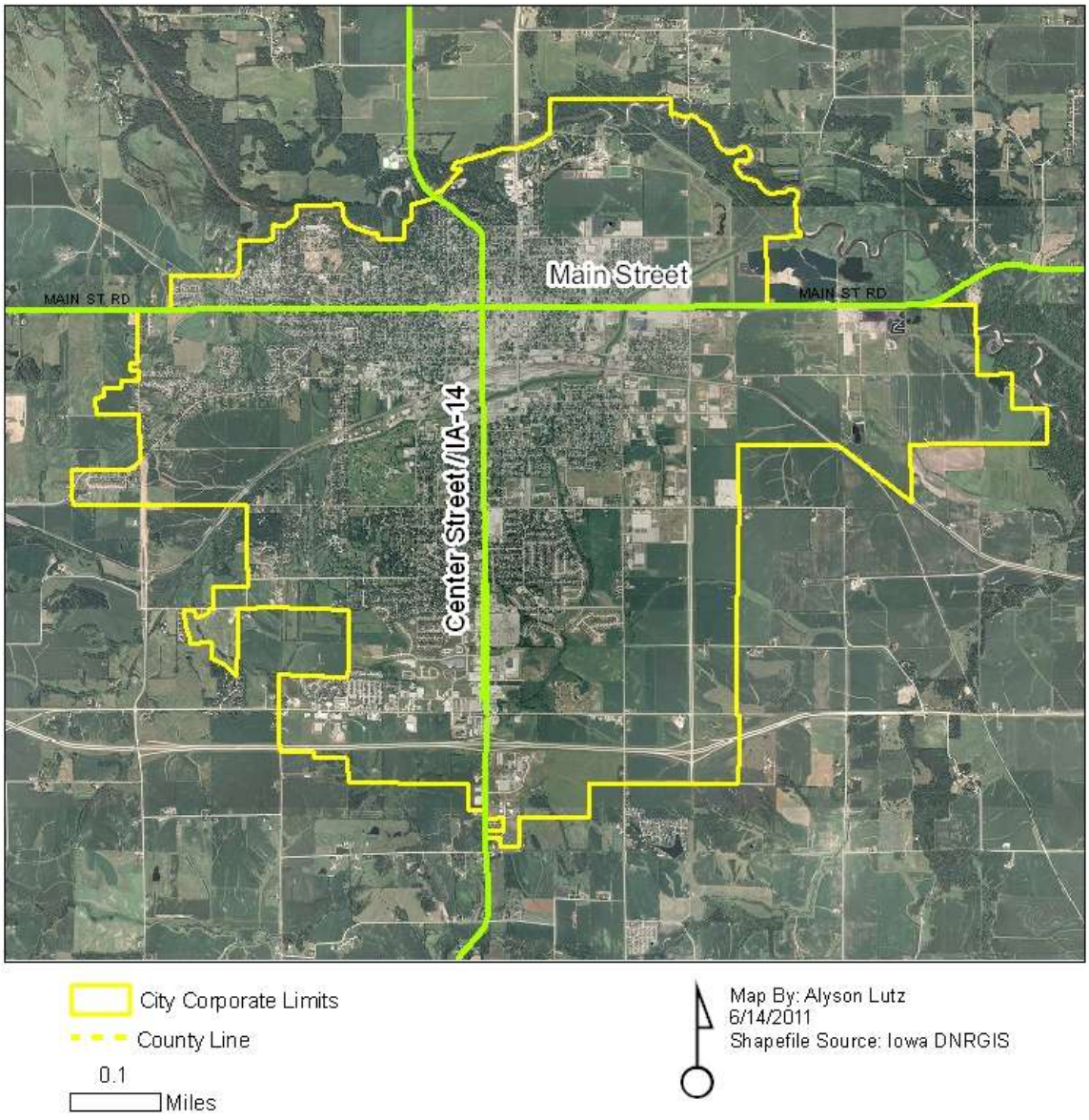
1 Schools, College, AEA 267
2 Police, Fire, EMS
3 City hall
4 Hospital, Iowa Veterans Home
5 E.O.S. Mobile Command
6 Public transit
7 Water works
8 Electric plant
9 Food services
10 Mall

These ten facilities (many have multiple locations) were identified for several reasons. The city hall serves as the city command post during disaster events. The schools provide shelter for a vulnerable population before, during and following the event. The water facilities process water during hazard events to ensure the city has a clean water supply and the electric plant is important to protect as it provides electricity and workers help to clean up downed power lines that create danger to residents. These critical facilities were not mapped due to many having multiple locations. Most services are located along Main Street and Center Street (IA-14). As seen in Figure 4.4.2.15. , these streets bisect the community, easing access from heavily developed areas as well as Highway 30, running south of town.

The vulnerable populations living in Marshalltown were also identified. These are the people in the community who may require special assistance or medical care. Vulnerable populations are identified so their needs can be made a priority in the event of a disaster.

1 Nursing homes – multiple locations in town
2 Daycare/preschools – multiple locations in town
3 Iowa Veterans Home
4 Hospital - MMSC

Figure 4.4.2.15: Marshalltown's Critical Facilities



**Critical facilities are not indicated due to mapping restrictions caused by the multiple locations of some facilities. Most services are located along Main Street and Center Street (IA-14)*

Melbourne

Melbourne's assets were identified by the Planning Team member who volunteered to represent the city. The assets were identified through asset mapping activity at the first countywide hazard mitigation meeting. For this activity, three major asset areas were considered: environment, economy, and social. Melbourne's assets are listed below.

1 2 ball diamonds
2 2 parks
3 Bank
4 Bike trail
5 Churches
6 Coop
7 Door manufacturing
8 Feed mill
9 Fertilizer plant
10 Fire Dept
11 Gateway to farm processing plant
12 Highway 330
13 Library
14 Meeting building
15 Melbourne Days
16 Mousehole
17 Owen Street Addition
18 Post Office
19 Preschool
20 Rec Complex
21 Repair Shop
22 Restaurant
23 Rural water
24 surrounding farmland
25 Times Republican
26 Vet

The city's critical facilities were also identified at the second countywide meeting. The facilities that need to function immediately following a hazard event are listed below.

1 Fire station
2 Rec center
3 City hall
4 Highway 330
5 Melbourne water/waste water
6 Randawha's Travel Center
7 Vern's Implement
8 Midwest One Bank
9 US Postal Service
10 Clark's Bar

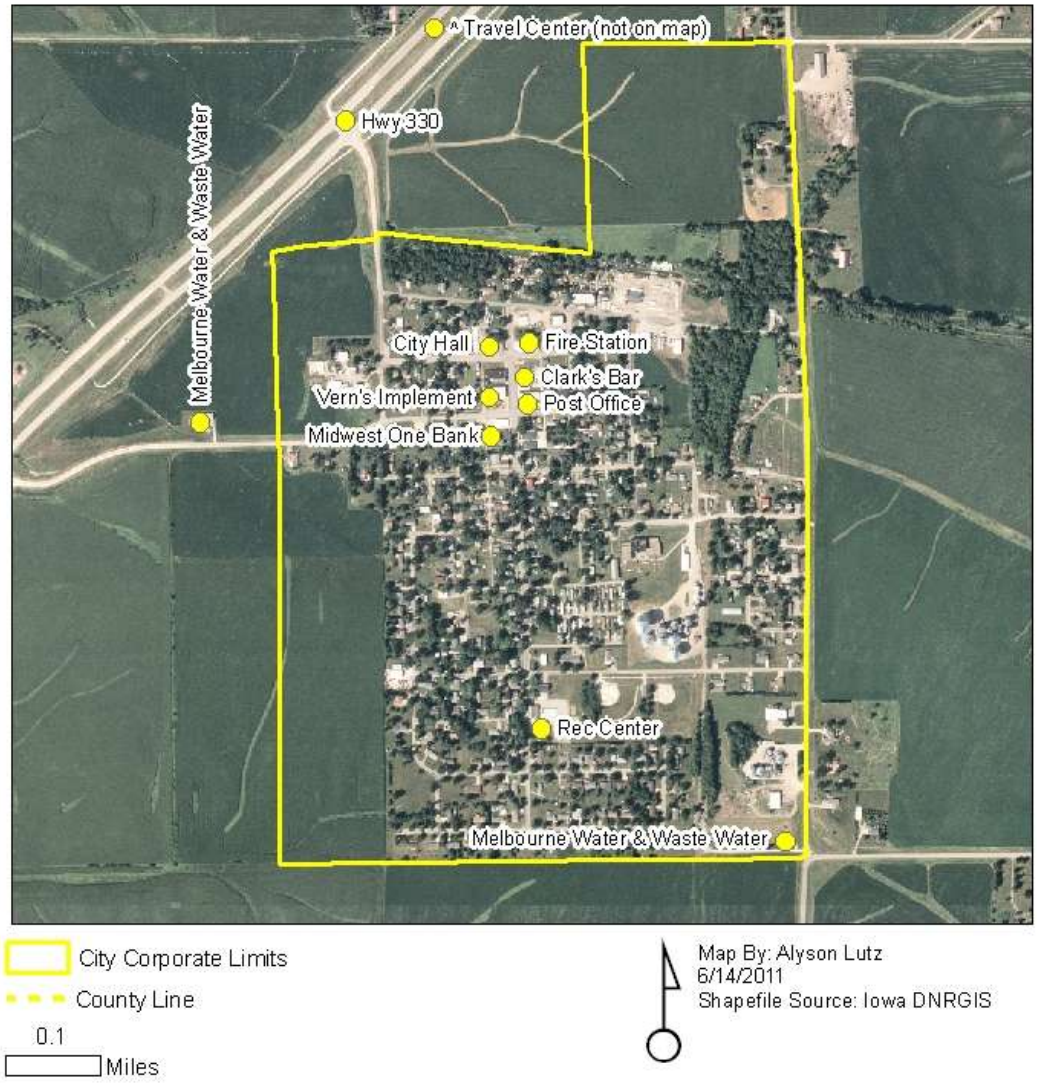
All of these facilities are important to Melbourne during and after a hazard event. These ten facilities were chosen for many reasons, of which some are very obvious. The Fire Station and City Hall are command posts for city operations and protect important equipment that will most likely be needed immediately following a hazard event. The travel center is a source for supplies and the highway is a major access point for the city. For the location of Melbourne's critical facilities, refer to Figure 4.4.2.16.

Melbourne's representative also identified vulnerable populations. These are the people in the community who may need immediate assistance after a hazard event due to special circumstances. The vulnerable populations identified in Melbourne are listed below.

1. Carl Swearingen apartments
2. Upchurch rentals (trailer court)
3. Steelsmith apartments
4. Jacob Bros apartments
5. Elderly in homes

These populations are identified so their needs can be made a priority in the event of a disaster. In some cases, like the trailer court residents, their housing is what's vulnerable for it may not be up to code and able to sustain intense weather hazards.

Figure 4.4.2.16: Melbourne's Critical Facilities



Rhodes

Rhodes's assets were identified by the Planning Team members who volunteered to represent the city. The assets were identified through asset mapping activity at the first countywide hazard mitigation meeting. For this activity, three major asset areas were considered: environment, economy, and social. Rhodes's assets are listed below.

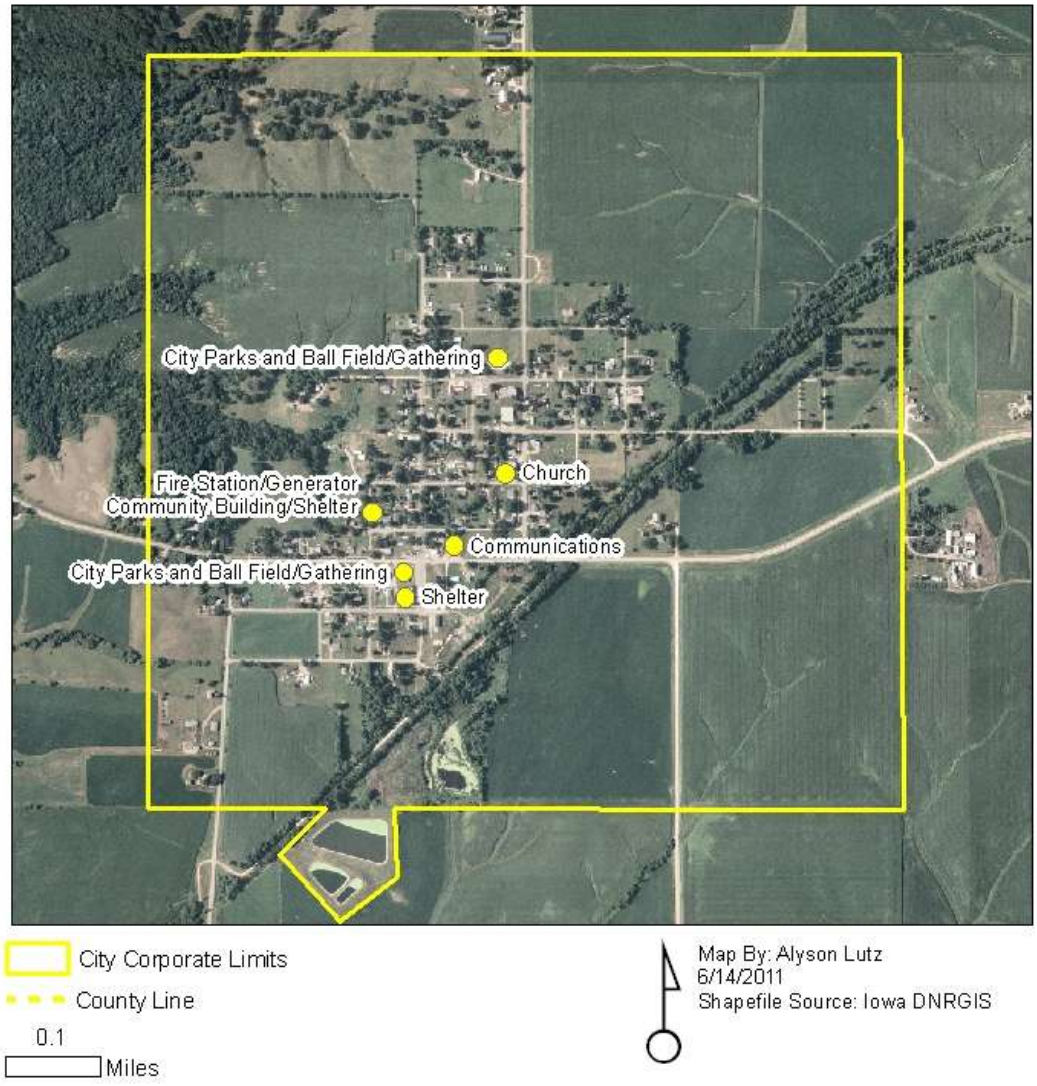
1 Auto repairs
2 Ball field
3 Bar
4 City parks
5 Iowa River
6 Limestone
7 Major highway close by
8 Methodist Church
9 New filtration system
10 Post Office
11 School bus system
12 Water tower
13 Wild animal habitat

The critical facilities for the community were also identified. These are the facilities in the community that are important to maintain the health, safety, and welfare of the residents and visitors of the Rhodes community. The critical facilities identified for Rhodes are below.

