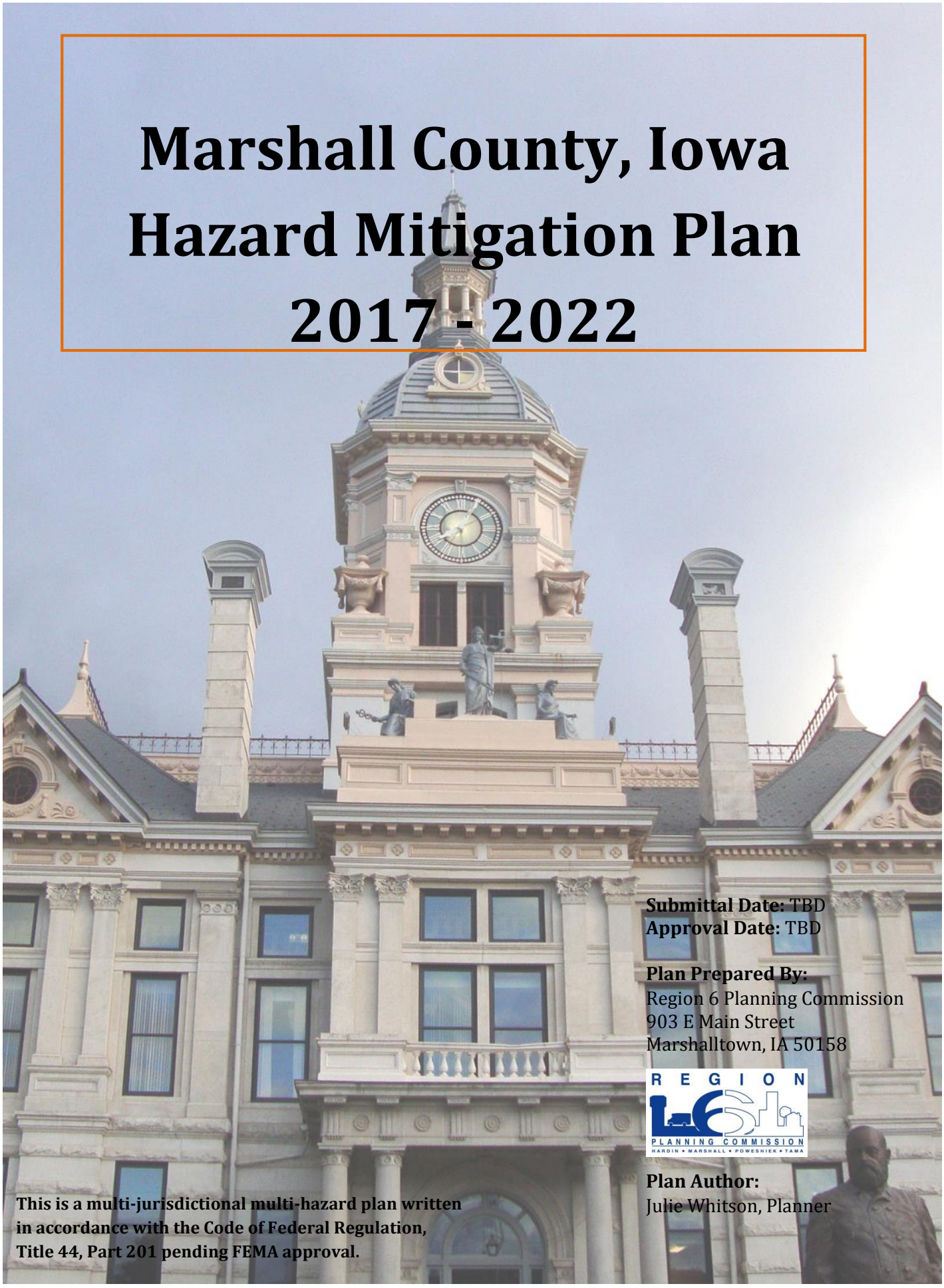
Marshall County, Iowa Hazard Mitigation Plan 2017 - 2022



Submittal Date: TBD
Approval Date: TBD

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

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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 - "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.

Background work and research was completed to produce a profile of the entire planning area – Marshall County. 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. Profiles for the four school districts are also included in the planning area.

In the Risk Assessment chapter, every hazard that could possibly affect Marshall County is identified and profiled with the information of its description, historical occurrence, probability, vulnerability, severity of impact, and speed of onset included. Based on the frequency and/or impact of each of these descriptors, the hazards are scored according to which hazards pose the largest threat to Marshall County.

A mitigation strategy is produced by each jurisdiction and takes into account their risk assessment and vulnerability to hazards to create goals with subsequent projects to help reach those goals. Some of the most popular goals include minimizing losses to structures, protecting the health and safety of residents, educating citizens of the dangers of hazards and continuing the operations of the jurisdictions and county without disruption during a hazard. Projects identified to help achieve those goals include the installation of safe rooms, purchase of generators for critical facilities, 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 several evaluation criteria.

This plan identifies individual jurisdiction's assets and vulnerable populations in order to gauge what/who needs priority when a hazard strikes. City facilities and grocery stores, and elderly and disabled populations are the most frequently identified as critical facilities and vulnerable populations. All of these exercises helped Region 6 have a better idea as to the need of each jurisdiction.

Much progress has been made for the communities of Marshall County during the previous planning process as they maintained culverts and added new culverts, purchased backup generators for critical facilities, completed public education on hazards, and improved public

infrastructure such as lagoons and water towers. Progress updates on mitigation actions included in the previous plan are included in the Appendix. It is hoped that this hazard mitigation plan update will continue to help communities face top-ranked hazards such as severe winter storms, wind storms, and thunderstorms.

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 when it comes to 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 to publicize success stories of projects, will keep the public involved and informed of what hazard mitigation can and is doing for their city.

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 Q.

The following 18 jurisdictions participated in the creation of this plan and have adopted the multi-jurisdictional plan. 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 LeGrand
- 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
- GMG Community School District
- Marshalltown Community School District
- West Marshall Community School District

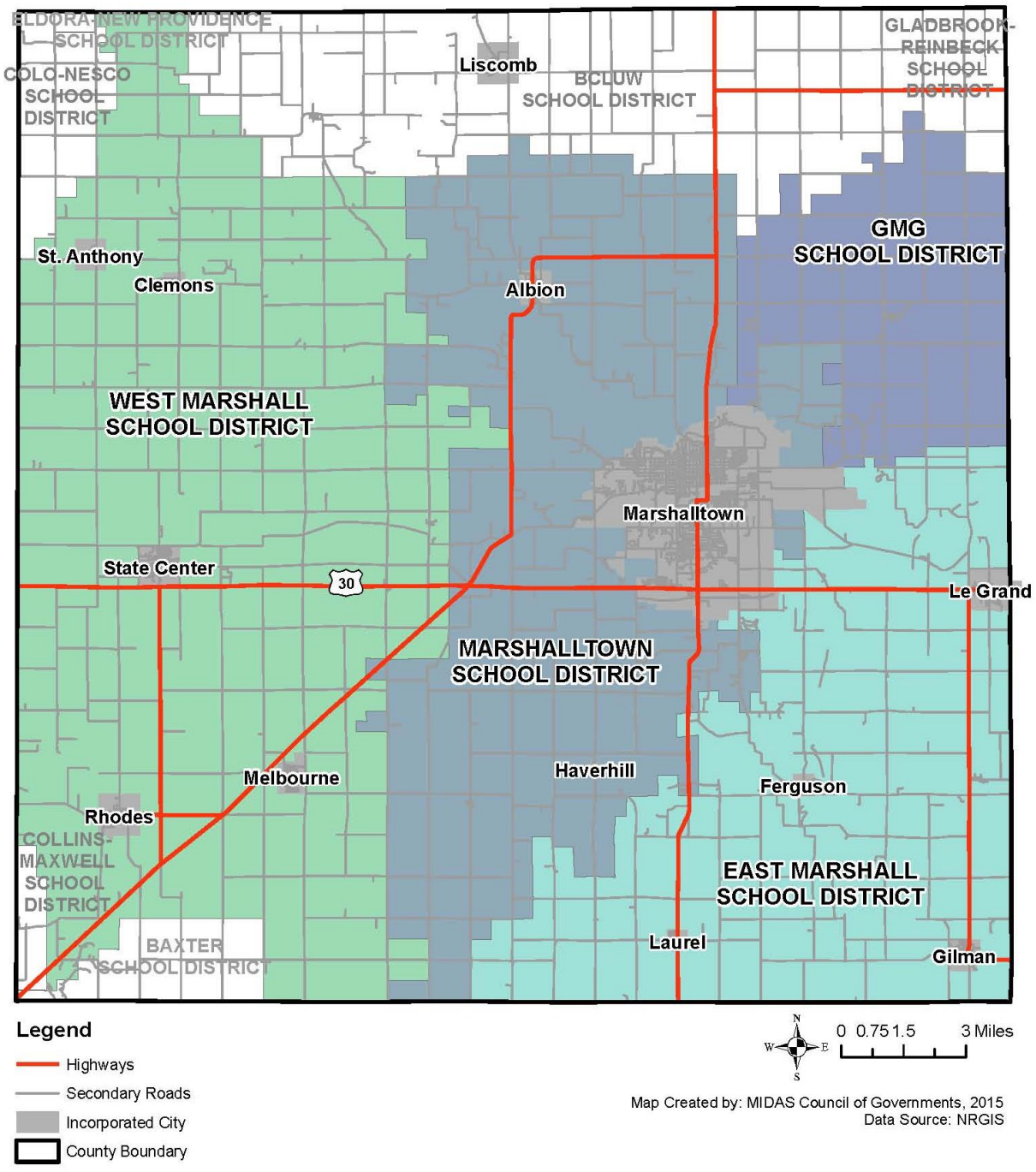
The planning boundary for this multi-jurisdictional hazard mitigation plan includes all of the incorporated and unincorporated areas of Marshall County, Iowa.

All incorporated jurisdictions within Marshall County participated in this plan update. In addition to jurisdictional representatives from within Marshall County, a variety of stakeholders were invited to participate in the planning process. Those invited to the meetings included Emergency Managers from the surrounding counties, law enforcement agencies, fire and rescue agencies, and local and regional agencies that may play a role in hazard mitigation activities (Health Department, DOT, non-profits and service providers, etc.).

Regarding school district participation, there are several changes to note from the previous plan. First, GMG Community School District and West Marshall Community School District did not participate in the previous Multi-Jurisdictional Hazard Mitigation Plan for Marshall County that was approved in 2012. The school districts chose to participate in the plan update, and as a result, they put forth several mitigation actions for their respective school districts.

Finally, all school districts with buildings in Marshall County were invited to participate in the planning process. See Figure1 for a map of participating jurisdictions. Note that the school districts *not* participating in the plan update have been grayed out.

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

Other information that was gathered during the planning process for the 2010 Multi-Jurisdictional Hazard Mitigation Plan for Marshall County includes each jurisdiction completing a community assessment and being part of a hazard mitigation kick-off meeting. For the plan update, these activities were not included in the planning process; however, data gathered from these activities was updated and carried over to the plan update.

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.

In lieu of attending all county-wide meetings, some jurisdictions chose to participate in the plan update by meeting one-on-one with staff members of Region 6 Planning Commission or Marshall County Emergency Management Agency. Jurisdictions were provided all materials that were handed out at meetings and were instructed how to complete meeting activities. If the activity was not able to be completed on-site, jurisdictions submitted requested materials by scanning copies and sending them via email. Through this alternative process, the plan update was able to include all jurisdictions in the planning process.

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

Table 1: Marshall County Strategic Planning Task Force Members and Meeting Attendance

Jurisdiction	Representative	Title	County Meeting #1	County Meeting #2	County Meeting #3	Make-up Meeting*
City of Albion	Keith Balvanz	Mayor	--	X	--	
City of Clemons	Marlene Krough	Mayor	--	--	--	X
City of Ferguson	Dale Thompson	Mayor	X	X	X	
	Glenda Thompson	City Council Member	X	X	X	
City of Gilman	Karen Buchanan	City Clerk	--	--	--	X
Green Mountain	Tom McWilliams	Green Mountain Fire Department	X	--	--	
City of Haverhill	Marilyn Polley	City Clerk	--	--	--	X
City of Laurel	Susanne Sietmann	City Council Member	X	X	--	
City of Le Grand	Maren Williams	City Hall Deputy Clerk	X	X	--	
	Jodi Abrahams	Clerk/Treasurer	X	X	X	
City of Liscomb	Hank Penner	Mayor	X	--	--	X

Jurisdiction	Representative	Title	County Meeting #1	County Meeting #2	County Meeting #3	Make-up Meeting*
	Jerry McDonald	City Council	--	X	--	
City of Marshalltown	Brian Bateson	Marshalltown Police Captain	X	--	X	
	David Daters	Public Facilities Superintendent	X	X	X	
	Scott Johnson	Marshalltown Deputy Chief of Fire Department	X	--	--	
	David Rierson	Marshalltown Chief of Fire Department	X	X	--	
	Stove Sincox	Marshalltown Water Works General Manager	X	X	--	
City of Melbourne	Robert Monroe	Monroe Fire Department Chief	X	X	--	
	Deb Mercer	Deputy Clerk	X	X	--	X
City of Rhodes	Gale Klosterman	City Clerk	--	X	--	
City of St. Anthony	Duane Bryant	City Council	--	--	--	X
City of State Center	Jeff Bunn	State Center Police Chief	X	X	X	
	Jim Eckhardt	State Center Fire and EMS Chief	X	X	X	
Marshall County	Kim Elder	Marshall County EMA Coordinator	X	X	X	
	Mike Stegmann	Marshall County Conservation Board Director	X	X	--	
	Pat Thompson	Marshall County Public Health	X	X	X	
East Marshall Community School District	Robb Gage	Buildings and Grounds Director	--	X	X	
	Randy Denham	Business Manager	--	--	X	
GMG Community School District	Mark Polich	Principal	--	--	X	
Marshalltown Community School District	Matt Tullis	Director of Equity/District Safety	X	--	--	
	Rick Simpson	Building and Grounds Director	--	X	--	
West Marshall Community School District	Nicole Kooiker	Superintendent	--	--	--	X
American Red Cross	Brandon Holstrom	Disaster Program Manager	X	X	--	
Beck's Hybrids	Andrew Nickell	Site Manager	X	--	--	
Central Iowa Health Care	Robert Douglas		X	--	--	
Heartland Coops	Mark Kingery		X	X	--	
Iowa Department of Transportation	Mark Stephens	Highway Maintenance Supervisor	X	--	--	
Lennox Industries	Leah Cox		X	--	--	

***Make up meetings.** If a community could not attend one of the three Task Force meetings, they were contacted via phone or email. Communities then received materials from the meeting they missed through an in-person meeting, through a drop-off of meeting materials at City Hall, or through email with instructions. Once these meeting materials were completed they were either sent back electronically or were brought to the next in-person meeting.

Chapter 1: Introduction

Hazards

Quite simply, 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, however, there are three 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 15 main natural hazards identified by the Iowa 2013 Hazard Mitigation Plan. The second hazard type is a technological hazard. The State Plan identifies five main technological hazards. The third type of hazard is a human caused hazard. Terrorism is alone in this category. Table 1.1 lists both natural and man-made hazards according to the 2013 Iowa Hazard Mitigation Plan. Natural, technological, and human-caused hazards will be considered in this plan.

Table 1.1: All Hazards

Natural Hazards	**Technological**
Animal/Plant/Crop Disease	Dam/Levee Failure
Drought	Hazardous Materials Incident
Earthquake	Radiological Incident
Expansive Soils	Transportation Incident
Extreme Heat	Infrastructure Failure
Flash Flood	
Grass/Wildland Fire	
Human Disease	**Human Caused**
Landslide	Terrorism
River Flooding	
Severe Winter Storm	
Sinkholes	
Thunder/Lightning/Hail	
Tornado	
Windstorm	

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. Therefore, 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) improved the hazard mitigation planning process and was put into motion on October 20, 2000, when the 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 Federal Register (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 VI Planning Commission is under contract with Marshall County Emergency Management to write the Marshall County Multi-Jurisdiction Hazard Mitigation Plan Update. Region VI maintains planning staff who have the 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.

Chapter 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 plan update 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 risk, 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 from each jurisdiction (carried over from previous 2012 Marshall County planning process and updated in plan update)
    C. Complete county and community profiles (carried over from previous 2012 Marshall County planning process and updated in plan update)
    D. Form county-wide strategic planning task force consisting of previous plan participants, city representatives, businesses, and organizations with a stake in hazard mitigation planning in their respective community

2. **Risk Assessment and Mitigation Strategy**
    A. Marshall County Strategic Planning Task Force Meeting #1 facilitated by Region VI Planning Commission
        i. Overview of the hazard mitigation plan update process
        ii. Identify hazards for Marshall County and determine boundaries
        iii. Profile all hazards in Marshall County
        iv. Complete the hazard risk assessment
        v. Identify areas prone to flash flooding
        vi. Complete take-home community "homework"
    B. Marshall County Strategic Planning Task Force Meeting #2 facilitated by Region VI Planning Commission
        i. Review risk assessment results
        ii. Develop county-wide hazard mitigation goals
        iii. Update status of mitigation actions from the previous plan
        iv. Create new mitigation actions
        v. Complete take-home community "homework"
    C. Marshall County Strategic Task Force Meeting #3 facilitated by Region VI Planning Commission
        i. Action plan
        ii. Action prioritization
    D. Region 6 follows up with the county and each jurisdiction
        i. Finish determining mitigation actions and evaluations
        ii. Create implementation plan

3. **Write Plan** (primary plan author is Julie Whitson)

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 2014, Region 6 met with the Emergency Management Coordinator (EMC) for Marshall County, Kimberly Elder. We discussed the EMC's role in the hazard mitigation process in terms of the information she can provide, involvement in 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.

B. Complete community inventory (carried over from previous planning process and update in plan update)

Please note that although this activity took place in the previous planning process, the information obtained from this process is still pertinent to the plan update and makes up the bulk of information presented in the Community Assets sub-chapter of this plan. For this reason, the planning process for the community inventory was included in the plan update in the following section.

During the previous planning process for the 2012 Marshall County Hazard Mitigation Plan, Region 6 created a community inventory that was completed in jurisdictions that were willing to participate. The jurisdictions that participated in this assessment include:

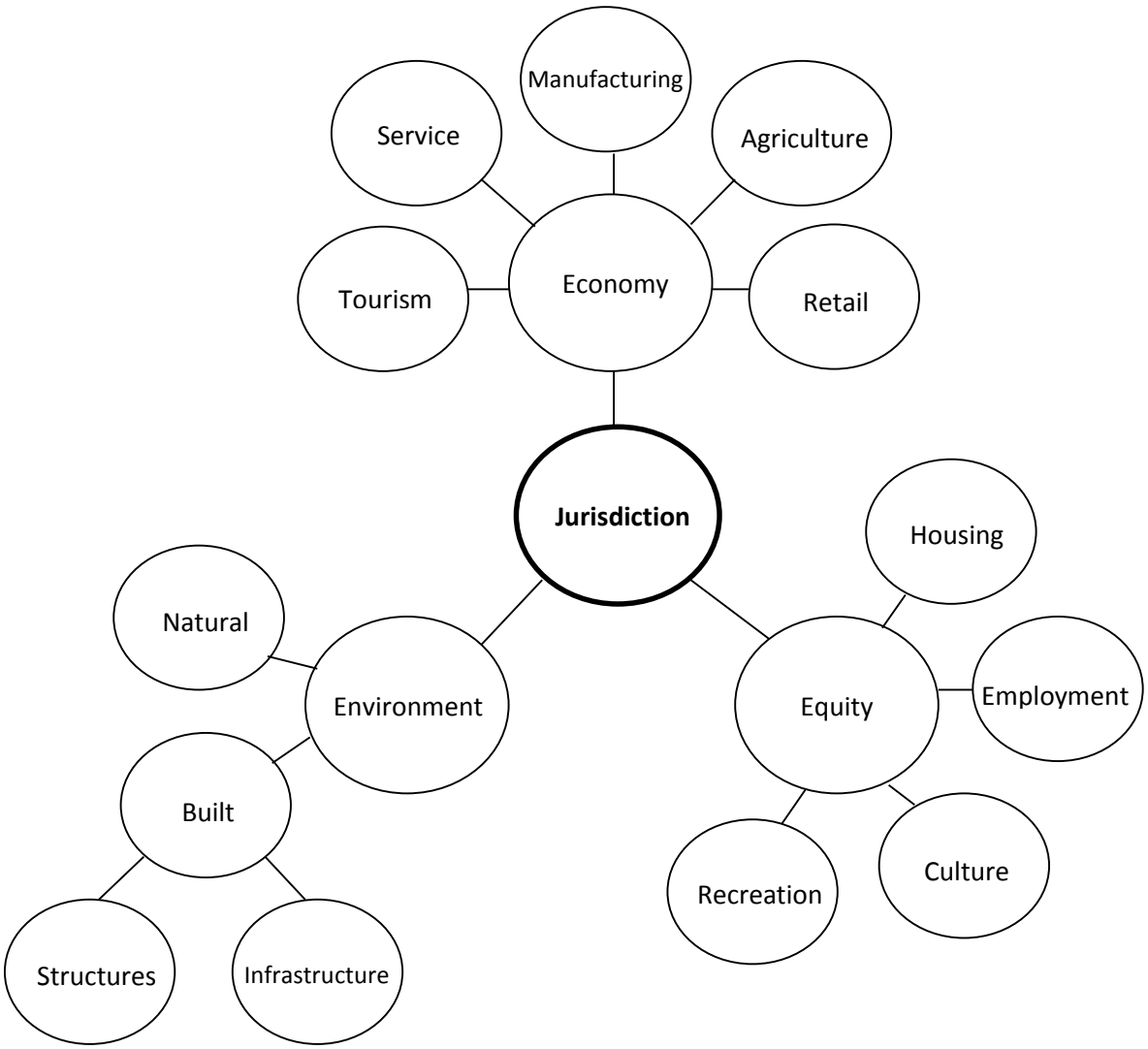
- City of Ferguson
- City of Laurel
- City of LeGrand
- City of Liscomb

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. During the plan update, communities were given the information that was included in the original plan and asked to update it with any changes that took place over the last five years.

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 Task Force members who attended the meeting. The assets particular to each jurisdiction can be found in the Community Assets section of this plan. An example of a completed diagram is in Figure 2.2.

Figure 2.2: Example Asset Identification Diagram

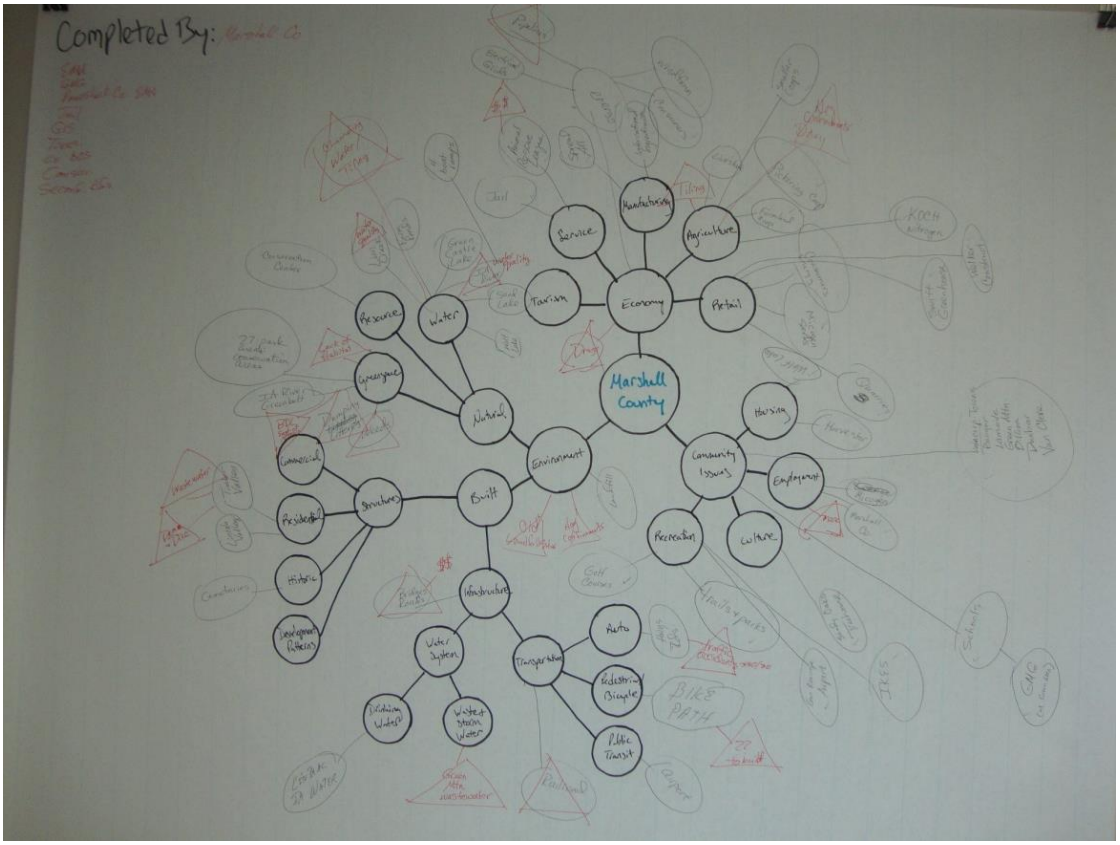


Image Source: Region 6 Planning Commission, 2012

Most Task Force 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.

C. Complete county and community profiles, determine local capabilities, research existing regulations (carried over from previous planning process and updated in plan update)

During the previous planning process for the 2012 Marshall County Hazard Mitigation Plan, extensive research and local knowledge was combined by Region 6 to complete 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. In addition, 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. This information was updated as needed in the planning process.

D. Form countywide strategic planning task force

With an understanding of the main issues faced by jurisdictions, Region 6 invited representatives from each jurisdiction to attend a series of three county-wide hazard mitigation planning meetings. The Task Force members were 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.

For the plan update, the Marshall County Strategic Planning Task Force was made up of nearly 40 people who live in Marshall County, and a majority also works in Marshall County. The members of the Task Force are listed in Table 1 along with the extent of their participation. Throughout the text of this plan, the Marshall County Strategic Planning Task Force will be referred to as the Task Force.

2. Risk Assessment, Inventory Assets, and Mitigation Strategy

Three county-wide meetings and additional one-on-one make-up meetings were held to complete the risk assessment, asset inventory updates, and to develop a mitigation strategy. Some planning work was completed outside these meetings by Region 6 and community representatives.

A. Marshall County Strategic Planning Task Force Meeting #1

All of the Task Force members plus people from the jurisdictions that did not participate in the previous plan were invited to attend the first countywide hazard meeting by either mail or email depending on the contact information that was available. If there were no representatives in attendance for a particular jurisdiction at the first meeting, they were contacted after the meeting via phone or email. Communities then received materials from the meeting they missed through an in-person meeting, through a drop-off of meeting materials at City Hall, or through email with instructions. Once these meeting materials were completed they were either sent back electronically or were brought to the next in-person meeting.

Meetings were advertised to the general public through the use of flyers that were sent to each city to hang up in the City Hall. The meetings were also published in the Marshalltown Time Republican. See Appendix C for these postings. Other counties were invited to the meeting so they could provide input on goals, projects, and possible collaborations. Representatives from the American Red Cross and the Iowa Department of Transportation were present as attendees who work in areas outside of Marshall County.

On April 21, 2015, the first Task Force meeting was held at the Marshall County Sherriff's Office Administrative Building at 11:00 AM. Meeting facilitators explained the purpose of a hazard mitigation plan and the process that the Task Force would undergo in the coming months. The following steps in the hazard mitigation process were completed during the first countywide hazard mitigation meeting: identify hazards for Marshall County and determine boundaries, profile hazards, complete the hazard risk assessment, identify areas prone to flash flooding, and complete

take-home community "homework." Refer to Appendix A for meeting minutes. The following sections outline how these steps were completed.

Marshall County Strategic Planning Task Force Meeting #1

i. Identify hazards for Marshall County and determine hazard boundaries

Ultimately, the hazards chosen for the plan were determined by the Task Force. Before the county meeting, Region 6 identified the hazards most likely to affect the county based on the 2013 Iowa Hazard Mitigation Plan, research, and knowledge of the area.

At the meeting, the Task Force was asked to discuss how the county might be affected by each hazard. The entire list of possible hazards (Table 4.1.2), was provided to the Task Force. Members were able to eliminate hazards if they could provide sufficient reasoning or add hazards that were not included on the list. Finally, members were asked to consider whether each hazard should be assessed on a county-wide scale, or if each hazard risk varied across jurisdictions and should be considered individually. Many hazards are county-wide or cover the entire planning boundary in terms of their potential geographic extent, 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.

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, among other sources. Data packets were given out to each Task Force member that included relevant data upon which they could use to rank hazards.
The actual profiles of each possible hazard are based on the format used by previous Iowa hazard mitigation plans. The following information for hazards in Marshall County is addressed in the hazard profile:

- Definition of the hazard
- General description of the hazard
- Historical occurrence of the hazard
- Probability of the hazard occurring again in the future
- Vulnerability of people and property that would be affected by the hazard event
- Severity of the hazard's potential impact on human life and property
- Speed of onset or amount of warning time before the hazard occurs

iii. Complete the hazard risk assessment

Once the hazards for Marshall County were chosen and relevant data was considered, hazards were given risk assessment scores to determine which hazards can have the greatest impact on the county. The risk assessment methodology was based on the method used in the 2007 Iowa Hazard Mitigation Plan. The risk assessment methodology involves assigning a score for historical occurrence, probability, vulnerability, severity of impact, and speed of onset.

iv. Identify areas prone to flash flooding

Task Force members were asked to draw on a map of their jurisdictions the areas where they experienced flash flooding. Many communities in Marshall County have experience road closures and building flood risk due to flash flooding. It was important to map that risk since that type of spatial information cannot be obtained from NCDC data. Refer to Appendix D for maps that identify areas in each community that are prone to flash flooding. Note that not all communities completed this map because not all jurisdictions have problems with flash flooding.

v. Complete take-home "homework"

Task Force members were asked to complete three items as homework: an update on their hazard mitigation actions, an update on the location of critical facilities and community assets, and an update on the city or school district mitigation capabilities. Each county-wide meeting spent a short amount of time on making sure that these items were completed to include in the final plan. To update actions, Task Force members were asked to provide a status on each action included in the previous plan and any additional details. For example, if the action was completed, communities could provide details on when it was completed, what source of funding was used, and if the action is ongoing in nature, how often the action occurs. For actions that were not completed, communities could provide information on why it was not completed or what a new timeline for the action might be.

For an update on critical facilities and community assets, members were given the current map of facilities and ask to add, delete, or change the location of facilities as needed. Members were also given the narrative of the community assets from the plan and asked to make corrections. 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.

For mitigation capabilities, members were asked to fill out a two-page form that asked about each jurisdiction's personnel, regulations, planning, and fundraising capabilities.

B. Marshall County Strategic Planning Task Force Meeting #2

A second countywide meeting was held at the Marshall County Sherriff's Office Administrative Building at 11:30 AM on May 19, 2015. All of the Task Force members plus others were invited to attend the second county-wide hazard meeting by either mail or email depending on the contact information that was available.

Meetings were advertised to the general public through the use of flyers that were sent to each city to hang up in the City Hall. The meetings were also published in the Marshalltown Times Republican. See Appendix C for these postings. To encourage a regional effort, emergency management coordinators from other counties (Hardin, Story, Tama, and Jasper) were invited to

share their ideas and also invite people from their county to participate. Unfortunately, there were no participants from neighboring counties. Refer to Appendix A for meeting minutes.

At this meeting, the following elements of the plan process were completed: review risk assessment results, develop county-wide hazard mitigation goals, update the status of actions from the previous plan, create new mitigation actions, and complete take-home homework. Not all of these activities were completed in the allowed one hour of the meeting so some communities had to finish certain activities outside of the meeting. The following sections detail how these activities were completed.

Marshall County Planning Strategic Planning Task Force Meeting #2

i. Review risk assessment results

Communities that had completed and returned the risk assessment activity were asked to review their results after scores were checked for accuracy based on the data that was available. Communities viewed hazards in a ranked list and were asked to make any necessary changes and provide additional information about the extent of past hazard damages and future vulnerability to hazards. Communities that had not yet completed the exercise were given instructions on how to do so and the exercise was then collected.

ii. Develop county-wide hazard mitigation goals

During the previous planning process, Region 6 identified four basic hazard mitigation goals for Marshall County. These goals were identified from FEMA suggestions and case studies. At the second meeting of the plan update, the Task Force was given a sheet that contained the four hazard mitigation goals that were used in the previous plan. The group chose to keep these goals for the plan update. All jurisdictions participating in the plan agreed that they could include existing and future hazard mitigation actions under these four goals. The four basic goals are as follows:

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.

iii. Update the status of mitigation actions from the previous plan

To update actions, Task Force members were asked to provide a status on each action included in the previous plan and any additional details. For example, if the action was completed, communities could provide details on when it was completed, what source of funding was used, and if the action is ongoing in nature, how often the action occurs. For actions that were not completed, communities could provide information on why it was not completed or what a new timeline for

the action might be. Action statuses include the following: completed, completed and carried over, carried over, and deleted. See Appendix B for a full explanation of action statuses.

iv. Create new mitigation actions

At the county-wide Hazard Mitigation Meeting 2, Task Force members were given lists of ideas for potential mitigation actions that jurisdictions could draw from. These lists were generated from FEMA publications and actions that were included in previous multi-jurisdictional hazard mitigation plans in Iowa. The lists separated mitigation action ideas by hazard and by popular topic such as tree trimming, warning sirens, fire department actions, and sewer system and drainage, and storm shelters.

Task Force members sat with their risk assessment results, action updates from the previous plan, and the sample mitigation lists provided. Each community was provided one-on-one support to consider actions that communities could include in the plan update. Communities brainstormed new actions at the meeting, and several Task Force members took this activity back to the city to finalize actions they wanted to include in the plan. The Task Force members were informed of the mitigation action requirement: each jurisdiction needs at least one hazard mitigation action while there must be a comprehensive, all-hazard inclusive set of actions for the entire county. Meeting facilitators encouraged each community to consider both large and small projects.

v. Complete take-home "homework"

At the first meeting, Task Force members were asked to complete three items as homework: an update on their hazard mitigation actions, an update on the location of critical facilities and community assets, and an update on the city or school district mitigation capabilities. Each county-wide meeting spent a short amount of time on making sure that these items were completed to include in the final plan.

C. Marshall County Strategic Planning Task Force Meeting #3

A third and final countywide meeting was held at the Marshall County Sherriff's Office Administrative Building at 11:30 AM on June 16, 2015. All of the Task Force members plus others were invited to attend the third county-wide hazard meeting by either mail or email depending on the contact information that was available.

Meetings were advertised to the general public through the use of flyers that were sent to each city to hang up in the City Hall. The meetings were also published in the Marshalltown Times Republican. See Appendix C for these postings. 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. Unfortunately, there were no participants from neighboring counties. Refer to Appendix A for meeting minutes.

At this meeting, the following elements of the planning process were completed: create an action plan for each mitigation action and evaluate and prioritize each action. The following sections detail how these activities were completed.

Marshall County Planning Strategic Planning Task Force Meeting #3

i. Create an action plan for each mitigation action

At the third meeting, each Task Force member was asked to fill out an action plan that detailed the following information for each action:

- Hazard addressed
- Responsible party/department
- Estimated cost
- Potential funding source
- Mitigation measure category
- Estimated start date
- Target completion date

Communities were given an exhaustive list of potential responsible parties/departments and potential funding sources to help them plan out each action. Several of the action plan categories were separated into ranges to make action planning easier. For the estimated cost of each action, communities chose from the following ranges of costs: Minimal ($9,999 or less), Low ($10,000 to $99,999), Moderate ($100,000 to $299,999), or High ($300,000 or more). If communities provided a more accurate cost assessment, that cost is listed in the action plan. For the start date of each action, communities chose from the following ranges: Ongoing (progress is already being made on this action), Within 1 year of plan adoption, 2 to 4 years from plan adoption, or 5 or more years from plan adoption.

Some communities had to take this exercise back to their respective communities to discuss specifics of the action plan.

ii. Evaluate and prioritize each mitigation action

Communities were also asked to prioritize each action based on a set of four criteria: Risk Assessment Score, Estimated Project State Date, the STAPLEE Economic Score, and Local Significance. Actions received higher scores if they targeted hazards that received higher risk assessment scores, were ready to begin in the next year or had already begun, scored highly based on the STAPLEE Economic criteria, and had an importance to the local community. For details specific to evaluation and prioritization of each action, see the Mitigation Strategy chapter of this report.

D. Follow up with the county and each jurisdiction

i. Finish determining actions and evaluations

Since most representatives did not have enough time at the public meetings to finish determining the goals and mitigation actions for their jurisdiction, many 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 meeting facilitators so they could be incorporated into the plan.

ii. Create implementation plan

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

3. Write the Plan

The plan update was based off of the Marshall County 2012 hazard mitigation plan. The main resources used to create this plan include FEMA's plan guidance known as *The Local Mitigation Planning Handbook*, previously approved hazard mitigation plans, and case studies like the Lee County, Iowa plan.

Along with general hazard mitigation guidance, several data sources were used for specific hazard information. These sources are cited throughout the plan. Other referenced plans used include existing plans, reports, technical information, and regulations. Some of these planning documents include:

- Marshall County 2012 Hazard Mitigation Plan
- Iowa 2013 State Hazard Mitigation Plan
- FEMA Map Service Center products, including DFIRMs, FIRMettes, and NFHL GIS data
- Flood Insurance Studies (City of Marshalltown)
- Repetitive loss property information from Iowa Homeland Security
- Region 6 Comprehensive Economic Development Strategy 2013 – 2018
- Region 6 Long Range Transportation Plan
- City codes of ordinances, zoning ordinances
- Other relevant documents that are cited

Above all, the Task Force 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

(This section is pending plan approval by the County)

The comment period for this plan began on ___ and ended on ___. 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 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 Q once the affidavit of publications is received from each newspaper.

5. Submit Plan

(This section is pending plan submittal to the State)

The plan was submitted by email to the state plan review staff and the State Hazard Mitigation Officer on ____.

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 Q.

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.

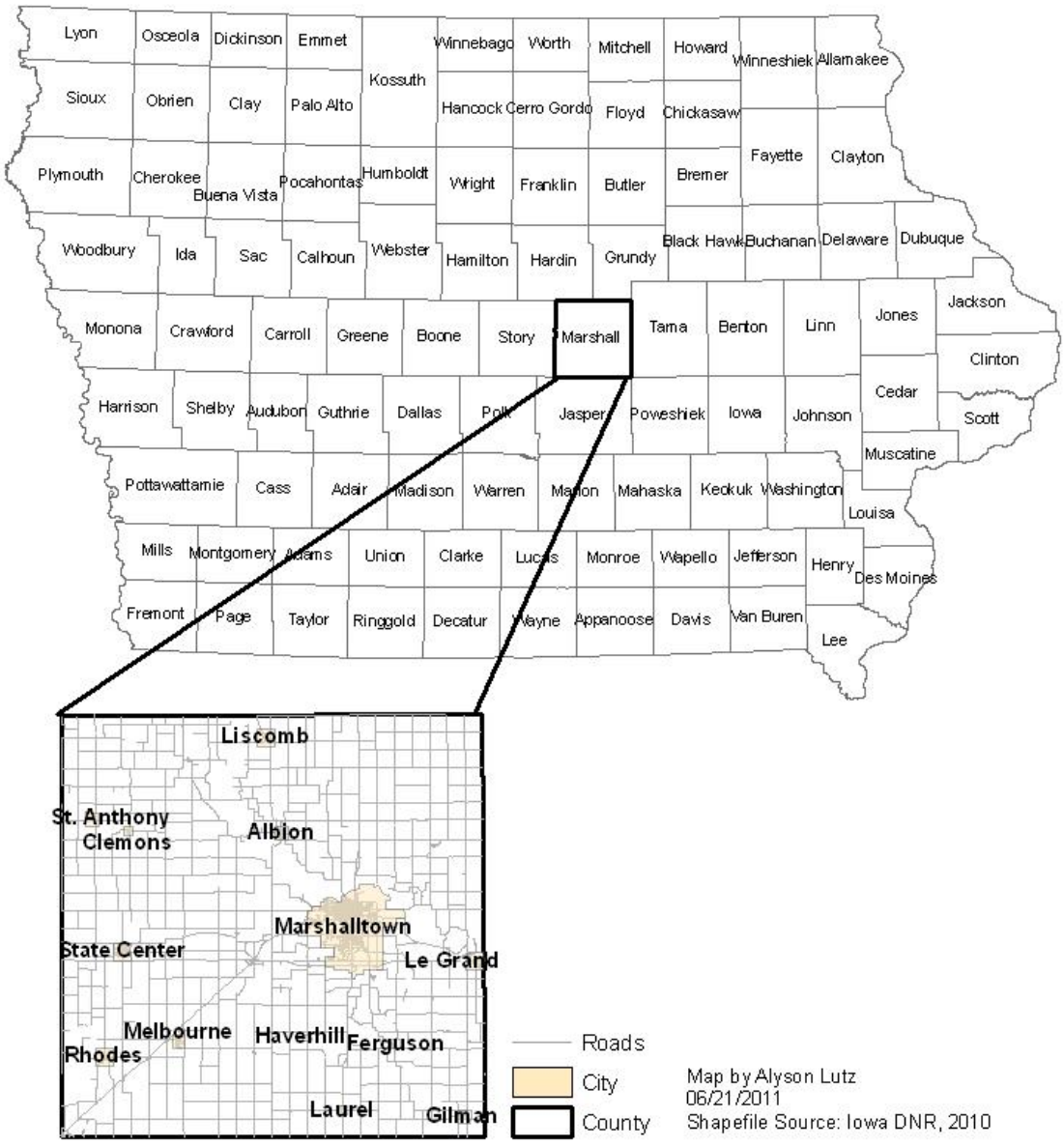
Chapter 3: Planning Area

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 3.3.1: Iowa Counties



Geography, Topography, and Hydrology

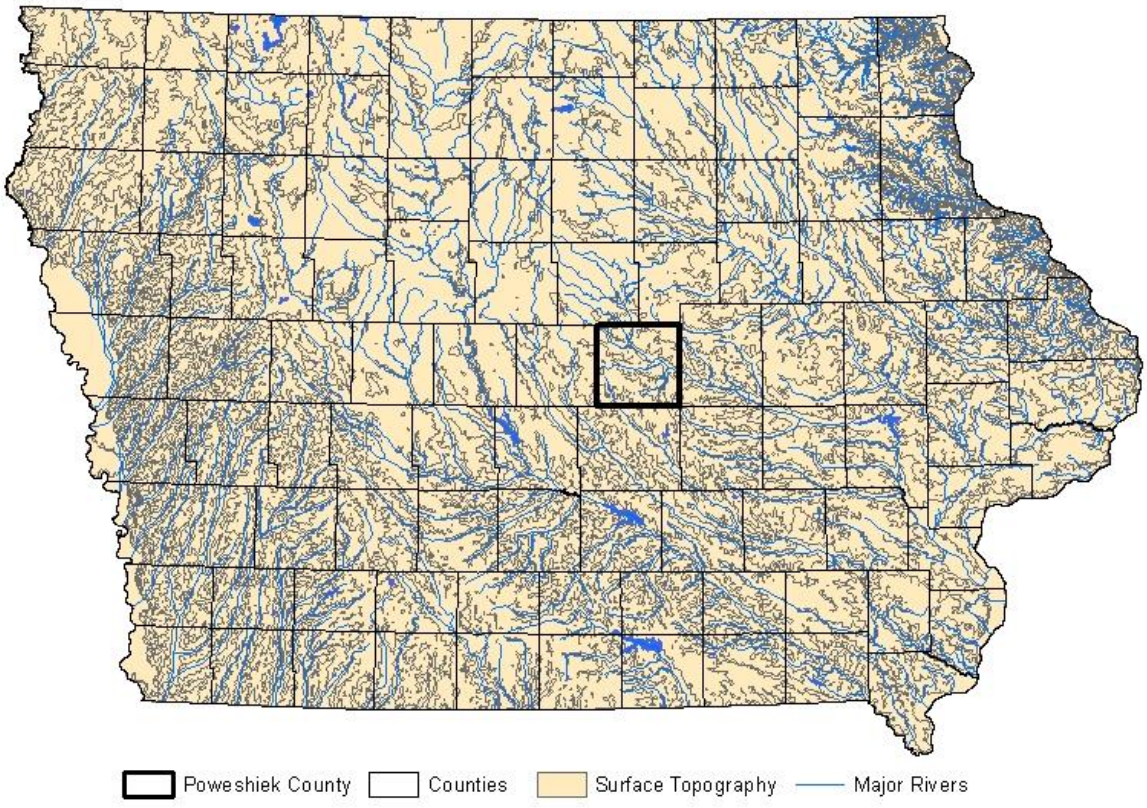
Marshall County has an area of 366,732.8 acres, or about 573.02 square miles. Most of the soils in the county are nearly level to gently sloping or moderately sloping.

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, which can produce high yields for crops such as corn and soybeans. Some of this land 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 feeding swine and beef cattle. The suitability for this association are cultivated crops, hay, and pasture. Much of the land is suited for row crops such as 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% (26,858 people) of its population living in urban areas. Of these urban residents, all live in urban clusters within Marshalltown. According to the US Census Bureau, in 2010, 13,790 people lived in Marshall County's rural areas. Rural population actually increased in Marshall County from 13,188 in 2000 to 13,790 in 2010 (4.6%). In 2010, the rural population is about 34% of the county's total population. Refer to Table 3.1.1.

Table 3.1.1: Urban Vs. Rural Population in 2010

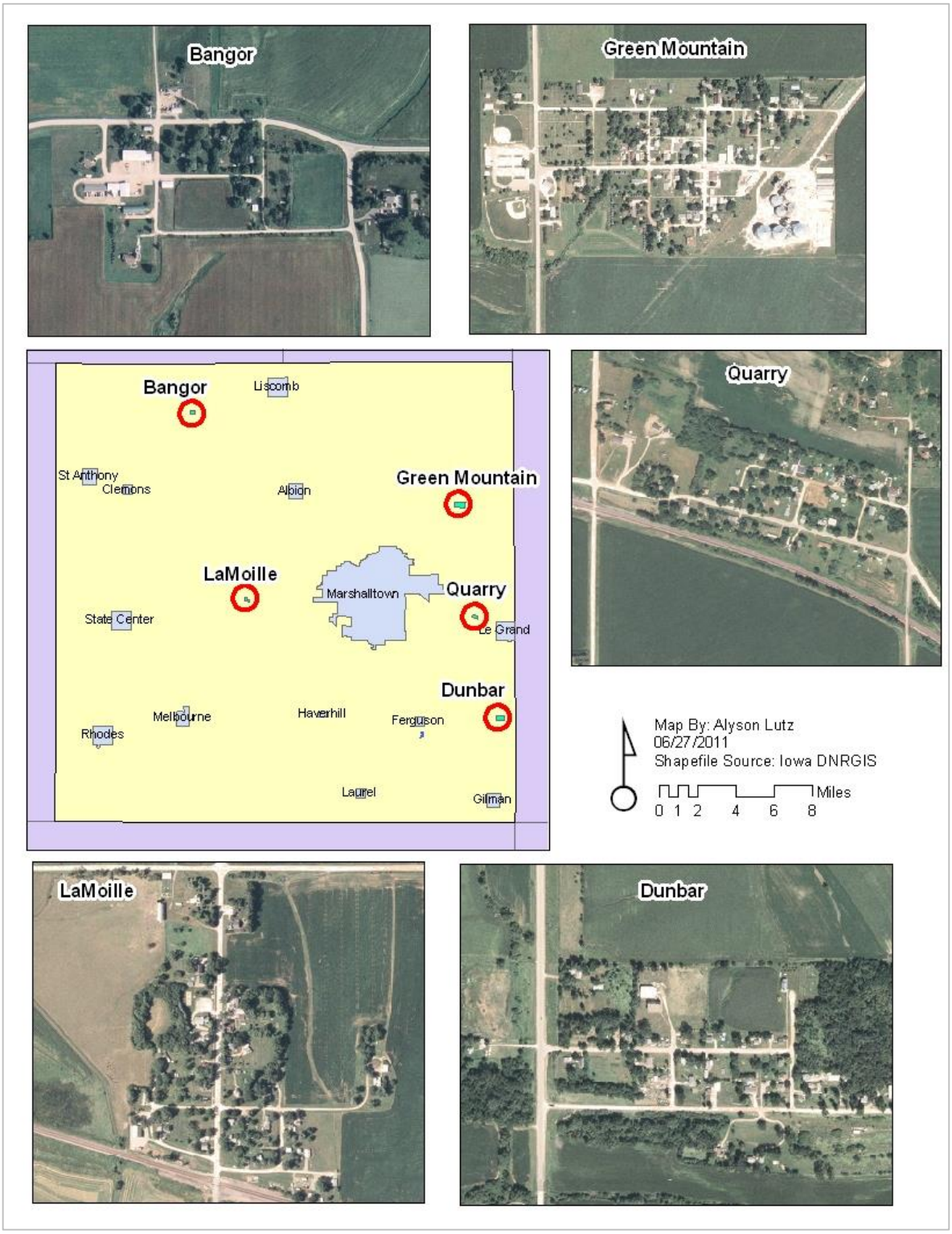
		Urban			Rural
Area	Total Population	Total	Inside Urbanized Areas	Inside Urban Clusters	Total
State of Iowa	3,046,355	1,950,256	1,268,964	681,292	1,096,099
Marshall County	40,648	26,858	0	26,858	13,790
Albion	505	0	0	0	505
Clemons	148	0	0	0	148
Ferguson	126	0	0	0	126
Gilman	509	0	0	0	509
Haverhill	173	0	0	0	173
Laurel	239	0	0	0	239
Le Grand	938	0	0	0	938
Liscomb	301	0	0	0	301
Marshalltown	27,552	26,858	0	26,858	694
Melbourne	830	0	0	0	830
Rhodes	305	0	0	0	305
St Anthony	102	0	0	0	102
State Center	1,468	0	0	0	1,468

Data from US Census Bureau – 2010 Census, 2015

The only urban city in Marshall County is considered Marshalltown (26,858 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 17% of the county with a total of over 7,000 students. In addition to the student population, several manufacturing and processing companies are present in town such as Lennox Manufacturing and JBS Swift, which provide many jobs. Based on Marshall County's history, 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.

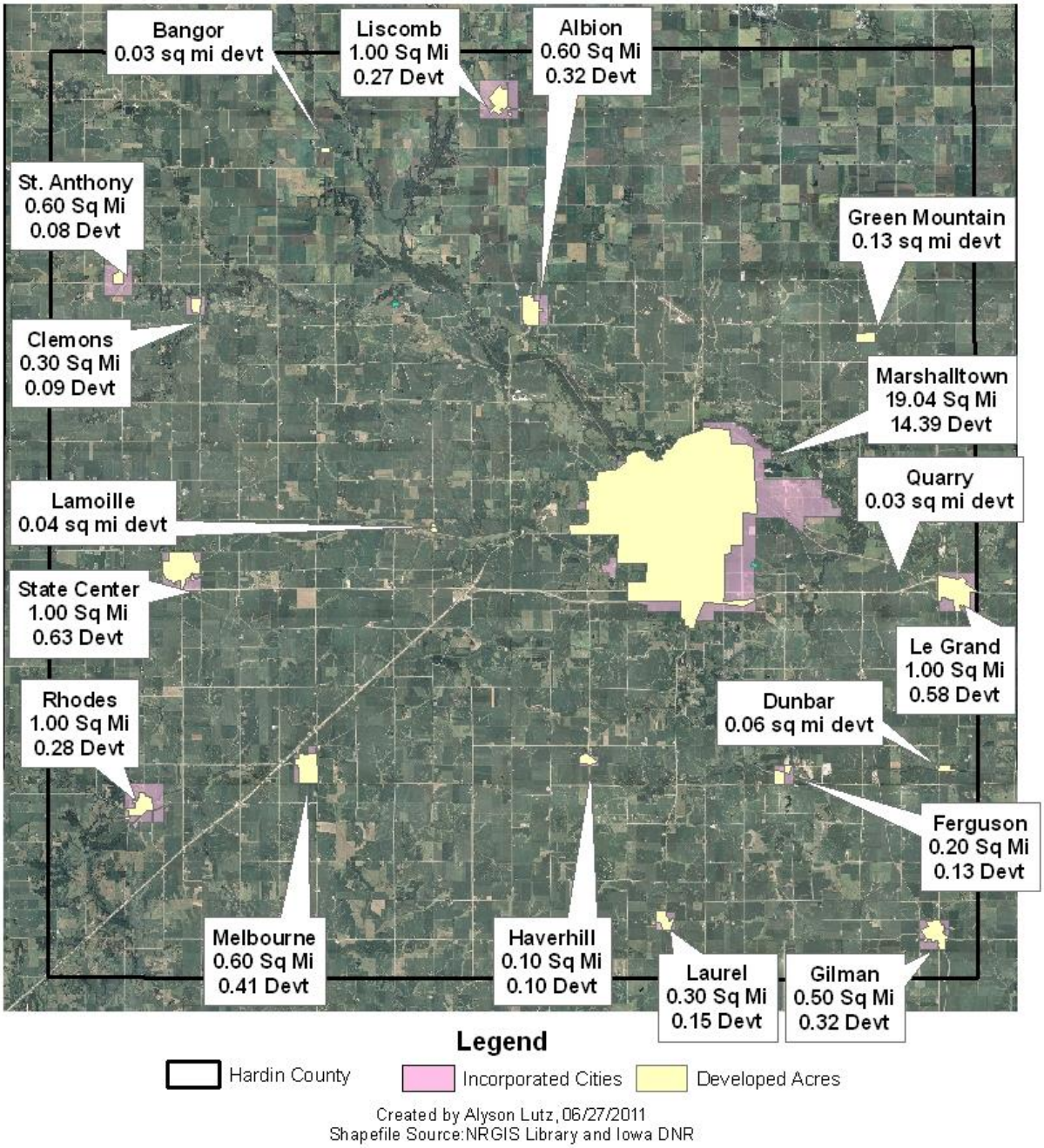
Figure 3.1.3: Marshall County Unincorporated Development



Overall, 3 percent (18.04 square miles) of Marshall County is developed land according to calculations done in ArcGIS. 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, which allow them to provide 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%

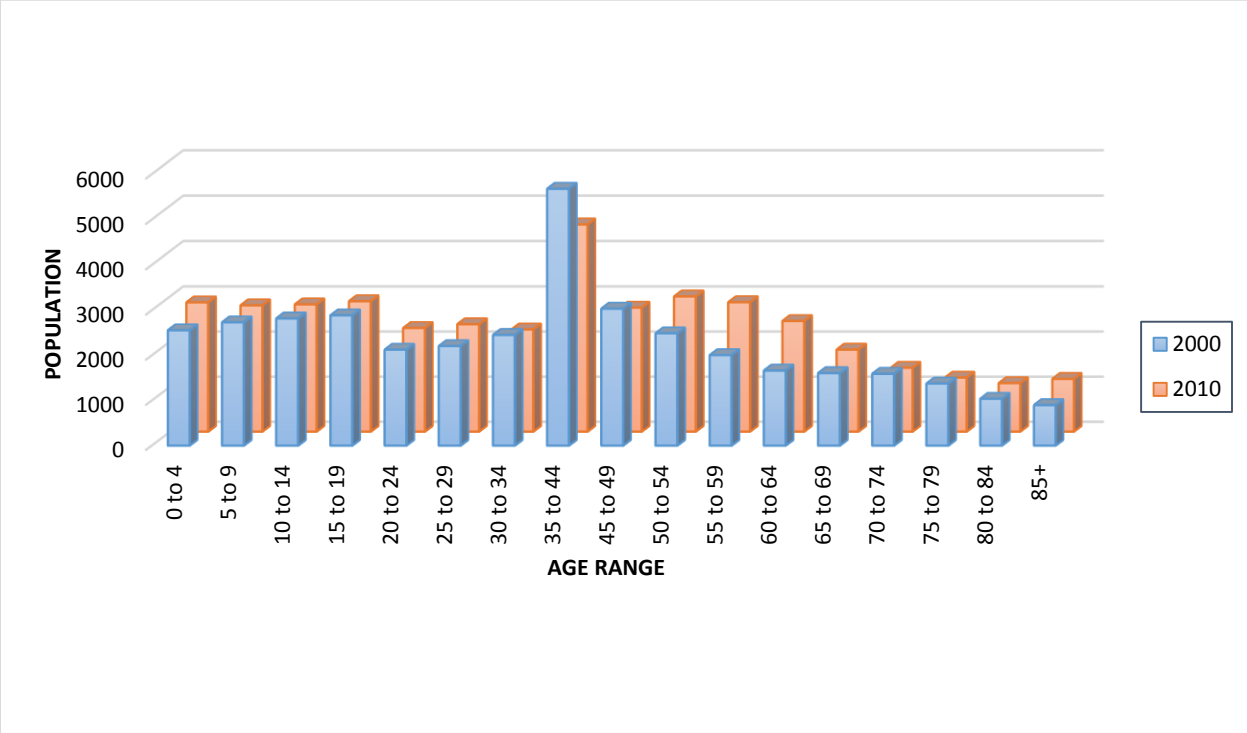
Data Source: State Data Center of Iowa, 2011

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 follow the trends of the State of Iowa, which experienced a 4.1% population increase since 2000. Those cities with moderately sized populations experienced rather large population decreases of roughly 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 amounts to only a 5.9% increase for such a large town. Refer to Table 3.1.2 for the population changes in each jurisdiction.

Age

From 2000 to 2010, Marshall County gained population in the 0 to 19 year old category. Particularly notable is the county's gain in the young population groups of 20 to 29 year olds. Marshall County experienced a slight decrease in population from the 30 to 49 year old group. Population increased significantly for the age ranges of 50 to 69. Overall, Marshall County saw a population increase of 3.4% from 2000 to 2010. See Figure 3.1.5 for more information.

Figure 3.1.5: Total Population of Marshall County by 5 Year Age Groups 2000-2010

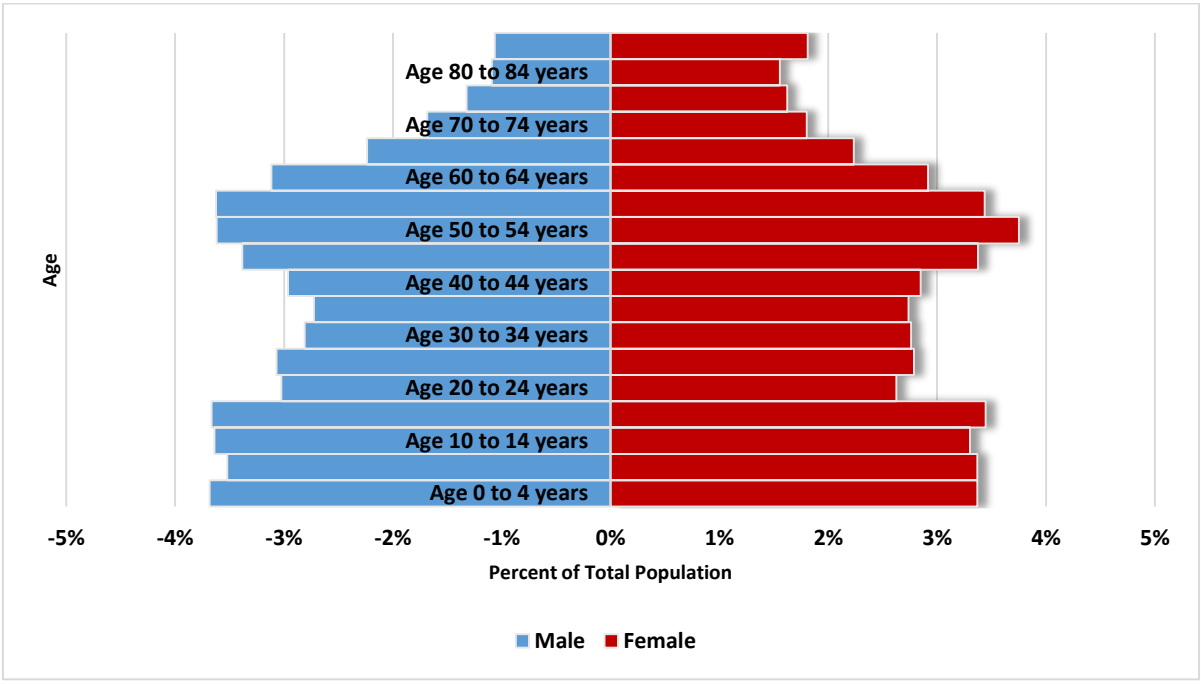


Data Source: US Census Bureau 2015

If we compare Marshall County's population pyramid to that of the State of Iowa, we find similar percentages of population in the age ranges of 0 to 19 to that of the State of Iowa but slightly higher percentages of population in the age ranges of 20 to 29. The county has lower percentages for the 30 to 49 year old age range, but significantly higher percentages throughout the 50 to 65 year old age range. Overall, in 2010, the median age of Marshall County is slightly higher than the state's average at 39.6 years old versus 38.1 years old, respectively.

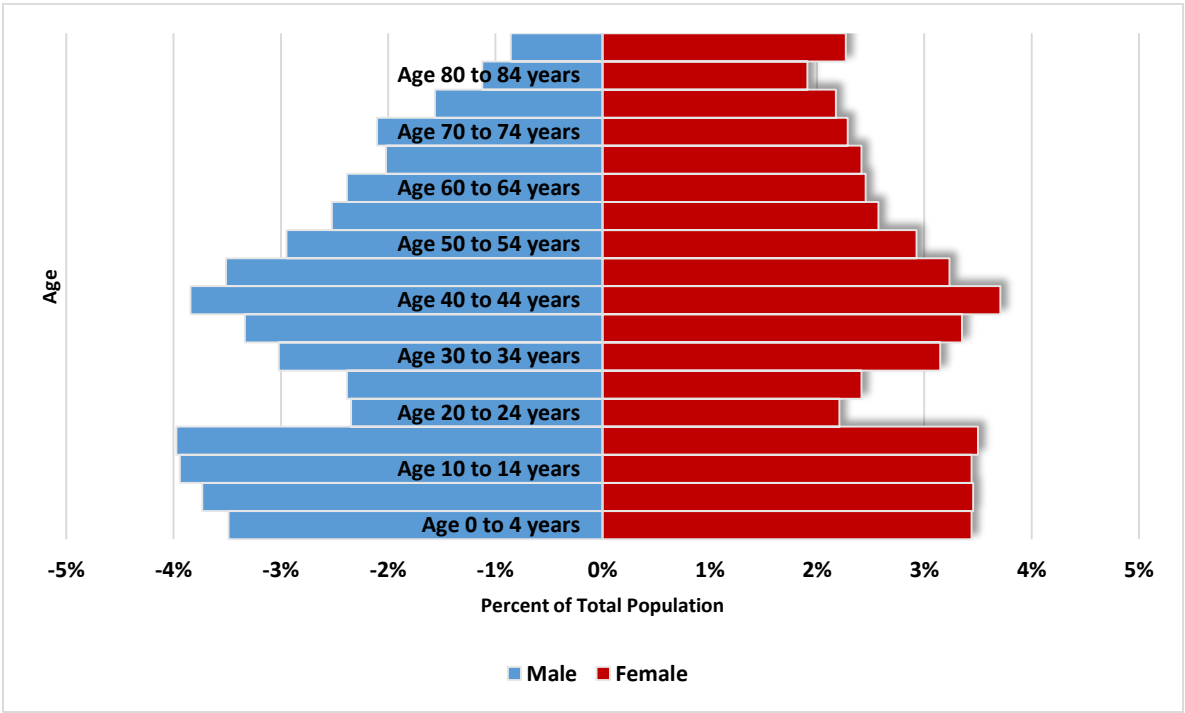
A large or increasing population aged 25 to 29 means that more population growth through birth will occur in Marshall County so the young age cohorts may also increase, which affects school funding and the amount and quality of youth-oriented services and activities. Retaining the young adult population in Marshall County must be cultivated and maintained in order to retain or increase the county's population. See Figures 3.1.6 and 3.1.7 for more information.

Figure 3.1.6: Marshall County Population Pyramid 2010



Data Source: US Census Bureau 2015

Figure 3.1.7: State of Iowa Population Pyramid 2010



Data Source: US Census Bureau 2015

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 38.1. Compared to the state, the county has a slightly older population. Refer to Table3.1.3 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	42.8
Clemons	42.5
Ferguson	51.0
Gilman	42.6
Haverhill	37.2
Laurel	43.8
Le Grand	41.9
Liscomb	37.5
Marshalltown	37.3
Melbourne	34.8
Rhodes	41.1
St Anthony	35.0
State Center	39.2

Data Source: US Census Bureau, 2015

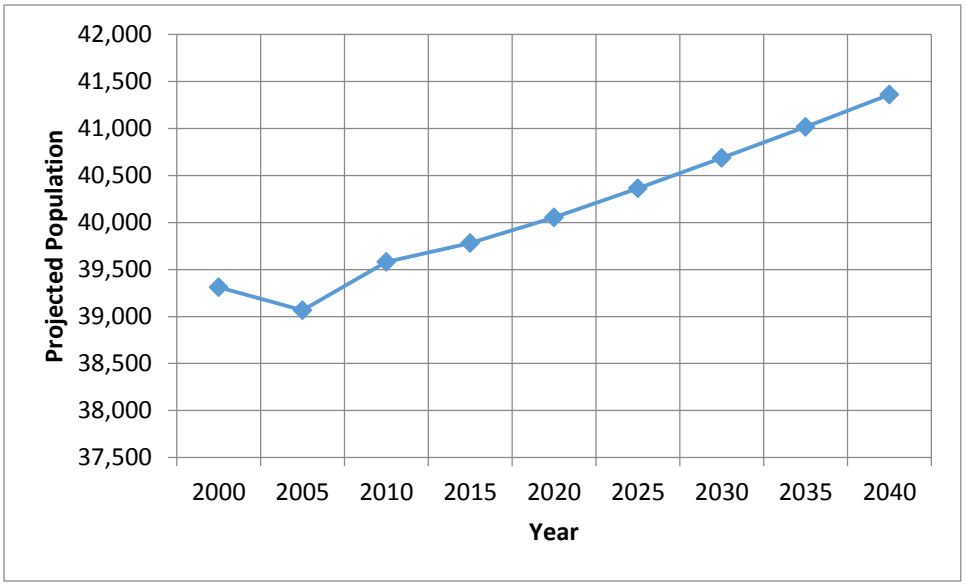
There is a range of 16.2 years in the median age in cities across Marshall County. Of all Marshall County cities, Ferguson has the highest median age of over 50 years old. There is a big gap before Laurel, in second, with 43.8 as the median age of residents. The City of Melbourne is the youngest with a median age of 34.8 years.

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.

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 3.1.8.

Figure 3.1.8: 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; 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.

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 Figure 3.1.9, the type of housing in Marshall is predominantly 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 3.1.9: Marshall County Housing by Type in 2010

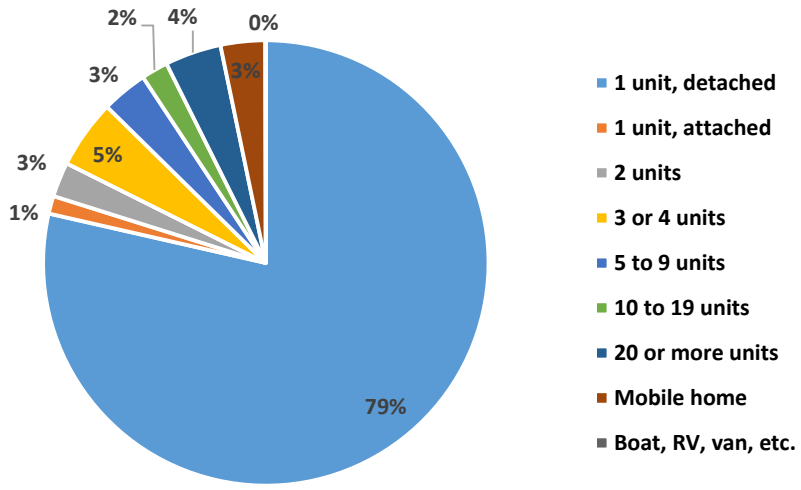
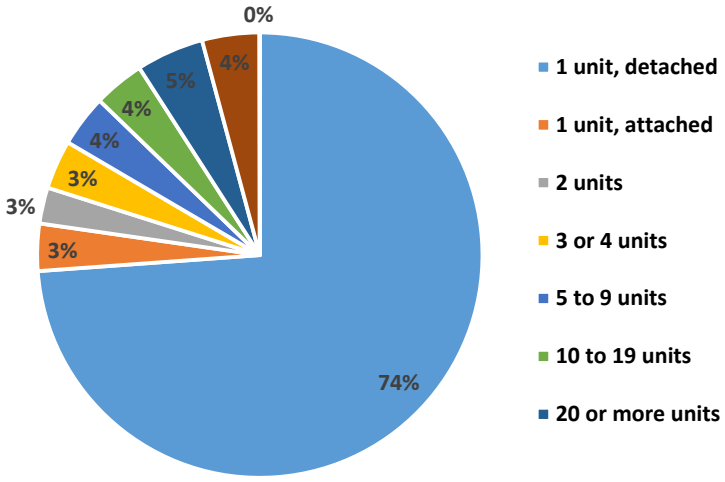


Figure 3.1.10: Iowa Housing by Type in 2010



Data Source: US Census Bureau 2015

Marshall County has only a slightly larger share of 1-unit detached housing units than the State of Iowa. Marshall County has a lower number of multi-unit structures, except for 3 or 4 unit structures. Marshall County may lack more 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 US Census Bureau, in 2010, the median built year for Iowa's housing stock was 1964 while Marshall County had a 1950 median built year. Compared to all of Iowa, Marshall County has a relatively 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 56% of the homes in St. Anthony and 55.1% of homes in Rhodes were built before 1940. Gilman and Ferguson also have a high percentage of older housing stock that accounts for nearly half of the city's housing stock. Le Grand has the smallest percentage (14.5%) of older homes. Refer to Table 3.1.6.

Table 3.1.6: Marshall County Housing Units Built in 1939 or Earlier as of 2010

Jurisdiction	Percentage
Marshall County	35.6
Albion	37.4
Clemons	38.7
Ferguson	48.1
Gilman	46.3
Haverhill	27.8
Laurel	41.1
Le Grand	14.5
Liscomb	42.3
Marshalltown	33.4
Melbourne	26.9
Rhodes	55.1
St. Anthony	56.0
State Center	44.0

Data Source: US Census Bureau 2015

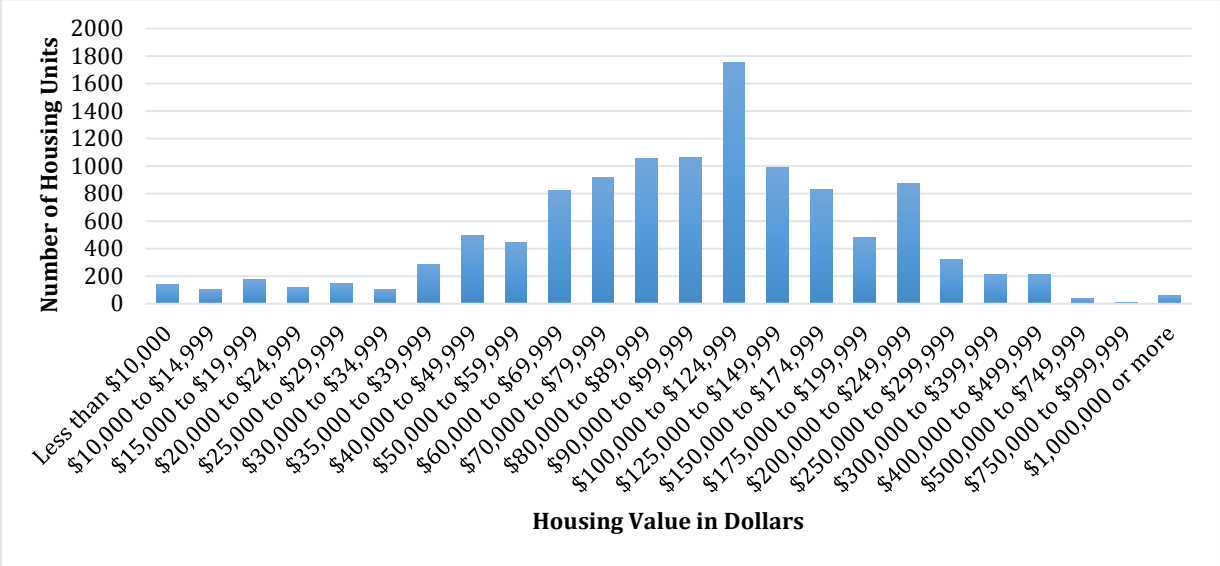
Since nearly 36% of all housing units in Marshall County have been built in 1939 or earlier, there is a possibility of some common issues associated with an older housing stock. Anything from electrical to structural issues could be a problem in homes across the county. In terms of hazard mitigation, 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 are also 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 11,630 owner-occupied housing units in the county, 50% have a housing value under $100,000 and 9% have a housing value over $40,000 as illustrated in Figure3.1.11. The highest percent of housing units is the $100,000 - $124,999 range with 15% of the county's units.