1 Fire station/generator
2 Community building/shelter
3 Bar/shelter
4 Methodist church
5 City parks and ball field
6 Communications

For the most part, Rhodes has critical facilities that are common throughout the county. The locations of Rhodes's critical facilities can be viewed in Figure 4.4.2.17. The only vulnerable population identified for the City of Rhodes is elderly in private homes.

Figure 4.4.2.17: Rhodes's Critical Facilities



St Anthony

It is important to identify community assets, which may be infrastructure, buildings, activities, or institutions, because it helps residents decide what to protect from the harmful impacts of hazard events. The assets identified for St Anthony are below:

1 Grain Elevator
2 New lagoon
3 Rural water system
4 Creek/stream
5 Bar and Grill flatheads
6 Post Office

The critical facilities for the community were also identified. These are the facilities in the community that are important to maintain the health, safety, and welfare of the residents and visitors of the St Anthony community. The critical facilities identified for St Anthony are below:

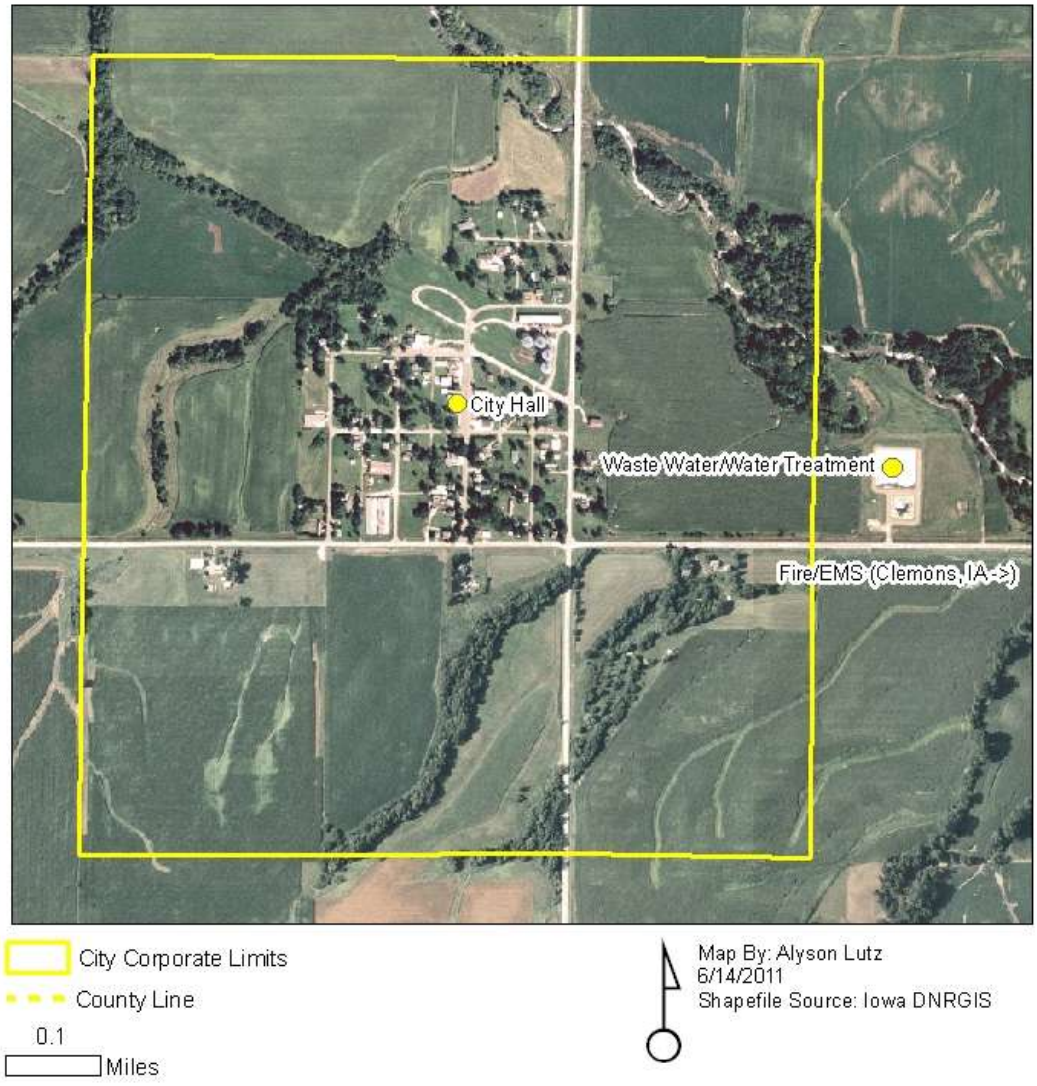
1 City hall
2 Waste water/water treatment
3 Out of town Fire and EMS (Clemons)

These three facilities were identified for several reasons. Because the town is so small with just a 102 person population, the city hall serves as the city command post during disaster events and the water facilities process water during hazard events to ensure the city has a clean water supply. St Anthony shares emergency response with the City of Clemons, however all equipment is housed in Clemons. Refer to Figure 4.4.2.18 for each facility's location in St Anthony.

The vulnerable populations living in St Anthony were also identified. These are the people in the community who may require special assistance or medical care. Vulnerable populations are identified so their needs can be made a priority in the event of a disaster. The vulnerable populations living in the City of St Anthony are identified below.

1. Elderly
2. Children home alone
3. Low income residents

Figure 4.4.2.18: St Anthony's Critical Facilities



State Center

State Center's assets were identified by the Planning Team members who volunteered to represent the city. The assets were identified through asset mapping activity at the first countywide hazard mitigation meeting. For this activity, three major asset areas were considered: environment, economy, and social. State Center's assets are listed below.

1 Brian's Body Shop
2 Central State Bank
3 City Jobs
4 Country School
5 Crème de la Rose
6 Doctor's Offices
7 Edgetown Apt
8 Figgins Additions
9 Fitness Center
10 Grocery Store
11 Hometown Foods
12 Library
13 Lincoln Valley Golf Course
14 Mid State's Milling
15 Millwright
16 Park Place Apt
17 Park Shelter
18 Restored building on Main Street
19 Rose Garden
20 Rosewood Apt
21 Sheppler's Barber Shop Museum
22 State Center Locker
23 Swimming Pool
24 Townhouse
25 US Post Office
26 Watson's Museum
27 West Country Customs
28 West Marshall Schools
29 Woodrow's Bar/Grill

The city's critical facilities were also identified at this meeting but in a separate activity. A couple of the city's assets were also considered critical facilities. The facilities that need to function immediately following a hazard event are listed below.

1 City hall
2 Police/fire/ambulance
3 Schools
4 Nursing rehab
5 Churches
6 Power/electrical plant/ infrastructure water/wastewater
7 Hometown Foods
8 MMSC Clinic
9 Gas stations

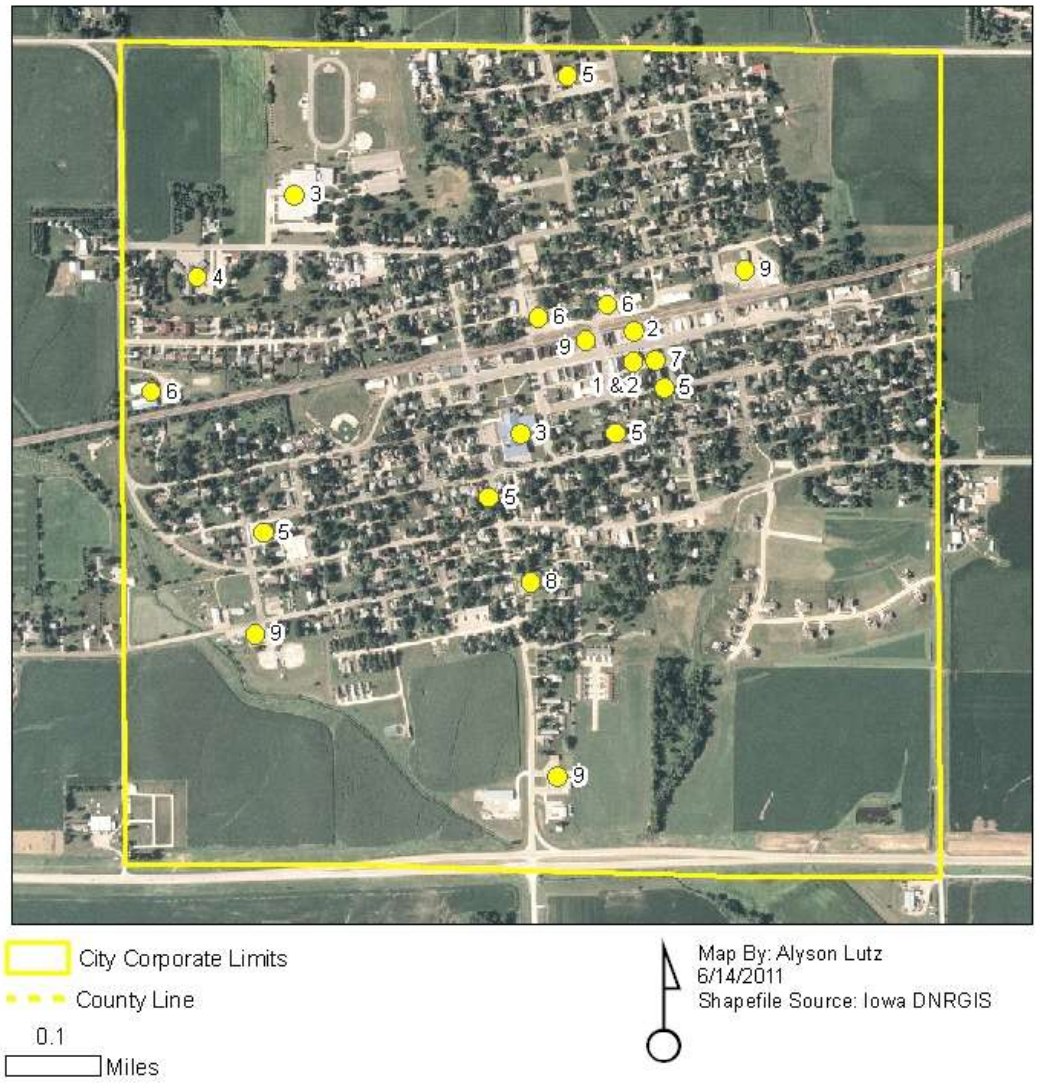
All of these facilities are extremely important to State Center during and after a hazard event. These nine facilities were chosen for many reasons of which some are very obvious. The Fire Department/ City Hall serve as a command post for City operations and protect important equipment that will most likely be needed immediately following a hazard event. The water plant and pump station are important to help process water during hazard events to ensure the city has a clean water supply. The electrical plant is important to restore electricity to the city as well as remove downed power lines from a hazard event. For the location of State Center's critical facilities, refer to Figure 4.4.2.19. because many of these facilities have multiple locations, please refer to the reference numbers above when looking at the map.

State Center's representative also identified vulnerable populations. These are the people in the community who may need immediate assistance after a hazard event due to special circumstances. The vulnerable populations identified in State Center are listed below.

1. People in nursing rehab facility
2. Edgetown apartments and Rosewood cottages
3. Daycare Center

State Center representatives expressed concern for the elderly and disabled who go to the nursing rehab center as well as those in apartments. These people may not have the mobility needed to respond quickly to hazard events.

Figure 4.4.2.19: State Center's Critical Facilities



Unincorporated Marshall County

The representatives for Marshall County and Marshall County Services, combined, identified fifty-five assets in the county, and there are more than likely dozens more. Refer to the list below for the assets indentified in Marshall County.