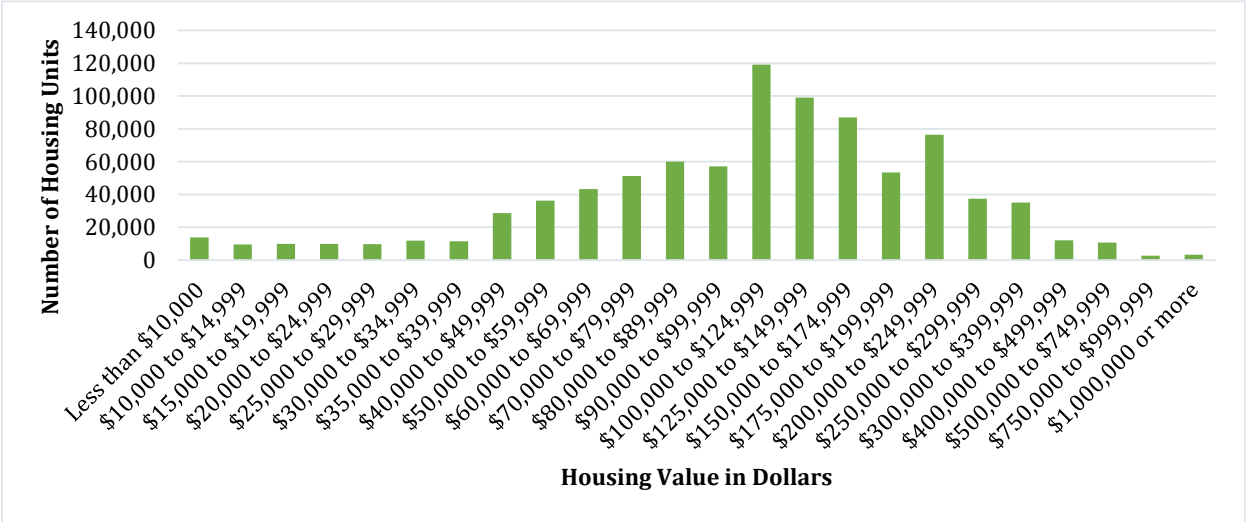
Figure 3.1.11: Marshall County Owner-occupied Housing Values in 2010



Data Source: US Census Bureau 2015

Compared to the state level (Figure 3.1.12), Marshall County has similar majority housing value range ($100,000 - $124,999) comprising their biggest percent of owner occupied units. This range is also the state's highest percentage category with 13% of the total housing stock in this category.

Figure 3.1.12: Iowa Owner-occupied Housing Values in 2010



Data Source: US Census Bureau 2015

If we compare the housing values of 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.

When looking at the median value of owner-occupied housing in Marshall County ($99,600), the value is significantly lower than Iowa's ($119,200); this is a difference of nearly $20,000. If we compare the lowest housing value in the county, the City of Clemons, we find that Iowa's median housing value is almost $73,600 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 2010

Jurisdiction	Median Housing Value	Median Gross Rent
Iowa	$119,200	$617
Marshall County	$99,600	$552
Albion	$74,400	$680
Clemons	$45,600	$433
Ferguson	$50,000	-
Gilman	$83,000	$444
Haverhill	$113,500	$400
Laurel	$73,500	$325
Le Grand	$98,100	$567
Liscomb	$54,000	$400
Marshalltown	$92,800	$552
Melbourne	$87,700	$581
Rhodes	$75,600	$425
St. Anthony	$55,000	-
State Center	$97,200	$594

Data Source: US Census Bureau, 2015

Haverhill, Le Grand, and State Center (in this order) have the largest median housing values in Marshall County. The cities with the lowest housing values in Marshall County have less than half of the value of the houses in Haverhill, Le Grand, and State Center. This is a huge range of values across the county.

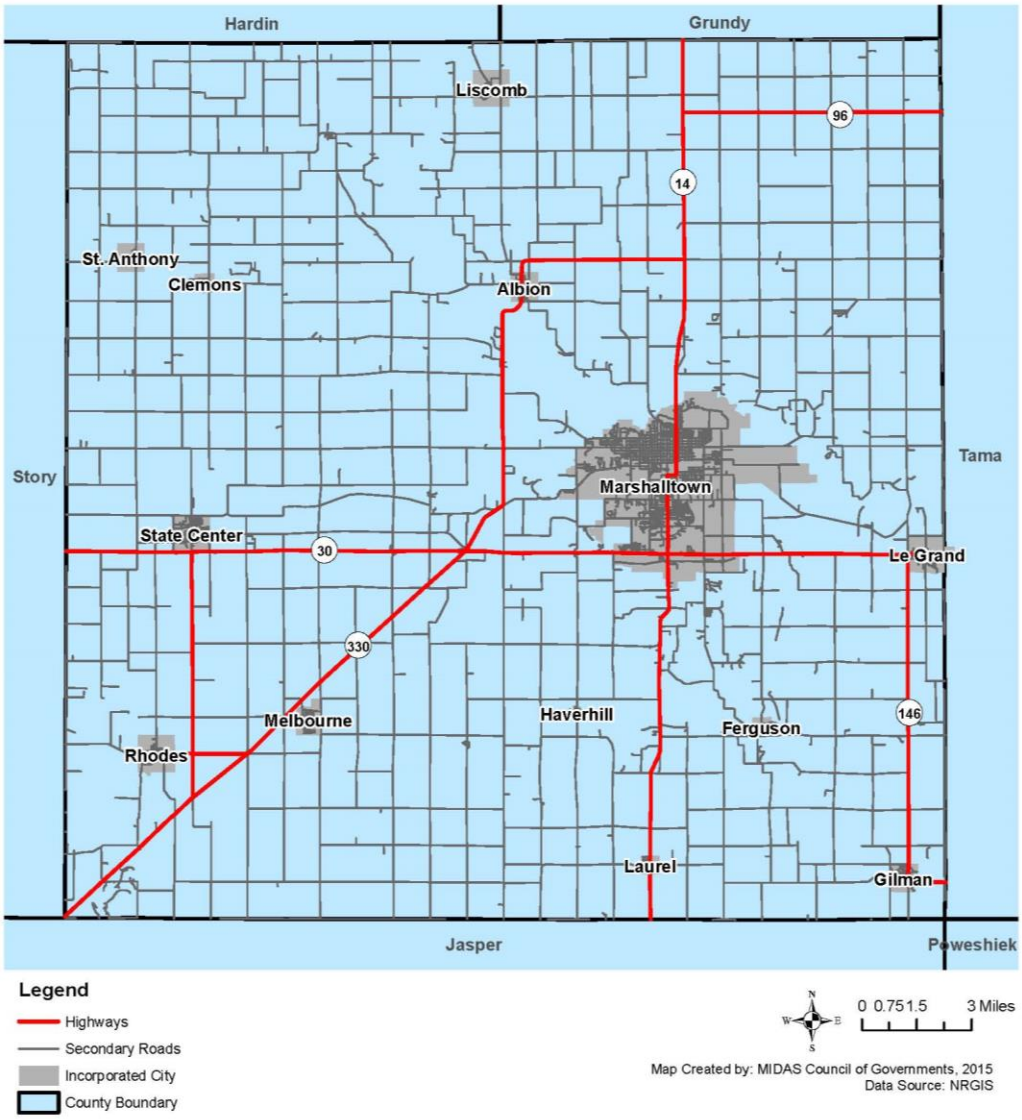
Looking at the median gross rent for tenants of rental properties in Marshall County, the lowest median rent can be found in Laurel ($325) while the highest rents can be found in Albion ($680), State Center ($594), and Melbourne ($581). This is interesting, considering that Albion has sixth-lowest median housing value in the county but the highest gross rent. Compared to the state, Marshall County's rental market is slightly lower than the state's. Iowa's median gross rent in 2010 was $617 according to the US Census Bureau. Across Marshall County, there is over a $355 range in

the median gross rent paid by tenants, which makes for a substantial variation in rental costs across the county.

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 3.1.13: 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 7:30 a.m. - 6:00 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.

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 2013 was $24,117. This is $2,910 lower than the State's $27,027. In 2013, the Marshall County median income was again close in range to the state's median household income, with $60,501 versus $65,802, respectively. This amounts to a difference of $5,301.

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 2013, 46.6 million people lived in poverty in the United States. This is a rate of 15.4%. Iowa has 367,414 people living in poverty out of its 2,963,129 residents (2013). This is a rate of 12.4%. Marshall County makes up 1.3% of the state's population in poverty with 4,818 people. Marshall County has an overall poverty rate of 12.2%.

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 a relatively low violent crime with 7 aggravated assaults in 2013 (Federal Bureau of Investigation, 2015). Property crimes including burglary, larceny theft, and motor vehicle theft totaled 176 in 2013. Compared to the State of Iowa as a whole, Marshall accounts for .7% of violent crimes and 1.2% of property crimes that occurred in 2013. 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 6,916 children were enrolled in the East Marshall, GMG, Marshalltown, and West Marshall Community School Districts in the 2013-2014 school year (Iowa Department of Education 2015). Of the Marshall County population that is 25 years or older, 33.1% have a high school degree or its equivalent. Additionally, 19.3% received a bachelor's degree, graduate degree, or professional degree.

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
Marshalltown Community College	245
Major Employers	**Employees**
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
McFarland Clinic P.C.	223

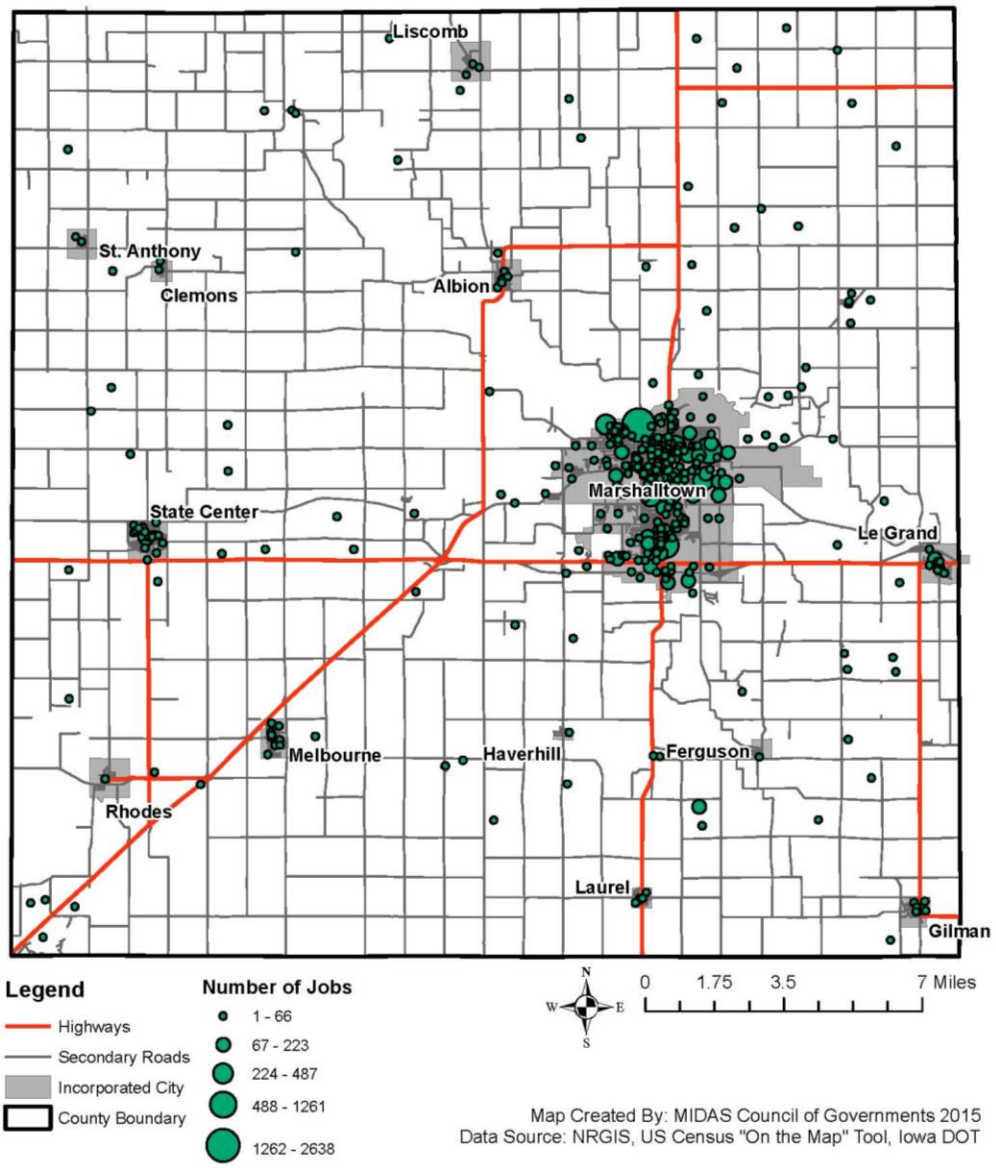
Data Source: Marshall Economic Development Impact Committee (MEDIC) 2015

In Marshall County, non-governmental organizations provide the most jobs. Refer to Figure 3.1.14 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 (2014) by MEDIC, found that Marshall County attracts employees from outside the county as far north as Aplington and Ackley, as far south as Pella, as far east as La Porte and Belle Plain, and as far west as Madrid and Boone. 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. The number of employees for the county's major employers may include people from the neighboring counties.

The following 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.

Figure 3.1.14: Job Distribution in Marshall County in 2013



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

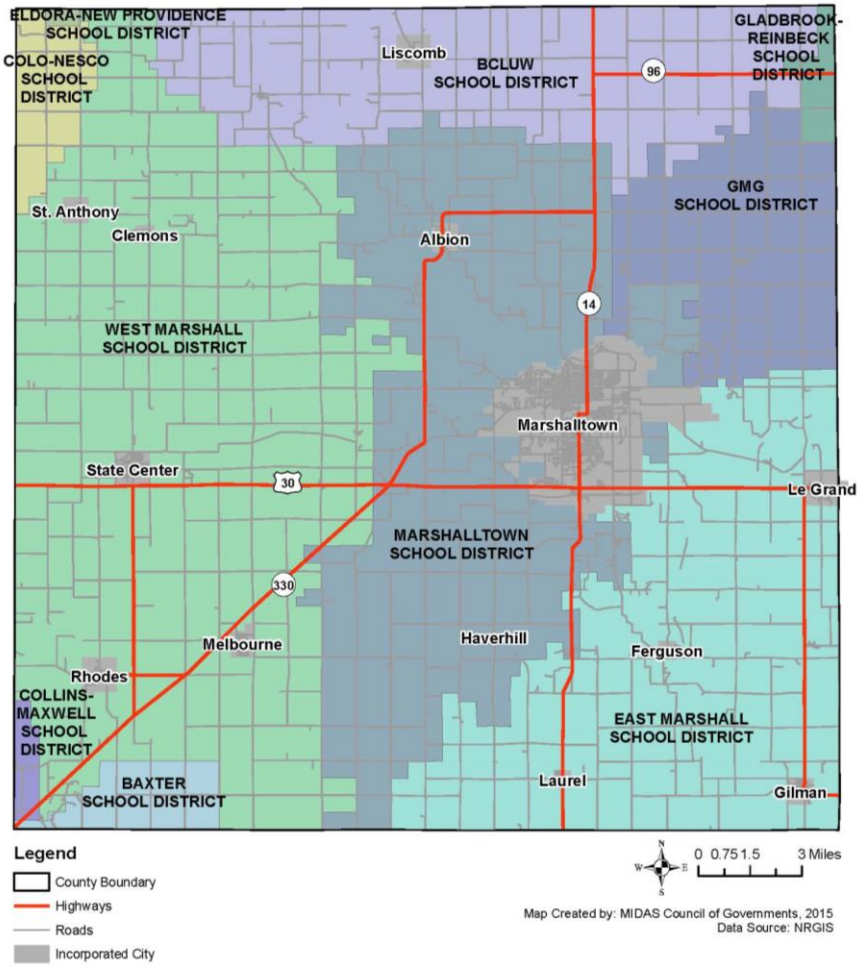
Tama, Hardin, Marshall, and Poweshiek counties, is written and maintained by Region 6 along with several programs for assisting economic development in the county. Five major economic goals were identified in the most recent plan update in 2012. These goals include:

1. Retain and increase quality jobs in the region by strengthening existing industries; promoting targeted industries; and strengthening and supporting small businesses, locally-owned businesses, and creative entrepreneurs in the region.
2. Promote and support healthy lifestyles in the region.
3. Enhance housing quality and affordability while reducing blight in the region.
4. Consider environmental quality, natural disaster resiliency, and overall sustainability in economic development projects in the region.
5. Support and promote the diversity in culture, community, and attractions in the region.

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 3.1.15.

Figure 3.1.15: 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).

Aside from 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:	Picnicking	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.

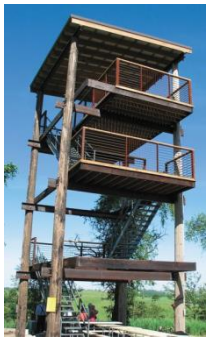
The most important issue in outdoor recreation areas throughout Marshall County is shelter for park visitors during hazard events like windstorms, hail, and tornadoes. In most parks, the only refuges provided are open picnic shelters or none at all. This is not sufficient during severe weather. Shelters 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.

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/.

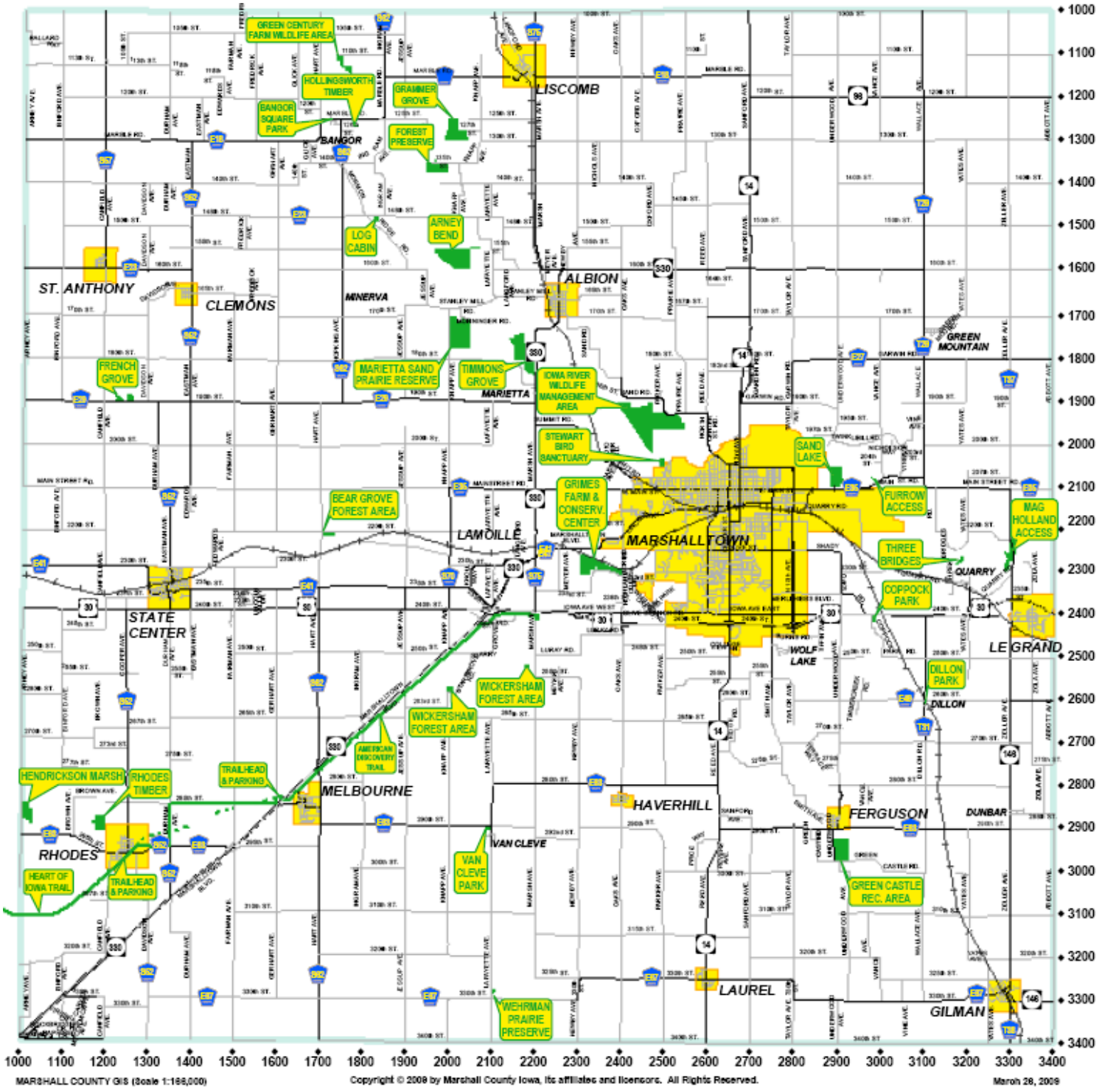




Mildred's Tower (Left), Grimes Farm 5K Run (Right), Photos by Friends of Grimes Farm

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



Historic Sites

Source: Marshall County Conservation Board, 2011

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.

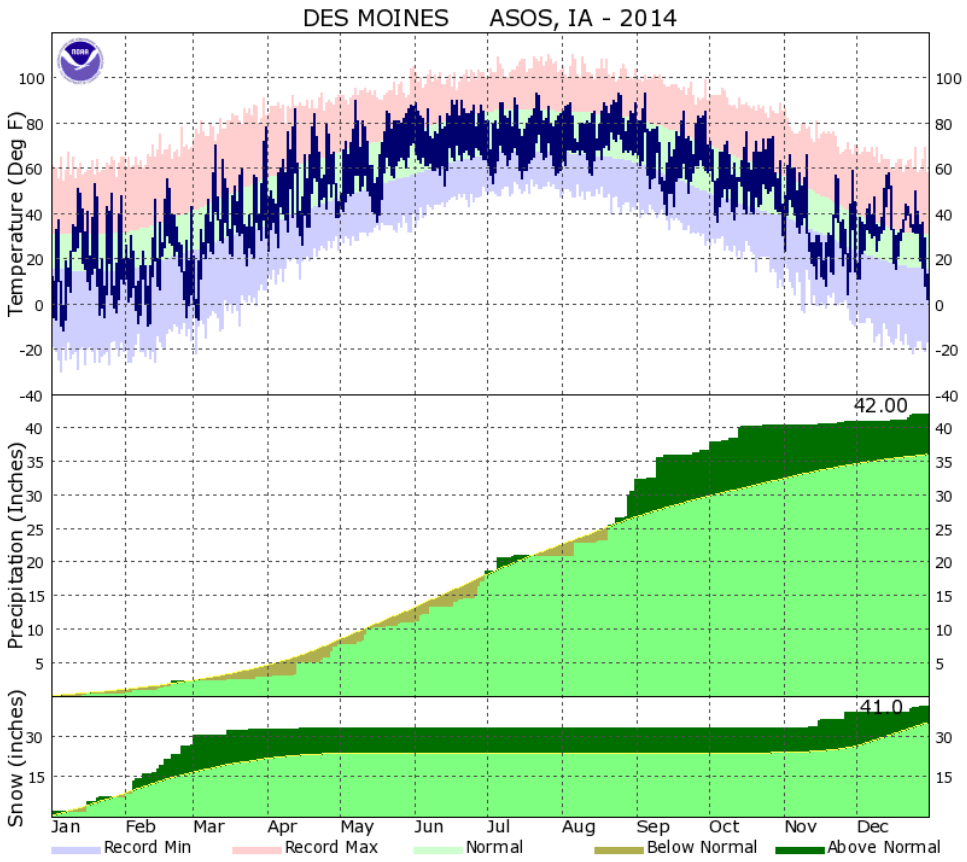
Climate

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 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 2014, 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 41 inches, and overall precipitation reached almost 42 inches.

Figure 3.1.16: Des Moines International Airport Automated Surface Observing System in 2014



Data Source: National Oceanic and Atmospheric Association, 2015

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 conducts the Census of Agriculture every five years. This survey covers many aspects of U.S. agriculture, including the following examples: 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 2012, the Census of Agriculture counted 2,109,303 farms in the United States. Marshall County had 882 farms which use approximately 312,402 acres of land. Farms in Marshall County account for nearly one percent of the 88,637 farms in the State of Iowa. The median farm size in Marshall County was 112 acres with 68% of farms in the county ranging in size between 10 and 499 acres. On average, farms in Marshall County produce $50,000-$99,000 in sales per year. Hogs and pigs

are the most common livestock produced in Marshall County with 371,072 hogs and pigs sold across 59 farms. Corn is the most common crop grown in Marshall County with 24,486,251 bushels that were produced on 146,381 acres from 484 farms. According to Iowa State University's Iowa Community Indicators Program, in 2014, Marshall County's average price of farmland per acre was $9,087. This is slightly higher than the state average of $7,943 per acre.

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 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 & CIH 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 thereafter. 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 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, all communities have been mapped (majority Zone A determination). Seven out of the fourteen municipal Region 6 member jurisdictions, including Albion, Clemons, Ferguson, Marshalltown, Rhodes, St Anthony, and Marshall County, participate in the NFIP. Among them, there are 69 policies with a total of $13,407,900 worth of insurance in force, as of 04/30/2015. The unincorporated area of Marshall County has 21 of those NFIP policies with a total of $2,979,100 worth of insurance coverage in force (NFIP Bureau Net 2015).

Other Mitigation Activities

Other hazard mitigation activities could include the Alert Iowa 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 also participates in the Alert Iowa system.

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 CIH 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 Hometown 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.

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 the NFIP Bureau Net (2015), Albion is participating in the NFIP but does not have any flood insurance policies in force.

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.

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
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 but has no flood insurance policies in force (NFIP Bureau Net 2015).

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. 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	Central Iowa Rural Water Association
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. According to the NFIP Bureau Net (2015), Ferguson is participating in the National Flood Insurance Program but does not have any flood insurance policies in force.

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. 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	Central Iowa Rural Water Association
Phone Services	Partner Comm
Cable/Internet Provider	Partner Comm
Emergency Medical Service	Gilman First Responders/ CIH
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 CIH 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 the NFIP Bureau Net (2015), Gilman is not participating in the National Flood Insurance Program and therefore has no flood insurance policies in force.

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

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 CIH & 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 the NFIP Bureau Net (2015), Haverhill is not participating in the National Flood Insurance Program and therefore has no flood insurance policies in force.

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. 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	Alliant
Water	Central Iowa Water Association
Phone Services	Heart of Iowa Coop
Cable/Internet Provider	Heart of Iowa Coop
Emergency Medical Service	Laurel First Responders
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 the NFIP Bureau Net (2015), the City is not participating in the National Flood Insurance Program and therefore has no flood insurance policies in force.

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.

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/CIH
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 but is currently not participating in the NFIP (NFIP Bureau Net 2015).

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.

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 CIH 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/CIH 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.

According to NFIP Bureau Net (2015), Liscomb does not participate in the NFIP and therefore does not have any flood insurance policies in force.

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.

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 mid1850s, 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	Multiple private providers
Landfill	Marshall County Landfill
Library	Marshalltown Public Library
Recycling	Private contractors
Public Transit	Peoplerides, Taxi, and Marshalltown Municipal Transit Bus
Medical Clinic	McFarland and CIH

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.

According to the NFIP Bureau Net (2015), the City of Marshalltown is a participant in the NFIP. As of 04/30/2015, the community has 45 policies in place with $9,002,300 worth of insurance in force.

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 several 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.

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 to lumber 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	Central Iowa Rural Water Association
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. According to the NFIP Bureau Net (2015), the City of Melbourne does not participate in the NFIP and therefore does not have any flood insurance policies in force.

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.

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.

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	Central Iowa Rural Water Association
Phone Services	Partner Communications
Cable/Internet Provider	Partner Communications
Emergency Medical Service	Rhodes First Responders
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 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 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. According to the NFIP Bureau Net (2015), the city does not currently have any flood insurance policies in force.

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.

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 Association
Phone Services	Minerva Valley
Cable/Internet Provider	Minerva Valley
Emergency Medical Service	Clemons First Responders
Law Enforcement	Marshall County Sheriff

Fire Protection	Clemons Fire Department
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. However, the city enforces a floodplain management ordinance to comply with NFIP program regulations. According to the NFIP Bureau Net (2015), St. Anthony participates in the NFIP and has one flood insurance policy in force.

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 several 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.

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 (NFIP Bureau Net 2015).

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.

School Districts Participating in the Marshall County Hazard Mitigation Plan

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, however, 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. In 2010, these were complete; the two segments were 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.

Participation in the National Flood Insurance Program

8 of the 14 communities in Marshall County participate in the National Flood Insurance Program (NFIP). As of 2015, the six cities of Gilman, Haverhill, Laurel, Liscomb, Melbourne, and State Center are not NFIP participants (NFIP Community Status Book 2015). Regarding the six communities that do not participate in the NFIP in Marshall County, Gilman, Laurel, and Melbourne had current map effective dates of 11/16/11 with sanction dates of 11/16/12. None of these communities were suspended from the NFIP according to the community status book; rather they chose not to participate in the program due to limited historic flooding damage to their community. Similarly, Liscomb and State Center had sanction dates back in the 1970s that occurred one year after their initial FIRM was identified. The City of Haverhill has no mapped floodplains in its jurisdictional boundaries. Although a lack of mapped floodplain boundaries does not mean that there is no risk of flooding, the city has not experienced flood problems in the past and therefore has not pursued NFIP participation. The city is not listed in the NFIP Community Status Book, which indicates that FEMA has not identified Haverhill as a flood-prone community. For floodplain maps of each jurisdiction, see Appendix E. Table 3.2.14 contains NFIP participation for communities in Marshall

County. All communities that participate in the NFIP have adopted floodplain management requirements, including the regulation of any new construction in the Special Flood Hazard Area.

For communities that do participate in the NFIP in Marshall County, all communities have designated someone to serve in the role of floodplain administrator in order to enforce the community's floodplain ordinance. Some of these communities work directly with the Iowa DNR to make sure that the floodplain ordinance is enforced based on the location of the mapped SFHA, the appropriate base flood elevation determination, and whether the type of development complies with the floodplain ordinance. Only portions of the City of Marshalltown have had detailed flood studies completed; all other communities enforce floodplain regulations based on Zone A flood zone determinations.

In addition to enforcing floodplain ordinances, some communities in Marshall County have taken on mitigation actions related to flooding such as floodproofing infrastructure, creating boat ramps that can aid in emergency rescue during flood events, and elevating roads that are prone to flooding. These and other mitigation actions are described in more detail in the Mitigation Strategies section of this plan.

Table 3.2.14. NFIP Participation

Community ID #	Community Name	NFIP Participant?	Current Effective Map Date	Regular-Emergency Program Entry Date
190542	**Albion**	Yes	11/16/11 (M)*	11/16/11
190201	**Clemons**	Yes	11/16/11 (M)*	04/01/92
190457	**Ferguson**	Yes	11/16/11 (M)*	11/16/11
190582	**Gilman**	No	11/16/11	N/A
N/A	**Haverhill**	No	N/A	N/A
190757	**Laurel**	No	11/16/11	N/A
190606	**LeGrand**	Yes	11/16/11(M)*	09/01/87
190767	**Liscomb**	No	11/16/11	N/A
190200	**Marshalltown**	Yes	11/16/11	04/17/84
190616	**Melbourne**	No	11/16/11	N/A
190795	**Rhodes**	Yes	11/16/11 (M)*	10/13/10
190983	**St. Anthony**	Yes	11/16/11 (M)*	09/30/13
190660	**State Center**	No	11/16/11	N/A
190890	**Marshall County**	Yes	11/16/11	06/30/03

(M) = No Elevation Determined – All Zone A, C, and X
Source: NFIP Community Status Book 3/10/2015 BureauNet, https://www.fema.gov/cis/IA.pdf

Community Capabilities Summary

The following charts summarize the community capabilities section of this plan. These charts were completed during the plan update according to city response and publicly available data on items such as National Flood Insurance Program participation and Community Rating System participation. Additionally, some capabilities applied to all communities in the county such as a

regional economic development plan, transportation plan, and the county emergency plan. Many communities in the county are small enough that they have not implemented specific zoning or building codes beyond what is required by the state and/or the National Flood Insurance Program.

Table 3.2.15. City Governance – Departments, Boards, and Commissions

Departments, Boards, and Commissions	Albion	Clemons	Ferguson	Gilman	Haverhill	Laurel	Le Grand	Liscomb	Marshalltown	Melbourne	Rhodes	St. Anthony	State Center	Marshall County
City Hall (City Clerk)	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fire Department	X	X	X		X	X	X	X	X	X	X		X	
Police Department		X	X						X	X	X		X	X
Public Works Department	X			X		X	X		X	X	X		X	X
Planning and Zoning Commission							X		X				X	X
Board of Adjustments							X		X				X	X
Library Board of Trustees						X	X		X				X	
Electric Board of Trustees													X	
Community Center Board			X				X		X				X	

Table 3.2.16. Mitigation Capabilities

Jurisdictional Capabilities	Albion	Clemons	Ferguson	Gilman	Haverhill	Laurel	Le Grand	Liscomb	Marshalltown	Melbourne	Rhodes	St. Anthony	State Center	Marshall County
Comprehensive/Land Use Plan									X					X
Capital Improvement Plan						X	X		X				X	X
Local/County Emergency Plan	Marshall County Emergency Management Agency has Emergency Support Functions (ESF) 1-15 in place for jurisdictions and the county at large.													
Local Mitigation Plan													X	
Flood Mitigation Assistance (FMA) Plan														
Watershed Plan									X	X				
Critical Facilities Plan (Mitigation/Response/Recovery)										X	X		X	X
Economic Development Plan	Region 6 Planning Commission authored a regional Comprehensive Economic Development Strategy Plan for a 4-county region that includes Marshall County.													
Transportation Plan	Region 6 Planning Commission authored a regional Passenger Transportation Plan for a 4-county region that includes Marshall County. No jurisdiction has an additional transportation plan in place.													
Firewise or other fire mitigation Plan	According to the Iowa DNR and the National Firewise program, no communities in the state of Iowa are recognized by the National Firewise program.													

Table 3.2.17. Policies/Ordinances

Policies/Ordinances	Albion	Clemons	Ferguson	Gilman	Haverhill	Laurel	Le Grand	Liscomb	Marshalltown	Melbourne	Rhodes	St. Anthony	State Center	Marshall County
Zoning Ordinance				X	X	X	X		X				X	X
Restricted Residential District		X				X			X	X	X		X	
Subdivision Ordinance						X	X		X	X			X	
Building Code				X			X		X	X			X	X
Building Permit Ordinance						X	X		X	X			X	X
Floodplain Ordinance	X	X	X			X	X		X		X	X	X	X
Tree Trimming Ordinance						X	X		X	X			X	X
Nuisance Ordinance		X	X	X		X	X	X	X	X	X		X	X
Storm Water Ordinance									X		X		X	
Drainage Ordinance						X			X		X		X	
Landscape Ordinance									X				X	
Debris Management Plan						X		X					X	

Table 3.2.18. Programs

Programs	Albion	Clemons	Ferguson	Gilman	Haverhill	Laurel	Le Grand	Liscomb	Marshalltown	Melbourne	Rhodes	St. Anthony	State Center	Marshall County
National Flood Insurance Program (NFIP) Participant	X	X	X				X		X		X	X		X
NFIP Community Rating System (CRS) Participant	No communities in Marshall County participate in the CRS													
Hazard Awareness Program						X				X				
Planning/Zoning Boards							X		X	X			X	X
Tree Trimming Program		X		X		X	X		X	X			X	X
Engineering Studies for Streams (Local/County/Regional)						X			X					
National Weather Service (NWS) Storm Ready	According to the NOAA Storm Ready website, Marshall County is not recognized as a Storm Ready community. No individual communities in Marshall County have received Storm Ready status.													
Mutual Aid Agreements	Mutual Aid agreements, in various capacities, are used throughout Marshall County among fire departments, emergency responders, etc. All jurisdictions have a mutual aid agreement with the Des Moines Fire Department in the event of a hazardous materials event.													

Table 3.2.19. Staff/Department

Staff/Department	Albion	Clemons	Ferguson	Gilman	Haverhill	Laurel	Le Grand	Liscomb	Marshalltown	Melbourne	Rhodes	St. Anthony	State Center	Marshall County
Building Code Official									X					
Building Inspector				X					X				X	X
Mapping Specialist (GIS)														X
Engineer									X					X
Public Works Official	X					X	X		X	X	X		X	X
Emergency Response Team									X	X			X	
NFIP Floodplain Administrator	All participating NFIP communities are required to designate a person in the community as the NFIP Floodplain Administrator. Because of this requirement, all participating NFIP communities have an NFIP Administrator, while those that do not participate in the NFIP do not.													
Development Planner	No jurisdictions specified that they employ a development planner. Most communities within the county are members of Region 6 Planning Commission, which provides planning services to the Marshall County region.													
Emergency Management Coordinator	All jurisdictions coordinate with the Tama County Emergency Management Coordinator, Mindy Benson. No jurisdictions specified that they have a specialize person on staff with the jurisdiction to take on this role. Some jurisdictions stressed the Fire Department's role as emergency management.													