1	27 Park Areas	20	Farmland	38	Livestock
2	4 boat camps	21	Golf Courses	39	Marshall County
3	Airport	22	Green Castle Lake	40	Micogen
5	Animal Rescue League	23	Green Mountain	41	Pipelines
6	Banger	24	Gun Range	42	Railroad
7	Bike Path	25	Harv Store	43	Rural water
8	Bridges/Roads	26	Highways and Roads	44	Sand Lake
9	Cemeteries	27	Historical society	45	Schools
10	Central Iowa Water	28	IKES	46	Shady Oaks Tree house
11	Conservation Center	29	International Ingredients	47	Spread All
12	Consumer's Energy	30	Iowa River	48	Swift Greenhouse
13	Coops	31	Iowa River Greenbelt	49	Timber Valley
14	County Engineer	32	Jail	50	Trails and Parks
15	Courthouse	33	KOCH Nitrogen	51	Van Cleve
16	Dillon	34	Lamoille	52	Walker Construction
17	Dunbar	35	Landfill	53	Wind farm
18	Electrical Grids	36	Lincoln Valley	54	Wolf Café
19	Farm Ponds	37	Linn Creek	55	Wolf Lake

Marshall County has an extensive network of critical facilities that includes several types of infrastructure, businesses, and structures. These are the facilities in the community that are important to maintain the health, safety, and welfare of the residents and visitors of Marshall County so they are especially important during and immediately following a hazard event. A list of Marshall County's critical facilities is below.

1. County government facilities, equipment, and vehicles (courthouse, administration offices and vehicles, sheriff's office, jail, emergency operations center, record storage, vehicle and equipment storage, etc.)
2. Transportation facilities (bridges, major highways, county roads, etc.)
3. Communication infrastructure (county radio towers, cell towers, telephone lines, etc.)
4. Potable water infrastructure (water towers, mains, pumps, wells, treatment facilities, etc.)
5. Major pipelines
6. Electrical infrastructure (power lines, sub stations, etc.)
7. Grocery stores
8. Hardware stores and businesses with disaster supplies
9. Facilities at the County's seventeen outdoor recreational areas

These facilities are located throughout Marshall County in both incorporated and unincorporated areas. The condition of these facilities is maintained by their respective operator or whoever is appointed by the county.

Vulnerable populations in unincorporated Marshall County include the students in schools in unincorporated towns; people using golf courses, lakes and parks; people living in trailer parks in unincorporated areas; and the unincorporated towns of Bangor, Dunbar, Green Mountain, LaMoille, and Quarry.

4.4.3 Repetitive Loss Properties

44 CFR Requirement §201.6(c)(2)(ii): *[The risk assessment in all] plans approved after October 1, 2008 must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.*

Flooding is a not a major concern in Marshall County. The county does not have any repetitive loss properties, identified by Iowa Homeland Security. Eight out of fourteen Region 6 member jurisdictions in Marshall County are participating in NFIP. Amongst them, there are 38 policies with a total of $7,662,200 worth of insurance in force, as of 05/31/2009. There have been 13 total paid losses worth $31,110, all together.

5 Mitigation Strategy

44 CFR Requirement §201.6(c)(3): *[The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

This section presents the mitigation strategy developed by the Planning Team based on the risk assessment. The mitigation strategy was developed through a collaborative group process and consists of general goal statements to guide the jurisdictions in efforts to lessen hazard impacts as well as specific mitigation actions that can be put in place to directly reduce vulnerability to hazards and losses. The following definitions are based upon those found in FEMA publication 386-3, *Developing a Mitigation Plan* (2002):

- **Goals** are general guidelines that explain what you want to achieve. Goals are defined before considering how they can be accomplished so they are not dependent on the means of achievement. Goals are long-term and broad in scope.
- **Mitigation actions** are specific actions that may help achieve goals.

These definitions were used to help the Planning Team understand the scope of the goals and mitigations actions that they chose for their respective jurisdiction.

5.1 Goals, Mitigation Actions, and Evaluation

44 CFR Requirement §201.6(c)(3)(i): *[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

44 CFR Requirement §201.6(c)(3)(iii): *[The mitigation strategy section shall include] an action plan describing how the actions identified will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

Region 6 and the Planning Team developed goals to provide direction for reducing hazard-related losses in Marshall County. These were based on the results of the risk assessment and review of mitigation goals from other state and local plans, specifically the Iowa Hazard Mitigation Plan, 2010, and a past hazard mitigation plan for Marshall County and certain communities in the county. The review was to ensure that this plan's mitigation strategy was integrated or aligned with existing plans and policies.

Initially, Region 6 created four goals for all of Marshall County to serve as a baseline. With these goals, Planning Team members either edited them to fit their jurisdiction's specific needs or disregarded them to form completely different goals that served their jurisdiction's needs. The four basic goals are:

1. Minimize losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority structures.
2. Protect the health and safety of Marshall County residents and visitors.
3. Educate Marshall County citizens about the dangers of hazards and how they can be prepared.
4. The continuity of county and local operations will not be significantly disrupted by disasters in Marshall County.

Some Planning Team members decided to completely omit certain goals to fit their needs. School districts are the main example because their needs differ quite a bit from cities. Unlike cities, Marshall County had to keep a much broader view in forming their goals because their jurisdiction is large and varies.

At public hazard mitigation meetings in individual jurisdictions, the public was given the chance to voice their concerns and propose potential mitigation ideas for any hazard they deemed to be a concern. Also, at the first planning boundary-wide meeting, Planning Team members shared mitigation ideas for each hazard that can affect their respective jurisdiction. The mitigation ideas from the meetings were compiled into a full list that could be used as a reference when choosing mitigation actions that fulfilled their jurisdiction's goals. This list complemented the results of the risk assessment, allowed idea sharing, and made sure that their community's ideas were considered. The list can be found in Appendix F.

Six types of mitigation actions were considered for this plan. The definition for mitigation action types is based on the definitions provided in the 2003 FEMA publication, *Developing the Mitigation Plan*. The six types of mitigation actions are:

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

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

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

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

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

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

In the following section, each jurisdiction's goals and mitigation actions along with their action plan will be listed and discussed. Several jurisdictions have similar goals and mitigation actions while others are unique to the jurisdiction's specific needs. The variance in hazard coverage, population, and structures require that each jurisdiction determine their own goals and actions rather than determining a set of goals and actions that blanket the entire planning area.

The STAPLEE Evaluation technique that was described in the process section of this plan was used to evaluate each of the mitigation actions identified for all the jurisdictions. The number in parentheses included next to each mitigation action is the STAPLEE score that each project received. The highest score a mitigation action could receive is 23, and the higher the mitigation action's score, the higher priority it will receive when all of the actions are prioritized.

The STAPLEE Evaluation considers not just political support and community acceptance but also the cost and benefits associated with the completion of a project. Some projects may have an intrinsic benefit to the community but the cost of the project may be too large to justify completion. The evaluation ensures that Planning Team members consider the feasibility of the projects chosen for their community. Often times, the cost of a project are what pulls down its evaluation score.

Please note that in many cases, mitigation actions received the same score. Even though these actions are shown in a particular order in the jurisdiction's priorities, no action has more value than another. They are interchangeable at the discretion of the particular jurisdiction. Conditions change allowing one project to take precedence over another like new grant programs, disaster declarations, loss of funding, etc. Also, mitigation actions that receive a negative score should be reconsidered for inclusion in the plan by the jurisdiction during the implementation process.

In addition to the following actions, jurisdictions who belong to the NFIP will continue their compliance; those of which have floodplain ordinances and policies will enforce and update them as necessary. Jurisdictions not participating in the program indicated no interest in joining during this planning process. They will have a chance to revisit this decision at the next plan update.

All of the evaluation sheets for the mitigation actions are included in Appendix G.

Albion

Goal 1: Protect the health and safety of residents and visitors

Mitigation Action 1.1: Bigger rural water line for backup water (9)

Plan for implementation and administration:	Install a large water line for backup water in case of emergency
Lead agency:	City of Albion
Partners:	City of Albion, Others to be identified
Potential Funding Source:	City of Albion, others to be identified
Total cost:	Te be determined once need is assessed and new lines priced
Benefits (loss avoided):	Larger capacity for back up water needs in drought events
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.2: Water well improvements (11)

Plan for implementation and administration:	Raise existing wellhead above flood level; dig additional well in high elevation location; build a new treatment building
Lead agency:	City of Albion
Partners:	Marshall County Engineer, others to be identified
Potential Funding Source:	City of Albion, FEMA HMGP, others to be identified
Total cost:	Approximately $638,000
Benefits (loss avoided):	Wells will be out of the way of potential flood damage, and increase in water provided to city.
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.3: Construct a safe room that doubles as communications storage and backup (3)

Plan for implementation and administration:	Add safe room to City Hall and outfit with capabilities to administer communications
Lead agency:	City of Albion
Partners:	City of Albion, Others to be identified
Potential Funding Source:	FEMA HMGP and PDM, CDBG, and others to be identified
Total cost:	Costs are variable depending on the size of the safe room and whether or not it is a retrofit or newly constructed safe room. For a small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size. Unknown cost for installation of communications capabilities.
Benefits (loss avoided):	Life safety for vulnerable residents and visitors to Albion
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.4: Purchase of emergency equipment for water rescue (4)

Plan for implementation and administration:	Purchase emergency equipment for use during and after river flood events, including rescue boats
Lead agency:	City of Albion
Partners:	Local emergency responders, Marshall County, Others to be indentified
Potential Funding Source:	City of Albion, others to be identified
Total cost:	Unknown until supplies are priced
Benefits (loss avoided):	Emergency personnel will serve residents better in events
Completion Date:	Ongoing or 1 year from when funds are secured

Mitigation Action 1.5: Purchase generators (6)

Plan for implementation and administration:	Purchase portable generators for Albion's identified critical facilities
Lead agency:	City of Albion
Partners:	City of Albion, Emergency Services, Others to be Identified
Potential Funding Source:	City of Albion, FEMA HMGP, and others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs also standby requires a permanent fuel source
Benefits (loss avoided):	Power generation to maintain the function of critical facilities
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.6: Purchase warning siren with backup power and remote triggering (8)

Plan for implementation and administration:	Purchase new warning siren with backup power capability and remote triggering so no manual switch is needed, as is the current situation
Lead agency:	City of Albion
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Albion, others to be identified

Total cost:	New sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost. Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Life safety of Albion residents and visitors, use of siren even if there is a power outage
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Goal 2: The continuity of operations will not be significantly disrupted by disasters in Albion

Mitigation Action 2.1: Elevate roads (4)

Plan for implementation and administration:	Elevate Iowa 330 or those roads that are identified as problematic or critical during and immediately following flood events
Lead agency:	City of Albion
Partners:	Iowa Department of Transportation, Marshall County Engineer, others to be identified
Potential Funding Source:	FEMA HMGP, Marshall County, and others to be identified
Total cost:	Unknown, most likely very expensive, need an engineering report to determine cost
Benefits (loss avoided):	Prevent road and vehicle damage and preserve the mobility of City residents during and immediately following a flood event
Completion Date:	1 year after funds are secured or the time allotted by funding source

Albion Mitigation Action Prioritization

1. **Mitigation Action 1.2:** Water well improvements (11)
2. **Mitigation Action 1.1:** Bigger rural water line for backup water (9)
3. **Mitigation Action 1.6:** Purchase warning siren with backup power & remote triggering (8)
4. **Mitigation Action 1.5**: Purchase generators (6)
5. **Mitigation Action 1.4:** Purchase of emergency equipment for water rescue (4)
6. **Mitigation Action 2.1:** Elevate roads (4)
7. **Mitigation Action 1.3:** Construct a safe room that double as communications storage and backup (3)

Clemons

Goal 1: Minimize physical losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority structures

Mitigation Action 1.1: Maintain existing culverts and add new culverts (12)

Plan for implementation and administration:	Keep existing culverts in good condition and add new culverts where they are needed in the city
Lead agency:	City of Clemons
Partners:	Engineering firm, others to be identified
Potential Funding Source:	FEMA HMGP, City of Clemons, and others to be identified
Total cost:	The cost of a culvert varies on the location and type. Culverts in a ditch or under a driveway are usually around $1,000 while culverts under a road are $4,000 and higher depending on the size and type of road.
Benefits (loss avoided):	Reduces potential damages due to flash or river flooding
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.2: Add lift station (13)

Plan for implementation and administration:	Add a lift station to the City's sanitary sewer when and where it is needed.
Lead agency:	City of Clemons
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, City of Clemons, and others to be identified
Total cost:	Depending on the type and capacity of the lift station, approximately $120,000 to $500,000 plus operation and maintenance cost over the lift station's useful life
Benefits (loss avoided):	Eliminate potential sanitary sewer backups into structures
Completion Date:	1 year after funds are secured or the time allotted by funding source

Goal 2: Protect the health and safety of residents and visitors

Mitigation Action 2.1: New emergency siren (16)

Plan for implementation and administration:	Purchase and install a new warning siren with backup power
Lead agency:	City of Clemons
Partners:	To be identified
Potential Funding Source:	City of Clemons, FEMA HMGP, and others to be identified
Total cost:	Sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety of Clemons residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 2.2: Purchase generators (15)

Plan for implementation and administration:	Purchase portable generators for shelters
Lead agency:	City of Clemons
Partners:	Marshall County Emergency Services, Others to be Identified
Potential Funding Source:	City of Clemons, FEMA HMGP, and others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs also standby requires a permanent fuel source
Benefits (loss avoided):	Power generation to maintain the function of shelters
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 2.3: Remove junk cars and farm machinery (18)

Plan for implementation and administration:	Remove blight in town that contains hazardous waste to prevent an incident
Lead agency:	City of Clemons
Partners:	Local fire and EMS, Others to be indentified
Potential Funding Source:	City of Clemons, others to be identified
Total cost:	Unknown until blight is identified
Benefits (loss avoided):	Reduce risk of possible hazardous materials incident
Completion Date:	Possibly ongoing or 1 year from when funds are secured

Clemons Mitigation Action Prioritization

1. **Mitigation Action 2.3:** Remove junk cars and Farm Machinery (18)
2. **Mitigation Action 2.1:** New emergency siren (16)
3. **Mitigation Action 2.2**: Purchase generators (15)
4. **Mitigation Action 1.2:** Add lift station (13)
5. **Mitigation Action 1.1**: Maintain existing culverts and add new culverts (12)

Ferguson

Goal 1: Minimize physical losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority structures

Mitigation Action 1.1: Upgrade emergency siren (9)

Plan for implementation and administration:	Update the current warning siren and have 911 activate
Lead agency:	City of Ferguson
Partners:	To be identified
Potential Funding Source:	City of Ferguson, FEMA HMGP, and others to be identified
Total cost:	Unknown until update needs are assessed
Benefits (loss avoided):	Life safety of Ferguson residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.2: Purchase generator (8)

Plan for implementation and administration:	Purchase generator for Ferguson's Community Center which doubles as a shelter
Lead agency:	City of Ferguson
Partners:	Emergency Services, Others to be Identified
Potential Funding Source:	City of Ferguson, FEMA HMGP, and others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs also standby requires a permanent fuel source
Benefits (loss avoided):	Power generation to maintain the function of the community center
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.3: Purchase generators (10)

Plan for implementation and administration:	Purchase portable generators for Ferguson's lift and pump stations
Lead agency:	City of Ferguson
Partners:	Emergency Services, Others to be Identified
Potential Funding Source:	City of Ferguson, FEMA HMGP, and others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs also standby requires a permanent fuel source
Benefits (loss avoided):	Power generation to maintain the function of utilities
Completion Date:	1 year after funds are secured or the time allotted by funding source

Goal 2: Protect the health and safety of Ferguson residents and visitors.