Table 3.2.20. Non-Governmental Organizations

Non-Governmental Organizations	Albion	Clemons	Ferguson	Gilman	Haverhill	Laurel	Le Grand	Liscomb	Marshalltown	Melbourne	Rhodes	St. Anthony	State Center	Marshall County
Veterans Groups						X		X	X		X		X	
Environmental Groups														
Chamber of Commerce									X					
Community Organizations (Lions, Kiwanis, etc.						X			X	X			X	
These cities listed the following community organizations: **Liscomb: American Legion • Marshalltown: American Red Cross, Salvation Army, Homeowners Associations, Neighborhood Associations**														

Table 3.2.21. Local Funding Availability

Local Funding Availability	Albion	Clemons	Ferguson	Gilman	Haverhill	Laurel	Le Grand	Liscomb	Marshalltown	Melbourne	Rhodes	St. Anthony	State Center	Marshall County
Ability to fund projects through Capital Improvements funding	All incorporated cities in Marshall County area capable of funding mitigation projects through Capital Improvements funding.													
Ability to incur debt through general obligation bonds	All incorporated cities in Marshall County area capable of funding mitigation projects through general obligation bonds.													
Ability to incur debt through special tax bonds	All incorporated cities in Marshall County area capable of funding mitigation projects through special tax bonds.													
Ability to incur debt through private activities	All incorporated cities in Marshall County area capable of funding mitigation projects through private activities.													
Ability to withhold spending in hazard prone areas	All incorporated cities in Marshall County area capable of withholding spending in hazard prone areas.													
Fees for water, sewer, gas, or electric services	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Water: Liscomb, Marshalltown Garbage: Sewer: Liscomb, Marshalltown													
Ability to apply for Community Development Block Grants	Marshall County communities can access CDBG funds for water/sewer projects, public facilities, housing, etc. through a competitive bidding process.													
Authority to levy taxes for a specific purpose	Iowa Code Chapter 384.12 (Cities) and Chapter 331.424 (County) enables municipalities to levy taxes for identified specific purposes.													
Impact fees for new development	Finance tools like impact fees cannot be used to fund projects because they are considered unconstitutional in the State of Iowa.													

Chapter 4: Risk Assessment

4.1: Hazard Identification

Ultimately, the hazards chosen for the plan were determined by the Task Force. First, Region 6 identified the hazards most likely to affect the county based on past disaster declarations in Iowa, hazards included in the 2013 Iowa Hazard Mitigation Plan, data collection, and knowledge of the area. Hazard identification will be further described in this chapter. Iowa has experienced 39 presidential disaster declarations from 1990 to 2014 (see Table 4.1.1). The state's most recent disasters occurred in late July and early August of 2014 when a pattern of severe storms, tornadoes, straight line winds, and flooding impacted 23 counties throughout Iowa.

Table 4.1.1: Disaster Declarations in Iowa 1990-2014

Date Declared	Disaster Type
8/5/2014	Severe Storms, Tornadoes, Straight-line Winds, and Flooding
7/24/2014	Severe Storms, Tornadoes, Straight-line Winds, and Flooding
7/14/2014	Severe Storms, Tornadoes, Straight-line Winds, and Flooding
7/31/2013	Severe Storms, Tornadoes, and Flooding
7/2/2013	Severe Storms, Tornadoes, and Flooding
5/31/2013	Severe Storms, Straight-line Winds, and Flooding
5/6/2013	Severe Winter Storm
8/30/2011	Severe Storms and Flooding
8/24/2011	Severe Storms, Straight-Line Winds, and Flooding
6/27/2011	Flooding
5/5/2011	Severe Storms, Tornadoes, and Straight-line Winds
7/29/2010	Severe Storms, Flooding, and Tornadoes
7/27/2010	Severe Storms and Flooding
3/2/2010	Severe Winter Storms
2/25/2010	Severe Winter Storms and Snowstorm
8/13/2009	Severe Storm
5/27/2008	Severe Storms, Tornadoes, and Flooding
1/4/2008	Severe Winter Storm
9/14/2007	Severe Storms and Flooding
5/25/2007	Severe Storms, Flooding, and Tornadoes
3/30/2007	Snow
3/14/2007	Severe Winter Storms
9/10/2005	Hurricane Katrina Evacuation
5/25/2004	Severe Storms, Tornadoes, and Flooding
6/19/2002	Severe Storms and Flooding
5/2/2001	Severe Storms & Flooding
7/22/1999	Severe Storms and Flooding
5/21/1999	Severe Storms, Flooding and Tornadoes
7/2/1998	Severe Weather, Tornadoes and 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

9/6/1990	Flooding, Severe Storm
5/26/1990	Flooding, Severe Storm

Data Source: FEMA Disaster Declarations for Iowa, January 2015

Conditions involving severe storms, severe winter storms, tornadoes, and flooding most frequently cause disaster declarations to be issued in Iowa. Of the 39 previously listed disaster declarations, Marshall County was included in 9 of the 39 disaster declarations since 1990. Disaster declarations involving Marshall County included severe storms (8), flooding (8), tornadoes (4), wind (1), and severe winter storms (1). Multiple hazards may be assigned to each disaster declaration.

To continue the hazard identification process, hazards from Iowa's 2013 hazard mitigation plan were given to the Task force to consider for incorporation into the Marshall County plan. These 21 hazards are listed in Table 4.1.2.

Table 4.1.2: Hazards From Iowa's 2013 Hazard Mitigation Plan

Natural Hazards	**Technological Hazards**
Animal/Plant/Crop Disease	Dam/Levee Failure
Drought	Infrastructure Failure
Earthquake	Radiological
Expansive Soil	Transportation Incident
Extreme Heat	
Flash Flood	
Grass and Wildland Fire	
Hazardous Materials Incident	**Human-Caused**
Human Disease Epidemic	Terrorism
Landslide	
River Flooding	
Severe Winter Storms	
Sinkholes	
Thunderstorms/Lightning/Hail	
Tornadoes	
Wind Storms	

At the first meeting, the Task Force was asked to discuss how the county might be affected by each hazard on the list in Table 4.1.2. The Task Force was also asked if they wanted to add any additional hazards to the plan; no hazards were added. Members were given the option to remove hazards from the plan if they could provide sufficient reasoning related to a lack of historical occurrence, low likelihood of a future occurrence, or less potential for mitigation. The Task Force removed the following hazards from consideration in the plan:

1. **Expansive Soils**. Marshall County is not located in an area that has high percentages of clay soils that can swell or shrink excessively due to variations in moisture content. The community has a remote chance of sustaining damage from this hazard. Most of Marshall County is located in a "brown" area on the map below that contains little or no swelling clay or at most, no more than 50%. Expansive soils were also excluded from the previous plan. See Figure 4.1.1 for more information.

Figure 4.1.1: USGS Map of Percentage of Swelling Clay in Iowa

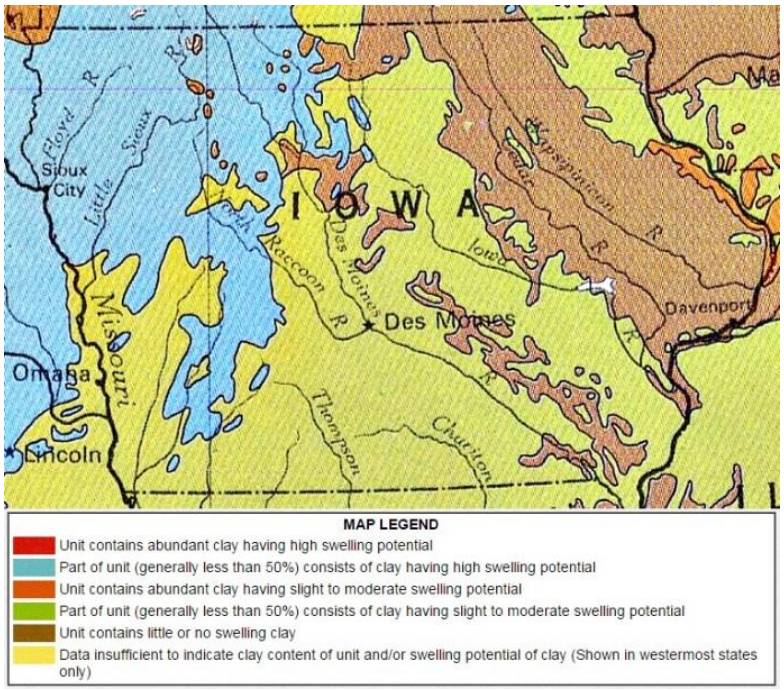
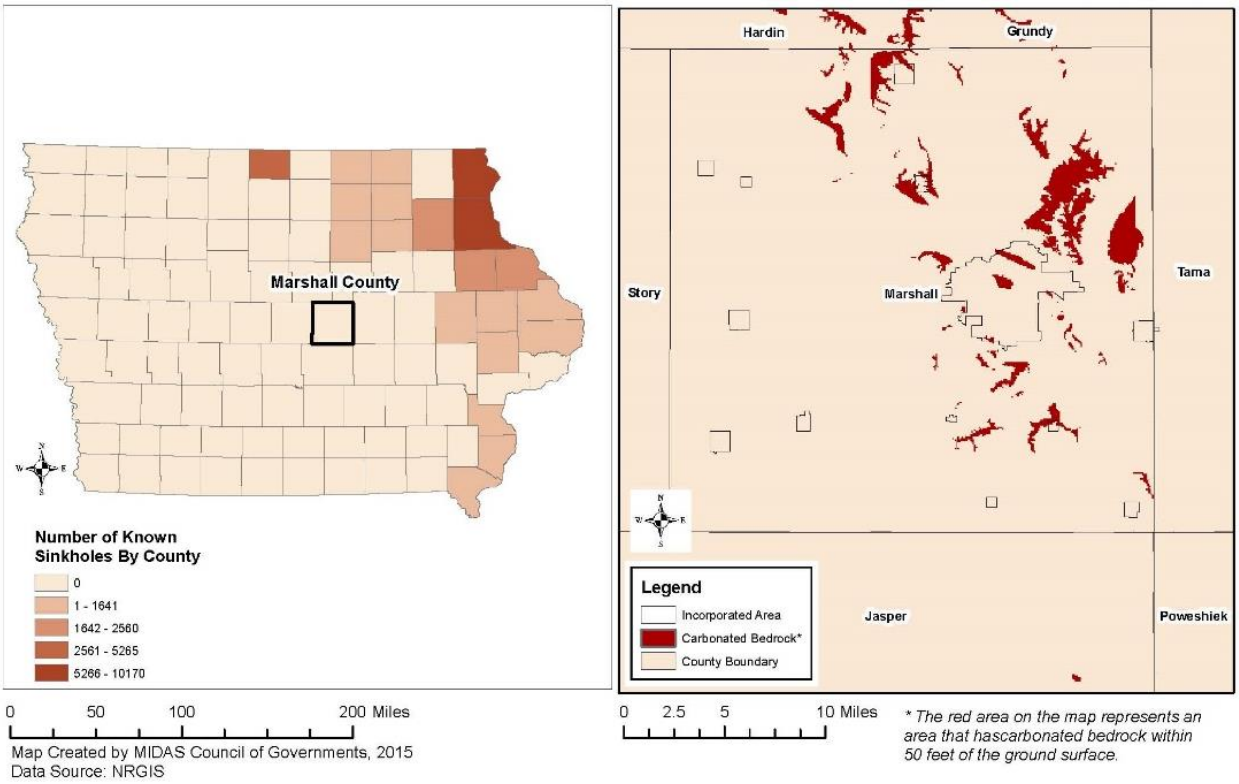


Image Obtained from: http://www.surevoid.com/soil_maps/ia.php

2. **Landslide**. Marshall County does not have significant slopes that could play a role in a landslide event. Marshall County's elevation varies from between 820 and 1115 feet, a difference of 295 feet (NRGIS 2015). The Task Force did not recall any landslide events that had ever occurred in Marshall County. The hazard was removed based on all of the information available. Landslides were also removed from the previous plan.
3. **Sinkholes.** There are no known sinkholes in Marshall County. This risk of sinkholes is remote, as there is no history of sinkholes in Marshall County and there are very few areas of the county that have carbonated bedrock within 50 feet of the ground surface (a risk factor for sinkholes). While sinkholes were included in the previous plan, the Task Force decided to remove the hazard from the plan after viewing the data and the actual possibility that a sink hole would affect the county. This hazard may be possible, but the likelihood and magnitude area would be so minimal that the planning team decided not to provide a detailed description or risk assessment.

Figure 4.1.2: Sinkhole Risk in Marshall County



Some hazards were analyzed at the county level due to the similar and widespread effect that they have on individual jurisdictions within Marshall County. When these hazards occur, they affect multiple jurisdictions at the same time with relatively similar impacts. Assessing these hazards at the county level represents shared risk among jurisdictions and reduces redundancy. Hazards that were addressed at the county level include:

1. Animal/Plant/Crop Disease
2. Drought
3. Extreme Heat
4. Radiological
5. Thunderstorm/Lightning/Hail
6. Tornado
7. Severe Winter Storm
8. Wind Storm

Table 4.1.3 shows the final list of hazards considered in this plan.

Table 4.1.3: Final List of Marshall County Area Hazards

Natural Hazards	Technological Hazards
Animal/Plant/Crop Disease*	Dam/Levee Failure
Drought*	Infrastructure Failure
Earthquake*	Radiological*
Extreme Heat*	Transportation Incident
Flash Flood	
Grass and Wildland Fire	
Hazardous Materials Incident	
Human Disease Epidemic	**Human-Caused**
River Flooding	Terrorism
Severe Winter Storms*	
Thunderstorms/Lightning/Hail*	
Tornadoes*	
Wind Storms*	

*Hazards were assessed at the County level

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 section contains the definitions of all hazards that have been considered in this plan. This section includes hazards that were removed from the plan. Definitions are included so there is consistency in how each hazard is understood in the context of this plan. The definitions were obtained from the 2013 Iowa Hazard Mitigation Plan. Descriptive charts are included as needed.

Marshall County Hazards and Definitions

Animal/Crop/Plant Disease
An outbreak of disease that can be transmitted from animal to animal or plant to plant.

Dam/Levee Failure
The uncontrolled release of water resulting from a structural failure in a dam, wall, dike, berm, or area of elevated soil can cause flooding. Possible causes of the breach could include flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, terrorism, erosion, piping, saturation, or under seepage.

Levee failure can occur by overtopping or breaching. Overtopping occurs when a river rises higher than the levee's crown. Breaching can result from the loss of structural integrity of a wall, dike, berm, or elevated soil by erosion, piping, saturation, under seepage, or animal burrows.

Drought
A period of prolonged abnormally low precipitation that produces severe dry conditions. A chart that classifies drought severity is included in Table 4.1.4.

Table 4.1.4. Drought Severity Classification Chart

Description	Possible Impacts	Palmer Drought Index
Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-1.0 to -1.9
Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested	-2.0 to -2.9
Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed	-3.0 to -3.9
Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	-4.0 to -4.9
Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less

Source: The National Drought Mitigation Center, 2015

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.

Expansive Soils

Soil and soft rock that tend to swell or shrink excessively due to changes in moisture content.

Extreme Heat

Summertime weather that is substantially hotter and/or more humid than average for a location at that time of year. This includes temperatures (including heat index) in excess of 100 degrees Fahrenheit or at least three (3) successive days of 90+ degrees. A chart illustrating danger related to the heat index is included in Table 4.1.5.

Table 4.1.5. NOAA's National Weather Service Heat Index

	Temperature (°F)																
Relative Humidity (%)		80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
	40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
	45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
	50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
	55	81	84	86	89	93	97	101	106	112	117	124	130	137			
	60	82	84	88	91	95	100	105	110	116	123	129	137				
	65	82	85	89	93	98	103	108	114	121	126	136					
	70	83	86	90	95	100	105	112	119	126	134						
	75	84	88	92	97	103	109	116	124	132							
	80	84	89	94	100	106	113	121	129								
	85	85	90	96	102	110	117	126	135								
	90	86	91	98	105	113	122	131									
	95	86	93	100	108	117	127										
	100	87	95	103	112	121	132										

Likelihood of heat Disorders with Prolonged Exposure or Strenuous Activity

Caution Extreme Caution Danger Extreme Danger

Heat Index (1/28/09)

http://www.weather.gov/om/heat/index.shtml

Flash Flood

A flood event that occurs with little to no warning where water levels rise at an extremely fast rate. 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.

Grass or Wildland Fire
An uncontrolled fire that threatens life and property in a rural or a wooded area. Grass and wild land fires are more likely to occur when conditions are favorable, such as during periods of drought when natural vegetation is drier and more combustible.

Hazardous Materials Incident
Hazardous materials incidents can occur with fixed hazardous materials, pipeline transportation, and transportation of hazardous materials. Incidents can include the accidental release of flammable or combustible, explosive, toxic, noxious, corrosive, oxidizable, irritant or radioactive substances or mixtures that can pose a risk to life, health, or property and possibly require an evacuation.

Human Disease
A medical, health, or sanitation threat to the general public including contamination, epidemics, plagues, or infestations.

Infrastructure Failure
Includes communication failure, energy failure, structural failure and structural fire. Failure can include an extended interruption, widespread breakdown or collapse (part or all) of any public or private infrastructure that threatens life and property.

Landslide
The sliding down of a mass of earth or rock from a mountain or cliff.

Radiological
An incident resulting in the release of radiological material at a fixed facility on in transit. This hazard includes power plants, hospitals, and laboratories.

River Flood
River flooding is a natural and expected phenomenon that can occur annually, and is usually restricted to specific streams, rivers or watershed areas. Many communities may experience some kind of flooding after spring rains, heavy thunderstorms, winter snow thaws, ice jams, waterway obstructions, or levee or dam failures. Floods can be slow or fast-rising but generally develop over a period of days.

Severe Winter Storm
Severe winter weather conditions that affect day-to-day activities. Severe winter storms can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold. Winter storms are common during the months of October through April. Included in Table 4.1.6 is a revised wind chill table that illustrates frostbite potential related to the amount of time that bare skin is exposed.

Table 4.1.6. NOAA's National Weather Service Wind Chill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63	
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72	
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77	
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81	
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84	
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87	
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89	
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91	
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93	
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95	
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97	
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98	

Frostbite Time = 30 minutes 10 minutes 5 minutes

NWS Wind chill Chart (1/28/09)
Source: NOAA 2015
http://www.weather.gov/os/windchill/index.shtml

Sinkhole

A sinkhole is the loss of surface elevation due to the removal of subsurface support.

Terrorism

A wide variety of human-caused threats including enemy attack, biological terrorism, agro-terrorism, chemical terrorism, conventional terrorism, cyber terrorism, radiological terrorism, and public disorder. This hazard includes the 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.

Thunderstorms, Lightning, and Hail

Thunderstorms are common in Iowa and can occur singly, in clusters, or in lines. Thunderstorms can result in heavy rains, high winds (reaching or exceeding 58 mph), tornados, or hail. Thunderstorms are created from a combination of moisture, rapidly raising warm air, and the lifting mechanism such as that caused when warm and cold air masses collide. Thunderstorms are hazards unto themselves, but can cause other hazards such as flash flooding, river flooding, and tornadoes/windstorms. Hailstorms are a product of a severe thunderstorm in which pellets or lumps of ice (of most concern when greater than 1 inch in diameter) fall with rain.

Tornado

A violent whirling wind characteristically accompanied by a funnel shaped cloud extending down from a cumulonimbus cloud that progress in a narrow, erratic path. Rotating wind speeds can exceed 300 mph and travel across the ground at average speeds of 25-30 mph. A tornado can be a few yards to about a mile wide where it touches the ground. An average tornado 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 condensation of water droplets in the center of the funnel. An explanation of the Fujita Scale, which is a measure of tornado damage, is included in Table 4.1.7.

Table 4.1.7. Fujita Tornado Damage Scale

Scale	Wind Estimate (MPH)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-318	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

Source: NOAA, 2015

Transportation Incident

Transportation incidents include any transportation accident involving any mode of transportation that directly threatens life, property damage, injury, or adversely impacts a community's capabilities to provide emergency services. A transportation incident can occur with air transportation, highway transportation, railway transportation, and waterways.

Windstorm

Extreme winds associated with severe winter storms, severe thunderstorms, downbursts, and very strong pressure gradients. Windstorms generally produce wind speeds in excess of 50 mph and can cause property damage, injuries, and/or death. The Beaufort Wind Scale measures wind via visual observations and is displayed in Table 4.1.8.

Table 4.1.8. Beaufort Wind Scale.

Force	Wind Speed (mph)	WMO Classification	Appearance of Wind Effects on Land
0	0-1	Calm	Calm, smoke rises vertically
1	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-7	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	13-18	Moderate Breeze	Dust, leaves, and loose paper lifted, small tree branches move
5	19-24	Fresh Breeze	Small trees in leaf begin to sway
6	25-31	Strong Breeze	Larger tree branches moving, whistling in wires
7	32-38	Near Gale	Whole trees moving, resistance felt walking against wind
8	39-46	Gale	Whole trees in motion, resistance felt walking against wind
9	47-54	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	55-63	Storm	Seldom experience on land, trees broken or uprooted, "considerable structural damage"
11	64-72	Violent Storm	Very rarely experienced, accompanied by wide-spread damage
12	73-83	Hurricane	--

Across Marshall County, the risk of different hazards varies by jurisdiction. Refer to Table 4.1.9 for the hazards identified by each jurisdiction in Marshall County. Additional differences in hazard risk will be discussed in other chapters of this plan.

Data Sources

Table 4.1.9 describes the data sources used for hazard identification and as a basis for the risk assessment portion of this plan. Data was collected from a variety of sources, including NCDC, the US Army Corps of Engineers, Iowa Department of Natural Resources, Iowa Department of Agriculture and Land Stewardship, and the Iowa Department of Public Health, among others. See Table 4.1.9 and Appendix R for a full list of sources.

For hazards with limited data at the jurisdictional level such as infrastructure failure, grass and wildland fires, animal/plant/crop disease, and terrorism, data was collected from the task force representing that jurisdiction (local knowledge). Task Force members included public works officials, emergency responders, firefighters, and others with direct knowledge of hazard occurrences within a jurisdiction. Marshall County Emergency Management also contributed information when possible.

Table 4.1.9: Marshall County Hazard Boundaries

Hazard	Jurisdictions	Source(s) of Identification*	Data Frame
Animal/Plant/Crop Disease	County-wide All jurisdictions	USDA, Plant Protection and Quarantine Iowa Department of Agricultural and Land Stewardship Iowa Department of Natural Resources Iowa State University Veterinary Medical Center Local knowledge	1999 – 2015** (16 years)
Dam/Levee Failure	All jurisdictions	National Inventory of Dams National Levee Database (US Army Corps of Engineers)	No events in the history of Marshall County according to data sources
Drought	County-wide All jurisdictions	NCDC Data	8/2000 – 8/2013 (13 years)
Earthquake	County-wide All jurisdictions	Iowa Geological Survey	No events in the history of Marshall County according to data sources
Extreme Heat	County-wide All jurisdictions	NCDC Data	1/1993 – 12/2014 (21 years)
Flash Flooding	All jurisdictions	NCDC Data Marshall County Emergency Management Local knowledge	6/2002 – 6/2014 (12 years)
Grass or Wildland Fire	County-wide All jurisdictions	Marshall County Emergency Management Local knowledge	10 Years
Hazardous Materials Incident	All jurisdictions	Iowa DNR Hazardous Materials Release Database Iowa DNR Hazardous Spills Summary Report US DOT Pipeline and Hazardous Materials Safety Administration	1/1995 – 10/2014 (19.8 years)

Human Disease Epidemic	All jurisdictions	Iowa Department of Public Health, Center for Acute Disease Epidemiology	2007 – 2012 (5 years)
Infrastructure Failure	All jurisdictions	Local knowledge	10 Years
Radiological	County-wide All jurisdictions	Iowa 2013 Hazard Mitigation Plan Iowa Emergency Management Association	No events in the history of Marshall County according to data sources
River Flooding	All jurisdictions	NCDC Data FEMA Map Service Center Local knowledge	2/1996 – 5/2008 (12.2 years)
Severe Winter Storms	County-wide All jurisdictions	NCDC Data	1/1996 – 2/2014 (18.1 years)
Terrorism	All jurisdictions	Marshall County Emergency Management Local knowledge	10 Years
Thunderstorm, Lightning, and Hail	County-wide	NCDC Data	6/1961 – 9/2013 (52.2 years)
Tornadoes	County-wide	NCDC Data	6/1951 – 7/2008 (57.1 years)
Transportation Incident	All jurisdictions	Iowa Department of Transportation National Transportation Safety Board Accident Reports	10 Years
Wind Storms	County-wide All jurisdictions	NCDC Data	1/1996 – 1/2014 (18 years)

*All hazards were first identified through their inclusion in the 2013 Iowa Hazard Mitigation Plan. This column lists additional sources of data that were used to identify the hazard as a risk in Marshall County based on historical occurrence and other factors.
** This time period beginning at 1999 was established by the previous planning process. The plan update simply updated this time frame to include events up to 2015. The data frame extends to 2015 because of the need for updated information on new risks in animal/plant/crop disease (Bird Flu, PED Virus).

Data Limitations

While this plan takes advantage of the data that is available through the NCDC and other sources, some hazards have a shorter span of time for which data is available. The NCDC is used as a primary source for many hazards discussed in this plan, but for some hazards and/or some communities, only partial records of significant events are available. In addition, details about each hazard event may not be available if the data is older. For example, tornado data from the 1950's classifies tornado events at the county level and often does not give a specific location of the event within the county. Historical trends can help us predict the probability of each hazard, but realistically, many hazard analyzed in this plan could occur at any point in time. The hazard identification and risk assessment activities rank hazards according to the data that was available at the time of the plan update.

For flash flooding, communities described flood events in which short periods of heavy rainfall flooded streets, basements, and backed up sewer systems. In some cases, any period of prolonged rainfall could cause streets or sewers to flood; NCDC data did not capture the frequency of these events, but communities did not feel that it was necessary to add to the events that NCDC data already reported. It should be noted that these events may not cause substantial damage to houses or structures, but they may result in flood costs that the county taxpayers and individual property owners must finance.

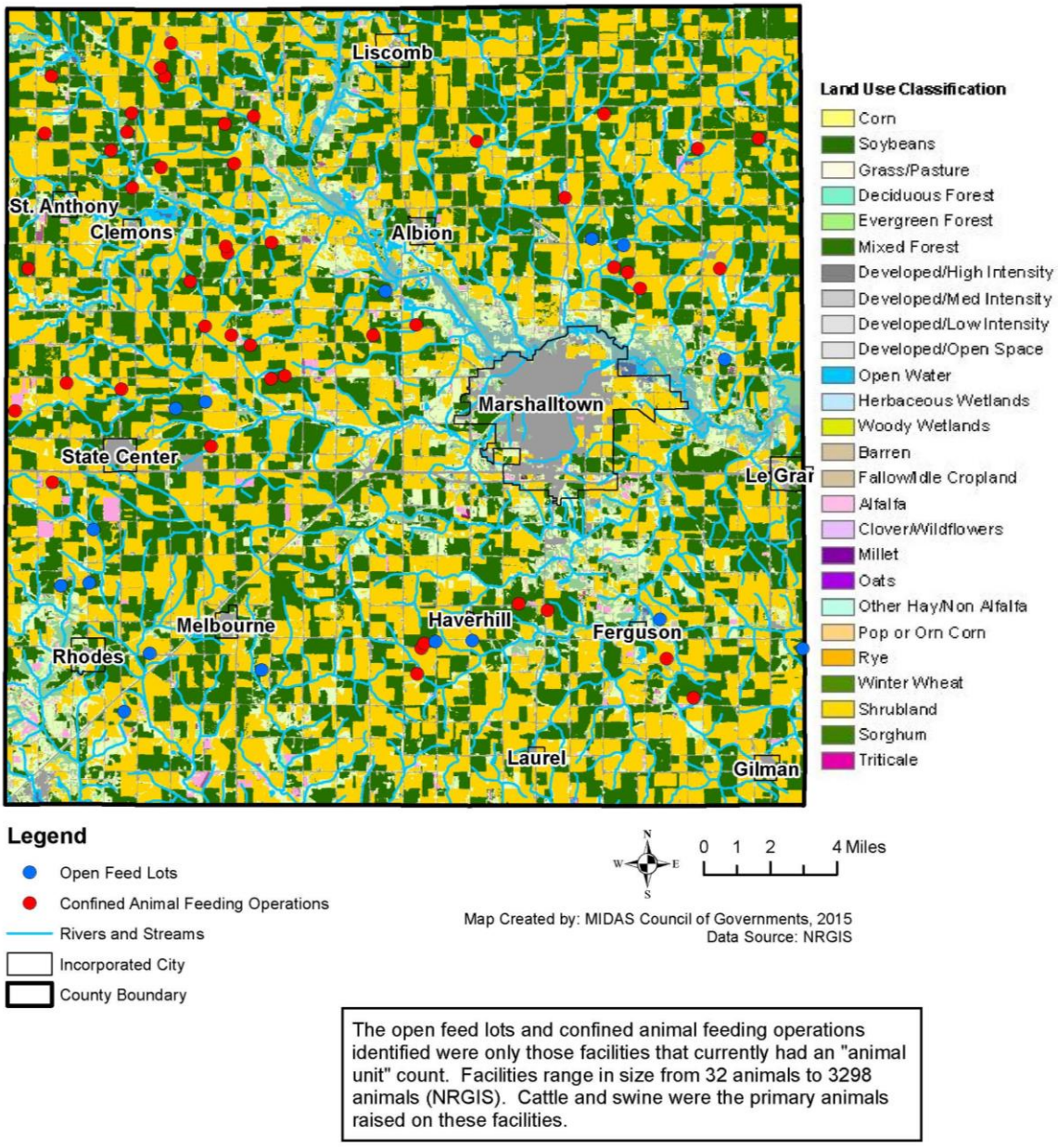
Data frames vary for each hazard. For most hazards with established data sets (ie: NCDC, IDNR hazardous spills summary reports, Iowa Department of Public Health, etc.), the data frame begins with the earliest year in which data was available and ends with 2014. The year 2014 was used as an ending date for data to allow for a complete year of data as data collection and the planning process began in early 2015. For hazards that relied more on the knowledge of city officials, public works employees, firefighters, and emergency responders as a data source, a ten year data frame was used. The ten year period for this type of data allows people to recall events and problems to the best of their knowledge. Hazards that used a ten year period include grass or wildland fire, infrastructure failure, terrorism, and transportation incident. Note that some of these hazards used supplementary data in addition to local knowledge; this data also used a ten year time frame.

Hazards at the County Level

The following maps introduce many of the hazards that affect Marshall County. Not all hazards have spatial data that can be used to represent all hazards covered in this plan. Additional details about all hazards, including specific jurisdictional vulnerabilities, will be discussed in other sections of this plan.

With Marshall County's large amount of cropland, the county is vulnerable to an animal/plant/crop disease outbreak. According to the 2012 Census of Agriculture, Marshall County has 882 farms which use approximately 312,402 acres of land in the county. The most common livestock produced in Marshall County is hogs and pigs, with 371,072 hogs and pigs sold across 59 farms.

Figure 4.1.3: Animal/Plant/Crop Disease in Marshall County



The open feed lots and confined animal feeding operations identified were only those facilities that currently had an "animal unit" count. Facilities range in size from 32 animals to 3298 animals (NRGIS). Cattle and swine were the primary animals raised on these facilities.

Special Flood Hazard Areas are prevalent throughout Marshall County. Special Flood Hazard Areas indicate the areas that have 1% chance of flooding in any given year. These areas account for about a fifth of the county's land area. Except for Gilman and Haverhill, every Marshall County jurisdiction has a Special Flood Hazard Area located within its jurisdictional boundaries; however, some jurisdictions experience a higher level of flood risk. The map does not depict the areas with a lower probability of being flooded that are outside of the Special Flood Hazard Area. The flooding disaster in the summer of 2008 proved that Iowa's waterways are more than capable of exceeding the 100-year floodplain boundary. See Figure 4.1.4 for a county-wide map of Special Flood Hazard Areas. See Appendix E for digital Flood Insurance Rate Maps for floodplain boundaries within each incorporated area. While the Special Flood Hazard Area is used primarily in Marshall County to

depict the probability of river flooding, many jurisdictions in Marshall County also identified areas of the SFHA as areas where flash flooding can occur. Maps of flash flooding areas that were identified by individual communities can be found in Appendix D.

Marshall County has a total of 20 dams. 17 of these dams are Low Hazard Dams and three are Moderate Hazard Dams. The majority of dams in the county were built for the purposes of fire protection, stock or small fish ponds. Three dams were built for the purposes of recreation, and two were built for flood control purposes. There are an additional 17 dams within five miles of Marshall County boundaries. One of those dams are moderate classification dams but pose a minimal risk to downstream communities in Marshall County. See Figure 4.1.5 for the location of these dams in the county.

Figure 4.1.4: Special Flood Hazard Areas in Marshall County

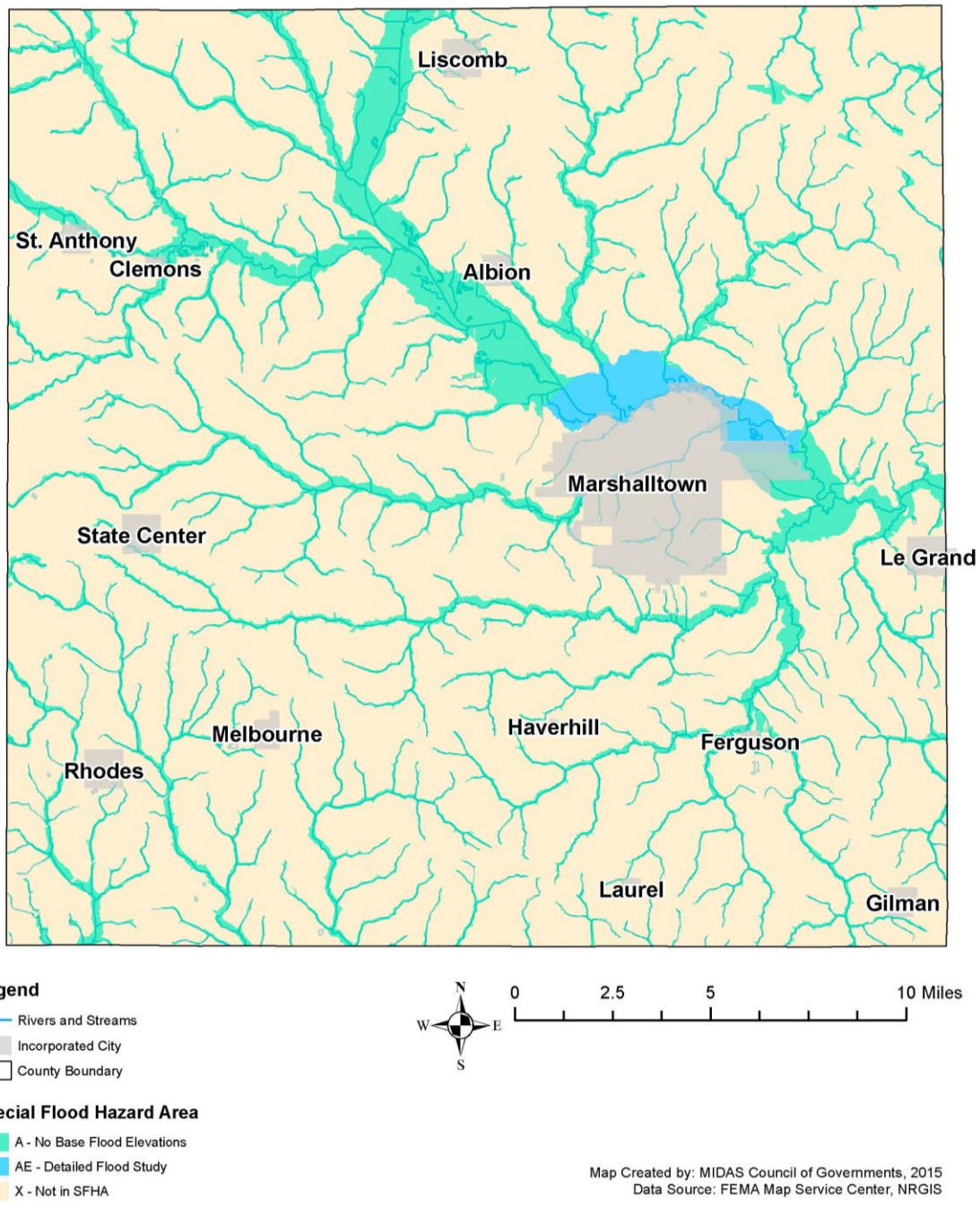
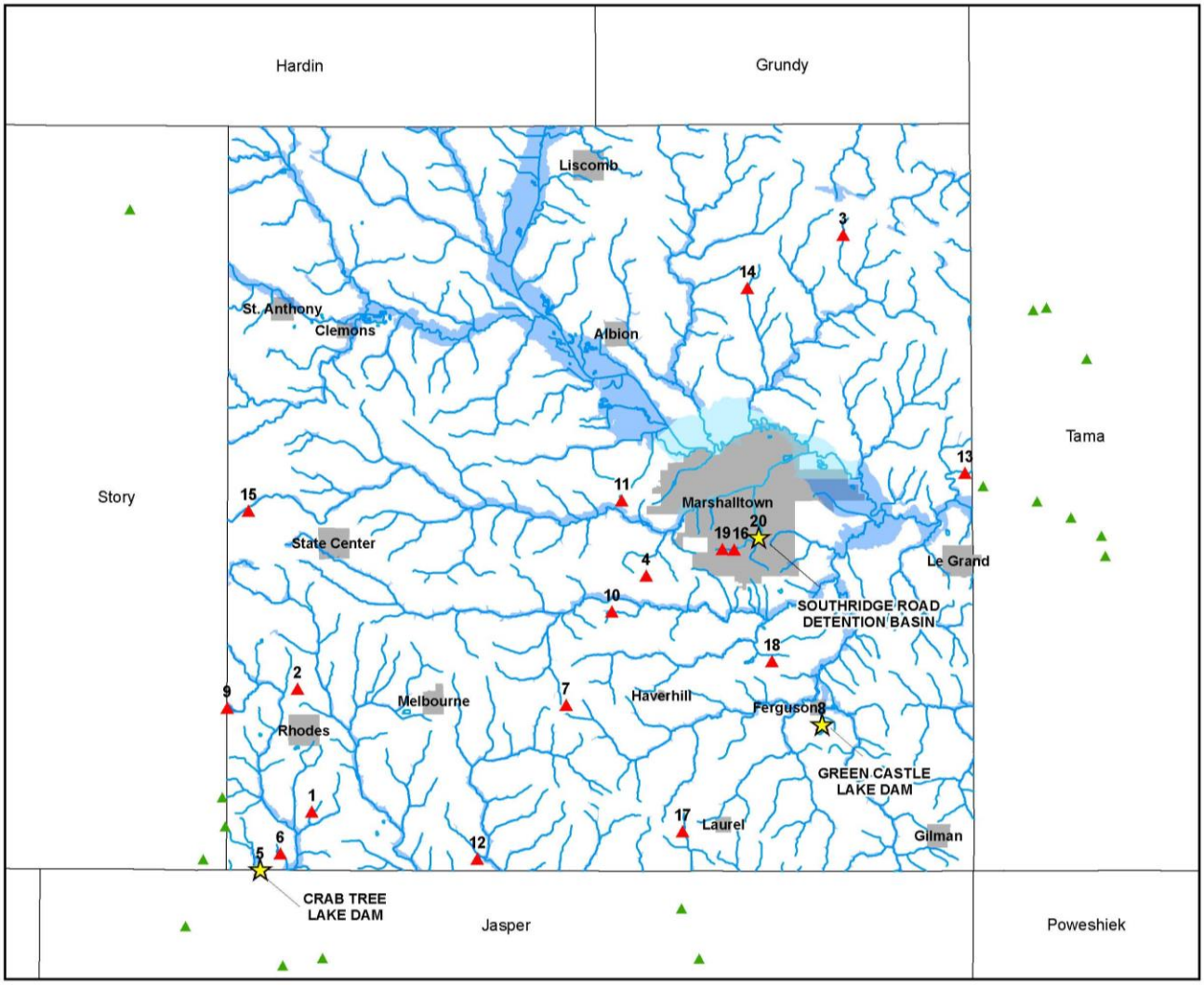


Figure 4.1.5: Location of Dams in Marshall County



Dams of Marshall County

1 BRYCE DEE POND DAM
2 BUCK DAM
3 CAPUTO DAM
4 CONTE DAM
5 CRAB TREE LAKE DAM
6 DEUTSCH DAM
7 GODFREY DAM
8 GREEN CASTLE
9 HENDRICKSON MARSH DAM
10 ILLUM DAM
11 IOWA NONAME 77
12 MADSEN DAM
13 MILLS DAM
14 OTTILIE DAM
15 RIEMENSCHNEIDER DAM
16 S 2ND STREET STORMWATER DETENTION BASIN
17 SIETMANN DAM
18 SLOPPY DAM
19 S 6TH STREET STORMWATER DETENTION BASIN
20 SOUTHRIDGE ROAD DETENTION BASIN

Marshall County has a total of 20 dams. 17 of these dams are Low Hazard Dams and 3 are Moderate Hazard Dams.

Low Hazard – Low Hazard dams are classified as such where damages from a failure would be limited to loss of the dam, livestock, farm outbuildings, agricultural lands and lesser used roads and where loss of human life is considered unlikely.

Moderate (Significant) Hazard – A Moderate Hazard Dam is where failure may damage isolated homes or cabins, industrialor commercial buildings, moderately traveled roads, interrupt major utility services, but are without substantial risk of loss of human life. Dams are also classified as Moderate Hazard where the dam and its impoundment are themselves of public importance, such as dams associated with public water supply systems, industrial water supply or public recreation or which are an integral feature of a private development complex.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS

The only jurisdiction at risk for levee failure is Marshalltown. Three levees are located in the northern area of the city. These levees were built in 1975 and were authorized by the Flood Control Act of 1965. The latest improvements to the levee system and floodwalls in Marshall County occurred between 2000 and 2008 (US Army Corps of Engineers 2015). Much of the area in northern Marshalltown is now protected from flooding from the Iowa River. More central Marshalltown is protected from flooding from Linn Creek, which is a tributary of the Iowa River. A FEMA FIRMette of the levee area in Marshalltown is included in Figure 4.1.7 on the following page. The area with black stippling portrays the area that is considered an areas with reduced risk due to the levees, according to the FEMA Map Service Center (2015).

Figure 4.1.6: Location of Levees in Marshalltown

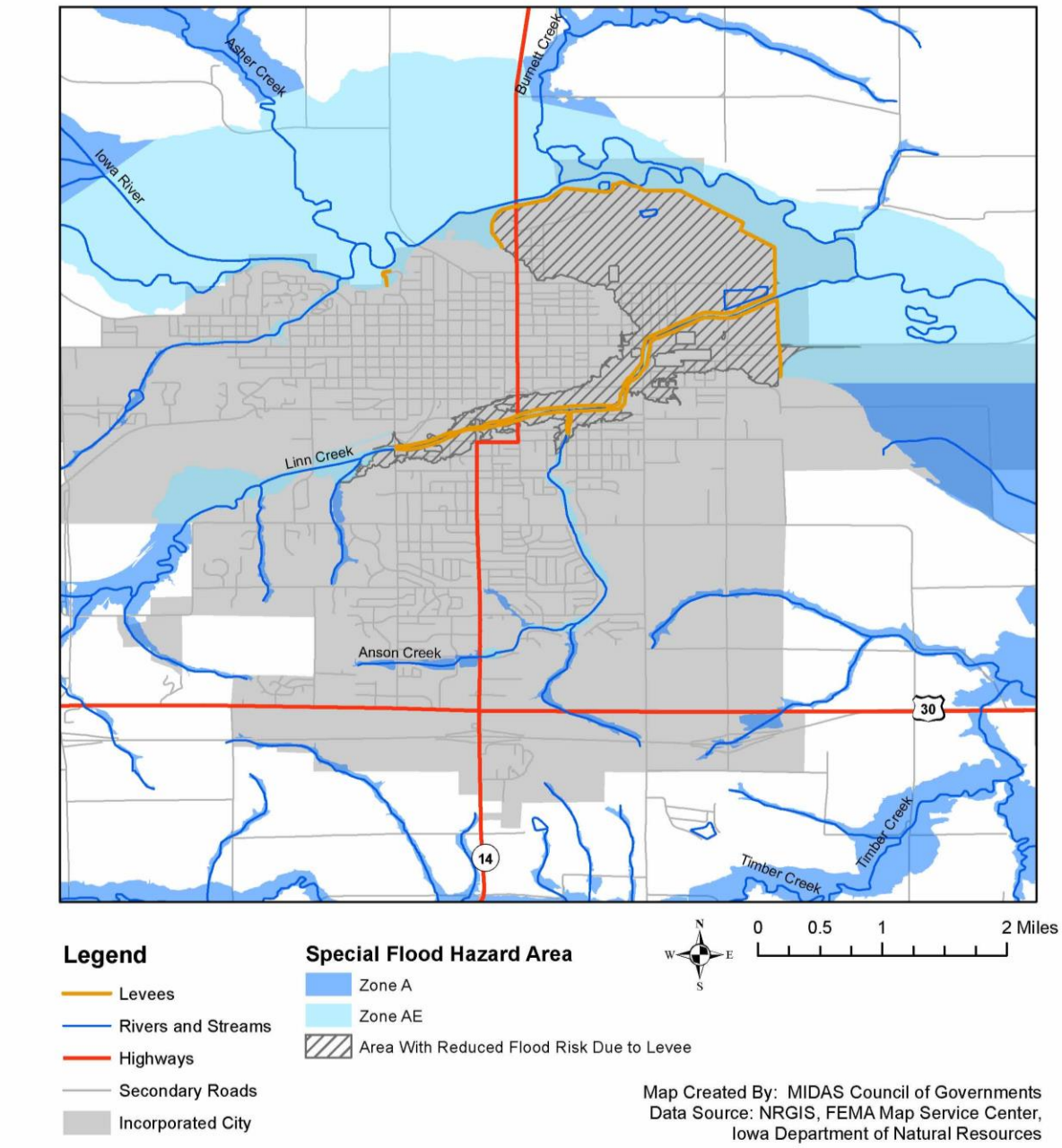
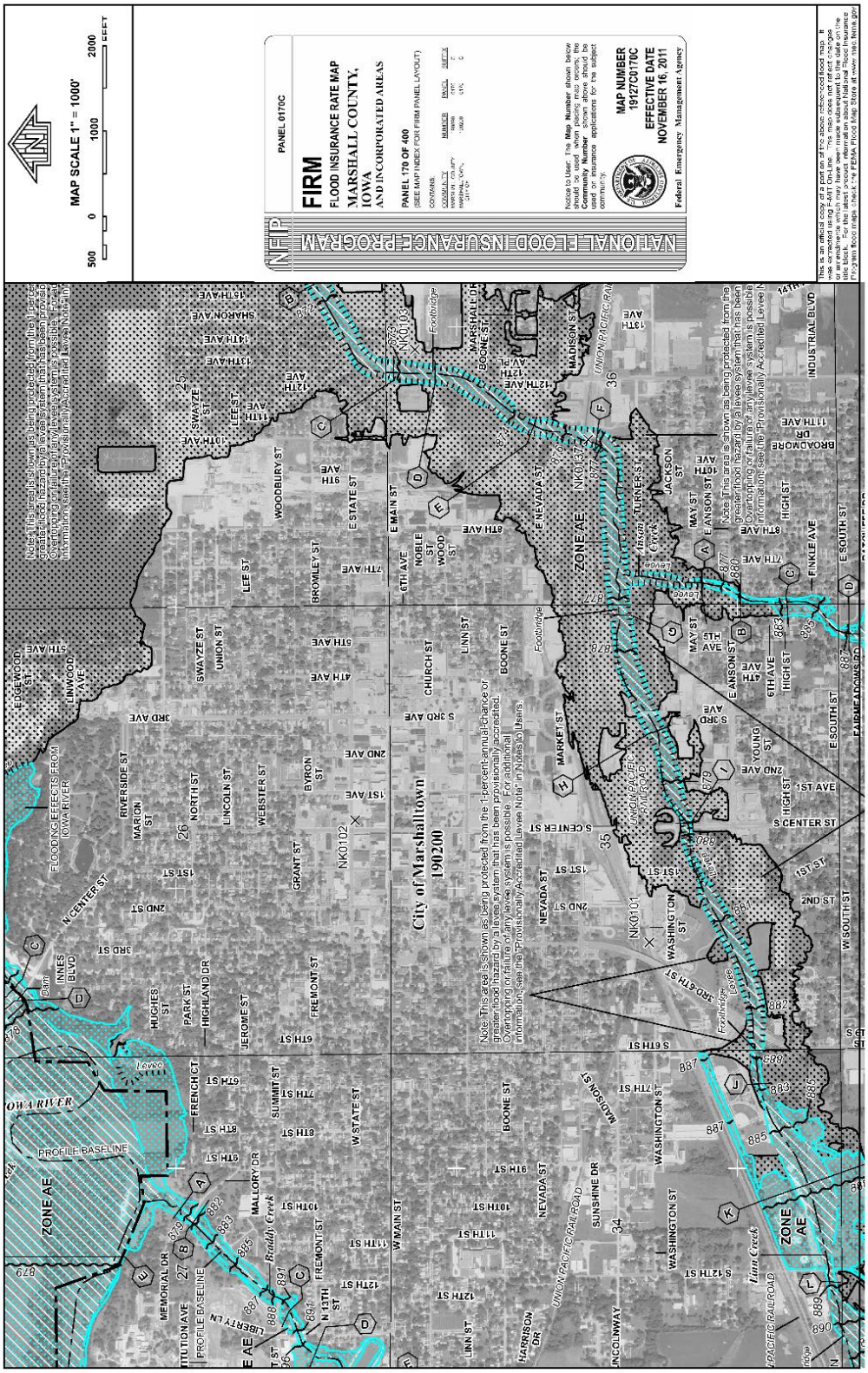
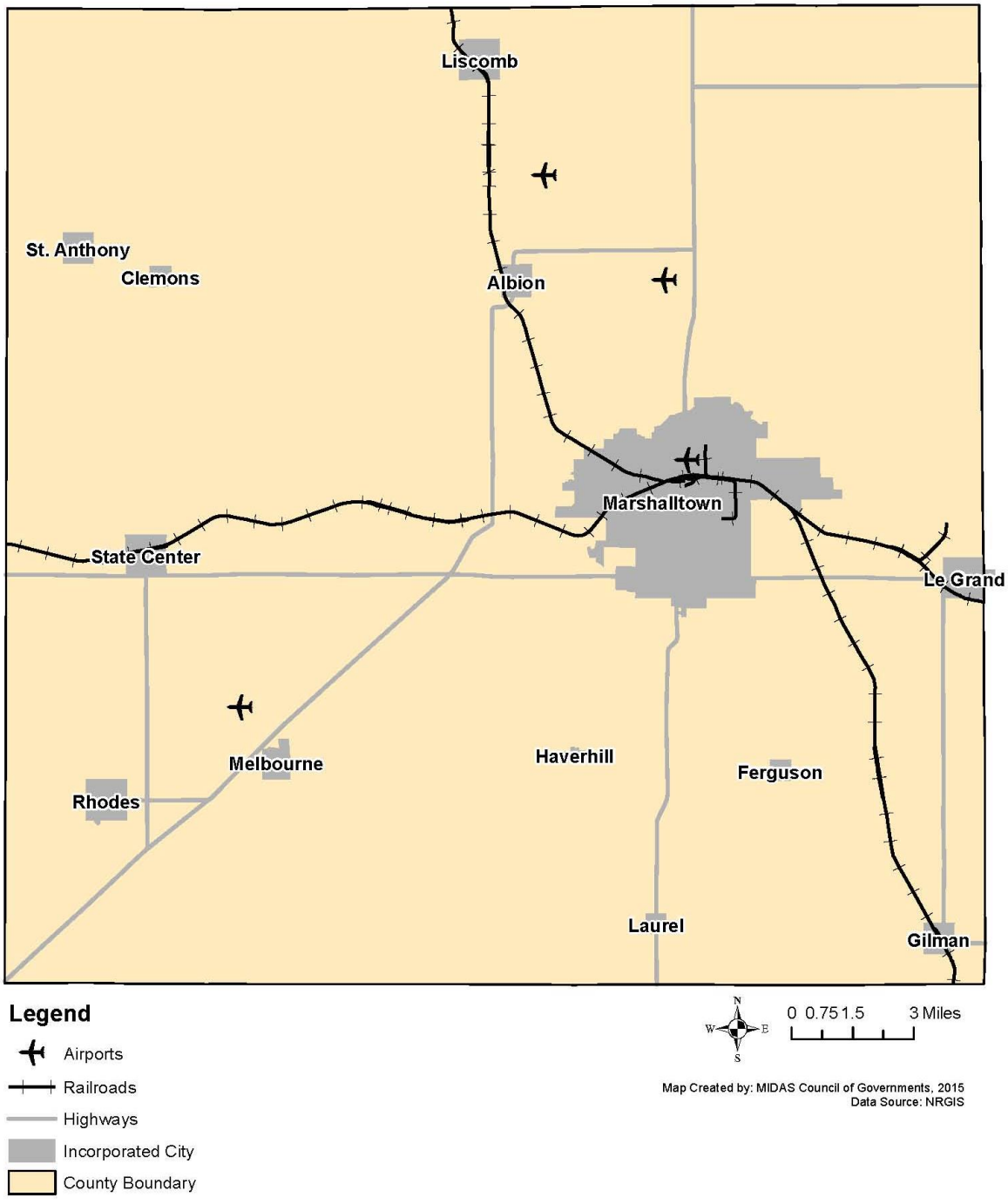


Figure 4.1.7: Location of Levees in Marshalltown



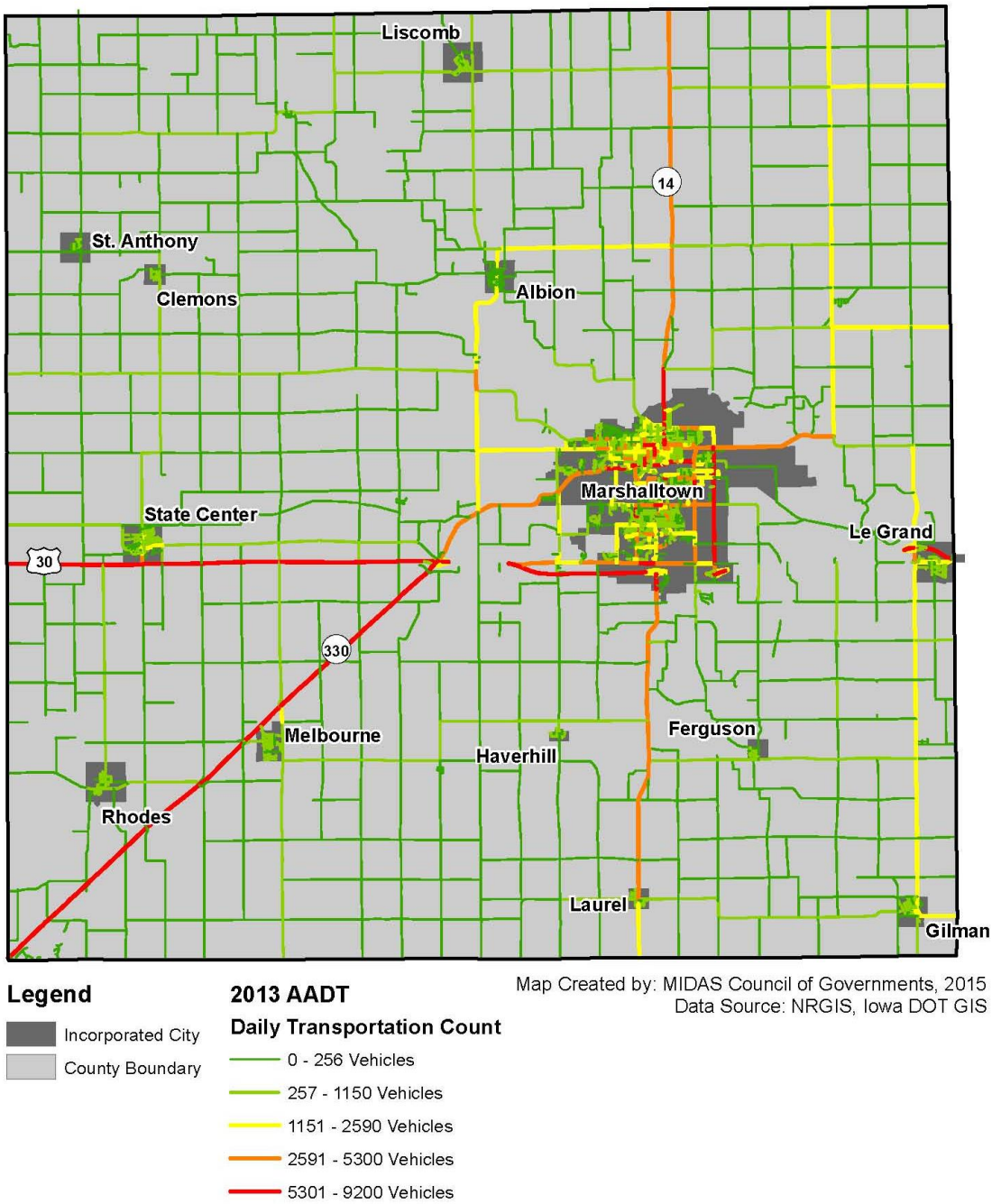
Regarding the risk of a transportation incident in Marshall County, rail freight lines run throughout Marshall County. Only the jurisdictions along the rail line (Liscomb, Albion, State Center, Marshalltown, LeGrand, Gilman) and unincorporated Marshall County are at risk for a rail transportation incident. Marshall County has a total of four airports located in or near Marshalltown, Albion, and Melbourne. Historically, no air traffic incidents have occurred at any of these airports, and probability of air traffic accidents is low.

Figure 4.1.8: Marshall County Air and Rail Transportation



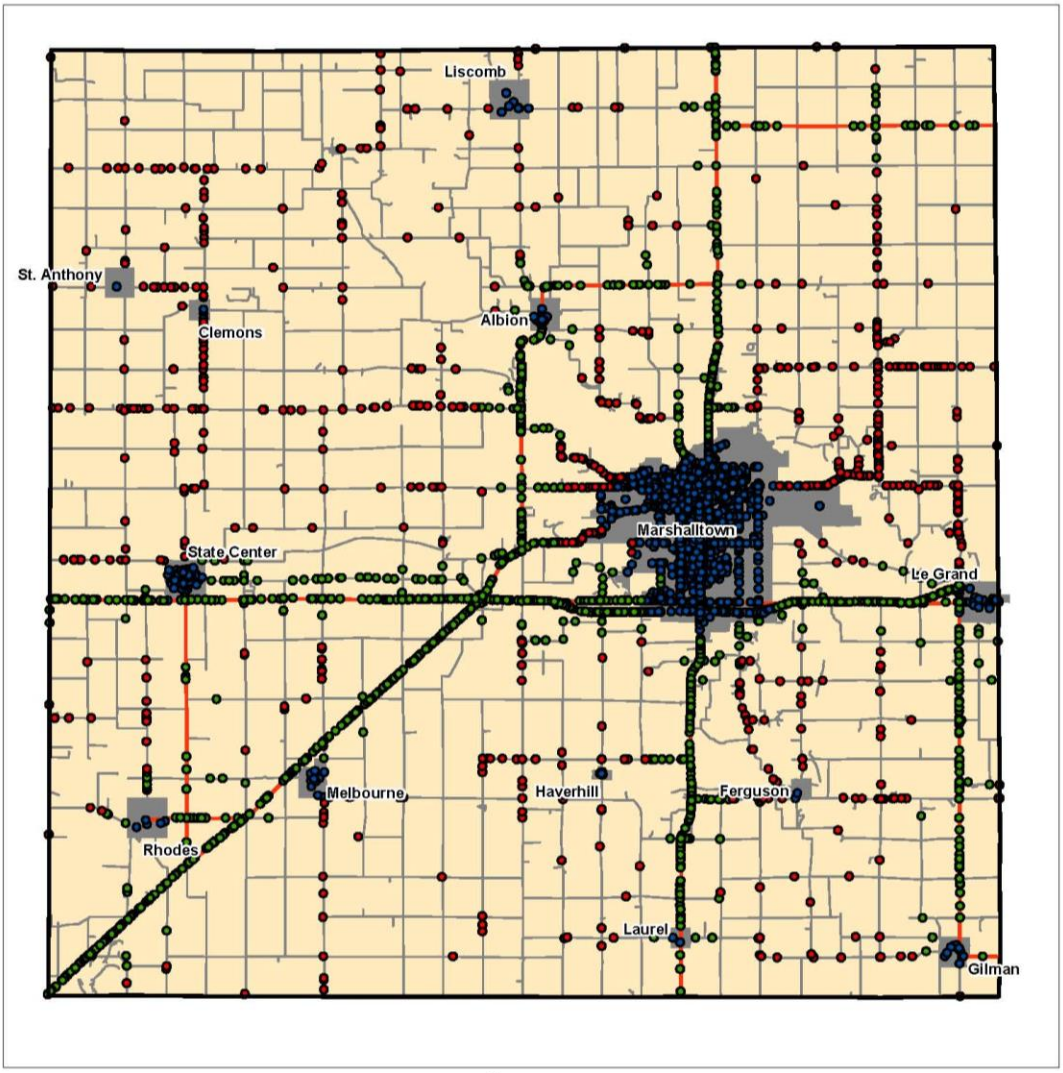
Marshall County has one US highway that runs through it: US Highway 30. The county also has several state highways, including 14 and 330. US Highways generally generate the highest average annual daily transportation (AADT) counts, which uses historic data to determine average traffic flows for a given area. Communities with higher AADT counts have a higher likelihood for a highway transportation incident to occur since more vehicle traffic occurs in these areas on a daily basis. Transportation incidents may occur as a result of the transportation of hazardous materials; however, nuclear transportation is not permitted on highways in Marshall County.

Figure 4.1.9: Marshall County Average Annual Daily Transportation (AADT) in 2013



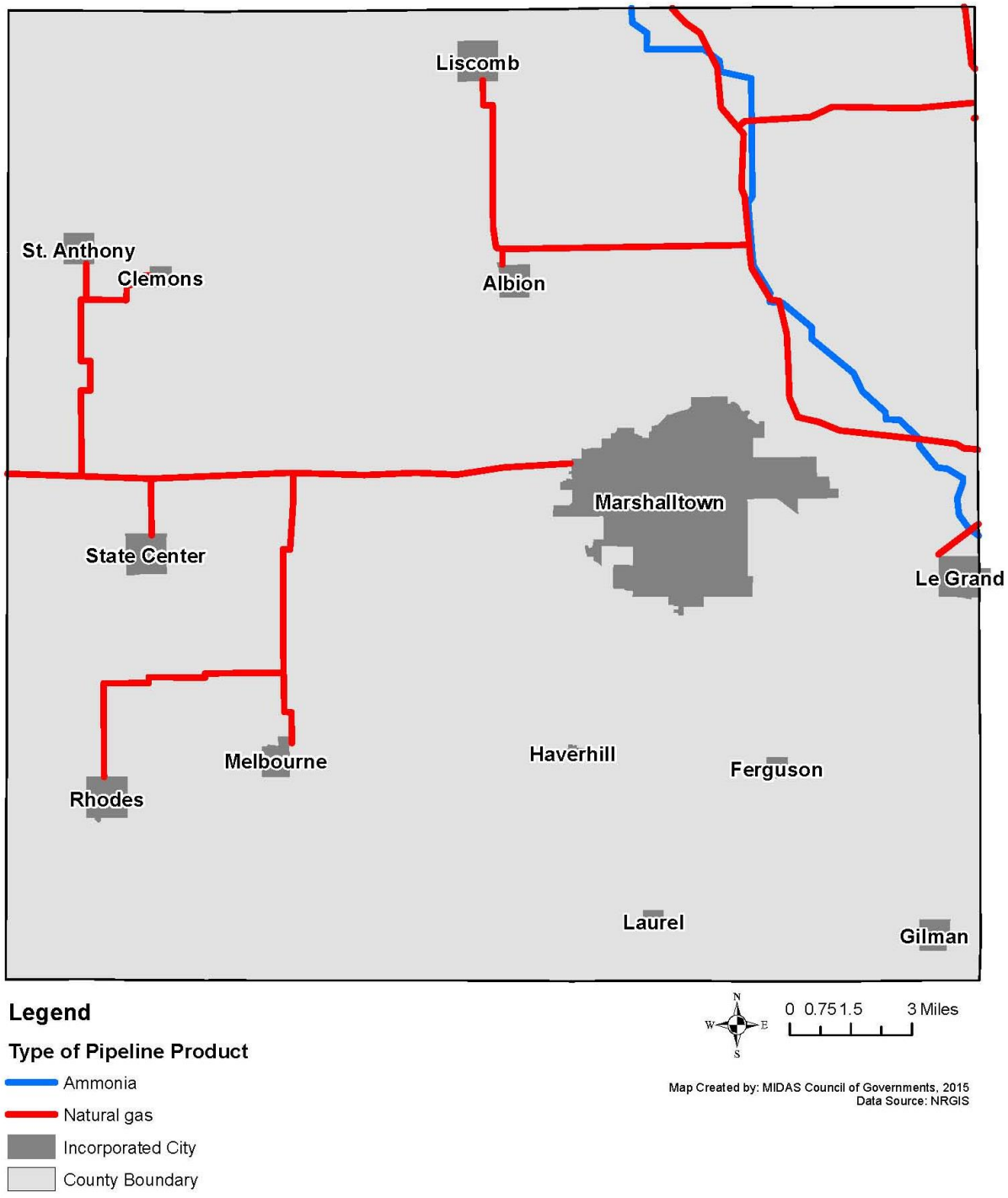
Crashes in Marshall County were most likely to occur in incorporated areas. While this data does not show us the severity of these accidents, it does show us that incorporated areas (especially those cities in close proximity to highways and higher AADT counts in Marshall County have an elevated vulnerability to highway transportation incidents.

Figure 4.1.10: Marshall County Vehicle Crashes from 2005 to 2014



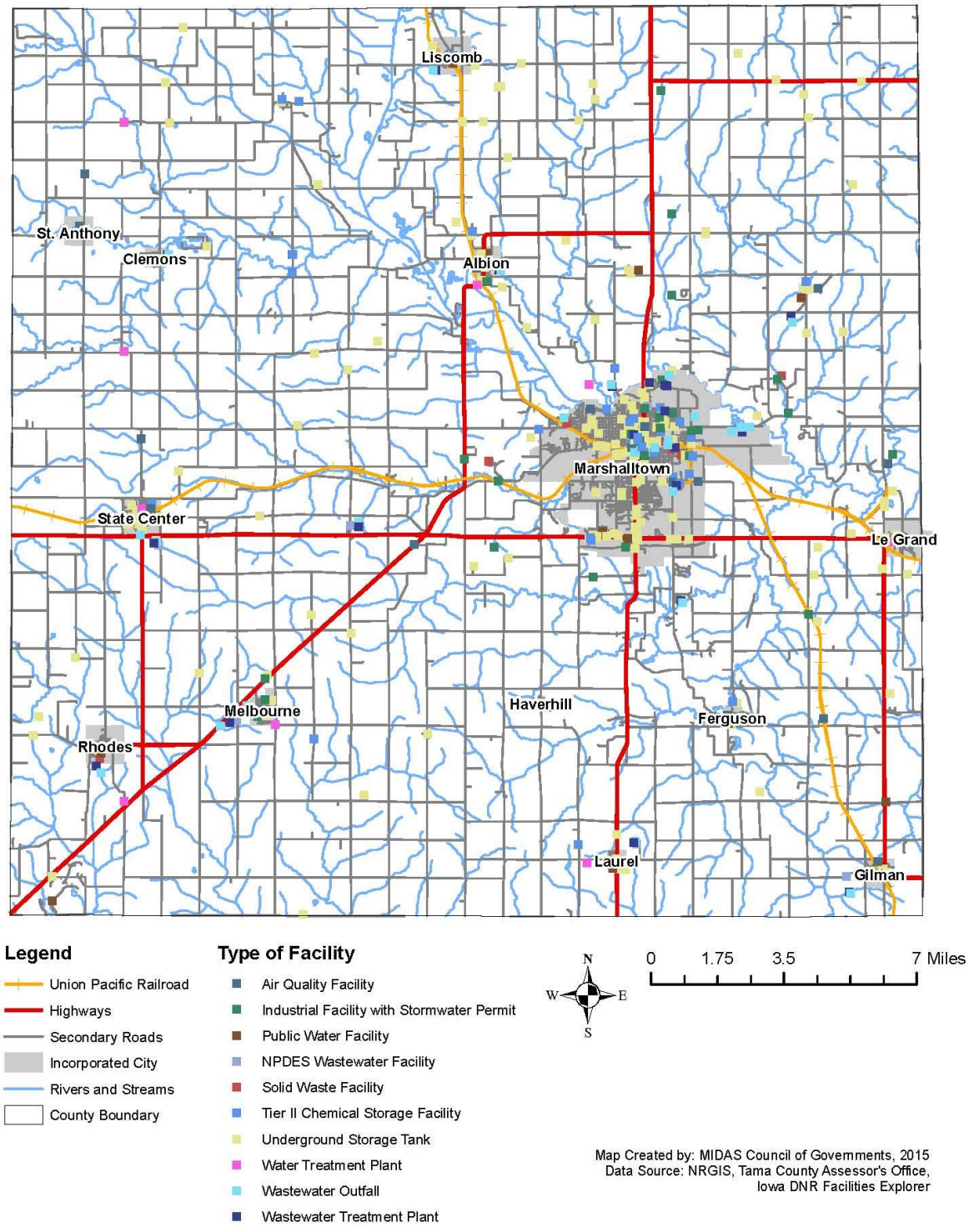
Marshall County has two different pipeline products that run through the county: ammonia and natural gas. Not all jurisdictions are at risk from a pipeline transportation incident. Four jurisdictions (Haverhill, Ferguson, Laurel, and Gilman) have no pipeline within five miles of their jurisdictional boundaries.

Figure 4.1.11: Location of Pipelines in Marshall County



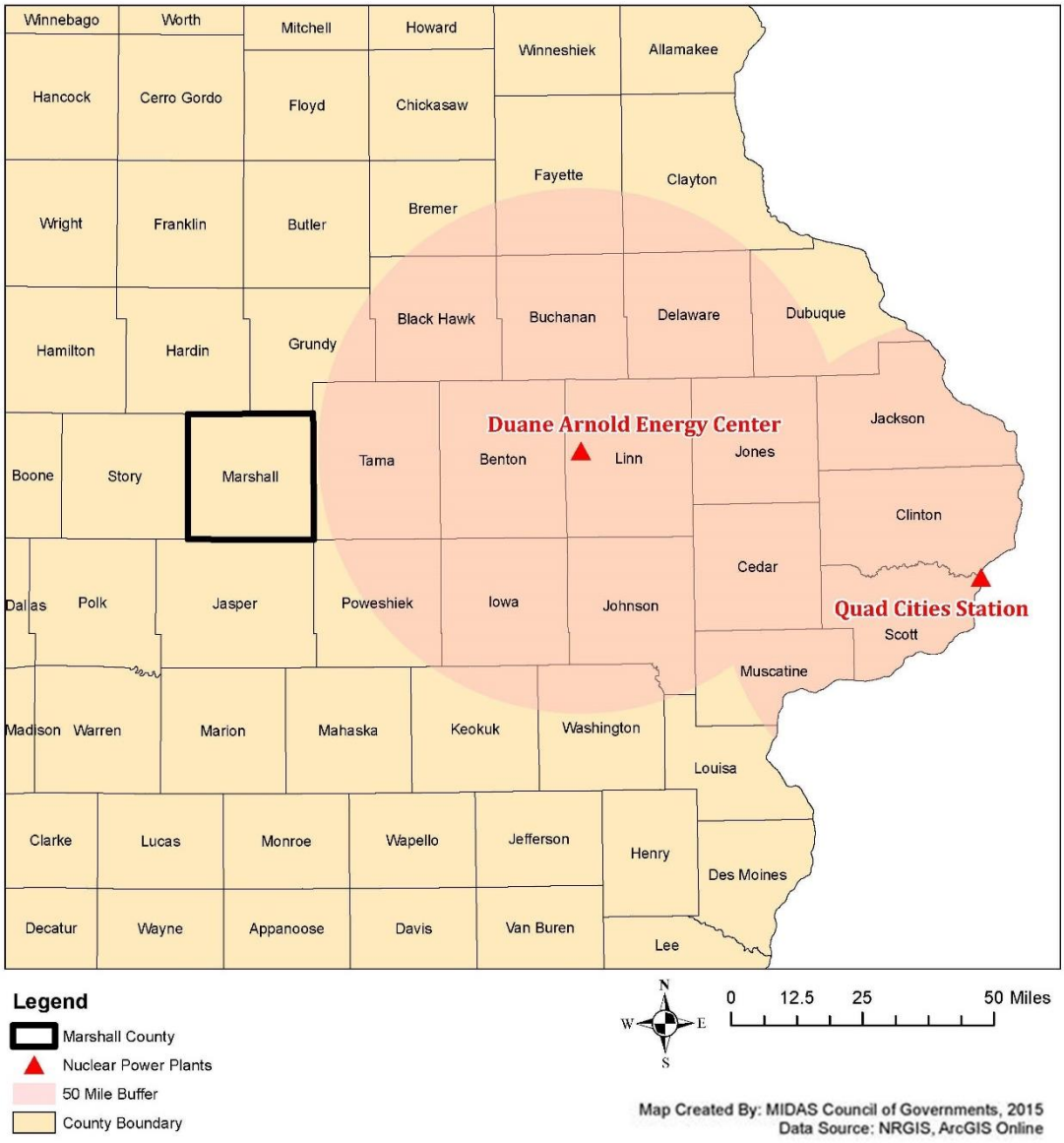
All jurisdictions in Marshall County have fixed hazardous materials within their jurisdictional boundaries. All jurisdictions considered this risk in the plan.

Figure 4.1.12: Location of Fixed Hazardous Materials in Marshall County



Marshall County is just outside the 50 mile buffer of Duane Arnold Energy Center in Linn County, however, the county still chose to consider radiological hazards in this plan. The risks associated with the radiological hazard in Marshall County are similar across jurisdictions. Regarding transportation of radiological waste, none of the highways in Marshall County are part of a nuclear transportation route; transportation of nuclear waste is only allowed on US Interstate Highways 35 and 80 in Iowa. According to the Council of State Governments Midwestern Office (2005), the Union Pacific railway line that runs through Marshall County may handle some radioactive materials transportation, but a majority of the high-level radioactive waste is shipped on another rail line that goes through the southern portion of Iowa. This change in rail shipping that does not use the Union Pacific Line for hazardous materials occurred in 1995. All jurisdictions in Marshall County could be affected if a mandatory evacuation is necessary from the areas surrounding the Duane Arnold Energy Center, as Highway 30 is a planned evacuation route.