Mitigation Action 2.1: Create a public information session and conservation (water) program for Ferguson (6)

Plan for implementation and administration:	Create a public information and conservation (water) program
Lead agency:	City of Ferguson
Partners:	Marshall County Conservation, Others to be identified
Potential Funding Source:	City of Ferguson
Total cost:	Unknown, this project may be of little cost besides a water stockpile
Benefits (loss avoided):	Giving information about drought hazards and being prepared with the necessary supplies in case of an event
Completion Date:	1 year from when political and public support is leveraged

Mitigation Action 2.2: Establish cooling center (4)

Plan for implementation and administration:	Establish a cooling center to be located in city limits
Lead agency:	City of Ferguson
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Ferguson, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent heat-related illness and death

Completion Date:	1 year from when cooling center location, operation, and funding is secured or within time allotted by funding source

Mitigation Action 2.3: Update general water system (13)

Plan for implementation and administration:	Improve and update the water and sewer systems within the city limits
Lead agency:	City of Ferguson
Partners:	CIWA and Region 6 Planning
Potential Funding Source:	City of Ferguson, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Water system run by the Central Iowa Water Association & not the city
Completion Date:	1 year from when funding is secured or time allotted by fund source

Goal 3: Educate Ferguson citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Add hazard information inserts to water bills and city newsletter (9)

Plan for implementation and administration:	Add hazard inserts with public information like shelter schedule, meeting announcements, events, etc.
Lead agency:	City of Ferguson
Partners:	To be identified
Potential Funding Source:	City of Ferguson
Total cost:	Unknown, most likely very small cost
Benefits (loss avoided):	All public information will be readily available
Completion Date:	Ongoing

Mitigation Action 3.2: Public education on open burning (9)

Plan for implementation and administration:	Create a program to educate Ferguson residents about the dangers of open burning and how to prepare through informational flyers, meetings, or other interactive media like drills and workshops
Lead agency:	City of Ferguson
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Ferguson and others to be identified
Total cost:	Unknown, this project may be of little cost depending on the medium used
Benefits (loss avoided):	Life safety of Ferguson residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Goal 4: The continuity of operations will not be significantly disrupted by disasters in Ferguson.

Mitigation Action 4.1: Further emergency education and training opportunities between jurisdictions (4)

Plan for implementation and administration:	Hold sessions to train emergency personnel of all jurisdictions to identify weather-related hazards and proper response and identify ways to cooperate – mutual aid
Lead agency:	City of Ferguson
Partners:	Marshall County Emergency Management, Marshall County jurisdictions, Others to be indentified
Potential Funding Source:	Marshall County, others to be identified
Total cost:	This may be of little cost since it is an information session
Benefits (loss avoided):	Personnel will serve better in events with proper training and cooperation with other jurisdictions
Completion Date:	Ongoing starting when a course can be formulated and possible funding secured

Ferguson Mitigation Action Prioritization

1. **Mitigation Action 2.3:** Update general water system (13)
2. **Mitigation Action 1.3**: Purchase generators (10)
3. **Mitigation Action 1.1:** Upgrade emergency siren (9)
4. **Mitigation Action 3.1:** Add hazard information inserts to water bills and city newsletter (9)
5. **Mitigation Action 3.2:** Public education on open burning (9)
6. **Mitigation Action 1.2**: Purchase generator (8)
7. **Mitigation Action 2.1:** Create a public information session and conservation (water) program for Ferguson (6)
8. **Mitigation Action 2.2:** Establish cooling center (4)
9. **Mitigation Action 4.1:** Further education and training opportunities between jurisdictions (4)

Gilman

Goal 1: Minimize physical losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority structures

Mitigation Action 1.1: Update fire rescue equipment (8)

Plan for implementation and administration:	Purchase new and update equipment as needed for fire department, including fire truck pumper
Lead agency:	City of Gilman
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Gilman Fire Department, and Assistance to Firefighters Grants
Total cost:	Unknown until needs are assessed and equipment purchased
Benefits (loss avoided):	Up-to-date equipment for fire department in Gilman
Completion Date:	Ongoing, starting 1 year from when funds are secured or within time allotted by funding source

Goal 2: Protect the health and safety of Gilman residents and visitors.

Mitigation Action 2.1: Establish warming/cooling shelter at Fire Station (7)

Plan for implementation and administration:	Establish cooling center to be located at the fire station
Lead agency:	Gilman fire department
Partners:	Local city government, others to be identified
Potential Funding Source:	Marshall County, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent heat-related illness and death
Completion Date:	1 year from when cooling center location, operation, and funding is secured or within time allotted by funding source

Mitigation Action 2.2: Remove debris from abandoned properties (11)

Plan for implementation and administration:	Remove blight in town that contains hazardous waste to prevent an incident
Lead agency:	City of Gilman
Partners:	Local fire and EMS, Others to be indentified
Potential Funding Source:	City of Gilman, others to be identified
Total cost:	Unknown until blight is identified
Benefits (loss avoided):	Reduce risk of possible hazardous materials incident
Completion Date:	Possibly ongoing or 1 year from when funds are secured

Goal 3: Educate Gilman citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Public education sessions on warning siren (14)

Plan for implementation and administration:	Create a program to educate Gilman residents about the warning siren and procedures to follow through informational flyers, meetings, or other interactive media like drills and workshops
Lead agency:	City of Gilman
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Gilman and others to be identified
Total cost:	Unknown, this project may be of little cost depending on the medium used
Benefits (loss avoided):	Life safety of Gilman residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Gilman Mitigation Action Prioritization

1. **Mitigation Action 3.1:** Public education sessions on warning siren (14)
2. **Mitigation Action 2.2:** Remove debris from abandoned properties (11)
3. **Mitigation Action 1.1:** Update fire rescue equipment (8)
4. **Mitigation Action 2.1:** Establish warming/cooling shelter at Fire Station (7)

Goal 1: Minimize physical losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority structures

Mitigation Action 1.1: New emergency siren (14)

Plan for implementation and administration:	Purchase and install a new warning siren with backup power
Lead agency:	City of Haverhill
Partners:	To be identified
Potential Funding Source:	City of Haverhill, FEMA HMGP, and others to be identified
Total cost:	Sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety of Haverhill residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.2: Purchase new fire truck (13)

Plan for implementation and administration:	Purchase new fire truck
Lead agency:	City of Haverhill
Partners:	To be identified
Potential Funding Source:	City of Haverhill, Assistance to Firefighters Grants, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Ensure the city has a proper vehicle and equipment to fight fires
Completion Date:	Ongoing

Mitigation Action 1.3: Purchase generators for Haverhill critical facilities and citizens (10)

Plan for implementation and administration:	Purchase a generators for city use in critical facilities and secure funding or create a program to subsidize the cost of generators for citizens
Lead agency:	City of Haverhill
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, and others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs also standby requires a permanent fuel source, For citizens; depends on how much is spent on the generators and if the generators for citizens will be subsidized to encourage residents to purchase one
Benefits (loss avoided):	Power generation to maintain the function of critical facilities and citizen homes
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.4: Create community water/supply station (9)

Plan for implementation and administration:	Create a community water supply location in town
Lead agency:	City of Haverhill
Partners:	To be identified
Potential Funding Source:	City of Haverhill, others to be identified
Total cost:	Unknown until location is identified and water supply priced
Benefits (loss avoided):	Large water supply available for city residents during/after a drought event
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.5: Pave a second road to town (15)

Plan for implementation and administration:	Pave a second route to town for use during and immediately following flood events
Lead agency:	City of Haverhill
Partners:	Iowa Department of Transportation, Marshall County Engineer, others to be identified
Potential Funding Source:	Marshall County, and others to be identified
Total cost:	Unknown, most likely very expensive, need an engineering report to determine cost
Benefits (loss avoided):	Preserve the mobility of Haverhill residents during and immediately following a flood event
Completion Date:	1 year after funds are secured or the time allotted by funding source

Goal 2: Protect the health and safety of Haverhill residents and visitors.

Mitigation Action 2.1: Establish warming/cooling shelters (7)

Plan for implementation and administration:	Establish a cooling center to be located in town
Lead agency:	City of Haverhill
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Haverhill, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent heat-related illness and death
Completion Date:	1 year from when cooling center location, operation, and funding is secured or within time allotted by funding source

Mitigation Action 2.2: Emergency equipment upgrades for first responders (7)

Plan for implementation and administration:	Update or replace substandard emergency equipment in emergency departments
Lead agency:	City of Haverhill
Partners:	Local fire and EMS, Others to be indentified
Potential Funding Source:	City of Haverhill, Local fire and EMS, others to be identified
Total cost:	Unknown until equipment is assessed and new equipment is priced
Benefits (loss avoided):	Emergency personnel will have reliable communication capabilities
Completion Date:	Possibly ongoing or 1 year from when funds are secured

Mitigation Action 2.3: Install sump pumps for city buildings and citizens (7)

Plan for implementation and administration:	Install sump pumps for all city buildings and create a program or secure funding to provide sump pumps to residents
Lead agency:	City of Haverhill
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Haverhill, Marshall County, others to be identified
Total cost:	Unknown, depends on how much is spent on the sump pumps and if the pumps for citizens will be subsidized to encourage residents to purchase one
Benefits (loss avoided):	Haverhill city buildings and residents will have reliable water that is unaffected by water shortages
Completion Date:	1 year from when funds are secured

Mitigation Action 2.4: Improve roads (7)

Plan for implementation and administration:	Improve roads that are identified as problematic or critical during and immediately following flood events
Lead agency:	City of Haverhill
Partners:	Iowa Department of Transportation, Marshall County Engineer, others to be identified
Potential Funding Source:	FEMA HMGP, Marshall County, and others to be identified
Total cost:	Unknown, most likely very expensive, need an engineering report to determine cost
Benefits (loss avoided):	Prevent road and vehicle damage and preserve the mobility of Haverhill residents during and immediately following a flood event
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 2.5: Construct a safe room with backup generator (7)

Plan for implementation and administration:	Construct a safe room
Lead agency:	City of Haverhill
Partners:	Marshall County Emergency Management, Others to be identified
Potential Funding Source:	City of Haverhill, FEMA HMGP and PDM, CDBG, others to be identified
Total cost:	Costs are variable depending on the size of the safe room and whether or not it is a retrofit or newly constructed safe room. For a small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of Haverhill residents and visitors
Completion Date:	1 year from funding or within the time allotted by funding source

Goal 3: Educate Haverhill citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Public education sessions on warning siren (8)

Plan for implementation and administration:	Create a program to educate Haverhill residents about the warning siren, hazards, and procedures to follow through informational flyers, meetings, or other interactive media like drills and workshops
Lead agency:	City of Haverhill
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Haverhill and others to be identified
Total cost:	Unknown, this project may be of little cost depending on the medium used
Benefits (loss avoided):	Life safety of Haverhill residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Goal 4: The continuity of operations will not be significantly disrupted by disasters in Haverhill.