Figure 4.1.13: Fixed Radiological Hazards That Affect Marshall County



4.2: Hazard Profiles and Risk Assessment

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 2013 Iowa Hazard Mitigation Plan, past events and declared disasters, and reviewing data from Marshall County Emergency Management, National Climatic Data Center, and other sources.

The actual profile of each possible hazard is based on the format used by previous versions of Iowa's 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 again in the future
- Vulnerability of people and property that would be affected by the hazard event
- Severity of the hazard's potential impact on human life and property
- Speed of onset or amount of warning time before the hazard occurs

The hazard scoring methodology used for this plan is modeled off of Iowa's 2007 Hazard Mitigation Plan. The plan update brought several changes to the ranking criteria used in the previous plan. The previous plan included the following six ranking criteria: (1) historic occurrence, (2) probability, (3) human vulnerability, (4) maximum geographic extent, (5) severity of impact, and (6) speed of onset. Criteria 1, 2, 5, and 6 did not change in the plan update. Criteria 4 was removed from the plan because it is not commonly used in many updated hazard mitigation plans. Criteria 3 was changed to consider the vulnerability of both people and poperty. The hazard scoring methodology that was used for the risk assessment of this plan update is described in the following tables.

1. **Historical Occurrence**: number of times that a hazard has occurred in the jurisdiction in the past.

Score	Number of Historical Occurrences
1	Less than 4 occurrences
2	4 to 7 occurrences
3	8 to 12 occurrences
4	More than 12 occurrences

2. **Probability** reflects the likelihood of a hazard occurring again in the future.

Score	Frequency of Occurrence
1	Unlikely – Less than 10% chance probability in the next year
2	Possible -Between 10% and 25% probability in the next year
3	Likely – Between 26% and 60% probability in the next year
4	High Likely – More than 60% chance in the next year

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

Score	Percentage of People and Property Affected
1	Less than 25% of people and property affected
2	25-50% of people and property affected
3	51-75% of people and property affected
4	More than 75% of people and property affected

4. **Severity of Impact** is an assessment of severity in terms of injuries and fatalities, personal property, and infrastructure.

Score	Characteristics
1	Negligible Few if any injuries. Minor quality of life lost with little or no property damage. Brief interruption of critical facilities and services for less than 4 hours. No environmental impact. No impact to reputation of the jurisdiction
2	Limited Minor injuries and illness. Minor or short-term property damage which does not threaten structural stability. Shutdown of critical facilities and services for 4 to 24 hours. Minor short-term environmental impact. Very limited impact to reputation of the jurisdiction
3	Critical Serious injury and illness. Major or long-term property damage which threatens structural stability. Shutdown of essential facilities for 24 to 72 hours. Minor long-term environmental impact. Moderate impact to the reputation of the jurisdiction
4	Catastrophic Multiple deaths. Property destroyed or damaged beyond repair. Complete shutdown of critical facilities and services for 3 days or more. Major long-term environmental impact. Severe impacts to the reputation of the jurisdiction.

5. **Speed of Onset** is the rating of the potential amount of warning time that is available before the hazard occurs.

Score	Probable Amount of Warning Time
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

At the first meeting, each hazard was scored based on the five criteria listed above. All of these scores were based on available data from a variety of sources and the judgment, experience, and local knowledge of the Task Force. See a complete list of data sources in Table 4.1.9 and Appendix R. Total hazard scores ranged from a minimum possible score of 5 points to a maximum possible score of 20 points. At the second meeting, Task Force members reviewed the results and were given the option to revise the hazard ranking outcome to best reflect their community's risks, vulnerability, and approaches to mitigation. Almost all communities had no additional changes and approved their final hazard scores at the second meeting.

Some communities were asked to provide additional details on their hazard risk and vulnerability such as what types of infrastructure they felt were most vulnerable to failure, how often a failure had occurred in the past, the extent of the failure, and how these failures may affect the community. The Task Force was asked for this information to best represent the hazard in the risk assessment score and to target mitigation actions in future meetings.

For hazards such as flash flooding, communities were asked to describe how often, where, and to what extent the hazard occurred in their community. These maps are included in Appendix D.

For river flooding, NCDC data appeared to under-report the number of flood events that affected each jurisdiction. For example, Marshall County was affected by severe river flooding in 2013, yet NCDC data does not list Marshall County as having experienced a river flooding event during this time. One unincorporated town in Marshall County, Minerva, was included in two river flooding events in 2013. The rest of the county was not mentioned or counted. See Appendix F for a news article involving flooding in Marshall County in 2013 that was not captured through NCDC data. See Appendix G for NCDC data. Communities in Marshall County did not add any additional flood events aside from what was included with NCDC data, but it is important to note that some communities may face a higher risk of river flooding than what is represented with the available data. For more information on flooding in Marshall County, see flood maps in Appendix E or see the detailed analysis of flood vulnerability in the Vulnerability Assessment Section of this plan and in Appendix L.

The entire ranking process was completed by each participating jurisdiction. Because of the similarities in hazard risk among jurisdictions, many communities scored hazard risk similarly. The scores for county-wide hazards were agreed upon by the entire Task Force at Hazard Mitigation Meeting 1. Those scores are included in the tables at the beginning of each hazard profile in this chapter. There are, however, differences in hazard risk among jurisdictions. For non-county-wide hazards, each jurisdiction's hazard risk score is included in the tables at the beginning of each hazard profile. Differences in scores based on community are described in this chapter and in the Vulnerability chapter of this plan. Several notable differences among jurisdictions include the hazards of river flooding and flash flooding. Maps indicating the extent of river flooding risks and flash flooding risks are included in Appendix L and D.

Regarding school districts' risk assessments, school districts' historical occurrence and probability were calculated based on a combination of data from the jurisdictions in which the school districts have facilities. For a map of school district facilities for each participating district in this plan, see Figures 4.3.2.20-24. Note that this methodology was only used for the following non-county-wide hazards for which NCDC data was available: hazardous materials, river flooding, thunderstorm lightning, hail, tornado, flash flood.

For other non-county-wide hazards, school districts considered their historical occurrence, probability, and other criteria based on the specific location of their district facilities. In some cases, school districts deferred to the scoring of the jurisdictions in which their facilities are located because they perceived the district risk to be similar.

Changes in the risk assessment scores from the previous 2012 Marshall County hazard mitigation plan and the plan update occurred for several reasons. First, the change in scoring methods described previously contributed to differences in scores. Second, many hazards were scored on a jurisdictional level with jurisdictional data sets in the plan update. This significantly changed scores, and it makes the previous scores difficult to compare with the scores in the new plan update. Finally, new data was available through the NCDC, NRGIS library, Iowa DNR, and other sources that was not available during the previous plan's writing. These new data sets had an impact on the risk assessment scores presented in this chapter.

Hazard profiles and risk assessment scores for each hazard included in this plan are discussed in the following narrative description. Hazards are separated into two broad categories: county-wide and community-specific hazards. Hazard profiles include a definition of the hazard, description of the hazard, the historical occurrence of the hazard, probability of the hazard occurring in the future, vulnerability to the hazard, and the amount of warning time associated with each hazard. Final risk assessment scores for each hazard are shown in the tables provided.

County-Wide Hazards

The following hazards are included in this section as county-wide: Animal/Plant/Crop Disease, Drought, Earthquake, Extreme Heat, Radiological, Thunderstorm/Lightning/Hail, Tornado, Severe Winter Storms, and Wind Storms. It should be noted that Thunderstorms/Lightning/Hail and Tornadoes were not initially considered county-wide hazards, but they were added to this section at the request of Iowa Homeland Security and Emergency Management Division. County-wide hazard profiles are listed in alphabetical order.

Animal/Crop/Plant Disease

Animal/Crop/Plant Disease – Hazard Score Calculation					
Historical Occurrence	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
1	1	1	3	1	7

Definition
An outbreak of disease that can be transmitted from animal to animal or plant to plant.

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.

Historical Occurrence

Statewide, there are several animal/plant/crop diseases that have the potential to affect Marshall County. One disease is the West Nile Virus (WNV). First identified 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 in 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. Marshall County has had no reported cases of West Nile Virus from 2007 to 2012 (the time frame for which data was available) (Iowa Department of Public Health, Center for Acute Disease Epidemiology 2015).

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. Scrapie is a fatal disease that affects the central nervous systems of sheep and goats. The disease peaked in the US in 2005; cases of Scrapie have been diagnosed in Iowa as recently as fall of 2014 (IDALS 2014). Porcine Epidemic Diarrhea (PED) Virus was confirmed in the US in 2013 (Iowa State University Veterinary Medicine Center 2015). The disease causes severe diarrhea in pigs of all ages; mortality rates in young pigs range from 30 – 100%. This disease's effect on Marshall County alone is not clear, but it has affected the hog market at large.

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

One disease that may affect Marshall County in the future is the Emerald Ash Borer. While the disease has not yet been identified in Marshall County, the adjacent counties of Jasper and Story have had positive identifications of the pest (Iowa DNR 2015).

Avian Influenza, or Bird Flu, was detected in Iowa in the spring of 2015. At the time that this plan was written in the summer of 2015, 70 farm facilities have been affected in 18 counties, resulting in 32.7 million affected chickens or turkeys in Iowa (IDALS 2015). There are no confirmed cases of the disease in Marshall County. According to the last Ag Census in 2012, Marshall County only had 33 poultry operations in the county that generated $199,900 in sales. The small size of poultry in the agricultural economy of Marshall County gives the county a low risk for the disease (National Agricultural Statistics Service 2015). According to the map in Figure 4.1.4 (data obtained from NRGIS), Marshall County currently has no confined animal feeding operations that house poultry, which also makes the county's risk for avian flu low.

Although there is potential for animal/plant/crop diseases to occur in Marshall County, the previous historical occurrence is rare, especially on a scale that has significantly affected the

region's economy or public safety. Marshall County has had no animal/plant/crop diseases that have affected the county on an epidemic scale. The task force determined the county's score to be a 1, with fewer than four hazard events that have affected the county in the last 16 years.

Probability

As one of the nation's top 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. However, based on the historical occurrence of animal/plant/crop diseases (zero events of epidemic proportion in the county between 1999 and 2015), probability of a future occurrence is low. The Task Force determined that Marshall County had a less than 10% chance of a significant animal/plant/crop disease occurring.

Vulnerability

Unincorporated Marshall County was identified as the jurisdiction most at risk for this hazard, as most domestic animals are located outside city corporate limits in Marshall County. U.S. agriculture is 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. However, Marshall County's vulnerability is significantly diminished due to the safeguards that the agriculture industry has in place for vaccinations, research, testing, and quarantine. Given the agriculture industry's current interest in keeping the risk of an outbreak low, Marshall County's vulnerability is also low. The Task Force determined that less than 25% of people or property would be affected in the event of an outbreak.

Severity of Impact

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 is that they can rapidly overwhelm the animal care system. However, state and federal animal health programs have been very successful in preventing or limiting the scope and magnitude of animal emergencies. If all of these safeguards failed, a disease outbreak might cause injury, illness, or major property damage (in the form of agricultural losses). Critical facilities and emergency services could be shut down or overwhelmed for more than 24 hours.

Speed of Onset

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 in certain circumstances, but farmers would be given at least a 24 hour notice.

Drought

Drought – Hazard Score Calculation					
Historical Occurrence	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
2	3	3	2	1	11

Definition
A period of prolonged abnormally low precipitation that produces severe dry conditions.

Description
There are three types of drought conditions that are relevant to Iowa: meteor logic 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, they can and do occur during cooler months.

Historical Occurrence
According to NCDC data, Marshall County has suffered five periods of drought conditions from 2000 to 2013, which gives the hazard a score of 2. While some may have been more severe than others, agricultural areas were affected much more than the metropolitan areas where impacts were indirect. The most recent drought was in 2013 which resulted in $21 million for the affected counties in Iowa, according to the NCDC. No deaths or injuries were reported during any of drought events.

Probability
Drought is part of normal climate fluctuations. Climatic variability can bring dry conditions to the region for up to years at a time. Research and observations of the El Nino/La Nina climatic events are resulting in more predictable climatic forecasts. The frequency of drought conditions in Iowa may increase with the onset on climate change. Based on historic occurrences of drought, Marshall County maintains between 25% and 50% chance of drought occurring in any given year.

Vulnerability
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. Generally, a drought event may directly or indirectly impact 50-75% of people and property in Marshall County. A prolonged drought would have a larger impact.

Severity of 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. Drought may cause short-term property damage until drought conditions dissipate.

Speed of Onset
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.

Earthquake

Earthquake – Hazard Score Calculation					
Historical Occurrence	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
1	1	1	1	4	8

Definition
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.

Historical Occurrence
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.

Probability
Based on historical occurrence, Marshall County has a less than 10% chance of an earthquake occurring in any given year in the 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.

Vulnerability
The Task Force estimated that, if an earthquake were to occur, less than 25% of people and property would be affected in Marshall County.

Severity of Impact
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 very minimal. 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.

Speed of Onset
Earthquake prediction is an inexact science. Even in areas that are well monitored with instruments, such as California's San Andreas Fault Zone, scientists only very rarely predict earthquakes.

Extreme Heat

Extreme Heat – Hazard Score Calculation					
Historical Occurrence	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
4	4	4	4	1	17

Definition
Summertime weather that is substantially hotter and/or more humid than average for a location at that time of year. This includes temperatures (including heat index) in excess of 100 degrees Fahrenheit or at least three (3) successive days of 90+ degrees.

Description
Extreme heat is 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.

Historical Occurrence
According to NCDC Climate data online search, a total of 39 extreme heat events impacted Marshall County from 1993 to 2014. For the purposes of this plan, extreme heat was defined as temperatures in excess of 100 degrees Fahrenheit or at least three (3) successive days of 90+ degrees. A measure of heat index in addition to actual air temperature was not available from the NCDC. Historic data tells us that extreme heat is a fairly common occurrence in Marshall County.

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.

Probability
Based on historical information, Iowa is extremely likely to experience an extreme heat event. There is more than a 60% chance of this hazard occurring in any given year.

Vulnerability
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. Generally, more than 75% of people and property in Marshall County are affected when this type of hazard occurs.

Severity of Impact
Extreme heat has broad impacts for Marshall County. On the whole, many communities in Marshall County have learned to adapt to extreme heat and periods of hot weather during the summer months through the use of air conditioned spaces, which makes the severity of extreme heat for Marshall County low, as long as people have access to a cool place. However, extreme heat spells can and do result in serious injury or death. One negative impact of air conditioning is that it increases demand for electricity, which can outstrip supply and cause city infrastructure to fail. These types of incidents can usually be resolved quickly, but sometimes power outages can affect communities for days.

Regarding agriculture, livestock and other animals can become stressed and adversely impacted by extreme heat. High temperatures at the wrong time can also inhibit crop yields. The demand for water increases sharply during periods of extreme heat, which may contribute to fire suppression problems for both urban and rural fire departments. In extreme cases, 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).

Speed of Onset
As with other weather phenomena, periods of extreme heat are predictable. 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.

Radiological

Radiological – Hazard Score Calculation					
Historical Occurrence	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
1	1	4	4	4	14

Definition
An incident resulting in the release of radiological material at a fixed facility on in transit. This hazard includes power plants, hospitals, and laboratories.

Description
Marshall County is located just outside a 50-mile buffer of the Duane Arnold Energy Center near Palo, Iowa in Linn County. Emergency classifications defined by the United States Nuclear Regulatory Commission are divided into four categories (Iowa Emergency Management Association 2014). Each calls for a certain level of response from plant and government personnel. From least to most severe, the classifications are:

- ***Unusual Event*** - Events that are in process or have occurred which indicate potential degradation in the level of safety of the plant. No release of radioactive material requiring offsite response or monitoring is expected unless further degradation occurs.
- ***Alert*** - Events are in process or have occurred that involve an actual or potential substantial degradation in the level of safety of the plant. Any releases of radioactive material from the

plant are expected to be limited to a small fraction of the Environmental Protection Agency (EPA) protective action guides (PAGs).

- ***Site Area Emergency*** - Events in process or which have occurred that result in actual or likely major failures of plant functions needed for protection of the public. Any releases of radioactive material are not expected to exceed the EPA PAGs except near the site boundary.
- ***General Emergency*** - Actual or imminent substantial core damage or melting of reactor fuel with the potential for loss of containment integrity. Radioactive releases during a general emergency can reasonably be expected to exceed the EPA PAGs for more than the immediate site area.

The Duane Arnold facility has experienced seven Unusual Events, one Alert, and no Site Area Emergencies or General Emergencies. None of these occurrences qualify as a radiological hazard event.

Historical Occurrence
There have been no occurrences of a radiological incident since the facility began operating in 1974.

Probability
The probability of a radiological incident occurring is very low in any given year (less than 10%).

Vulnerability
While Marshall County is more than 50 miles away from the facility, communities in Marshall County are still vulnerable. Task Force members estimated that if a radiological event did occur, more than 75% of people and property would be affected in Marshall County. Effects would include increased vehicle traffic, as the portion of Highway 30 that runs through Marshall County is part of the emergency evacuation route in the event of a general emergency at the plant. Depending on the extent of the radiological incident, property in Marshall County could also be affected.

Severity of Impact
The Task Force determined that a radiological event could cause serious injury or even death and a shutdown of critical facilities and services for more than three days. Environmental impacts could also be significant in the event of a nuclear incident.

Speed of Onset
Radiological events cannot be predicted. Marshall County would have no warning time to prepare for a radiological incident.

Severe Winter Storm

Severe Winter Storm – Hazard Score Calculation					
Historical Occurrence	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
4	4	4	4	2	18

Definition
Severe winter weather conditions that affect day-to-day activities. Severe winter storms can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold. Winter storms are common during the months of October through April.

Description
Winter storms are common during the months 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.

Historical Occurrence
From 1996 to 2014, Marshall County experienced a total of 53 incidents of severe winter storms including: winter storms (15), heavy snow (14), ice storms (11), or winter weather (1). According to NCDC data, these weather events did not result in any deaths or injuries but they did cause a total of $2.7 million in property damages and $2.6 million in crop damages. Note that these events were based on all events that occurred throughout the county. See Appendix G for a complete list of events.

Probability
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 even of 10 inches or more will occur about once every three years.

Based on the historic occurrences of this hazard, Marshall County is highly likely experience severe winter weather in any given year.

Vulnerability

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. The Task Force estimated that more than 75% of people and property would be affected by a severe winter storm in Marshall County.

Severity of Impact

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. Poor road conditions, immobilized transportation and downed trees and electrical wire can impair snow removal on roads and road treatment.

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.

Speed of Onset
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 at least 12-24 hours in advance as storms form and totals are estimated. Several notifications made by the National Weather Service include winter storm warning, blizzard warning, winter weather advisory, and a frost/freeze advisory.

Thunderstorm, Lightning, and Hail

Tornado – Hazard Score Calculation					
Historical Occurrence	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
4	4	3	2	4	17

Definition
Thunderstorms are common in Iowa and can occur singly, in clusters, or in lines. Thunderstorms can result in heavy rains, high winds (reaching or exceeding 58 mph), tornados, or hail. Thunderstorms are created from a combination of moisture, rapidly raising warm air, and the lifting mechanism such as that caused when warm and cold air masses collide. Thunderstorms are hazards unto themselves, but can cause other hazards such as flash flooding, river flooding, and tornadoes/windstorms. Hailstorms are a product of a severe thunderstorm in which pellets or lumps of ice (of most concern when greater than 1 inch in diameter) fall with rain.

Description
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. Hail is produced by many strong thunderstorms. Strong rising currents of air within a storm carry water droplets to a height where freezing occurs. The size of hail ranges from 0.75 inches in diameter to 2.75 inches. Ice particles grow in size until they are too heavy to be supported by the updraft. Hail can be smaller than a pea or as large as a softball and can be very destructive to plants and crops. Pets and livestock are particularly vulnerable to hail.

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.

Historical Occurrence

According to NCDC data, Marshall County has experienced 265 thunderstorm, thunderstorm wind, hail, lightning, or heavy rain events from 1961 to 2013 (the time frame for which data was available). In total, these events have caused $3,652,500 in property damages and $1,487,000 in crop damages. The high winds during these events ranged from speeds of 57 to 92 miles per hour. On the whole, the county occurrence is high; however, there are variations among jurisdictions. Note that these events were based on all events that occurred throughout the county. See Appendix G for a complete list of events.

A jurisdictional breakdown of historical occurrence is included in Table 4.2.4. Overall, Marshall County received a score of 4 for historical occurrence, meaning that well over 12 events occurred from 1961 to 2013. It is probable that jurisdictions experienced thunderstorms, lightning, and hail even more than NCDC data reported, but communities were not given the opportunity to add additional historic events.

Table 4.2.4. Historical Occurrence of Thunderstorms, Lightning, and Hail in Marshall County

Jurisdiction	Time Period	# of Events	Total Damages
Albion	4/1960 – 9/2014 (54.6 years)	8	$136,000 (Property) $30,000 (Crop)
Clemons		4	$15,000 (Property) $275,000 (Crop)
Ferguson		4	$8,000 (Property) $10,000 (Crop)
Gilman		11	$126,000 (Property) $45,000 (Crop)
Haverhill		5	$59,000 (Property) $30,100 (Crop)
Laurel		7	$50,000 (Property) $40,000 (Crop)
Le Grand		4	$60,500 (Property) $3,000 (Crop)
Liscomb		7	$150,000 (Property) $30,000 (Crop)
Marshalltown		97	$1,686,000 (Property) $500,000 (Crop)
Melbourne		11	$118,000 (Property) $120,000 (Crop)
Rhodes		6	$45,000 (Property) $22,000 (Crop)
St. Anthony		7	$370,000 (Property) $30,000 (Crop)
State Center		47	$645,000 (Property) $66,000 (Crop)
Marshall County Uninc		27	--

East Marshall SD		26	$244,500 (Property) $98,000 (Crop)
GMG SD		4	$22,000 (Property) $20,000 (Crop)
Marshalltown SD		97	$1,686,000 (Property) $500,000 (Crop)
West Marshall SD		47	$645,000 (Property) $66,000 (Crop)

Data Source: NCDC Storm Events Database 2015

Probability

Based on the historical occurrences of the county, the county has a greater than 60% chance of a thunderstorm, lightning, or hail even in any given year (a score of 4).

Vulnerability

People in unprotected areas, mobile homes, or automobiles during a storm are especially at risk of thunderstorm, lightning, and hail storms. 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. 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.

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. Vulnerable populations in all jurisdictions include the elderly residents who are living in their home. This is a commonly identified group of people in Marshall County. Most cities have older residents who live alone and may not have the mobility to respond quickly during a hazard event.

The county ranked vulnerability to a thunderstorm, lightning, or hail event as a 3, meaning that between 51-75% of people and property might be affected. Effects of such an event could range from minimal property damage that was not significant or widespread to significant property damage affects a large portion of a jurisdiction. In addition to routine damage, West Marshall Community School District do not currently have safe rooms available for their students and staff. The cities of Gilman and Albion also do not have safe rooms available for their residents, although some alternative locations in the community have been identified as informal places to shelter during inclement weather. These factors could affect each community' vulnerability to thunderstorm, lightning, and hail events.

Severity of Impact

It is possible for the entire county to be affected by a large thunderstorm and lightning event that moves across the entire county, but effects are often localized. Thunderstorms can 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.

In extreme or isolated circumstances, severe thunderstorms can bring 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.

Communities considered these risks and common occurrences when scoring severity of impact. Communities that scored impacts lower (little to no, minimal property damage, minimal environmental impacts, short-term effects on critical facilities operation) considered the effects of an average storm for their city. Communities that scored impacts higher (significant property damage, serious injury, shutdown of critical facilities for days), they considered a worst-case scenario storm.

Marshall County scored severity if impact as a 2, meaning that effects would generally cause only minor injuries or illness, minor property damage, and a shutdown of critical facilities for between 4 and 24 hours.

Speed of Onset

Some thunderstorms can be seen approaching, while others hit with minimal 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. Weather forecasting and severe weather warnings issued by the National Weather Service usually provide residents and visitors alike adequate time to prepare, but isolated problems arise when warnings are ignored. Warnings in the 20 to 30 minute range are usually available prior to the occurrence of the storm. Jurisdictions scored speed of onset as a 4, meaning that there is usually less than 6 hours warning time regarding the specific path, duration, or intensity of a thunderstorm, lightning, event, or hail storm.

Tornado

Tornado – Hazard Score Calculation					
Historical Occurrence	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
4	3	3	3	4	17

Definition

A violent whirling wind characteristically accompanied by a funnel shaped cloud extending down from a cumulonimbus cloud that progress in a narrow, erratic path. Rotating wind speeds can exceed 300 mph and travel across the ground at average speeds of 25-30 mph. A tornado can be a few yards to about a mile wide where it touches the ground. An average tornado 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 condensation of water droplets in the center of the funnel.

Description

In the U.S., Iowa is ranked third in the number of strong-violent (F2-F5) tornadoes per 10,000 square miles. From 1950-1995, Iowa averaged 31 twisters per year. In Iowa, most tornadoes occur in the spring and summer months, but twisters can and have occurred in every month of the year. Late afternoon to evening hour tornadoes are the most common, but they can occur at any time of the day. The rating scale used to rate tornado intensity is the Enhanced Fujita Scale.

Historical Occurrence

According to the National Climatic Data Center, Marshall County has experienced a total of 31 tornadoes from 1951 to 2014 (the earliest data available to the cutoff of 2014 for the purposes of data collection before the planning process began). These events caused a total of $31.5 million in property damage and $70,500 in crop damage. The intensity of these tornadic events ranged from an EF 0 to an EF 4 tornado in May of 1989. Note that these events were based on all events that occurred throughout the county. See Appendix G for a complete list of events. For a jurisdictional breakdown of tornadic events in Marshall County according to NCDC data, see Table 4.2.5.

Table 4.2.5. Historical Occurrence of Tornadoes in Marshall County

Jurisdiction	Time Period	# of Events	Total Damages
Albion	6/1951 – 6/2014 (63 years)	1	$100,000 (Property) $10,000 (Crop)
Clemons		0	--
Ferguson		1	$1,000 (Crop)
Gilman		1	$25,000 (Property)
Haverhill		0	--
Laurel		0	--
Le Grand		1	--
Liscomb		0	--
Marshalltown		7	$2,597,500 (Property)

			$5,000 (Crop)
Melbourne		2	$60,000 (Property) $15,000 (Crop)
Rhodes		2	$3,000 (Property) $500 (Crop)
St. Anthony		1	$150,000 (Property) $20.000 (Crop)
State Center		4	$30,000 (Property) $7,000 (Crop)
Marshall County Uninc		9	$27,780,000 (Property)
East Marshall SD		3	$25,000 (Property) $1,000 (Crop)
GMG SD		0	--
Marshalltown SD		7	$2,597,500 (Property) $5,000 (Crop)
West Marshall SD		4	$30,000 (Property) $7,000 (Crop)

Data Source: NCDC Storm Events Database 2015

As a whole, county-wide tornadic events in Marshall County received a score of 4, meaning that well over 12 tornadoes occurred during the time frame for which data was available. Individually, however, most communities in the county experience less than four tornado events. The Marshall County unincorporated area has the highest incidence of previous tornadic events with 9 events. It should be noted that this high rate of occurrence could be part of a data limitation. NCDC data before roughly 1990 does not always provide the location of a tornadic event. The NCDC event notes were analyzed in an attempt to better identify a location of an event for events that were only labeled as occurring within Marshall County. As many events as possible were counted as within the appropriated location in which they occurred; the locations are reflected in Table 4.2.5 and Appendix G.

Probability

Based on NCDC data, Marshall County has between 25% and 60% chance of a tornadic event occurring in any given year, which results in a score of 3. Even though the probability of an individual jurisdiction is low, there is almost always risk of a tornado event somewhere in the county every year. It can be difficult to pinpoint the exact location of a tornado, so risk remains high for a large area when conditions for tornadoes are present. Historically, 30-40 tornadoes are confirmed in Iowa per year.

Vulnerability

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 broadcasted tornado watches and warnings due to language barriers are also at risk.

According to the 2013 American Community Census five-year estimates, Marshall County had a total of 668 mobile homes. The cities of Haverhill and St. Anthony were the only areas in Marshall

County that did not have any mobile homes, although other cities including Albion and Gilman noted that former mobile home parks in the city no longer contained any mobile homes. According to the ACS data, there were mobile home units in Albion (6), Clemons (5), Ferguson (3), Gilman (20), Laurel (9), Le Grand (64), Liscomb (21), Marshalltown (264), Melbourne (34), Rhodes (7), and State Center (26). The remaining mobile homes were located within unincorporated Marshall County (209). Communities in Marshall County have various access to safe rooms, shelters, basements, and public areas that can serve as shelters.

As a whole, Marshall County scored vulnerability to tornadoes as a 3, meaning that between 51-75% of people and property might be affected. Communities in Marshall County considered the extent of their vulnerability to tornadoes in various ways depending on the extent of the tornado. Some jurisdictions considered their vulnerability low, noting that the destructive path of a tornado is often only a couple hundred feet in width and would not impact a large area of the community. While a large-scale event could be devastating, Marshall County has the highest probability of experiencing an F1 tornado based on past occurrences. Other communities considered large, destructive tornado events when scoring vulnerability. 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 and are associated with severe storms and may cause significant damage to a wider area. The county as a whole determined their vulnerability score to be a 3, meaning that between 51-75% of people and property might be affected.

Severity of Impact

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.

All communities in Marshall County ranked severity of impact as a 3 or a 4, recognizing the potential for serious injury or deaths. Some of these communities have lived through tornadoes that have caused serious property damage. While there are also more common, less severe damages that can result from tornadoes like broken tree branches and windows, the Task Force agreed that jurisdictions would like to consider the more severe impacts that tornadoes can cause.

Speed of Onset

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 tornado 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. Communities would have minimal to no warning time in the event of a tornado.

Windstorm

Windstorm – Hazard Score Calculation					
Historical Occurrence	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
4	4	4	2	4	18

Definition
Extreme winds associated with severe winter storms, severe thunderstorms, downbursts, and very strong pressure gradients. Windstorms generally produce wind speeds in excess of 50 mph and can cause property damage, injuries, and/or death.

Description
NCDC defines high winds as "sustained non-convective winds of 40 mph (35 knots) or greater lasting for 1 hour or longer, and/or gusts greater than or equal to 58 mph (50 knots) for any duration." Windstorms are a regional event that can affect all of Marshall County.

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. Historically, high wind events are associated with severe thunderstorms and blizzards.

Historical Occurrence
According to NCDC data, Marshall County has counted 25 high wind events that occurred between 1996 and 2014. Wind speeds during these windstorms ranged from 57 to 70 miles per hour. No deaths or injuries were reported during these windstorm events. These events caused $3.2 million in property damage and $964,100 in crop damage. Note that these events were based on all events that occurred throughout the county. See Appendix G for a complete list of events.

Probability
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 could be occurrences of high winds that may not necessarily be considered a windstorm.

Vulnerability
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 broadcasted watches and warnings due to language barriers are also at risk. In general, the Task Force determined that more than 75% of the population in Marshall County might be affected by a wind storm. These effects include downed trees, power outages, and structural damage to houses and automobiles.

Severity of Impact
The severity of damage from windstorms can vary. 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. The wind storms that Marshall County has experienced have caused minor injuries or illness and minor property damage. Crop damage is often associated with windstorms, laying down crops, breaking stalks, and twisting plants, thus reducing the yield and making it difficult to harvest.

Speed of Onset
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 tornado watches to be broadcasted to those in the path of these storms hours in advance. The best lead-time for a specific severe storm is about 30 minutes.

Community-Specific Hazards

The following hazards are included in this section: Dam/Levee Failure, Flash Flood, Grass or Wildland Fire, Infrastructure Failure, Hazardous Materials, Human Disease, River Flooding, Terrorism, and Transportation Incident. The risk for these hazards varied among jurisdictions, therefore, the scores also varied among jurisdictions. Scores for each jurisdiction are included in the tables provided. Community-specific hazard profiles are listed in alphabetical order.

Dam/Levee Failure

Dam/Levee Failure – Hazard Score Calculation						
Jurisdiction	**Historical Occurrence**	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
Albion	1	1	1	1	4	8
Clemons	1	1	1	1	4	8
Ferguson	1	1	1	1	4	8
Gilman	1	1	1	1	4	8
Haverhill	1	1	1	1	4	8
Laurel	1	1	1	1	4	8
Le Grand	1	1	1	1	4	8
Liscomb	1	1	1	1	4	8
Marshalltown	1	1	1	3	4	10
Melbourne	1	1	1	1	4	8
Rhodes	1	1	1	1	4	8
St. Anthony	1	1	1	1	4	8
State Center	1	1	1	1	4	8
Marshall County	1	1	1	2	4	9
East Marshall Community SD	1	1	1	1	4	8
GMG Community SD	1	1	1	1	4	8
Marshalltown Community SD	1	1	1	2	4	9
West Marshall Community SD	1	1	1	1	4	8

Definition

The uncontrolled release of water resulting from a structural failure in a dam, wall, dike, berm, or area of elevated soil can cause flooding. Possible causes of the breach could include flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, terrorism, erosion, piping, saturation, or under seepage.

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 were 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 its 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. Marshall County has a total of 20 dams. 17 of these dams are Low Hazard Dams and three are Moderate Hazard Dams. According to the Iowa Department of Natural Resources, Low Hazard dams are classified as dams in which damages from a failure would be limited to loss of the dam, livestock, farm outbuildings, agricultural lands and lesser used roads, and where loss of human life is considered unlikely. Moderate Hazard dams are classified as dams where failure may damage isolated homes or cabins, industrial or commercial buildings, moderately traveled roads, or dams that may interrupt major utility services but are without substantial risk of loss of human life. Dams are also classified as Moderate Hazard when the dam and its impoundment are themselves of public importance, such as dams associated with public water supply systems, industrial water supply or public recreation, or which are an integral feature of a private development complex. The majority of dams in the county were built for the purposes of fire protection, stock or small fish ponds. Three dams were built for the purposes of recreation, and two were built for flood control purposes. There are an additional 17 dams within five miles of Marshall County boundaries. One of those dams are moderate classification dams but pose a minimal risk to downstream communities in Marshall County. See Figure 4.1.6 in this plan for a map of dams in Marshall County and adjacent counties.

According to the National Levee Database, Marshall County has a three-levee system located in the City of Marshalltown. The levees are located on the right and left descending banks of Linn Creek, right and left descending banks of Anson Creek, and the right descending bank of the Iowa River (US Army Corps of Engineers 2015). The levees' are 5.51, 2.32, and 1.28 miles in length. The levee system was completed in 1975 and were authorized by the Flood Control Act of 1965. The levee system has a total of 1361.3 leveed area acreage. The most recent periodic inspection of the levees in 2012 resulted in a rating of "Minimally Acceptable" for all three levees, which is the middle ranking in between unacceptable and acceptable. Levees are given a minimally acceptable ranking if they have one item or more from a checklist that does not meet national standards. Citation items were minimal and did not point to an increased risk of levee failure due to operation. Note that the National Levee Database lists all federal levees; however, it is possible that there is more than just these levees located in Marshall County. Any levees not included in the National Levee Database are likely rural, agricultural-related man-made levees, dikes, or berms that protect primarily agricultural lands and communities. A breach or over-topping of these levees would likely *not* impact any other property than that of the levee owner.

There are 29 other levees within 75 miles of Marshall County; however, none of these levees pose a risk to Marshall County communities. Many of the levees are not located on the same rivers as those in Marshall County (ie: levees in Black Hawk, Dallas, Fayette, Polk, Wapello Counties). For a list of levees within 75 miles of Marshall County, see Appendix H.

Historical Occurrence

No jurisdictions have any reported incidents of a dam or levee failure in Marshall County.

Probability
The probability of a major dam failure or levee failure occurring in or affecting any jurisdiction in Marshall County is less than 10% in any given year.

Vulnerability
A failure of a low hazard dam, which includes the majority of dams in Marshall County, would result in damages that are limited to loss of the dam, livestock, farm outbuildings, agricultural lands, and lesser used roads. Low hazard dam failure would likely not have an impact on property beyond where the dam is located. The loss of human life is considered highly unlikely.

A failure of a moderate hazard dam may damage isolated homes or cabins, industrial or commercial buildings, moderately traveled roads, or interrupt major utility services, but are without substantial risk of loss of human life. Dams are also classified as Moderate Hazard where the dam and its impoundment are themselves of public importance, such as dams associated with public water supply systems, industrial water supply or public recreation or which are an integral feature of a private development complex.

All jurisdictions scored vulnerability as a 1 due to the limited impact of a low hazard dam failure. The Task Force estimated that less than 25% of people and property would be affected.

Severity of Impact
Most jurisdictions in Marshall County determined the severity of impact of a dam failure to be negligible (a score of 1), with few or no injuries, little or no property damage, and any interruption of services to take place for less than four hours, if at all. Marshall County and Marshalltown Community School District determined their severity of impact to be a 2. Impacts could cause minor or short-term property damage or environmental impacts. Marshall County considered the potential damage that could be caused due to a moderate hazard dam failure in an incorporated area; the failure is remote and would still only result in minimal property damage, but this risk is slightly higher than most other communities in Marshall County. Marshalltown Community School District has a slightly higher severity of impact score than other communities because of its proximity to the levee system in Marshalltown. The City of Marshalltown determined their severity of impact to be a 3 due to the potential for flood damage from a levee failure that could cause property damage that threatens structural stability in houses and buildings. There are already some ponding issues that the city has to address near one of the levees. The city has a pump system set up to address this issue during potential flood events.

Speed of Onset
A dam failure can be immediate, 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. Al jurisdictions scored speed of onset as a 4.

Flash Flood

Flash Flood – Hazard Score Calculation						
Jurisdiction	**Historical Occurrence**	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
Albion	1	1	1	1	4	8
Clemons	1	1	1	2	4	9
Ferguson	1	1	1	1	4	8
Gilman	1	1	1	1	4	8
Haverhill	1	1	1	1	4	8
Laurel	1	1	1	1	4	8
Le Grand	1	1	1	1	4	8
Liscomb	1	1	2	2	4	10
Marshalltown	2	3	1	2	4	12
Melbourne	1	1	1	2	4	9
Rhodes	1	1	1	1	4	8
St. Anthony	1	1	1	2	4	9
State Center	1	2	1	2	4	10
Marshall County	1	2	3	3	4	13
East Marshall Community SD	1	1	1	1	4	8
GMG Community SD	1	1	2	2	4	10
Marshalltown Community SD	2	3	3	2	4	14
West Marshall Community SD	1	2	1	1	4	9

Definition

A flood event that occurs with little to no warning where water levels rise at an extremely fast rate. 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.

Description

Flash flooding results from intense rainfall over a brief period and is 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.

Historical Occurrence

The historical occurrence of flash flooding varies across jurisdictions. According to NCDC data, 20 flash flooding events have occurred in the county from 2002 to 2014 (the time frame for which data was available). Note that these events were based on all events that occurred throughout the

county. See Appendix G for a complete list of events. A summary of NCDC data on flash flooding by jurisdiction is included in Table 4.2.1. These events have caused a total of $1,360,000 in property damage and $355,000 in crop damage. Note that some flood events may go unrecorded by NCDC data; these events may not cause substantial damage to houses or structures, but they may result in flood costs that the county taxpayers and individual property owners must finance.

Some communities did not identify flash flooding as an issue and had no previous occurrences. All cities in Marshall County except for Marshalltown had less than four flash flood events according to NCDC data and scored historical occurrence as a one. The cities of Albion, Ferguson, Gilman, Haverhill, Laurel, Le Grand, Rhodes, and State Center all stated that flash flooding had never been an issue in the city and did not complete flash flood maps for their incorporated areas. The cities of Clemons, Liscomb, Marshalltown, Melbourne, St. Anthony, and Marshall County marked on a map areas in their communities that were prone to flash flooding; these maps are included in Appendix D.

Marshalltown had seven flash flooding events from 2002 to 2014, which resulted in a score of two for historical occurrence. Marshalltown Community School District and West Marshall Community School District scored three and two for historical occurrence, respectively.

Table 4.2.1. NCDC Data on Flash Flooding in Marshall County

Hazard	Time Period	# of Events	Total Damages
Albion	6/2002 – 6/2014 (12 years)	0	--
Clemons		1	$25,000 (Property)
Ferguson		0	--
Gilman		0	--
Haverhill		1	$100,000 (Property)
Laurel		0	--
Le Grand		0	--
Liscomb		0	--
Marshalltown		7	$265,000 (Property) $250,000 (Crop)
Melbourne		0	--
Rhodes		1	$5,000 (Property)
St. Anthony		1	$25,000 (Property)
State Center		2	$50,000 (Property)
Marshall County Unincorporated		2	$325,000 (Property) $100,000 (Crop)
East Marshall SD		0	--
GMG SD		0	--
Marshalltown SD		7	$265,000 (Property) $250,000 (Crop)
West Marshall SD		2	$50,000 (Property)

Source: National Climate Data Center 2015

Probability
The probability of flash flooding is varied across jurisdictions. Probability is dependent on historic occurrences. Most jurisdictions had a probability of less than 10% for a flash flood incident to occur in any given year, which resulted in a score of 1. State Center, Marshall County, and West Marshall Community School District had a probability of 10-25%, which resulted in a score of 2. Marshalltown and Marshalltown Community School District had a probability of 25-60%, which resulted in a score of 3.

Vulnerability
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 matter of minutes.

All Marshall County communities are prone to flash flooding. Albion, Clemons, Ferguson, Gilman, Haverhill, Laurel, Le Grand, Marshalltown, Melbourne, Rhodes, St. Anthony, State Center, East Marshall Community School District, and West Marshall Community School District ranked vulnerability to flash flooding as a 1, meaning that less than 25% of people and property would be affected. Many of these communities did not cite flash flooding as an issue historically and did not identify any areas of the community where flash flooding has damaged property or infrastructure. Marshalltown has a few intersections that have experienced flash flooding or ponding in the past. These areas are marked on the flash flooding map included in Appendix D.

Clemons ranked vulnerability to flash flooding as a 1. The city is sometimes affected by flash flooding from Minerva Creek and South Minerva Creek in the north, east, and south of the community. Historically, this flooding has only affected one house in 1993 and the sewer system for several hours in 2013. However, these flood events were extremely rare and historic. In the case of 2013, flash flooding did affect portions of the town, but only after 14 inches of rain had fallen over the area in a short period of time. On average, the effects of flash flooding are still localized to a small portion of the city; flood events generally impact less than 25% of people and property.

Liscomb and GMG Community School District ranked vulnerability to flash flooding as a 2, meaning that an event could affect 26-50% of the population. Liscomb is located very near to the Iowa River. A tributary of the river, Dowd Creek, runs through the northeast corner of the city. The city's proximity to both the Iowa River and this tributary increase its vulnerability to future flash flooding events. Marshall County and Marshalltown Community School District ranked vulnerability to flash flooding as a 3, meaning that an event could affect 51-75% of the population. When these areas experience flash flooding, roads, railroads, and other travel thoroughfares could be affected. In the unincorporated areas of the county, areas near Clemons, Rhodes, and outside of Marshalltown

experience flash flooding and road closures during flood events. These closures can affect anyone traveling within the county who is forced to take a detour.

Severity of Impact

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.

Albion, Ferguson, Gilman, Haverhill, Laurel, Le Grand, Rhodes, East Marshall Community School District, and West Marshall Community School District ranked severity of impact as a 1, as most of these jurisdictions would experience little to no property damage such as the items described in the previous paragraph during flash flooding. These jurisdictions also did not see environmental impacts or interruptions in critical facilities as likely to occur.

Clemons, Liscomb, Marshalltown, Melbourne, St. Anthony, State Center, GMG Community School District, and Marshalltown Community School District ranked severity of impact as a 2. Mainly, these communities were concerned with short-term property damage. Marshall County rated severity of impact as a 3. When flash flooding occurs in the unincorporated area, it can cause property damage that sometimes threatens structural stability.

Speed of Onset

Flash floods are somewhat unpredictable, but there are factors that can point to the likelihood of a flood 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. All jurisdictions in Marshall County scored speed of onset as a 4.

Grass or Wildland Fire

Grass or Wildland Fire – Hazard Score Calculation						
Jurisdiction	**Historical Occurrence**	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
Albion	1	1	1	1	4	8
Clemons	1	1	1	1	4	8
Ferguson	1	1	1	1	4	8
Gilman	1	1	1	1	4	8
Haverhill	1	1	1	1	4	8
Laurel	1	1	1	2	4	9
Le Grand	1	2	1	2	4	10
Liscomb	1	2	2	2	4	11
Marshalltown	1	1	1	1	4	8
Melbourne	3	4	1	2	4	14
Rhodes	4	4	1	1	4	14
St. Anthony	1	1	1	1	4	8
State Center	4	4	2	4	4	18
Marshall County	4	4	2	2	4	16
East Marshall Community SD	1	1	1	1	4	8
GMG Community SD	1	1	1	1	4	8
Marshalltown Community SD	1	1	1	2	4	9
West Marshall Community SD	1	1	1	1	4	8

Definition

An uncontrolled fire that threatens life and property in a rural or a wooded area. Grass and wild land fires are more likely to occur when conditions are favorable, such as during periods of drought when natural vegetation is drier and more combustible.

Description

Grass and wildland fire can occur when conditions are favorable, such as during periods of drought when natural vegetation would be drier and more combustible. Most communities in Marshall County are completely surrounded by agricultural land. Parcels located on the outskirts of incorporated areas and parcels in unincorporated Marshall County are most likely to experience effects from this hazard.

Historical Occurrence

According to the National Climatic Data Center, there were no wildland or forest fire events with significant impact that have been reported in Marshall County. This does not account for small or contained grass fires that may not have been reported. Marshall County Emergency Management Agency reported that grass or wildland fires do occur, but an accurate number by jurisdiction is not available. The data does not provide an accurate assessment of fires *in* a city; instead, the data captures fires that occurred throughout a fire department's district (both inside of and outside of the city limits), and even in another city during a mutual aid request. The Task Force estimated that, for most jurisdictions, the number of fires that have occurred within city limits in the last ten

years was minimal (one or less). For those communities that ranked historical occurrence of grass or wildland fire as very minimal, the Task Force did not recall fires within city limits in the past ten years that they could not adequately respond to with their current fire suppression gear. These communities did not consider small grassland fires as significant hazard events. Le Grand and Liscomb estimated the historical occurrence of grass or wildland fires to be slightly higher (two occurrences). Melbourne, Rhodes, and State Center estimated that the number of grass or wildland fires was higher in the last ten years (8 to 12 occurrences or more than 12). Marshall County is the jurisdiction with the highest historical occurrence (more than 12 occurrences in the last 10 years) because of the large amount of cropland and open space.

Probability

Because probability is based on historic occurrence, the Task Force estimated that, for most jurisdictions, there was a low probability (less than 10%) of a grassland fire occurring in any given year. Le Grand and Liscomb had a slightly elevated probability (between 10-25%), and Melbourne, Rhodes, State Center, and Marshall County had a high probability (more than 60% chance) to experience a grass or wildland fire.

Vulnerability

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-acres grass fire within a matter of minutes, but 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 fires. 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. It should be noted that all communities stressed that their vulnerability to damage from grass or wildland fires is extremely low due to the ability of fire departments throughout the county to respond to and put out fires before they are able to spread. Most jurisdictions in Marshall County estimated that less than 25% of people and property would be affected by any grass or wildland fire. Liscomb, State Center, and Marshall County estimated that their vulnerability might be slightly higher and 26-50% of people or property might be affected in some way by a grass or wildland fire.

Severity of Impact

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, and other vegetative matter. Occasionally, a house or outbuilding can be damaged or destroyed. Most jurisdictions in Marshall County scored severity of impact as a 1 or 2, meaning that little or minor property damage might occur or there may be a minor short-term environmental impact.

Speed of Onset

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. Generally, grass and wildland fires

occur with minimal to no warning time. All jurisdictions in Marshall County scored speed of onset as a 4.

Hazardous Materials Incident

Hazardous Materials Incident – Hazard Score Calculation						
Jurisdiction	**Historical Occurrence**	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
Albion	3	3	1	1	4	12
Clemons	1	1	1	1	4	8
Ferguson	1	1	1	1	4	8
Gilman	2	3	1	1	4	11
Haverhill	1	2	1	1	4	9
Laurel	1	2	2	2	4	11
Le Grand	1	2	3	3	4	13
Liscomb	1	2	2	3	4	12
Marshalltown	4	4	4	4	4	20
Melbourne	3	3	1	4	4	15
Rhodes	1	2	1	1	4	9
St. Anthony	1	1	1	2	4	9
State Center	4	4	4	4	4	20
Marshall County	2	2	4	4	4	16
East Marshall Community SD	4	4	2	2	4	16
GMG Community SD	2	2	1	2	4	11
Marshalltown Community SD	4	4	2	4	4	18
West Marshall Community SD	4	4	1	1	4	14

Definition

Hazardous materials incidents can occur with fixed hazardous materials, pipeline transportation, and transportation of hazardous materials. Incidents can include the accidental release of flammable or combustible, explosive, toxic, noxious, corrosive, oxidizable, irritant or radioactive substances or mixtures that can pose a risk to life, health, or property and possibly require an evacuation.

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.

Historical Occurrence

According to the Iowa DNR, hazardous materials spills throughout Marshall County are fairly common. From 1995 to 2014, the county experienced a total of 204 hazardous spills. 71% (144) of these spills occurred in Marshalltown alone. Of the total spills, 62% of these events involved fixed incidents and 22% involved transportation of hazardous materials. Other incident types included railroad incidents, manure, and unknown. Certain jurisdictions are more prone to these types of hazards than others depending on the location of these facilities and the level or amount of hazardous materials these facilities handle.

Clemons, Ferguson, Haverhill, Laurel, Le Grand, Liscomb, Rhodes, and St. Anthony received a score of 1 for historical occurrences because each jurisdiction had less than 4 hazardous material spill events. Gilman, Marshall County, and GMG Community School District received a score of 2 with occurrences ranging from 4 to 7. Albion and Melbourne received a score of 3 with occurrences ranging from 8 to 12, and Marshalltown, State Center, East Marshall Community School District, and West Marshall Community School District received a score of 4 with more than 12 hazardous materials spills

Maps illustrating each jurisdiction's vulnerability to specific types of hazardous materials facilities are included in Appendix I and J. These maps, and the corresponding location of hazardous materials facilities described throughout this chapter, used environmental data obtained from NRGIS. A summary table illustrating the differences in historical occurrence of hazardous materials spills is included in Table 4.2.2.

Table 4.2.2. Summary of Hazardous Spills in Marshall County

			Incident Type					
Jurisdiction	**Time Period**	**# of Events**	**Fixed**	**Trans.**	**RR**	**Manure**	**Unknown**	**Pipeline**
Albion	1/1995 – 10/2014 (19.8 years)	10	7	3	0	0	0	0
Clemons		2	0	0	0	2	0	0
Ferguson		1	0	1	0	0	0	0
Gilman		7	5	2	0	0	0	0
Haverhill		3	2	0	0	1	0	0
Laurel		2	2	0	0	0	0	0
Le Grand		3	1	1	1	0	0	0
Liscomb		2	2	0	0	0	0	0
Marshalltown		144	97	27	8	2	5	5
Melbourne		8	3	5	0	0	0	0
Rhodes		4	4	0	0	0	0	0
St. Anthony		1	1	0	0	0	0	0
State Center		13	2	3	0	8	0	0
Marshall County Uninc		4	0	3	1	0	0	0
East Marshall SD		13	8	4	1	0	0	0
GMG SD		4	2	2	0	0	0	0
Marshalltown SD		144	95	27	8	2	5	5
West Marshall SD		13	2	3	0	8	0	0

Data Source: Iowa DNR Hazardous Spill Summary Report 2015

According to the USDOT Pipeline and Hazardous Materials Safety Administration (2015), Marshall County has experienced no pipeline incidents in the last 20 years. For a map displaying the location of pipelines in the county, see Figure 4.1.11.

Probability

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 for commercial, agricultural, and domestic uses and are being transported on Iowa roads and railways. Natural gas and ammonia pipelines exist in Marshall County, further adding to the risk of a hazardous materials spill event.

Based on historical occurrence according to Iowa DNR data and the USDOT Pipeline and Hazardous Materials Safety Administration, the following jurisdictions received the following scores for probability. Clemons, Ferguson, and St. Anthony received a score of 1, meaning that there is less than 10% chance of a hazardous materials spill occurring in any given year. Haverhill, Laurel, Le Grand, Liscomb, Rhodes, Marshall County, and GMG Community School District received a score of 2, meaning that there is a 10 – 25% chance of a hazardous materials spill occurring in any given year. Albion, Gilman, and Melbourne District received a score of 3, meaning that there is a 26-60% chance of a hazardous materials spill occurring in any given year. Marshalltown, State Center, East Marshall Community School District, Marshalltown Community School District, and West Marshall Community School District received a score of 4, meaning that there is a greater than 60% chance of a hazardous materials spill occurring in any given year.

Vulnerability

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, pipelines, 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 may be harmed directly or through consumption of contaminated food and water.

An underground pipeline incident can be caused by environmental disruption, accidental damage, or sabotage. Incidents can range from a small slow leak that is not ignited, to a large rupture in which the gas is ignited, to a large rupture in which the gas is ignited. Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure can lessen the risk to those in proximity to the pipelines.

The Task Force members representing Albion, Clemons, Ferguson, Gilman, Haverhill, Melbourne, Rhodes, St. Anthony, GMG Community School District, and West Marshall Community School District estimated that their jurisdiction's vulnerability to a hazardous spill is low with a score of 1, meaning that less than 25% of people or property would be affected in the event of a hazardous

materials event. Excepting Haverhill, none of these jurisdictions have a Tier II hazardous materials facility located within their jurisdictional boundaries. Haverhill's Co-Op is located on the southern portion of the city. Albion, Clemons, Melbourne, and Rhodes do have a natural gas pipeline runs to the edge of their jurisdictional boundary. If a pipeline incident occurred, however, the Task Force felt confident that less than 25% of people or property would be affected.

Liscomb, East Marshall Community School District, and Marshalltown Community School District estimated that their jurisdiction's vulnerability to a hazardous spill is somewhat low with a score of 2. These jurisdictions estimated that 25-50% of people or property would be affected in the event of a spill. Liscomb has a Co-Op (Tier II facility) in town. Liscomb also has a natural gas pipeline that stops very near to their jurisdictional boundaries, according to GIS data. While Marshalltown Community School District has facilities in Marshalltown with a large amount of hazardous facilities, the school district facilities are not particularly vulnerable to the effects of a hazardous spill. In addition, the school district noted that it had adequate emergency plans and other measures in place for such an event.

The Task Force members of Le Grand estimated that their jurisdiction's vulnerability to a hazardous spill is somewhat high with a score of 3. These jurisdictions estimated that 51-75% of people might be affected by a hazardous materials spill. Le Grand has both a natural gas pipeline and an ammonia pipeline running within a ½ mile of their jurisdictional boundaries. Le Grand does not have any Tier II facilities within their jurisdictional boundaries, but the city would fall within a two mile buffer area of a facility that is approximately one mile to the north of the city (Cessford Construction Company).

The Task Force members of Marshalltown, State Center, and Marshall County estimated that their jurisdiction's vulnerability to a hazardous spill is high with a score of 4. These jurisdictions estimated that more than 75% of people might be affected by a hazardous materials spill. All of these jurisdictions have a natural gas pipeline located very near to their jurisdictional boundaries. Marshall County has several natural gas lines and an ammonia pipeline within the county. If a pipeline incident were to occur (especially with the ammonia line), the incident could impact more than 75% of people and property in the community through explosion, fumes, evacuation, or closed roads and railways. The location of these pipelines adds to the vulnerability of the county. Marshall County has a total of 55 Tier II chemical storage facilities (32 of these facilities are located in Marshalltown). Unincorporated, more rural factories or facilities could be more vulnerable to additional damages from a spill if emergency responders cannot reach these facilities as quickly as they could facilities in the incorporated areas.

Severity of Impact

Severity of impact due to a hazardous materials spill is varied across jurisdictions. The severity of the impact depends first and foremost on the type and amount of material that is part of a spill. Most hazardous materials incidents are localized and are quickly contained or stabilized by highly trained fire departments and hazardous materials teams. Marshall County depends on the Des Moines Fire Department for these incidents because their firemen are trained for hazardous materials incidents. Other jurisdictions are working with Marshall County Emergency Management to train their fire department for hazardous materials events. 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.

For most incidents, the severity of impact would be limited with minor injuries and illness, minor short-term property damage, and minor short-term environmental impacts. Albion, Clemons, Ferguson, Gilman, Haverhill, Rhodes, and West Marshall Community School District scored the severity of impact of a hazardous materials spill as a 1 due to the limited amount of hazardous materials facilities and/or their ability to quickly respond to hazardous materials incidents with their fire departments. These jurisdictions anticipate few injuries, little to no property damage, and a brief interruption of critical facilities (less than four hours) if a spill event occurred. Most of these cities have their own fire departments that can respond quickly to a hazardous materials situations and call for reinforcements from Waterloo if needed.

Laurel, St. Anthony, East Marshall Community School District, and GMG Community School District scored severity of impact as a 2, meaning that these jurisdictions might expect minor injuries, minor property damage, minor environmental impact, and a shutdown of critical facilities for 4 to 24 hours in the event of a hazard. Of these cities, St. Anthony is the only city to have a pipeline in or near the jurisdiction. Hazardous materials incidents involving a pipeline could cause minor property damage. Neither city has a Tier II hazardous materials facility within their jurisdictional boundaries or within two miles of the city. Overall, the three jurisdictions have a relatively small severity of impact.

Le Grand and Liscomb scored severity of impact as a 3, meaning that there could be serious injuries or major property damage in the event of a hazardous materials spill. Liscomb has a Tier II hazardous materials facility (the Co-Op). Both cities have a railroad line that runs through their jurisdictional boundaries. Both cities are also within close proximity to a pipeline.

Marshalltown, Melbourne, State Center, Marshall County, Marshalltown Community School District, and West Marshall Community School District scored severity of impact as a 4, meaning that property damage, multiple injuries, or even death could be possible. All of these cities except for Melbourne have Tier II hazardous materials facilities within their jurisdictional boundaries. All jurisdictions are within close proximity to pipelines. All jurisdictions except for Melbourne also have a railroad line that runs through the community.

Speed of Onset

When managed properly under current regulations, hazardous materials pose little risk. However, when handled improperly or in the event of an accident, hazardous materials can pose a significant risk to the population. Hazardous materials incidents usually occur very rapidly with little or no warning. Even if reported immediately, people in the area of the release have very little time to be warned and evacuated. During some events, sheltering in-place is the best alternative to evacuation because the material has already affected the area and there is no time to evacuate safely. Public address systems, television, radio, and the NOAA Weather Alert Radios are used to disseminate emergency messages about hazardous materials incidents.

Human Disease

Human Disease – Hazard Score Calculation						
Jurisdiction	**Historical Occurrence**	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
Albion	1	1	1	2	1	6
Clemons	1	1	2	2	1	7
Ferguson	1	1	1	1	1	5
Gilman	1	1	1	1	1	5
Haverhill	1	1	1	1	1	5
Laurel	1	1	2	1	1	8
Le Grand	1	1	2	2	1	7
Liscomb	1	1	2	2	1	7
Marshalltown	1	2	1	4	1	9
Melbourne	1	1	2	2	1	7
Rhodes	1	1	1	3	1	7
St. Anthony	1	1	1	2	1	6
State Center	1	1	1	4	1	8
Marshall County	1	2	2	2	1	8
East Marshall Community SD	1	1	1	1	1	5
GMG Community SD	1	1	1	1	1	5
Marshalltown Community SD	1	1	1	4	1	8
West Marshall Community SD	1	1	2	2	1	7

Definition
A medical, health, or sanitation threat to the general public including contamination, epidemics, plagues, or infestations.

Description
Disease control has resulted from improvements in sanitation and hygiene, the discovery of antibiotics and the implementation of universal childhood 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 (Iowa Hazard Mitigation Plan 2007).

Historical Occurrence
According to the Iowa Department of Public Health, Center for Acute Disease Epidemiology, Marshall County has a relatively low occurrence of diseases when compared to other, more populous areas in Iowa (2015). Aside from sexually transmitted diseases, the most common diseases that were reported from 2007 to 2012 include Campylobacter (28 cases) and Salmonella (26 cases). Both of these diseases are food-borne illnesses that occur due to improper handling of food. Other illnesses that were reported between 5 and 20 times in the county include Cryptospora, E. Coli, Giardia, Hepatitis A, Hepatitis B (acute and chronic), Pertussis, Shigella, and Tuberculosis. Not all of the diseases previously described, however, are considered epidemics, plagues, or

infestations, according to the definition of a human disease epidemic. For most jurisdictions in the county, historical occurrence was scored as a 1, meaning that no human disease epidemics occurred in the last 10 years. Marshalltown and Marshall County also scored historical occurrence of disease epidemics as a 1, but these jurisdictions indicated that one or two cases of human disease may have been present in the past 10 years. Iowa Department of Public Health data indicates that there were five reported cases of tuberculosis in the county between 2007 and 2012; however, this data is not broken down by jurisdiction. While these events were not out of control epidemics, these entities did recognize that highly contagious disease cases were present in the county.

Probability

It is highly likely that human diseases will occur in Marshall County on an annual basis. However, it is far less likely that a human disease epidemic will result from these occurrences. Based on historical occurrence, the probability of a human disease epidemic occurring in most cities in Marshall County is extremely low in any given year (less than 10%). Marshalltown and Marshall County ranked this risk slightly higher at 10-25% based on historical occurrence.

Vulnerability

While everyone is vulnerable to human diseases, the elderly, young, and people with medical conditions tend to be affected most. The Task Force members in most jurisdictions estimated that fewer than 25% of the people in the community would be vulnerable to a pandemic human disease, which resulted in a score of 1 for vulnerability. Clemons, Laurel, Le Grand, Liscomb, Melbourne, St. Anthony, Marshall County, and West Marshall Community School District estimated that 25-50% of people or property might be affected. A human disease epidemic occurring anywhere in Marshall County would likely be handled at the county level. People from all over the county may become involved if residents are asked to close roads or other facilities.

Severity of Impact

Improvements in sanitation and hygiene, the discovery of antibiotics, and the implementation of universal childhood vaccination programs have decreased the number and severity of human diseases. IDPH also provides consultation to county and local health agencies on diseases requiring public health intervention, collaborates with Centers for Diseases Control and Prevention by weekly reporting of nationally reportable diseases, and offers health education opportunities. Programs guide community-based prevention planning, monitor current infectious disease trends, prevent transmission of infectious disease, provide early detection and treatment for infected persons, and ensure access to health care for refugees in Iowa. All of these safeguard work to limit the severity of impact of human disease epidemics.

Because of these safeguards, most jurisdictions in Marshall County ranked severity of impact as a 1 or a 2, meaning that there would likely be few or minimal injuries if a human disease epidemic occurred. Any disease present in the county would most likely not have the ability to reach epidemic levels. There are safeguard in place throughout the state and Marshall County that can prevent disease outbreaks, and in the worst case, monitor these events so that they do not reach epidemic proportions. Marshalltown, Rhodes, State Center, and Marshalltown Community School District ranked severity of impact as a 3 or 4, meaning that there could be some minor injuries or

even death from a disease epidemic. These communities are larger and have higher population numbers in which the risk of a highly communicable disease might be higher and may spread more quickly. Jurisdictions that ranked severity of impact higher considered the worst-case scenario of a human disease epidemic. Most jurisdictions stated that the safeguards that the County and State departments of public health had in place would prevent most serious injuries of illnesses from occurring.

Speed of Onset
Generally, health care practitioners would be the first to know of a human disease epidemic. It is expected that, if a highly contagious disease were diagnosed in Marshall County, appropriate safety measures would be taken and further spread of the disease would be reduced. The community would be given at least 24 hours warning time.

Infrastructure Failure

Infrastructure Failure – Hazard Score Calculation						
Jurisdiction	**Historical Occurrence**	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
Albion	1	1	1	1	4	8
Clemons	1	1	1	1	4	8
Ferguson	1	2	1	1	4	9
Gilman	1	1	1	1	4	8
Haverhill	1	1	1	1	4	8
Laurel	1	1	1	1	4	8
Le Grand	1	2	3	3	4	13
Liscomb	3	4	4	3	4	18
Marshalltown	1	1	4	4	4	14
Melbourne	1	2	1	2	4	10
Rhodes	1	1	1	1	4	8
St. Anthony	1	1	1	1	4	8
State Center	2	3	4	1	4	14
Marshall County	2	3	4	4	4	17
East Marshall Community SD	1	1	1	1	4	8
GMG Community SD	1	2	2	2	4	11
Marshalltown Community SD	1	1	1	2	4	9
West Marshall Community SD	1	1	1	3	4	10

Definition
Includes communication failure, energy failure, structural failure and structural fire. Failure can include an extended interruption, widespread breakdown or collapse (part or all) of any public or private infrastructure that threatens life and property.

Description
There are a variety of infrastructure failures that affect Marshall County. Water main breaks, sewer system backups, power failures, bridge failures, and infrastructure damaged by flooding are just a

few of these issues. One of the most common causes of infrastructure failure in Marshall County is related to sewer and water systems. Many of the municipalities in Marshall County have older sewer systems. During prolonged wet weather periods with substantial rainfall, sewer systems can experience too much inflow and infiltration, which causes system overloading. This forces cities to bypass the treatment facility and pump untreated wastewater into open streams. Albion, Marshalltown, LeGrand, Liscomb, Gilman, and State Center all described some occurrences of sewer backup that caused system flooding in streets and low-lying areas or backup in home within the community. Albion's sewer system was built in the 1960's and the lift station sometimes cannot keep up with the inflow from the sewer system, so it has an overflow pipe built into the system. LeGrand is in the process of upgrading their water distribution system and only has approximately 25% of the system remaining that needs to be upgraded. Marshalltown's water/sewer system is also in the process of long-term repairs. Gilman expressed that although backups occur, it takes an extreme rainfall event for backups to happen and fixing the system is not a city priority compared to other projects. Other cities in the county such as St. Anthony have already updated their sewer systems and no longer experience backup problems.

Many cities in Marshall County expressed vulnerability to infrastructure failure due to power loss during wind and ice storms. In 2006, Gilman was affected by an ice storm that caused the city to lose power for an entire week. Now, the city has invested in backup generators for critical facilities such as City Hall, the sewer station, and for the emergency sirens. Clemons lost power for one day in July 2014 following a severe thunderstorm that caused tree damage. Liscomb recalled at least three extended power outages that lasted for multiple days.

Marshall County at large experiences a risk of infrastructure failure due to the condition of old county bridges. These bridges would likely fail due to old age and poor condition; a disaster event may cause a weak structure to fail. Bridges are routinely inspected and closed if there are problems. Bridge failure could be aggravated due to flood events that affect the Iowa River and close roads and bridges in the county. Some county roads affected by flooding must be serviced more often because certain areas are extremely vulnerable to river flooding from the Iowa River. Some cities in Marshall County have infrastructure vulnerabilities related to key city services like power delivery, water delivery, and wastewater treatment; however, not all cities are financially capable of providing matching funds for large infrastructure projects at this time. Therefore, even though infrastructure problems exist, not all problems described in this section were able to be addressed by the mitigation actions covered in this plan.

Historical Occurrence

Historical occurrence of infrastructure failure varies across jurisdiction. There is no NCDC data available for this hazard, but Task Force Members were able to identify instances of infrastructure failure in the last 10 years. Most jurisdictions scored the historical occurrence of infrastructure failure as a 1, meaning that there were less than four events in the last 10 years that they could recall. State Center and Marshall County scored historic occurrence as a 2, meaning that 4 to 7 infrastructure failure events have occurred in the last 10 years. State Center has had issues with sewer backups into homes during heavy periods of rain. Marshall County has dealt with aging infrastructure, including roads and bridges, throughout the county. Liscomb scored historic

occurrence as a 3, meaning that there were 8-11 infrastructure failure events over the last 10 years. Some of these events include extended power outages that lasted for multiple days, high wind events (100+ MPH) that damaged the community center and fire station, and sewer backups as a result of flash flooding.

It is important to note that although infrastructure failure data was based on local knowledge, most jurisdictions had public works officials and fire department officials involved in the planning process by either being members of the Task Force at meetings or by consulting with these representatives outside of meetings before risk assessment scores and mitigation actions were finalized.

All four school districts included in the plan update rated historical occurrences as a 1. GMG Community School District mentioned downed power lines, water shutdowns, and water main breaks as potential events that could affect the school district.

Probability

Based on the number of historical occurrences, the Task Force determined the following scores for each jurisdiction. Albion, Clemons, Gilman, Haverhill, Laurel, Marshalltown, Rhodes, and St. Anthony received scores of 1, meaning that each jurisdiction had a less than 10% probability of occurring in any given year. East Marshall Community School District, Marshalltown Community School District, and West Marshall Community School District also determined their probability score to be 1. These jurisdictions had no events, or potentially one event that they could recall but weren't sure if it was significant enough to count as an occurrence.

Ferguson, Le Grand, Melbourne, and GMG Community School District received a probability score of 2, meaning that an infrastructure failure had a 10-25% chance of occurring. These jurisdictions had one to two events that they could remember occurring and that were significant.

Liscomb received a probability score of 4, meaning that a chance of an infrastructure failure occurring was greater than 60%. Liscomb recalled at least 10 instances of infrastructure failure that have occurred in the last 10 years. Mainly, these events are related to the sewer and water system issues that were described in previous paragraphs.

Vulnerability

Albion, Clemons, Ferguson, Gilman, Haverhill, Laurel, Melbourne, Rhodes, and St. Anthony scored vulnerability as a 1, meaning that less than 25% of people and property would be affected in the event of infrastructure failure. Many of the homes that may be flooded due to sewer backups are the homes in lower areas of the city or along a certain path related to the infrastructure. For these communities, not all residents are affected by an event. For the average event, effects are localized. East Marshall Community School District, Marshalltown Community School District, and West Marshall Community School District also scored vulnerability as a 1.

LeGrand, Liscomb, Marshalltown, State Center, and Marshall County scored vulnerability as a 3 or a 4, meaning that 50% or more of people and property might be affected. These cities' sewer and water system issues could affect a larger amount of people. Road infrastructure may be vulnerable

to failure which could cause road or bridge closures. Power failure from ice storms and wind storms can and have affected these communities and caused extended power losses than affect larger numbers of people.

Severity of Impact
Severity of impact is dependent on the event. Energy disruptions and communications failures generally do not result in injuries or illnesses, have a limited impact on property damage, and results in a brief interruption of essential facilities or services. Structural fires could potentially cause serious injury and major property damage that threatens structural stability.

Most jurisdictions scored severity of impact as a 1 or a 2, meaning that injuries and property damage would be very minor, if they would occur at all. Short term property damage might occur but would not threaten structural stability. Le Grand, Liscomb, Marshalltown, Marshall County, and West Marshall Community School District scored severity of impact as a 3 or a 4, meaning that impacts could be more severe such as major property damage and shut down of essential facilities for more than 24 hours. These jurisdictions ranked severity of impact higher because of sewer backups that affected homeowners. In the worst case scenario, significant property damage has the possibility to occur.

Speed of Onset
Infrastructure failure cannot be predicted. There would be minimal or no warning time if an infrastructure failure occurred.

River Flooding

River Flooding – Hazard Score Calculation						
Jurisdiction	**Historical Occurrence**	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
Albion	1	1	1	1	2	6
Clemons	1	1	1	2	2	7
Ferguson	1	1	1	1	2	6
Gilman	1	1	1	1	2	6
Haverhill	1	1	1	1	2	6
Laurel	1	1	1	1	2	6
Le Grand	1	1	1	1	2	6
Liscomb	1	1	1	1	2	6
Marshalltown	3	4	1	3	2	13
Melbourne	1	1	1	1	2	6
Rhodes	1	1	1	1	2	6
St. Anthony	1	1	1	1	2	6
State Center	1	1	1	1	2	6
Marshall County	4	4	3	3	2	16
East Marshall Community SD	1	1	1	1	2	6
GMG Community SD	1	1	2	2	2	8
Marshalltown Community SD	3	4	3	2	2	14
West Marshall Community SD	1	1	1	1	2	6

Definition

River flooding is a natural and expected phenomenon that can occur annually, and is usually restricted to specific streams, rivers or watershed areas. Many communities may experience some kind of flooding after spring rains, heavy thunderstorms, winter snow thaws, ice jams, waterway obstructions, or levee or dam failures. Floods can be slow or fast-rising but generally develop over a period of days.

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.

Historical Occurrence

According to NCDC data, Marshall County experienced 55 flood events from 1996 – 2008 (the time frame for which data was available). These events caused a total of $2,716,070 in property damage and $273,581,040 in crop damage. Note that these events were based on all events that occurred throughout the county. See Appendix G for a complete list of events. It is important to note that data from the NCDC website for flood events is available for only this time frame at the time of the plan update. Therefore, the available data was what communities used as a basis for the risk assessment scores for historical occurrence and probability. A summary of this data is included in Table 4.2.3.

Table 4.2.3. Summary of River Flooding Events in Marshall County (NCDC Data)

Hazard	Time Period	# of Events	Total Damages
Albion	2/1996 – 5/2008 (12.2 years)	0	--
Clemons		0	--
Ferguson		0	--
Gilman		0	--
Haverhill		0	--
Laurel		0	--
Le Grand		0	--
Liscomb		0	--
Marshalltown		9	$380,000 (Property) $148,000 (Crop)
Melbourne		0	--
Rhodes		0	--
St. Anthony		1	$20,000,000 (Crop)
State Center		0	--
Marshall County Unincorporated		33	$1,433,570 (Property) $873,040 (Crop)
East Marshall SD		0	--
GMG SD		0	--
Marshalltown SD		9	$380,000 (Property) $148,000 (Crop)
West Marshall SD		1	$20,000,000 (Crop)

Data Source: NCDC Storm Events Database 2015

More information about river flooding events in Marshall County is included in Appendix G.