Mitigation Action 4.1: Create a sandbag committee (11)

Plan for implementation and administration:	Create a committee that is responsible for organizing sandbagging efforts when they are needed
Lead agency:	City of Haverhill or interested citizen
Partners:	Marshall County Emergency management, others to be identified
Potential Funding Source:	City of Haverhill, others to be identified
Total cost:	Unknown, forming the committee may have little to no cost
Benefits (loss avoided):	A group of people who already know how to sandbag will be ready to assemble whenever sandbagging might be needed
Completion Date:	To be indentified

Mitigation Action 4.2: Mutual aid for disaster clean up (11)

Plan for implementation and administration:	Hold sessions to coordinate mutual aid between jurisdictions for disaster cleanup
Lead agency:	City of Haverhill
Partners:	Marshall County Emergency Management, Marshall County jurisdictions, Others to be indentified
Potential Funding Source:	Marshall County, others to be identified
Total cost:	This may be of little cost since it is a coordination meeting
Benefits (loss avoided):	Cleanup procedures will be more efficient and effective with cooperation
Completion Date:	Ongoing starting when meetings can be held and possible funding secured for cleanup procedures

Mitigation Action 4.3: Purchase debris removal equipment (11)

Plan for implementation and administration:	Purchase debris removal equipment
Lead agency:	City of Haverhill
Partners:	Marshall County Sanitarian, Marshall County Emergency Management
Potential Funding Source:	City of Haverhill
Total cost:	Unknown until needs are assessed and equipment purchased
Benefits (loss avoided):	Restore safety of city infrastructure immediately following a hazard event
Completion Date:	1 year after funds are secured or the time allotted by funding source

Haverhill Mitigation Action Prioritization

1. **Mitigation Action 1.5:** Pave a second road to town (15)
2. **Mitigation Action 1.1:** New emergency siren (14)
3. **Mitigation Action 1.2**: Purchase new fire truck (13)
4. **Mitigation Action 4.1:** Create a sandbag committee (11)
5. **Mitigation Action 4.2:** Mutual aid for disaster clean up (11)
6. **Mitigation Action 4.3**: Purchase debris removal equipment (11)
7. **Mitigation Action 1.3:** Purchase generators for Haverhill critical facilities and citizens (10)
8. **Mitigation Action 1.4:** Create community water/supply station (9)
9. **Mitigation Action 3.1:** Public education sessions on warning siren (8)
10. **Mitigation Action 2.1:** Establish warming/cooling shelters (7)
11. **Mitigation Action 2.2:** Emergency equipment upgrades for first responders (7)
12. **Mitigation Action 2.3:** Install sump pumps for city buildings and citizens (7)
13. **Mitigation Action 2.4:** Improve roads (7)
14. **Mitigation Action 2.5:** Construct a safe room with backup generator (7)

Laurel

Goal 1: Protect the health and safety of Laurel residents and visitors

Mitigation Action 1.1: New emergency siren (3)

Plan for implementation and administration:	Purchase and install a new warning siren with backup power
Lead agency:	City of Laurel
Partners:	To be identified
Potential Funding Source:	City of Laurel, FEMA HMGP, and others to be identified
Total cost:	Sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety of Laurel residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.2: Distribute NOAA All-Hazard Radios to all Laurel residents (-1)

Plan for implementation and administration:	Create a program or secure funding to provide NOAA All-Hazard Radios to all Laurel residents
Lead agency:	City of Laurel
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Laurel, Marshall County, Iowa Homeland Security, others to be identified
Total cost:	Unknown, depends on how much is spent on the radios or if they are only subsidized to encourage residents to purchase one
Benefits (loss avoided):	Laurel residents will be informed of approaching hazards and updates throughout a hazard event
Completion Date:	1 year from when funds are secured

Mitigation Action 1.3: Create an emergency phone tree (3)

Plan for implementation and administration:	Hold a meeting for all those who wish to be included on the phone tree, especially the elderly and those with small children
Lead agency:	City of Laurel
Partners:	All City Departments, Marshall County Emergency Management, and others to be identified
Potential Funding Source:	City of Laurel, other to be identified
Total cost:	Staff time and Printing cost
Benefits (loss avoided):	Ensuring all vulnerable populations and citizens will be notified and taken care of in an event. Regular updates will be needed.
Completion Date:	Ongoing from the publication of the call tree

Mitigation Action 1.4: Distribute fans to all Laurel residents (-5)

Plan for implementation and administration:	Create a program or secure funding to provide fans to all Laurel residents
Lead agency:	City of Laurel
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Laurel, Marshall County, others to be identified
Total cost:	Unknown, depends on how much is spent on the fans or if they are only subsidized to encourage residents to purchase one
Benefits (loss avoided):	Laurel residents will avoid effects of extreme heat to personal health
Completion Date:	1 year from when funds are secured

Goal 2: The continuity of operations will not be significantly disrupted by disasters in Laurel

Mitigation Action 2.1: Develop an alternate water source (9)

Plan for implementation and administration:	Create a program or secure funding to develop an alternate water source for during hazard events
Lead agency:	City of Laurel
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Laurel, Marshall County, others to be identified
Total cost:	Unknown, depends on how much is spent on a water supply or permanent source
Benefits (loss avoided):	Laurel residents will have safe water during hazards
Completion Date:	1 year from when funds are secured

Mitigation Action 2.2: Purchase generators (7)

Plan for implementation and administration:	Purchase portable generators for Laurel's identified critical facilities
Lead agency:	City of Laurel
Partners:	Emergency Services, Others to be Identified
Potential Funding Source:	City of Laurel, FEMA HMGP, and others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs also standby requires a permanent fuel source
Benefits (loss avoided):	Power generation to maintain the function of critical facilities
Completion Date:	1 year after funds are secured or the time allotted by funding source

Laurel Mitigation Action Prioritization

1. **Mitigation Action 2.1:** Develop an alternate water source (9)
2. **Mitigation Action 2.2**: Purchase generators (7)
3. **Mitigation Action 1.1:** New emergency siren (3)
4. **Mitigation Action 1.3:** Create an emergency phone tree (3)
5. **Mitigation Action 1.2:** Distribute NOAA All-Hazard Radios to all Laurel residents (-1)
6. **Mitigation Action 1.4:** Distribute fans to all Laurel residents (-5)

Le Grand

Goal 1: Minimize physical losses to structures within hazard areas, critical facilities and identified assets are high priority structures

Mitigation Action 1.1: Improve and update all city buildings (0)

Plan for implementation and administration:	Improve and update all city buildings to current structural and technological standards
Lead agency:	City of Le Grand
Partners:	Marshall County Emergency Management, Others to be indentified
Potential Funding Source:	City of Le Grand, others to be identified
Total cost:	Unknown until needs are assessed and updates priced
Benefits (loss avoided):	City personnel will have reliable offices and systems in place for a hazard event
Completion Date:	Possibly ongoing or 1 year from when funds are secured

Mitigation Action 1.2: Purchase generators for all critical facilities (10)

Plan for implementation and administration:	Purchase generators for city use in all critical facilities
Lead agency:	City of Le Grand
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, City of Le Grand, and others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs also standby requires a permanent fuel source
Benefits (loss avoided):	Power generation to maintain the function of critical facilities
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.3: Install alternate communication devices in all critical facilities (8)

Plan for implementation and administration:	Purchase and install alternate communication devices (besides phones) for city use in all critical facilities
Lead agency:	City of Le Grand
Partners:	Marshall County Emergency Management
Potential Funding Source:	City of Le Grand, and others to be identified
Total cost:	Unknown, depending on devices chosen
Benefits (loss avoided):	Maintain communication abilities in critical facilities
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.4: Identify each critical facility's function in a hazard event (8)

Plan for implementation and administration:	Hold a meeting to assign functions and purposes during a hazard event
Lead agency:	City of Le Grand
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Le Grand and others to be identified
Total cost:	May be of little cost besides staff time
Benefits (loss avoided):	All facilities with a known function during hazards to make aid more efficient and effective
Completion Date:	Ongoing

Mitigation Action 1.5: Create a sandbag committee (2)

Plan for implementation and administration:	Create a committee that is responsible for organizing sandbagging efforts when they are needed
Lead agency:	City of Le Grand or interested citizen
Partners:	Marshall County Emergency management, others to be identified
Potential Funding Source:	City of Le Grand, others to be identified
Total cost:	Unknown, forming the committee may have little to no cost
Benefits (loss avoided):	A group of people who already know how to sandbag will be ready to assemble whenever sandbagging might be needed
Completion Date:	To be indentified

Goal 2: Protect the health and safety of Le Grand residents and visitors.

Mitigation Action 2.1: Construct safe room (9)

Plan for implementation and administration:	Construct a safe room for trailer court, low income renters, and community members
Lead agency:	City of Le Grand
Partners:	City of Le Grand, Others to be identified
Potential Funding Source:	FEMA HMGP and PDM, City of Le Grand, others to be identified
Total cost:	Costs are variable depending on the size of the safe room and whether or not it is a retrofit or newly constructed shelter. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of Le Grand trailer court and low income residents and other community members
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 2.2: Lagoon improvements (13)

Plan for implementation and administration:	Repair/update existing lagoon infrastructure
Lead agency:	City of Le Grand
Partners:	To be identified
Potential Funding Source:	City of Le Grand, FEMA HMGP, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent damages due to possible sewer issues
Completion Date:	One year from when funds are secured or within time allotted by funding source

Mitigation Action 2.3: Hydrant improvements (10)

Plan for implementation and administration:	Update water hydrants as needed when water distribution line project is complete
Lead agency:	City of Le Grand
Partners:	To be identified
Potential Funding Source:	City of Le Grand, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Ensure hydrants are in proper working order for fire hazards
Completion Date:	One year from when funds are secured or within time allotted by funding source

Mitigation Action 2.4: New emergency siren (10)

Plan for implementation and administration:	Purchase and install a new warning siren with backup power on the East side of town
Lead agency:	City of Le Grand
Partners:	To be identified
Potential Funding Source:	City of Le Grand, FEMA HMGP, and others to be identified
Total cost:	Sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety of Le Grand residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Goal 3: Educate Le Grand citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Public education program (12)

Plan for implementation and administration:	Create a program to educate LeGrand residents about the dangers of hazards, how to prepare, and about the Le Grand Emergency Plan through informational brochures and the welcome packet
Lead agency:	City of Le Grand
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Le Grand and others to be identified
Total cost:	Unknown, this project may be of little cost depending on the mediumd
Benefits (loss avoided):	Accessible information for Le Grand residents and visitors
Completion Date:	Ongoing

Mitigation Action 3.2: Create online forms of hazard information (12)

Plan for implementation and administration:	Update the city webpage to include the emergency procedures for the city
Lead agency:	City of Le Grand
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Le Grand and others to be identified
Total cost:	Unknown, this project may be of little cost besides staff time
Benefits (loss avoided):	Life safety of Le Grand residents and visitors
Completion Date:	Ongoing

Mitigation Action 3.3: Create an emergency phone tree (12)

Plan for implementation and administration:	Hold a meeting for all those who wish to be included on the phone tree, especially the elderly and those with small children
Lead agency:	City of Le Grand
Partners:	All City Departments, Marshall County Emergency Management, and others to be identified
Potential Funding Source:	City of Le Grand, other to be identified
Total cost:	Printing will be of some cost
Benefits (loss avoided):	Ensuring all vulnerable populations and citizens will be notified and taken care of in an event. Regular updates will be needed.
Completion Date:	Ongoing from the publication of the call tree

Goal 4: The continuity of operations will not be significantly disrupted by disasters in Le Grand

Mitigation Action 4.1: Continued water tower updates and maintenance (3)

Plan for implementation and administration:	Water tower modifications to ensure efficiency and working order for during emergencies where safe water is needed, like flooding
Lead agency:	City of Le Grand
Partners:	To be identified
Potential Funding Source:	City of Le Grand, others to be identified
Total cost:	Unknown until structure can be evaluated
Benefits (loss avoided):	Ensure efficiency of tower and cleanliness of water from the tower
Completion Date:	1 year from when funds are secured or time allotted by funding source

Mitigation Action 4.2: Ensure online emergency system is working (1)

Plan for implementation and administration:	Continually test "E 911" system to make sure it is communicating with city officials and county sheriff
Lead agency:	City of Le Grand
Partners:	Marshall County Sheriff, Le Grand City officials
Potential Funding Source:	City of Le Grand, others to be identified
Total cost:	Unknown, may be of little cost to simply test
Benefits (loss avoided):	Ensure efficiency of emergency system
Completion Date:	Ongoing

Mitigation Action 4.3: Mutual aid for disaster relief (-1)

Plan for implementation and administration:	Hold sessions to coordinate mutual aid between jurisdictions and county for disaster relief and aid
Lead agency:	City of Le Grand
Partners:	Marshall County Emergency Management, Marshall County jurisdictions, Others to be indentified
Potential Funding Source:	Le Grand, others to be identified
Total cost:	This may be of little cost since they are coordination meetings
Benefits (loss avoided):	Aide will be more efficient and effective with cooperation
Completion Date:	Ongoing starting when meetings can be held

Le Grand Mitigation Action Prioritization

1. **Mitigation Action 2.2:** Lagoon improvements (13)
2. **Mitigation Action 3.1:** Public education program (12)
3. **Mitigation Action 3.2:** Create online forms of hazard information (12)
4. **Mitigation Action 3.3:** Create an emergency phone tree (12)
5. **Mitigation Action 1.2:** Purchase generators for all critical facilities (10)
6. **Mitigation Action 2.3:** Hydrant improvements (10)
7. **Mitigation Action 2.4:** New emergency siren (10)
8. **Mitigation Action 2.1:** Construct safe room (9)
9. **Mitigation Action 1.3:** Install alternate communication devices in all critical facilities (8)
10. **Mitigation Action 1.4:** Identify each critical facility's function in a hazard event (8)
11. **Mitigation Action 4.1:** Continued water tower updates and maintenance (3)
12. **Mitigation Action 1.5:** Create a sandbag committee (2)
13. **Mitigation Action 4.2:** Ensure online emergency system is working (1)
14. **Mitigation Action 1.1:** Improve and update all city buildings (0)
15. **Mitigation Action 4.3:** Mutual aid for disaster relief (-1)

Liscomb

Goal 1: Protect the health and safety of Liscomb residents and visitors

Mitigation Action 1.1: New automatic emergency siren (15)

Plan for implementation and administration:	Purchase and install a new warning siren with backup power
Lead agency:	City of Liscomb
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, and others to be identified
Total cost:	Sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety of Liscomb residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Goal 2: The continuity of operations will not be significantly disrupted by disasters in Liscomb

Mitigation Action 2.1: Purchase generator for City (15)

Plan for implementation and administration:	Purchase a portable generator to use in different community buildings
Lead agency:	City of Liscomb
Partners:	Others to be identified
Potential Funding Source:	City of Liscomb, FEMA HMGP, others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Continuation of critical facility functions during a power outage
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 2.2: Develop an alternate water supply (6)

Plan for implementation and administration:	Create a program or secure funding to develop an alternate water supply for during hazard events
Lead agency:	City of Liscomb
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Liscomb, Marshall County, others to be identified
Total cost:	Unknown, depends on how much is spent on a water supply and storage/location
Benefits (loss avoided):	Liscomb residents will have safe water during hazards
Completion Date:	1 year from when funds are secured

Liscomb Mitigation Action Prioritization

1. **Mitigation Action 1.1:** New automatic emergency siren (15)
2. **Mitigation Action 2.1:** Purchase generator for City (15)
3. **Mitigation Action 2.2:** Develop an alternate water supply (6)

Marshalltown

Goal 1: Minimize physical losses to critical facilities and protect health structures within hazard areas. Critical facilities and identified assets are high priority structures

Mitigation Action 1.1: Flood protection and repairs for sewer lift station and levees (18)

Plan for implementation and administration:	Identify repairs and construct flood protection for critical sewer infrastructure and levees
Lead agency:	City of Marshalltown
Partners:	Engineering firm, County Engineer, others to be identified
Potential Funding Source:	FEMA HMPG, City of Marshalltown, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent the loss of critical infrastructure and the damages associated with their loss
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 1.2: Structural inspections of levee (22)

Plan for implementation and administration:	Hire a consultant to complete a structural study to survey the state of the levee in Marshalltown
Lead agency:	City of Marshalltown
Partners:	Engineering Companies, County Engineer, Others to be identified
Potential Funding Source:	City of Marshalltown, FEMA HMGP, others to be identified
Total cost:	Unknown till consultants are profiled and their services priced
Benefits (loss avoided):	Problems with the levee in town will be identified
Completion Date:	Within the time allotted by funding source

Goal 2: Protect the health and safety of Marshalltown residents and visitors.

Mitigation Action 2.1: Inspections of medical and care facilities in town (13)

Plan for implementation and administration:	Hire a consultant to complete a study to survey the structural and sanitary state of the critical medical and care facilities in town (Marshalltown Medical and Surgical Center, McFarland Clinic, Iowa Veteran's Home)
Lead agency:	City of Marshalltown
Partners:	Engineering Companies, County Engineer, County Sanitarian, Others to be identified
Potential Funding Source:	City of Marshalltown, Others to be identified
Total cost:	Unknown till consultants are profiled and their services priced
Benefits (loss avoided):	Problems with the critical medical and care facilities in town will be identified
Completion Date:	Within the time allotted by funding source

Mitigation Action 2.2: Flood protection and repairs for medical and care facilities in town (17)

Plan for implementation and administration:	Identify repairs and construct flood protection for critical medical and care facilities in town (Marshalltown Medical and Surgical Center, McFarland Clinic, Iowa Veteran's Home)
Lead agency:	City of Marshalltown
Partners:	Engineering firm, County Engineer, others to be identified
Potential Funding Source:	FEMA HMPG, City of Marshalltown, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent the loss of critical medical and care facilities during hazard events
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Goal 3: Educate Marshalltown citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Public education program (13)

Plan for implementation and administration:	Create a program to educate Marshalltown residents about the dangers of hazards and how to prepare through informational flyers, meetings, or other interactive media like drills and workshops
Lead agency:	City of Marshalltown
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Marshalltown and others to be identified
Total cost:	Unknown, this project may be of little cost depending on the medium used
Benefits (loss avoided):	Life safety of Marshalltown residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Goal 4: The continuity of operations will not be significantly disrupted by disasters in Marshalltown.

Mitigation Action 4.1: Further education and training opportunities between jurisdictions (9)

Plan for implementation and administration:	Hold meeting to establish cooperation between different city services and county on proper response to hazards
Lead agency:	City of Marshalltown
Partners:	Marshall County Emergency Management, Marshall County jurisdictions, Others to be indentified
Potential Funding Source:	Marshall County, others to be identified
Total cost:	This may be of little cost since it is a cooperative meeting
Benefits (loss avoided):	Personnel will serve better in events with proper training and cooperation with other jurisdictions
Completion Date:	Ongoing starting when a course can be formulated and possible funding secured

Marshalltown Mitigation Action Prioritization

1. **Mitigation Action 1.2:** Structural inspections of levee (22)
2. **Mitigation Action 1.1:** Flood protection and repairs for sewer lift station and levees (18)
3. **Mitigation Action 2.2:** Flood protection and repairs for medical and care facilities in town (17)
4. **Mitigation Action 2.1:** Inspections of medical and care facilities in town (13)
5. **Mitigation Action 3.1:** Public education program (13)
6. **Mitigation Action 4.1:** Further education and training opportunities between jurisdictions (9)

Melbourne

Goal 1: Minimize physical losses to critical facilities and protect health structures within hazard areas. Critical facilities and identified assets are high priority structures

Mitigation Action 1.1: New emergency siren (7)

Plan for implementation and administration:	Purchase and install a new warning siren with backup power
Lead agency:	City of Melbourne
Partners:	To be identified
Potential Funding Source:	City of Melbourne, FEMA HMGP, and others to be identified
Total cost:	Sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety of Melbourne residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.2: Sewer improvements (10)

Plan for implementation and administration:	Improve existing storm & sanitary sewer, In–place lining of sewer infrastructure
Lead agency:	City of Melbourne
Partners:	To be identified
Potential Funding Source:	City of Melbourne, FEMA HMGP, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent damages due to possible sewer issues
Completion Date:	One year from when funds are secured or within time allotted by funding source

Mitigation Action 1.3: Demolish hazardous buildings in town (11)

Plan for implementation and administration:	Demolition of an old school building with asbestos
Lead agency:	City of Melbourne
Partners:	Region 6 Planning Commission, Others to be identified
Potential Funding Source:	City of Melbourne, FEMA HMGP, others to be identified
Total cost:	To be determined
Benefits (loss avoided):	Remove unsafe structures from the community to prevent hazardous materials incidents
Completion Date:	1 year from when funds are secured

Goal 2: Educate Melbourne citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 2.1: Add hazard information articles to quarterly newsletter (9)

Plan for implementation and administration:	Add hazard articles to newsletter with public information like shelter schedule, meeting announcements, events, etc.
Lead agency:	City of Melbourne
Partners:	To be identified
Potential Funding Source:	City of Melbourne
Total cost:	Unknown, most likely very small cost
Benefits (loss avoided):	All public information will be readily available
Completion Date:	Ongoing

Goal 3: The continuity of operations will not be significantly disrupted by disasters in Melbourne.

Mitigation Action 3.1: Back up computer system off-site (12)

Plan for implementation and administration:	Purchase back-up system for city communication/computer system to be installed off-site
Lead agency:	City of Melbourne
Partners:	To be identified
Potential Funding Source:	City of Melbourne, and others to be identified
Total cost:	Unknown until updates and new equipment are priced
Benefits (loss avoided):	Backup system to ensure communications and data will operate during hazard events
Completion Date:	1 year after funds are secured or the time allotted by funding source

Melbourne Mitigation Action Prioritization

1. **Mitigation Action 3.1:** Back up computer system off-site (12)
2. **Mitigation Action 1.3**: Demolish hazardous buildings in town (11)
3. **Mitigation Action 1.2:** Sewer improvements (10)
4. **Mitigation Action 2.1:** Add hazard information articles to quarterly newsletter (9)
5. **Mitigation Action 1.1:** New emergency siren (7)

Goal 1: Minimize physical losses to critical facilities and protect health structures within hazard areas. Critical facilities and identified assets are high priority structures

Mitigation Action 1.1: Demolition of building on Main Street (8)

Plan for implementation and administration:	Demolition of a hazardous building on Main Street
Lead agency:	City of Rhodes
Partners:	Region 6 Planning Commission, Others to be identified
Potential Funding Source:	City of Rhodes, FEMA HMGP, others to be identified
Total cost:	To be determined
Benefits (loss avoided):	Remove unsafe structures from the community to prevent hazardous materials incidents
Completion Date:	1 year from when funds are secured

Goal 2: Protect the health and safety of Rhodes residents and visitors.

Mitigation Action 2.1: New emergency siren (7)

Plan for implementation and administration:	Purchase and install a new warning siren with backup power
Lead agency:	City of Rhodes
Partners:	To be identified
Potential Funding Source:	City of Rhodes, FEMA HMGP, and others to be identified
Total cost:	Sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety of Rhodes residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Goal 3: Educate Rhodes citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Inform residents of shelter areas in town (8)

Plan for implementation and administration:	Create a program to educate Rhodes citizens of shelter locations as well as about the dangers of hazards and how to prepare through informational flyers, meetings, or other interactive media like drills and workshops
Lead agency:	City of Rhodes
Partners:	Marshall County Emergency Management, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Rhodes and others to be identified
Total cost:	Unknown, this project may be of little cost depending on the medium
Benefits (loss avoided):	Life safety of Rhodes citizens
Completion Date:	Ongoing

Rhodes Mitigation Action Prioritization

1. **Mitigation Action 1.1**: Demolition of building on Main Street (8)
2. **Mitigation Action 3.1:** Inform residents of shelter areas in town (8)
3. **Mitigation Action 2.1:** New emergency siren (7)

St. Anthony

Goal 1: Protect the health and safety of St Anthony residents and visitors

Mitigation Action 1.1: Construct a safe room (8)

Plan for implementation and administration:	Construct a safe room in a safe zone outside of flood areas
Lead agency:	City of St Anthony
Partners:	Marshall County Emergency Management, Others to be identified
Potential Funding Source:	City of St Anthony, FEMA HMGP and PDM, CDBG, others to be identified
Total cost:	Costs are variable depending on the size of the safe room and whether or not it is a retrofit or newly constructed safe room. For a small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of St Anthony residents and visitors
Completion Date:	1 year from funding or within the time allotted by funding source

Mitigation Action 1.2: Backup power for shelter and critical facilities (8)

Plan for implementation and administration:	Purchase portable generators for use in shelter and critical facilities
Lead agency:	City of St Anthony
Partners:	To be identified
Potential Funding Source:	City of St Anthony, FEMA HMGP, others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	The ability to power critical facilities, shelters, and warning devices during a power outage
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 1.3: Recruiting emergency responders (1)

Plan for implementation and administration:	Increase fire and EMS protection through training sessions for current responders and citizens (to become storm spotters and CRP certified)
Lead agency:	City of St Anthony
Partners:	Marshall County Emergency Management, local emergency responders, Others to be indentified
Potential Funding Source:	City of St Anthony, others to be identified
Total cost:	This may be of little cost since it is a set of information sessions
Benefits (loss avoided):	Personnel will serve better in events with proper training
Completion Date:	Ongoing starting when a course can be formulated and possible funding secured

Mitigation Action 1.4: Public education sessions on warning siren (9)

Plan for implementation and administration:	Create a program to educate St Anthony residents about emergency notification like the warning siren and procedures to follow through informational flyers, meetings, or other interactive media like drills and workshops
Lead agency:	City of St Anthony
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of St Anthony and others to be identified
Total cost:	Unknown, this project may be of little cost depending on the medium used
Benefits (loss avoided):	Life safety of St Anthony residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

St Anthony Mitigation Action Prioritization

1. **Mitigation Action 1.4:** Public education sessions on warning siren (9)
2. **Mitigation Action 1.1:** Construct a safe room (8)
3. **Mitigation Action 1.2:** Backup power for shelter and critical facilities (8)
4. **Mitigation Action 1.3:** Recruiting emergency responders (1)

State Center

Goal 1: Minimize losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority structures.

Mitigation Action 1.1: New warning siren (5)

Plan for implementation and administration:	Purchase and install warning siren with remote triggering and backup
Lead agency:	City of State Center
Partners:	To be identified
Potential Funding Source:	City of State Center, FEMA HMGP, and others to be identified
Total cost:	Sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety of State Center residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Goal 2: Protect the health and safety of State Center residents and visitors

Mitigation Action 2.1: Backup power for critical facilities (5)

Plan for implementation and administration:	Purchase portable generators for use in city hall, West Marshall Schools and Fire Station
Lead agency:	City of State Center
Partners:	West Marshall School District
Potential Funding Source:	City of State Center, FEMA HMGP, others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	The ability to power critical facilities, shelters, and warning devices during a power outage
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 2.2: Purchase new grass fire vehicle (6)

Plan for implementation and administration:	Purchase new grass fire vehicle
Lead agency:	City of State Center
Partners:	To be identified
Potential Funding Source:	City of State Center, Assistance to Firefighters Grants, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Ensure the city has a proper vehicle and equipment to fight grass/wildland fires
Completion Date:	Ongoing

Mitigation Action 2.3: Construct a safe room (2)

Plan for implementation and administration:	Construct a safe room
Lead agency:	City of State Center
Partners:	Marshall County Emergency Management, Others to be identified
Potential Funding Source:	City of State Center, FEMA HMGP and PDM, CDBG, others to be identified
Total cost:	Costs are variable depending on the size of the safe room and whether or not it is a retrofit or newly constructed safe room. For a small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of State Center residents and visitors
Completion Date:	1 year from funding or within the time allotted by funding source

Goal 3: Educate State Center residents about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Coordinate city public awareness (13)

Plan for implementation and administration:	Create a communication strategy between city and citizens
Lead agency:	City of State Center
Partners:	Marshall County Emergency Management, Others to be identified
Potential Funding Source:	City of State Center
Total cost:	To be determined, may be of little cost
Benefits (loss avoided):	Citizens will be informed before, during and after hazard events
Completion Date:	Ongoing

State Center Mitigation Action Prioritization

1. **Mitigation Action 3.1:** Coordinate city public awareness (13)
2. **Mitigation Action 2.2**: Purchase new grass fire vehicle (6)
3. **Mitigation Action 1.1:** New warning siren (5)
4. **Mitigation Action 2.1:** Backup power for critical facilities (5)
5. **Mitigation Action 2.3:** Construct a safe room (2)

Goal 1: Minimize physical losses to critical facilities and protect health structures within hazard areas. Critical facilities and identified assets are high priority structures

Mitigation Action 1.1: Reinforce school buildings (9)

Plan for implementation and administration:	Maintain structural integrity of school buildings for the students, staff and public
Lead agency:	East Marshall Community School District
Partners:	Marshall County Engineer, Others to be identified
Potential Funding Source:	East Marshall Community School District, CDBG, others to be identified
Total cost:	Unknown until an assessment of the structures can be completed
Benefits (loss avoided):	Life safety of East Marshall students, staff and visitors
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 1.2: Complete required hazard drills every year (12)

Plan for implementation and administration:	Complete required practice drills for the school district, including: bus evacuation, tornado, and fire drills
Lead agency:	East Marshall Community School District
Partners:	Marshall County Emergency Management, local fire, law enforcement, and emergency response personnel
Potential Funding Source:	East Marshall Community School District, others to be identified
Total cost:	Unknown, may be of little cost
Benefits (loss avoided):	Students will know proper procedures and exits during a hazard
Completion Date:	Ongoing

Goal 2: The continuity of school operations will not be significantly disrupted by disasters in Marshall County.

Mitigation Action 2.1: Purchase/update snow removal equipment (14)

Plan for implementation and administration:	Purchase/update snow removal equipment for use following a severe winter storm
Lead agency:	East Marshall Community School District
Partners:	Cities of Laurel, Le Grand and Gilman, Marshall County Emergency Management, Others to be indentified
Potential Funding Source:	East Marshall Community School District, others to be identified
Total cost:	Unknown until equipment is assessed and new equipment priced
Benefits (loss avoided):	Restore safety of school infrastructure immediately following a hazard event, as well as ensuring efficiency of equipment
Completion Date:	Ongoing or 1 year from when funds are secured

Mitigation Action 2.2: Create debris removal plan (14)

Plan for implementation and administration:	Develop a plan to remove debris and obstructions from school grounds immediately following a hazard event
Lead agency:	East Marshall Community School District
Partners:	Marshall County Emergency Management
Potential Funding Source:	East Marshall Community School District, Others to be identified
Total cost:	Unknown, may be of little cost
Benefits (loss avoided):	Restore safety of school grounds and infrastructure immediately following a hazard event
Completion Date:	Ongoing with updates

Goal 3: Protect the health and safety of East Marshall students, staff and visitors.

Mitigation Action 3.1: Ensure proper grounding of facilities during hazard events (13)

Plan for implementation and administration:	Have study done and properly ground any school facilities out of regulation for hazard events
Lead agency:	East Marshall Community School District
Partners:	Marshall County Engineer, Others to be identified
Potential Funding Source:	East Marshall Community School District, others to be identified
Total cost:	Unknown until an assessment of the structures can be completed
Benefits (loss avoided):	Life safety of East Marshall students, staff and visitors, as well as protection of electrical systems
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 3.2: Retrofit school buildings as shelters (12)

Plan for implementation and administration:	Retrofit 3 school buildings as community shelters for hazard events
Lead agency:	East Marshall Community School District
Partners:	East Marshall Community School District, Others to be identified
Potential Funding Source:	FEMA HMGP & PDM, East Marshall Community School District, &CDBG
Total cost:	Costs are variable depending on the size of the shelter and whether or not it is a retrofit or newly constructed shelter. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of East Marshall students and visitors
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Goal 4: Educate East Marshall students and staff about the dangers of hazards and how they can be prepared.

Mitigation Action 4.1: Public education sessions on safe room procedures (11)

Plan for implementation and administration:	Create a program to educate students and residents about school shelters and procedures to follow through informational flyers, meetings, or other interactive media like drills and workshops
Lead agency:	East Marshall Community School District
Partners:	Marshall County Emergency Management, other Marshall County schools
Potential Funding Source:	East Marshall Community School District and others to be identified
Total cost:	Unknown, this project may be of little cost depending on the medium used
Benefits (loss avoided):	Life safety of East Marshall students, visitors and city citizens
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 4.2: Coordinate city public awareness and emergency plan (11)

Plan for implementation and administration:	Create a communication strategy between schools and public as well as write an emergency plan
Lead agency:	East Marshall Community School District
Partners:	Marshall County Emergency Management, Others to be identified
Potential Funding Source:	East Marshall Community School District
Total cost:	To be determined, may be of little cost
Benefits (loss avoided):	Citizens will be informed before, during and after hazard events of school resources and safety of students
Completion Date:	Ongoing

East Marshall Community School District Mitigation Action Prioritization

1. **Mitigation Action 2.1:** Purchase /update snow removal equipment (14)
2. **Mitigation Action 2.2**: Create debris removal plan (14)
3. **Mitigation Action 3.1:** Ensure proper grounding of facilities during hazard events (13)
4. **Mitigation Action 1.2:** Complete required hazard drills every year (12)
5. **Mitigation Action 3.2:** Retrofit school buildings as shelters (12)
6. **Mitigation Action 4.1:** Public education sessions on safe room procedures (11)
7. **Mitigation Action 4.2:** Coordinate city public awareness and emergency plan (11)
8. **Mitigation Action 1.1:** Reinforce school buildings (9)

Goal 1: Minimize losses to existing and future school structures within hazard areas.

Mitigation Action 1.1: Maintain facility standards and safe code compliance (12)

Plan for implementation and administration:	Maintain structural integrity and safety of school buildings for the students, staff and public
Lead agency:	Marshalltown Community School District
Partners:	Marshall County Engineer, Others to be identified
Potential Funding Source:	Marshalltown Community School District, CDBG, others to be identified
Total cost:	Unknown until an assessment of the structures can be completed
Benefits (loss avoided):	Life safety of Marshalltown Schools' students, staff and visitors
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Goal 2: Protect the health and safety of Marshalltown School District's students, staff and visitors.

Mitigation Action 2.1: Update and review facility safety awareness program (7)

Plan for implementation and administration:	Hire a consultant to complete a study to evaluate the existing safety condition of the schools and existing safety plan
Lead agency:	Marshalltown Community School District
Partners:	Engineering Companies, County Engineer, County Sanitarian, Others to be identified
Potential Funding Source:	Marshalltown Community School District, Others to be identified
Total cost:	Unknown till consultants are profiled and their services priced
Benefits (loss avoided):	Problems with the safety and safety procedures of school facilities in town will be identified
Completion Date:	Within the time allotted by funding source

Goal 3: Educate Marshalltown School District students and staff about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Create a hazard/safety information session for students (7)

Plan for implementation and administration:	Create an information session for students to learn proper safety procedures in hazard events
Lead agency:	Marshalltown Community School District
Partners:	Marshall County Emergency Management, Others to be identified
Potential Funding Source:	Marshalltown Community School District
Total cost:	Unknown, this project may be of little cost
Benefits (loss avoided):	Giving information about hazards and how to proceed in an event
Completion Date:	Ongoing with updates

Mitigation Action 3.2: District-wide training (6)

Plan for implementation and administration:	Hold session to train district employees and staff on hazard identification, proper response and facility safety procedures
Lead agency:	Marshalltown Community School District
Partners:	Marshall County Emergency Management, Others to be indentified
Potential Funding Source:	Marshalltown Community School District, others to be identified
Total cost:	This may be of little cost since it is an information session
Benefits (loss avoided):	Personnel will serve better in events with proper training and instruction
Completion Date:	Ongoing starting when a course can be formulated, possible funding secured, and plan written, may require updates

Goal 4: Cooperative, multi-agency planning.

Mitigation Action 4.1: Write an emergency plan for city, emergency response, and schools (13)

Plan for implementation and administration:	Complete a cooperative plan for use between the city, emergency responders, and school
Lead agency:	Marshalltown Community School District
Partners:	Marshall County Emergency Management, local fire, law enforcement, and emergency response personnel
Potential Funding Source:	Marshalltown Community School District, Local responders and city
Total cost:	This may be of little cost besides printing
Benefits (loss avoided):	A crisis plan will be set in place so all facilities will be prepared for crises and regain control of operations and provide cooperative aid as soon as possible
Completion Date:	At such time the plan is complete, possible ongoing updates

Marshalltown Community School District Mitigation Action Prioritization

1. **Mitigation Action 4.1:** Write an emergency plan for city, emergency response and schools (13)
2. **Mitigation Action 1.1:** Maintain facility standards and safe code compliance (12)
3. **Mitigation Action 2.1:** Update and review facility safety awareness program (7)
4. **Mitigation Action 3.1:** Create a hazard/safety information session for students (7)
5. **Mitigation Action 3.2:** District-wide training (6)

Goal 1: Minimize losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority structures.

Mitigation Action 1.1: Reinforce levee and surrounding land (16)

Plan for implementation and administration:	Identify repairs and construct flood protection for levee and surrounding soft ground
Lead agency:	Marshall County Emergency Management
Partners:	County Engineer, others to be identified
Potential Funding Source:	FEMA HMPG, City of Marshalltown, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent the loss of critical infrastructure and the damages associated with their loss
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 1.2: Construct safe rooms in vulnerable areas of the county (16)

Plan for implementation and administration:	Construct safe rooms in fairgrounds, trailer courts, etc
Lead agency:	Marshall County Emergency Management
Partners:	Marshall County Conservation Board
Potential Funding Source:	FEMA HMGP and PDM, CDBG, and others to be identified
Total cost:	Costs are variable depending on the size of the safe room/shelter and whether or not it is a retrofit or newly constructed safe room/shelter. For a small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of residents and visitors during tornado events
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.3: Acquisition and elevation of structures (14)

Plan for implementation and administration:	Elevation of structures in flood plains and flood-prone areas
Lead agency:	Marshall County Emergency Management
Partners:	Marshall County Engineer, Region 6 Planning
Potential Funding Source:	Marshall County, others to be identified
Total cost:	Unknown until structures can be evaluated
Benefits (loss avoided):	Life safety for County residents and visitors
Completion Date:	1 year from when funds are secured or time allotted by funding source

Mitigation Action 1.4: Laminated glass for use during hailstorms (3)

Plan for implementation and administration:	Secure funding to put up laminated glass to protect county buildings during hailstorms
Lead agency:	Marshall County Emergency Management
Partners:	Marshall County, Region 6 Planning Commission, others to be identified
Potential Funding Source:	Marshall County, Others to be identified
Total cost:	Unknown until needs are assessed and product priced
Benefits (loss avoided):	All county buildings will be properly protected during a hailstorm
Completion Date:	1 year from when funds are secured

Mitigation Action 1.5: Plant windbreaks (7)

Plan for implementation and administration:	Plant windbreaks around the county and near county highways
Lead agency:	Marshall County Emergency Management
Partners:	Iowa DOT, others to be identified
Potential Funding Source:	Marshall County, others to be identified
Total cost:	Unknown till areas can be assessed
Benefits (loss avoided):	Protect the county from excess wind and snow from surrounding fields
Completion Date:	Ongoing

Mitigation Action 1.6: Ground water protection (4)

Plan for implementation and administration:	Facilitate ground water protection measures to avoid damages due to sink holes
Lead agency:	Marshall County Emergency Management
Partners:	Marshall County, Marshall County Conservation, Others to be identified
Potential Funding Source:	Marshall County, Others to be identified
Total cost:	Unknown until sink holes are identified
Benefits (loss avoided):	Prevent damages due to sink hole hazards
Completion Date:	One year from when funds are secured or within time allotted by funding source

Goal 2: Protect the health and safety of Marshall County residents and visitors.

Mitigation Action 2.1: Coordinate public awareness (15)

Plan for implementation and administration:	Create a communication strategy between the county and city and work together on an emergency plan
Lead agency:	Marshall County Emergency Management
Partners:	Marshall County jurisdicitons, Others to be identified
Potential Funding Source:	Marshall County
Total cost:	To be determined, may be of little cost
Benefits (loss avoided):	Citizens will be informed before, during and after hazard events
Completion Date:	Ongoing

Mitigation Action 2.2: Courthouse security (0)

Plan for implementation and administration:	Purchase and install security measures such as cameras, key fab, secure doors, and starting night checks
Lead agency:	Marshall County Emergency Management
Partners:	Local Marshalltown law enforcement
Potential Funding Source:	Marshall County, others to be identified
Total cost:	To be determined once cameras, equipment, and labor are priced
Benefits (loss avoided):	Catch suspicious activity near courthouse to prevent terrorism
Completion Date:	1 year from when funds are secured and the system is established or within time allotted by funding source

Mitigation Action 2.3: Create a public information session and conservation (water) program (7)

Plan for implementation and administration:	Create a public information and conservation (water) program
Lead agency:	Marshall County Emergency Management
Partners:	Marshall County Conservation, Others to be identified
Potential Funding Source:	Marshall County
Total cost:	Unknown, this project may be of little cost besides a water stockpile
Benefits (loss avoided):	Giving information about drought hazards and being prepared with the necessary supplies in case of an event
Completion Date:	1 year from when political and public support is leveraged

Mitigation Action 2.4: Install radiology monitors in all county vehicles (-4)

Plan for implementation and administration:	Install radiology monitors in county vehicles to detect radiological incidents across the whole county
Lead agency:	Marshall County Emergency Management
Partners:	All county departments, Des Moines Fire Department, Others to be identified
Potential Funding Source:	Marshall County
Total cost:	Unknown until monitors can be priced
Benefits (loss avoided):	Detect radiological incidents across the whole county
Completion Date:	Ongoing from when funding is secured

Goal 3: Educate Marshall County citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Public education program (8)

Plan for implementation and administration:	Update the current program to educate Marshall County residents about the dangers of hazards (thunderstorms and earthquakes) and how to prepare through informational flyers, meetings, or other interactive media like drills and workshops
Lead agency:	Marshall County Emergency Management
Partners:	Local businesses and churches, others to be identified
Potential Funding Source:	Marshall County
Total cost:	Unknown, this project may be of little cost depending on the medium used
Benefits (loss avoided):	Life safety of Marshall County residents and visitors during hazards like thunderstorms and earthquakes
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 3.2: CERT responder training (10)

Plan for implementation and administration:	Hold session to train Citizen Emergency Response Team members from each community and the county on proper hazard response
Lead agency:	Marshall County Emergency Management
Partners:	Local emergency responders, Others to be indentified
Potential Funding Source:	Marshall County, others to be identified
Total cost:	This may be of little cost depending on price of training
Benefits (loss avoided):	Personnel will serve better in events with proper training and instruction
Completion Date:	Ongoing starting when a course can be formulated, and possible funding secured

Mitigation Action 3.3: Animal/Crop/Plant and Human Disease Epidemic planning and training (5)

Plan for implementation and administration:	Hold session to train emergency personnel to identify animal/crop/plant disease and human epidemic disease outbreaks and proper response, Create county plan to deal with outbreaks
Lead agency:	Marshall County Emergency Management
Partners:	Local emergency responders, County Veterinarian, Others to be indentified
Potential Funding Source:	Marshall County, others to be identified
Total cost:	This may be of little cost since it is an information session and document
Benefits (loss avoided):	Personnel will serve better in events with proper training and instruction
Completion Date:	Ongoing starting when a course can be formulated, possible funding secured, and plan written, may require updates

Mitigation Action 3.4: Train fire departments for grass fires and maintain needed equipment (7)

Plan for implementation and administration:	Create a program or incentives for firemen to be trained for grass fires and purchase or maintain the needed equipment
Lead agency:	Marshall County Emergency Management
Partners:	Marshall County Sherriff's Department, city fire departments, others to be identified
Potential Funding Source:	Assistance to Firefighters Grant, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Quick and proper response in grass fire situations
Completion Date:	1 year from when funding is secured or within time allotted by funding

Mitigation Action 3.5: Public warnings of dam failures (-1)

Plan for implementation and administration:	Communicate to residents using different media to warn of an imminent dam failure
Lead agency:	Marshall County Emergency Management
Partners:	Marshall County Sherriff's Department, local emergency responders, others to be identified
Potential Funding Source:	Marshall County, Others to be identified
Total cost:	Unknown, this project may be of little cost depending on the medium used
Benefits (loss avoided):	Immediate warning for residents downstream of dams and other vulnerable areas of the county
Completion Date:	Ongoing starting after residents are identified

Mitigation Action 3.6: Create hazardous materials removal plan (11)

Plan for implementation and administration:	Develop a plan to remove hazardous materials efficiently from a hazard event site
Lead agency:	Marshall County Emergency Management
Partners:	Marshall County
Potential Funding Source:	Marshall County, Others to be identified
Total cost:	Unknown, may be of little cost
Benefits (loss avoided):	Restore safety of county during a hazardous materials incident
Completion Date:	Ongoing with updates

Goal 4: The continuity of operations will not be significantly disrupted by disasters in Marshall County.

Mitigation Action 4.1: Purchase generators for critical facilities (15)

Plan for implementation and administration:	Install generators at sheds on secondary roads to fill fuel
Lead agency:	Marshall County Emergency Management
Partners:	County farmers, others to be identified
Potential Funding Source:	Marshall County, FEMA HMGP, others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	The ability to power fuel stations on secondary roads so people can still be mobile after a hazard
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 4.2: Elevate roads (13)

Plan for implementation and administration:	Elevate all County roads or those that are identified as problematic or critical during and immediately following flood events (Oaks street where it crosses Chicken and Asher Creeks)
Lead agency:	Marshall County Emergency Management
Partners:	Iowa Department of Transportation, Marshall County Engineer, others to be identified
Potential Funding Source:	FEMA HMGP, Marshall County, and others to be identified
Total cost:	Unknown, most likely very expensive, need an engineering report to determine cost
Benefits (loss avoided):	Prevent road and vehicle damage and preserve the mobility of County residents during and immediately following a flood event
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 4.3: Improve communication systems (17)

Plan for implementation and administration:	Invest in communication mechanisms to support coordination of all critical facilities
Lead agency:	Marshall County Emergency Management
Partners:	County emergency response, Others to be indentified
Potential Funding Source:	Marshall County, others to be identified
Total cost:	Unknown until equipment is assessed and new equipment is priced
Benefits (loss avoided):	The County will have reliable communication capabilities
Completion Date:	Possibly ongoing or 1 year from when funds are secured

Mitigation Action 4.4: Purchase/update snow removal equipment (12)

Plan for implementation and administration:	Purchase/update snow removal equipment for use following a severe winter storm
Lead agency:	Marshall County Emergency Management
Partners:	Others to be indentified
Potential Funding Source:	Marshall County, others to be identified
Total cost:	Unknown until equipment is assessed and new equipment priced
Benefits (loss avoided):	Restore safety of county infrastructure immediately following a hazard event, as well as ensuring efficiency of equipment
Completion Date:	Ongoing or 1 year from when funds are secured

Mitigation Action 4.5: Maintain quality of courthouse's technological equipment with temperature regulation (8)

Plan for implementation and administration:	Add air conditioning units to technology departments and server closets
Lead agency:	Marshall County Emergency Management
Partners:	Marshall County
Potential Funding Source:	Marshall County
Total cost:	Unknown
Benefits (loss avoided):	Protect technological instruments from heat damage
Completion Date:	Ongoing, starting when funding is secured

Marshall County Mitigation Action Prioritization

Mitigation Action 4.3: Improve communication systems (17)
Mitigation Action 1.1: Reinforce levee and surrounding land (16)
Mitigation Action 1.2: Construct safe rooms in vulnerable areas of the county (16)
Mitigation Action 2.1: Coordinate public awareness (15)
Mitigation Action 4.1: Purchase generators for critical facilities (15)
Mitigation Action 1.3: Acquisition and elevation of structures (14)
Mitigation Action 4.2: Elevate roads (13)
Mitigation Action 4.4: Purchase/update snow removal equipment (12)
Mitigation Action 3.6: Create hazardous materials removal plan (11)
Mitigation Action 3.2: CERT responder training (10)
Mitigation Action 3.1: Public education program (8)
Mitigation Action 4.5: Maintain quality of courthouse's technological equipment with temperature regulation (8)
Mitigation Action 1.5: Plant windbreaks (7)
Mitigation Action 2.3: Create a public information session and conservation (water) program (7)
Mitigation Action 3.4: Train fire departments for grass fires and maintain needed equipment (7)
Mitigation Action 3.3: Animal/Crop/Plant and Human Disease Epidemic planning and training (5)
Mitigation Action 1.6: Ground water protection (4)
Mitigation Action 1.4: Laminated glass for use during hailstorms (3)
Mitigation Action 2.2: Courthouse security (0)
Mitigation Action 3.5: Public warnings of dam failures (-1)
Mitigation Action 2.4: Install radiology monitors in all county vehicles (-4)

6 Plan Maintenance Process

This section of the plan provides an overview of the general strategy for plan maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The section also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

6.1 Monitoring, Evaluating, and Updating the Plan

44 CFR Requirement 201.6(c)(4): *The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

With the adoption of this plan, the Planning Team (members may vary over time) agrees to monitor, evaluate, and maintain the plan. The Planning Team will meet once each year to monitor and evaluate the plan. The Marshall County Emergency Manager will coordinate the meeting time and place and notify other members. Other organizations may be of some assistance in this process. The participating jurisdictions and agencies, led by Marshall County Emergency Management, will do the following:

- Meet annually to monitor and evaluate the implementation of the plan
- Act as a forum for hazard mitigation issues
- Disseminate hazard mitigation ideas and activities
- Pursue the implementation of high priority, low- or no cost mitigation actions
- Maintain vigilant monitoring of multi-objective, cost-share, and other funding opportunities to help the county and other jurisdictions implement the plans mitigation actions for which no current funding exists
- Monitor and assist in implementation and updating of this plan
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters
- Report on plan progress and recommend changes to the Marshall County Board of Supervisors and governing bodies of participating jurisdictions
- Inform and solicit input from the public

The primary duty of the Planning Team is to see that the plan is successfully carried out and to report to the governing boards and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, hearing stakeholder concerns, and passing concerns on to appropriate entities.

Evaluation of progress can be achieved by monitoring changes and vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions
- Increased vulnerability as a result of failed or ineffective mitigation actions
- Increased vulnerability as a result of new development or annexation

Updates to the plan will:

- Consider changes in vulnerability due to action implementation
- Document success stories where mitigation efforts have proven effective
- Document areas where mitigation actions were not effective
- Document any new hazards that may arise or were previously overlooked
- Incorporate new data or studies on hazards and risks such as Digital Flood Insurance Rate Maps
- Incorporate new capabilities or changes in capabilities
- Incorporate growth and development-related changes to inventories
- Incorporate new action recommendations or changes in action prioritization

In order to best evaluate any changes in vulnerability as a result of plan implementation, the participating jurisdictions will undergo the following process:

- A representative from the jurisdiction will be responsible for tracking and reporting annually on action status. The representative will also provide input on whether the action as implemented meets the defined objectives and is likely to be successful in reducing vulnerabilities.
- If the action does not meet identified objectives, the jurisdictional lead will determine what additional measures may be implemented, and an assigned individual will be responsible for defining action scope, implementing the action, monitoring success of the action, and making any required modifications to the plan.

Changes will be made to the plan to accommodate actions that have failed or are not considered feasible after a review of their adherence to established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan, every five years as a minimum, will be enacted through written changes and submissions, as Marshall County Emergency Management deems appropriate and necessary, and as approved by the Marshall County Board of Supervisors or the governing board of the participating jurisdictions.

6.2 Incorporation into Existing Planning Mechanisms

44 CFR Requirement §201.6(c)(4)(ii): *[The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. This plan builds upon the some of the previous related efforts and recommends implementing actions, where possible, through the following means:

- General or related plans of participating jurisdictions
- Ordinances of participating jurisdictions
- Building codes
- Capital improvements plans and budgets
- School district facilities plans
- Mutual aid agreement (28E Agreement)
- Other community plans within the county either in existence or developed in the future such as water conservation plans, storm water management plans, and parks and recreation plans

The governing bodies of the jurisdictions adopting this plan will encourage all other relevant planning mechanisms under their authority to consult this plan to ensure minimization of risk to natural and manmade hazards as well as coordination of activities.

The Planning Team involved in the plan update will be responsible for encouraging the integration of the findings actions of the mitigation plan as appropriate. The Planning Team is also responsible for monitoring this integration and incorporating the appropriate information into the five-year update of the plan.

6.3 Continued Public Involvement

44 CFR Requirement §201.6(c)(4)(iii): *[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.*

The update process provides an opportunity to publicize success stories from the plan's implementation and seek additional public comment. Information will be posted in the local newspaper concerning projects and the annual hazard mitigation meeting that will be held. The public will be invited to attend the annual hazard mitigation meeting where the Planning Team will meet to monitor and evaluate the plan. The public will have to chance to participate and interact with their respective jurisdiction representative in order to have a stake in the outcome of plan implementation and update. Planning Team members will be invited by invitation to the annual meeting and the public will be invited through a public notice in the local newspapers and flyer(s) posted in their jurisdiction by the City or administration.

7 Recommendations

Aside from the goals and projects each jurisdiction identified to mitigate hazards, the writers of the plan would also like to use the knowledge acquired during plan research, training, observation, and writing to make some general recommendations to Marshall County and participating jurisdictions. These recommendations may be considered during the five-year life of this plan or in the plan update. Our recommendations include the following:

- Jurisdictions should encourage businesses and care facilities especially those that were identified as critical facilities to complete continuity plans so there is little interruption in service and economic losses can be avoided.

- The jurisdictions that already have generator(s) should complete the needed changes to make the generators usable. The generator(s) should also be tested on a regular basis to ensure that they will function during a power outage.

- Jurisdictions with mobile homes should require tie-downs to prevent flying large debris that may be a danger during severe weather that involves high speed winds. Also, jurisdictions should consider providing or requiring some sort of shelter for residents of mobile homes to use during severe weather.