Each community has its own specific issues pertaining to flooding. There is significant variability among communities in Marshall County regarding their proximity to rivers, water bodies, or Special Flood Hazard Areas. Digital flood insurance rate maps showing this variability can be found for each incorporated area in Appendix E.

Some communities have had little to no issues with flooding. Albion, Clemons, Ferguson, Gilman, Haverhill, Laurel, Le Grand, Liscomb, Melbourne, Rhodes, St. Anthony, State Center, East Marshall Community School District, GMG Community School District, and West Marshall Community School District received a score of 1 for historical occurrence, which means that these communities have experienced fewer than four river flooding events from 1996 to 2008. Many communities are located at a high elevation in relation to flood-prone areas in the county such as the Iowa River basin. Marshalltown and Marshalltown Community School District received a score of 3 for historical occurrence, meaning that these communities experienced between 8 and 12 river flooding events. Marshalltown has a network of levees constructed in the city to protect much of the area when the Iowa River floods, but other portions of the city are still susceptible to flooding. Marshall County received a score of 4 for historical occurrence, meaning that the county experienced more than 12 river flooding events. Portions of the county are vulnerable to road closures due to flooding.

Probability

Based on historical occurrence according to NCDC data, nearly all jurisdictions in Marshall County received a score of 1 for probability, meaning that a flood event had a less than 10% chance of occurring in any given year. Marshalltown, Marshall County, and Marshalltown Community School District were the exceptions in scoring, as these jurisdictions receives a score of 4 for probability, meaning that a flood event had a greater than 60% chance of occurring in any given year.

Vulnerability

Nearly all jurisdiction sin Marshall County received a score of 1 for vulnerability to river flooding. As was mentioned previously, many jurisdictions in Marshall County are located on high ground in relations to the floodplains located throughout the county. Marshall County, GMG Community School District and Marshalltown Community School District ranked vulnerability as a 2 or 3, recognizing that some river flooding in the jurisdiction has the potential to affect 51% or more of people due to road closures and property damage.

When Marshall County experiences river flooding, it can be vulnerable to road closures. The following are transportation concerns due to river flooding:

- Iowa Highway 14 between US Highway 30 and Iowa Highway 330, Marshalltown.
- Iowa Highway 330 between County Road E29 and County Road S75, near Albion.
- Zeller Avenue from 2200 mile to 2300 mile is closed.
- East Main Street Road in Marshalltown is closed from 2900 to 3100 block due to water over the road.
- US Highway 63 between County Road E64 and US Highway 30, near Tama.
- US 30 eastbound: Left lane closed between County Road T47 and Exit 202: US 63, two miles east of the Montour area. The left lane is closed because of flooding.
- US 30 westbound: Right lane closed between County Road T47 and Exit 202: US 63, near Montour. The right lane is closed because of flooding.
- Stanley Mill Road from 2000 to 2100 mile is closed due to water over the road from east of Knapp Avenue to Lafayette Avenue.
- Garwin Road from 2600 to 2700 mile is closed due to water at the intersection of Highway 14 and Garwin Road, right of Wiesegarden intersection.

- North Center Street Road from 1900 to 2100 mile is closed due to water over the road south of KDAO through the Marshalltown Water Works.

Severity of Impact

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.

Based on the effects of flooding already described, communities scored severity of impact as follows. Albion, Ferguson, Gilman, Haverhill, Laurel, Le Grand, Liscomb, Melbourne, Rhodes, St. Anthony, State Center, East Marshall Community School District, and West Marshall Community School District ranked severity of impact from river flooding as a 1, meaning that injuries, property damage, and environmental impacts would be minimal or would not occur.

Clemons, GMG Community School District, and Marshalltown Community School District scored severity of impact as a 2, meaning that injuries, property damage, and environmental impacts would be limited. Short-term property damage might occur, but the structural stability of buildings would not be threatened. Shutdown of critical facilities may occur, but shutdown times would be less than 72 hours.

Marshalltown and Marshall County scored severity of impact as a 3, meaning that property damage and environmental impacts would be more serious. Property damage may threaten structural stability of buildings. These jurisdictions were not significantly concerned about the risk of severe injury or death since Marshall County has not experienced a river flooding-related death according to NCDC data, but the possibility still exists.

Speed of Onset

Gages along streams and rain gages throughout the state provide for an early flood warning system. River flooding usually develops over the course of several hours or even days depending on the basin characteristics and the position of the particular reach of the stream. The National Weather Service provides flood forecasts for Iowa. Flood warnings are issued over emergency radio and television messages as well as the NOAA weather radios. Jurisdictions in Marshall County would likely have at least 12-24 hours of warning time if a river flooding event was imminent.

Terrorism

Terrorism – Hazard Score Calculation						
Jurisdiction	**Historical Occurrence**	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
Albion	1	1	1	1	4	8
Clemons	1	1	3	3	4	12
Ferguson	1	1	1	1	4	8
Gilman	1	1	1	1	4	8
Haverhill	1	1	1	1	4	8
Laurel	1	1	4	4	4	14
Le Grand	1	1	1	1	4	8
Liscomb	1	1	1	3	4	10
Marshalltown	1	1	4	4	4	14
Melbourne	1	1	1	2	4	9
Rhodes	1	1	1	3	4	10
St. Anthony	1	1	1	2	4	9
State Center	1	1	2	3	4	11
Marshall County	1	2	2	2	4	11
East Marshall Community SD	1	1	4	4	4	14
GMG Community SD	1	1	3	2	4	11
Marshalltown Community SD	1	1	1	4	4	11
West Marshall Community SD	1	1	1	3	4	10

Definition

A wide variety of human-caused threats including enemy attack, biological terrorism, agro-terrorism, chemical terrorism, conventional terrorism, cyber terrorism, radiological terrorism, and public disorder. This hazard includes the 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.

Description

Types of terrorism that communities considered include:

- Enemy Attack – an incident that would cause massive destruction and extensive casualties.
- Public Disorder – Mass demonstrations, or direct conflict by large groups of citizens, as in marches, protest rallies, riots, and non-peaceful strikes.
- Biological Terrorism – Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point of line sources such as munitions, covert deposits and moving sprayers.
- Biological agents may pose viable threats from hours to years depending upon the agent and the conditions in which it exits.
- Agro-terrorism – Causing intentional harm to an agricultural product or vandalism of an agricultural/animal related facility is agro-terrorism.
- Chemical Terrorism – Liquid/aerosol or dry contaminants can be dispersed using sprayers or other aerosol generators; liquids vaporizing from puddles/containers; or munitions.
- Conventional Terrorism – Suspicious package, explosive device, etc.

- Cyber Attack – Electronic attack using one computer system against another in order to intimidate people or disrupt other systems is a cyber-attack
- Radiological Terrorism – Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point of line sources such as munitions, covert deposits and moving sprayers or by the detonation of a nuclear device underground, at the surface, in the air or at high altitude.

Historical Occurrence

For most jurisdictions in Marshall County, there have been no known incidences of terrorism. Marshall County at large identified approximately two events that occurred in the last 10 years as terroristic in nature. These events included shootings and general threats to the community that placed law enforcement on high alert and forced portions of the county to be at risk until the situation was resolved. All communities in Marshall County received a score of 1 for historical occurrence, meaning that they experienced less than four occurrences of terrorism in the last 10 years.

Probability

Based on historical occurrence, the probability for a terroristic event in most communities in Marshall County is low in any given year (less than 10%). Marshall County at large has a slightly higher probability of between 10% and 25% of terrorism occurring based on historical occurrence.

Vulnerability

The Task Force from each jurisdiction considered their vulnerability to a terrorism event in their community and scored vulnerability in a variety of ways. Most jurisdictions decided that a terroristic event would affect less than 25% of people and property. They considered an event and determined that any likely event would be small and would affect only a small portion of the city if it happened at all. A protest was a common event that was cited as an example. Most cities in Marshall County have a small population and have never experienced unrest or terroristic threats.

State Center and Marshall County scored vulnerability to terrorism as a 2, meaning that 26-50% of people and property might be affected. State Center has a large event each summer, the Rose Festival that draws crowds of several thousand people over several days. This particular event increased State Center's vulnerability to terrorism.

Clemons and GMG Community School District ranked their community's vulnerability to a terror event slightly higher than others at a 3, meaning that 51-75% of people and property may be affected by an event. Laurel, Marshalltown, and East Marshall Community School District ranked their community's vulnerability to a terror event at a 4, meaning that more than 75% of people and property may be affected by an event. Communities that ranked vulnerability to terrorism as a 3 or 4 generally thought of larger terror events that have the ability to affect large areas of the town and cause more serious property damage. In Marshalltown, continued vulnerability to stand-offs and threats to the community remained a concern. For the less-populated communities with these scores, agro-terrorism was often cited as a cause for concern.

Severity of Impact
The severity of impact varies tremendously depending on the form of terrorism. The Task Force determined that, although some terroristic activity could result in serious injury and major property damage, the most likely terroristic threat that Marshall County would experience would involve little to no injuries, illness, or property damage, or minor injuries, illness, or property damage (scores of 1 or 2 for severity of impact).

Communities with heightened concern for severity of impact from terrorism included: Clemons, Liscomb, Rhodes, State Center, West Marshall Community School District with scores of 3, and; Laurel, Marshalltown, East Marshall Community School District, and Marshalltown Community School District with scores of 4. These jurisdictions considered significant terrorist events such as bomb detonations or agro-terrorism that may cause serious injuries or death.

Speed of Onset
Terrorism occurs with minimal or no warning. No jurisdiction in Marshall County would have advanced notice of a terrorism event.

Transportation Incident

Transportation Incident – Hazard Score Calculation						
Jurisdiction	**Historical Occurrence**	**Probability**	**Vulnerability**	**Severity of Impact**	**Speed of Onset**	**Total Score**
Albion	1	1	1	1	4	8
Clemons	1	1	2	2	4	10
Ferguson	1	1	1	1	4	8
Gilman	1	1	1	1	4	8
Haverhill	1	1	1	1	4	8
Laurel	1	1	1	1	4	8
Le Grand	1	1	1	2	4	9
Liscomb	1	1	2	4	4	12
Marshalltown	1	2	1	4	4	12
Melbourne	1	1	1	2	4	9
Rhodes	1	1	2	1	4	9
St. Anthony	1	1	1	1	4	8
State Center	1	1	1	3	4	10
Marshall County	4	4	4	4	4	20
East Marshall Community SD	1	1	1	2	4	9
GMG Community SD	1	2	2	2	4	11
Marshalltown Community SD	1	1	1	1	4	8
West Marshall Community SD	1	1	1	3	4	10

Definition

Transportation incidents include any transportation accident involving any mode of transportation that directly threatens life, property damage, injury, or adversely impacts a community's capabilities to provide emergency services. A transportation incident can occur with air transportation, highway transportation, railway transportation, and waterways.

Description

An air transportation incident may involve a military, commercial, or private aircraft. Air transportation is playing a more prominent role in transportation as a while; airplanes, helicopters, and other modes of air transportation are used to transport passengers for business and recreation as well as thousands of tons of cargo. A variety of circumstances can result in an air transportation incident; mechanical failure, pilot error, enemy attack, terrorism, weather conditions, and on-board fir can all lead to an incident at or near the airport.

A highway transportation incident can be a single or multi-vehicle requiring responses exceeding normal day-to-day capabilities. An extensive surface transportation network exists in Iowa; local residents, travelers, business, and industry rely on this network on a daily basis. Weather conditions play a major factor in the ability of traffic to flow safely in and through the state as does the time of day (rush hour) and day of week. Incidents involving buses and other high-occupancy

vehicles could trigger a response that exceeds the normal day-to-day capabilities of response agencies.

A railway transportation incident is a train accident that directly threatens life and/or property, or adversely impacts a community's ability to provide emergency services. Railway incidents may include derailments, collisions, and highway/rail crossing accidents. Train incidents can result from a variety of causes; human error, mechanical failure, faulty signals, and/or problems with the track. Results of an incident can range from minor "track hops" to catastrophic hazardous material incidents and even human/animal casualties. With the many miles of track in Iowa, vehicles must cross the railroad tracks at numerous at-grade crossings.

Historical Occurrence

Data for historical occurrence was collected for a period of ten years in order to provide the most accurate representation of events according to local knowledge. Data from other sources was only collected for the previous 10 years (2005 to 2015) to match this data frame. Four airports exist in Marshall County near or in the cities of Marshalltown, Melbourne, Albion, and Liscomb. See Figure 4.1.8 for a map of airports in the county. According to the National Transportation Safety Board, there have been no air transportation incidents in Marshall County. This includes incidents involving these airports or any other flights that have included Marshall County on the flight path.

Marshall County has one main rail line that runs throughout the county. The line runs directly through the communities of Liscomb, Albion, State Center, Marshalltown, Le Grand, and Gilman. Railway incidents may include derailments, collisions, and highway/rail crossing accidents. Railway transportation incidents involving derailments have become a more common, and dangerous, occurrence with the increased shipment of oil and oil products. According to the Federal Railroad Administration, seven train-vehicle accidents occurred in the county in the last 10 years. These incidents are represented in the county's overall risk assessment scores for historical occurrence and probability.

Highway transportation incidents are likely throughout the county, although transportation incidents are more likely to occur in areas with higher annual average daily transportation (AADT) counts. AADT uses a formula and historic data to determine average traffic flows for a given area. The roads of Marshall County with the highest AADT numbers include US Highway 30, State Highway 330, several secondary roads in Marshalltown, and State Highway 14. See Figure 4.1.9 for a map of Marshall County AADT in 2013. According to vehicle crash data from the Iowa Department of Transportation, between 2005 and 2014, Marshall County experienced a total of 6,996 crashes. Of these crashes, 4,376 (63%) occurred in incorporated areas, 1,744 (25%) occurred in unincorporated areas less than one mile away from a major highway, and 876 (12%) occurred in an unincorporated area on a secondary road.

Because this data does not measure the extent of each crash and how significantly it affected the community, Task Force Members were asked to recall vehicle transportation incidents at planning meetings. They were asked how many crashes affected their community in the last 10 years that exceeded normal day-to-day capacities of emergency personnel and/or caused significant road

closures or injuries. Most jurisdictions could not recall a single incident in the last 10 years that caused significant road closures or overwhelmed the capacities of emergency personnel. Marshall County recalled at least 6 events in the last 10 years. Task Force members said it was common with Highway 30 running through town to have, on average, one large accident per year that stopped traffic and affected the community.

When considering all forms of transportation incidents, most jurisdictions reported no transportation incidents. Marshall County reported more than 12 (a combination of railroad incidents and highway transportation incidents) and Marshalltown reported approximately 2 (highway transportation incidents).

Probability

Since probability is based on historical occurrence, most jurisdictions scored 1 for probability, meaning that there is a less than 10% chance of a transportation incident occurring in any given year. Marshalltown and GMG Community School District scored a 2, meaning that there is between a10-25% chance of a transportation event occurring in any given year. Marshall County scored 4, meaning that there is a more than 60% chance of a transportation incident occurring.

Vulnerability

Those who use the surface transportation system are most vulnerable. Travelers, truckers, delivery personnel, and commuters are at risk the entire time 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.

For railway transportation incidents, 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 tracks and facilities are vulnerable only to large-scale incidents including those in which hazardous materials are involved. 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 make Marshall County vulnerable to a potential highway/rail collision. Derailments are also possible, while a major derailment would occur less frequently.

Most communities in Marshall County scored vulnerability as a 1 or a 2, meaning that less than 25% or 26-50% of people and property would be affected in the event of a transportation incident. These jurisdictions viewed a transportation incident as affecting a small portion of the community. For some of these communities, highway accidents are fairly routine, and emergency personnel have the capability of handling most types and sizes of accidents that are likely to occur. Most of these communities do not have major highways or railways running through their communities, but they determined that a transportation incident on a road could impact at least 25% of the community.

The exception to this scoring was Marshall County, which scored vulnerability as a 4. A significant accident could affect more than 75% of people in the city through closed roads, detours, or

hazardous materials. The county is a major responder and manager of significant transportation events, should they occur within the county.

Severity of Impact

Highway incidents threaten the health and lives of people in the vehicles, pedestrians, and citizens of the community if hazardous materials are involved. Mass casualty events can occur if mass transit vehicles are involved. Community bus and school buses have a good safety record, but accidents can and do occur. Numerous injuries are a realistic possibility in situations involving mass transit vehicles. Property damage would be limited to vehicles and cargo involved; roads, bridges, and other infrastructure; utilities such as light and power poles; and third-party property adjacent to the accident scene such as buildings and yards.

Railway incidents can result in death, injury, and property damage. Deaths and injuries can range from those directly involved, to citizens in the community affected by hazardous materials. Depending on the materials involved, evacuations may occur, moving residents away from dangerous products and the possibility of explosion. Gases, liquids, and solids can contaminate air, soil, and water in and near the incident scene. If a railway incident occurred in an urban area, the health and welfare of thousands of people could be put in jeopardy. Damage may be limited to the train, railcars, and cargo involved, but it can also include loss of production, business disruption due to evacuations, and business disruptions of those served by the railroad. Business and traffic disruptions could last several days until the clean-up efforts are complete.

Albion, Ferguson, Gilman, Haverhill, Laurel, Rhodes, St. Anthony, and Marshalltown Community School District scored severity of impact as a 1, meaning that injuries, damages, and impacts related to the shutdown of critical facilities would be minimal. These jurisdictions are not significantly vulnerable to transportation incidents. They have limited vehicle traffic on the roads and highways nearby. With the exception of Albion and Gilman, they are not located near railroad tracks.

Clemons, Le Grand, Melbourne, East Marshall Community School District, and GMG Community School District scored severity of impact as a 2, meaning that injuries, damages, and impacts related to the shutdown of critical facilities would be limited. Critical facilities could be impaired for up to 24 hours. These communities have a slightly elevated risk to transportation incidents, and an accident could cause more damage in a community. A railway transportation incident in Le Grand could cause injuries. Melbourne could experience a highway car accident on Highway 330 that could cause multiple injuries and a shutdown of critical facilities or roads.

State Center and West Marshall Community School District scored severity of impact as a 3, meaning that the community anticipated a worst-case scenario if a transportation incident occurred. Serious injury and major property damage that threatens structural stability of buildings could be possible. State Center is located just off of a major thoroughfare through the county, US Highway 30. State Center also has a railroad line running through nearly the center of town. More serious impacts from a transportation incident could be possible. Finally, Liscomb, Marshalltown, and Marshall County scored severity of impact as a 4, meaning that major property damage or deaths could occur.

Speed of Onset

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. All jurisdictions in Marshall County scored this hazard as a 4, meaning that there would be little to no warning time for a transportation incident.

4.3: 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 Task Force 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 vary across jurisdiction and by hazard; these effects will be considered in this section.

4.3.1: 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 risk assessment in Section 4.2 of this plan were used to help determine just how vulnerable Marshall County and its individual jurisdictions are to natural and manmade hazards. For the purposes of determining what the greatest risks were across the county according to the results of the risk assessment, risk assessment scores were averaged among jurisdictions to result in one total hazard score per hazard. These averaged scores are included in Table 4.3.1.1. As a reminder, the total risk assessment score considered the following hazard characteristics: historical occurrence, probability, vulnerability, severity of impact, and speed of onset.

During the scoring process, the highest score a hazard could possibly receive is 20. Based on averaged scores, the highest score a hazard received was an 18, while the lowest score a hazard received was a 7. These scores were used to assign a vulnerability rating of high, medium, or low. Hazards that scored 15 to 18 are considered high priority. Hazards that scored 10 to 14 are medium, and hazards that scored 9 or below are considered lower priority. It is important to note that although a score may have received an overall vulnerability rating, there are differences among jurisdictions regarding hazard risk and vulnerability. Some of these differences were described in this chapter and in Chapter 4.2, Hazard Profiles and Risk Assessment.

Regarding 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, and the hazard could 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. In addition, referring back to the detailed ranking score for each hazard will help distinguish the differences among 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 the detailed ranking score for each hazard will be helpful to distinguish differences among hazards. 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.

Jurisdictions' vulnerability to hazards will be presented in this section according to their averaged risk assessment score as displayed in Table 4.3.1.1.

Table 4.3.1.1 Final Table of Risk Assessment Scores (Average)

Hazard	Jurisdictions	Total Score	Priority
Severe Winter Storm	County-wide	18	High
Wind Storms	County-wide	18	High
Tornado	County-wide	17	High
Thunderstorms, Lightning, and Hail	County-wide	17	High
Extreme Heat	County-wide	17	High
Radiological	County-wide	14	Medium
Hazardous Materials	All jurisdictions	13	Medium
Drought	County-wide	11	Medium
Infrastructure Failure	All jurisdictions	11	Medium
Transportation Incident	All jurisdictions	10	Medium
Terrorism	All jurisdictions	10	Medium
Grass or Wildland Fire	All jurisdictions	10	Medium
Flash Flood	All jurisdictions	9	Low
River Flooding	All jurisdictions	8	Low
Dam/Levee Failure	All jurisdictions	8	Low
Earthquake	County-wide	8	Low
Human Disease	All jurisdictions	7	Low
Animal/Plant/Crop Disease	County-wide	7	Low

Jurisdictions' vulnerability to hazards are described in the chapter in several ways. First, an average annual countywide loss estimate has been calculated for hazards that have previous loss data. This calculation is based on the methodology from the Iowa 2013 State Plan. Hazards that did not have historical loss estimates available do not have average annual countywide loss estimates.

Next, a spatial analysis was performed for each jurisdiction to estimate potential property losses due to each hazard. Methods and data sources are included within each hazard sub-section. A "hazard area" was established for each hazard, and the number of parcels with value and total value of structures that located within the hazard area are provided in the tables. Data was also obtained from the Iowa Department of Natural Resources regarding the locations of structures in Marshall County. Structural location data was overlaid with each hazard area, and the number of structures in the hazard area was analyzed based on the land use class of the parcel in which it was located. Potential property losses are broken down by number of parcels with value, the total value of structures in the hazard area, and the number of structures in each hazard area. A table of number of parcels with value and total value of structures for each jurisdiction is included in Table 4.3.1.2.

"Number of People" vulnerable to each hazard was calculated by considering each jurisdiction's population in 2010 according to the census and determining the percentage of the jurisdiction's total area that the vulnerable parcels with value made up. The population number was then multiplied by the percentage of the total area in the hazard area with value. This estimate is based on the number of people that could be affected through displacement or damaged property by a

given hazard. The vulnerability analysis does not consider indirect effects of a hazard such as closed roads, flooded areas that do not contain property with value, or people who may be affected by a necessary evacuation due to hazardous conditions that extend beyond the affected parcels with value.

Finally, each hazard section includes a discussion of vulnerability in relation to critical facilities, infrastructure, and cultural facilities. Jurisdictions' vulnerability to hazards will be presented in this section according to their averaged risk assessment score as displayed in Table 4.3.1.1.

Table 4.3.1.2. Number of Parcels With Value and 2014 Assessed Building Values

		Agricultural	Residential	Commercial	Industrial	Exempt	Total
Albion	Number of Parcels	16	208	11	4	8	247
	Value of Structure	$531,730	$11,174,290	$1,018,590	$733,460	$859,747	$14,317,817
Clemons	Number of Parcels	3	70	3	0	6	82
	Value of Structure	$13,080	$2,685,670	$317,330	0	$231,970	$3,248,050
Ferguson	Number of Parcels	3	55	2	0	4	64
	Value of Structure	$69,670	$1,490,860	$76,480	0	$396,220	$2,033,230
Gilman	Number of Parcels	5	211	29	0	10	255
	Value of Structure	$336,930	$10,269,460	$1,811,820	0	$567,596	$12,985,806
Haverhill	Number of Parcels	0	67	6	0	4	77
	Value of Structure	0	$5,103,900	$1,179,420	0	$490,107	$6,773,427
Laurel	Number of Parcels	0	106	15	0	10	131
	Value of Structure	0	$5,705,410	$403,940	0	$1,861,025	$7,970,375
LeGrand	Number of Parcels	1	304	18	0	10	333
	Value of Structure	$48,870	$25,732,600	$1,325,490	0	$4,343,122	$31,450,082
Liscomb	Number of Parcels	5	114	13	0	6	138
	Value of Structure	$293,450	$4,601,990	$1,762,870	0	$253,784	$6,912,094
Marshalltown	Number of Parcels	16	8770	833	59	242	9920
	Value of Structure	$2,170,990	$671,208,029	$201,562,932	$66,153,968	$146,023,248	$1,087,119,167
Melbourne	Number of Parcels	2	286	32	0	8	328
	Value of Structure	$82,020	$19,916,690	$ 2,829,089	0	$ 637,676	$23,465,475
Rhodes	Number of Parcels	13	131	12	0	4	160
	Value of Structure	$621,600	$6,297,350	$84,500	0	$84,346	$7,087,796
St. Anthony	Number of Parcels	1	55	9	0	2	67
	Value of Structure	$50,960	$1,147,750	$1,175,090	0	$17,046	$2,390,846
State Center	Number of Parcels	5	534	73	0	18	630
	Value of Structure	$219,840	$41,409,500	$4,781,699	0	$3,793,080	$50,204,119
Marshall County Uninc	Number of Parcels	1689	1868	74	81	61	3773
	Value of Structure	$154,644,440	$194,278,704	$21,902,110	$32,311,340	$7,929,068	$411,065,662

Source: Marshall County Assessor's Office 2014

High Priority Hazards

Hazard: Severe Winter Storm
Jurisdictions: County-wide
Score: 18

According to NCDC data, Marshall County experienced 53 severe winter storm events from 1996 – 2014. These events caused a total of $2,749,680 in property damage and $2,600,000 in crop damage. Using this data, an average annual countywide loss estimate was calculated as follows:

Total Severe Winter Storm Damage History ($5,349,680) / Number of Years of Record (18.1 years) = Average Annual Countywide Loss Estimate ($295,562.43)

Based on previous data, Marshall County may experience $295,562.43 in damages related severe winter storms in any given year.

Severe winter storms can affect a large portion of the county at once. Because of this hazards' widespread effect, it was not possible to provide an accurate potential property loss estimate using spatial analysis software. The Task Force estimated that between 75-100% of people and property might be affected in Marshall County during a severe winter storm event; however, it's not likely that 100% of structures in Marshall County would face significant or total damage. Effects of a severe winter storm might include dangerous driving conditions that could cause accidents, injuries, property damage, or stranding of drivers. Roofs could buckle under the weight of heavy snowfall. Power lines and tree branches may break if an ice storm or wet snow occurs. Emergency service personnel may find it difficult to respond to situations if roads are not kept clear. A table showing the total parcels with value of all jurisdictions in the county and value of structures that could be affected is included in Table 4.3.1.2 of this chapter.

All critical facilities in all jurisdictions are vulnerable to this hazard. These critical facilities include, but are not limited to, schools, health care facilities, police and fire stations, water towers, lift stations, city and county buildings, and sirens. Severe winter weather can significantly affect road conditions and the ability of emergency responders to travel to emergencies. Cultural facilities in Marshall County can shut down as a result of severe winter weather. Cultural facilities include restaurants, parks, community centers, museums, and businesses.

Although severe winter storms ranked highest during the risk assessment for Marshall County, many communities determined that they were adequately prepared for this hazard. Public works officials, law enforcement, and emergency responders were all part of the Marshall County Task Force. Members of the Task Force stressed that their communities had adequate equipment such as trucks, plows, chemicals, and staff to keep the roads as safe as possible during severe winter weather. Many communities have specific snow ordinances or other provisions written in their city code that address safety conditions during inclement weather. Some communities addressed

severe winter weather as part of their action plans when they discussed establishing shelters; this mitigation action was typically listed as addressing all hazards. Establishing a shelter or providing a public service announcement about the location of that shelter can assist residents who need shelter during severe winter storms due to loss of power, being stranded, or roof cave-ins from heavy snowfall.

Hazard: Wind Storm
Jurisdictions: County-wide
Score: 18

According to NCDC data, Marshall County experienced 25 wind storm events from 1996 – 2014. These events caused a total of $3,259,000 in property damage and $964,100 in crop damage. Using this data, an average annual countywide loss estimate was calculated as follows:

Total Wind Storm Damage History ($4,223,100) / Number of Years of Record (18 years) = Average Annual Countywide Loss Estimate ($234,616.66)

Based on previous data, Marshall County may experience $234,616.66 in damages related to wind storms in any given year.

Wind storms have the potential to affect a large portion of the county at once. In addition, wind storms can be unpredictable; the hazard area encompasses the entire county. Because of this hazards' widespread and unpredictable effects, it was not possible to provide an accurate potential property loss estimate using spatial analysis software. The Task Force estimated that between 75 and 100% of people and property might be affected in Marshall County during a wind storm event; however, it's not likely that 100% of structures in Marshall County would face significant or total damage from a wind storm. Effects of a wind storm might include structural damage to roofs, windows, and buildings. Power lines, trees, and other vegetation may be damaged and may cause power outages. Powerful wind events can event damage or destroy well-constructed structures. Crop damage is often associated with windstorms, including pushed down crops, breaking stalks, and twisting plants. This damage can reduce yields and make it difficult to harvest. A table showing the total parcels with value of all jurisdictions in the county and value of structures that could be affected is included in Table 4.3.1.2 of this chapter.

All critical facilities in all jurisdictions are vulnerable to this hazard. These critical facilities include, but are not limited to, schools, health care facilities, police and fire stations, water towers, lift stations, city and county buildings, and sirens. A shutdown of critical facilities could occur for days if damage to utility infrastructure is significant. Cultural facilities in Marshall County could also be affected by a power outage as a result of a wind storm that causes a significant outage that takes times to be repaired. Cultural facilities include restaurants, parks, community centers, museums, and businesses.

Hazard: Tornado
Jurisdictions: County-wide
Score: 17

Since 1951, Marshall County has experienced a total of 31 tornado events that caused a total of over $31.5 million in property damage (NCDC 2015). Tornadoes in the county have ranged from an FO tornado ten different times to an F4 tornado in May of 1989. According to historical NCDC data, on average, the county has the highest probability of experiencing an F1 tornado.

Table 4.3.1.5. History of Tornadoes in Marshall County

Hazard	Time Period Earliest event on record to 12/2013	Type of Event	# of Events	Probability
Tornado	6/1951 – 6/2014 (63 years)	F0	10	16%
		F1	13	21%
		F2	4	6%
		F3	3	5%
		F4	1	2%

According to NCDC data, Marshall County experienced 31 tornado events from 1951 – 2014. These events caused a total of $31,475,500 in property damage and $70,500 in crop damage. Using this data, an average annual countywide loss estimate was calculated as follows:

Total Tornado Damage History ($31,546,000) / Number of Years of Record 63 years) = Average Annual Countywide Loss Estimate ($500,730.16). Based on previous data, Marshall County may experience $500,730.16 in damages related to tornados in any given year.

If a tornado were to occur in Marshall County, all critical facilities in all jurisdictions could be affected. These critical facilities include, but are not limited to, schools, health care facilities, police and fire stations, water towers, lift stations, city and county buildings, and sirens. Cultural facilities could also be temporarily shut down until debris is cleaned and residents are accounted for. Some cultural facilities such as community centers, parks, or gas stations may be turned into impromptu emergency centers where emergency supplies can be distributed and emergency personnel can organize.

To estimate Marshall County's vulnerability to tornadoes, a scenario was created to model an F2 tornado with wind speeds of roughly 130 mph, a length of five miles, and a width of 100 yards in three different locations in the county. ArcGIS was used to perform this analysis. Parcel data was obtained from the Marshall County Assessor's office and structure location information was obtained from the Iowa Department of Natural Resources. The analysis used the building and dwelling values based on individual parcels. Note that these values are kept by the Assessor's office for taxing purposes; some parcels may have structures or additional value that was not captured by the available data and was therefore not included in this analysis. Despite these data limitations, the following scenarios still provide a good estimate regarding an F2 tornado event in various parts of Marshall County. Three locations in Marshall County were chosen for this analysis based on their varied populations, densities, and total parcels with value:

- The City of Laurel (pop: 239, total parcels with value: 131)
- The City of Marshalltown (pop: 27,552, total parcels with value: 9,920)
- Unincorporated Marshall County East of the City of State Center (pop: 40,648, total parcels with value: 3,773)

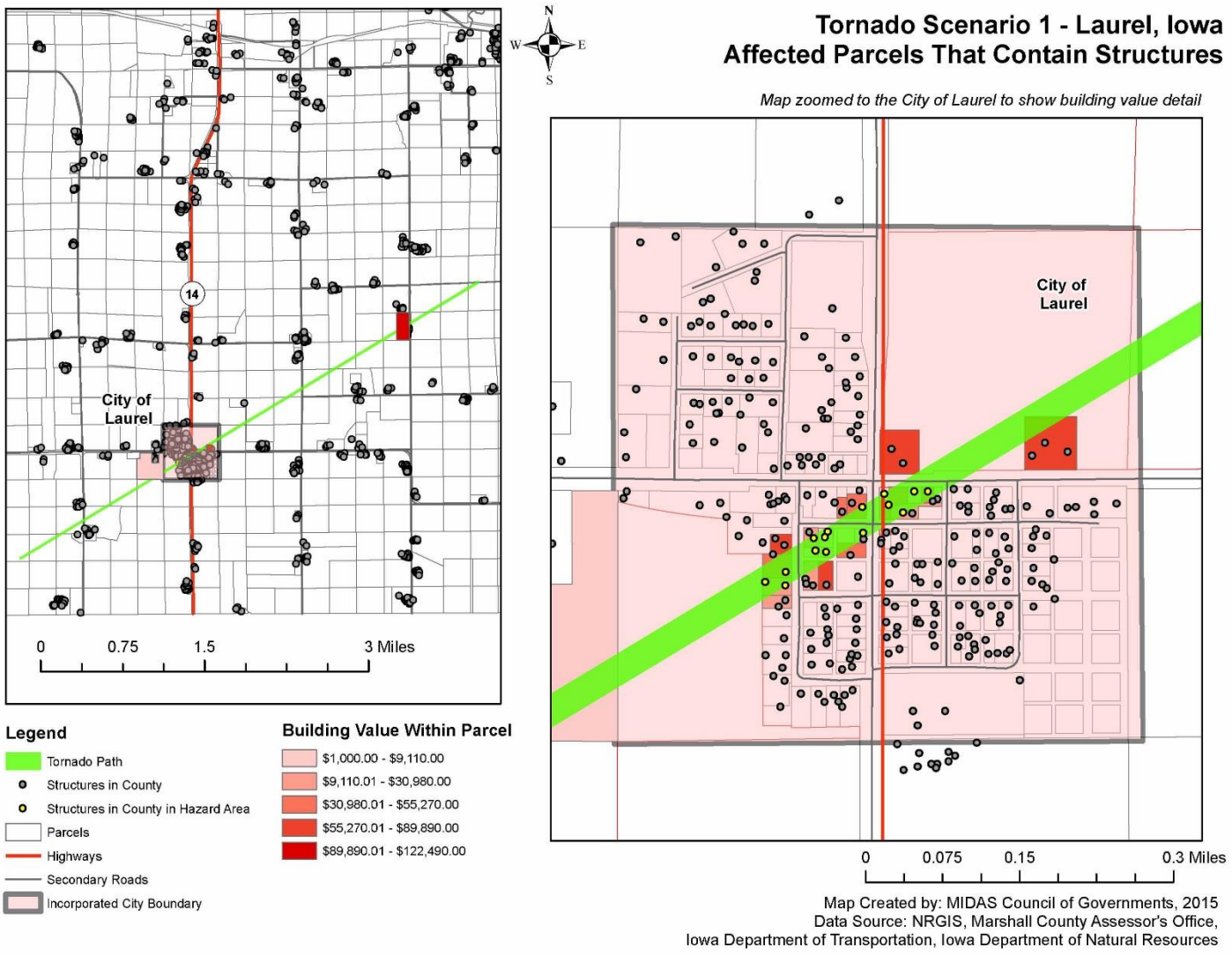
F2 Tornado Scenario 1: Laurel, IA

The F2 tornado touches down just southwest of Laurel. The tornado first affects a few agricultural parcels (none of which have any dwellings or buildings) as it moves northeast into the incorporated area of Laurel. The tornado hits the US Post Office and Smith and Smith Store along with 17 other structures and then continues northeast. The tornado continues out of Laurel city limits to the northeast where it encounters mostly agricultural land with no structures. The tornado was on the ground for approximately 5 miles. A total of 24 parcels with value and 17 structures would be in the path of the tornado with residential occupancy being at the most risk. Buildings in the path of the tornado would sustain a total of $278,899.80in damages if 30% damage were incurred.

Tornado Potential Property Loss Estimates Scenario 1

Occupancy	Parcels With Value Affected Within Scenario 1	Building Value - Exposure	30% Damage
Agriculture	2	$130,980	$39,294
Residential	12	$457,640	$137,292
Commercial	6	$216,330	$64,899
Industrial	0	$0.0	$0.00
Exempt	4	$124,716	$37,414.80
Total	24	$929,666	$278,899.80
Structures: 19			

Source: Marshall County Assessor's Office, Iowa Department of Natural Resources



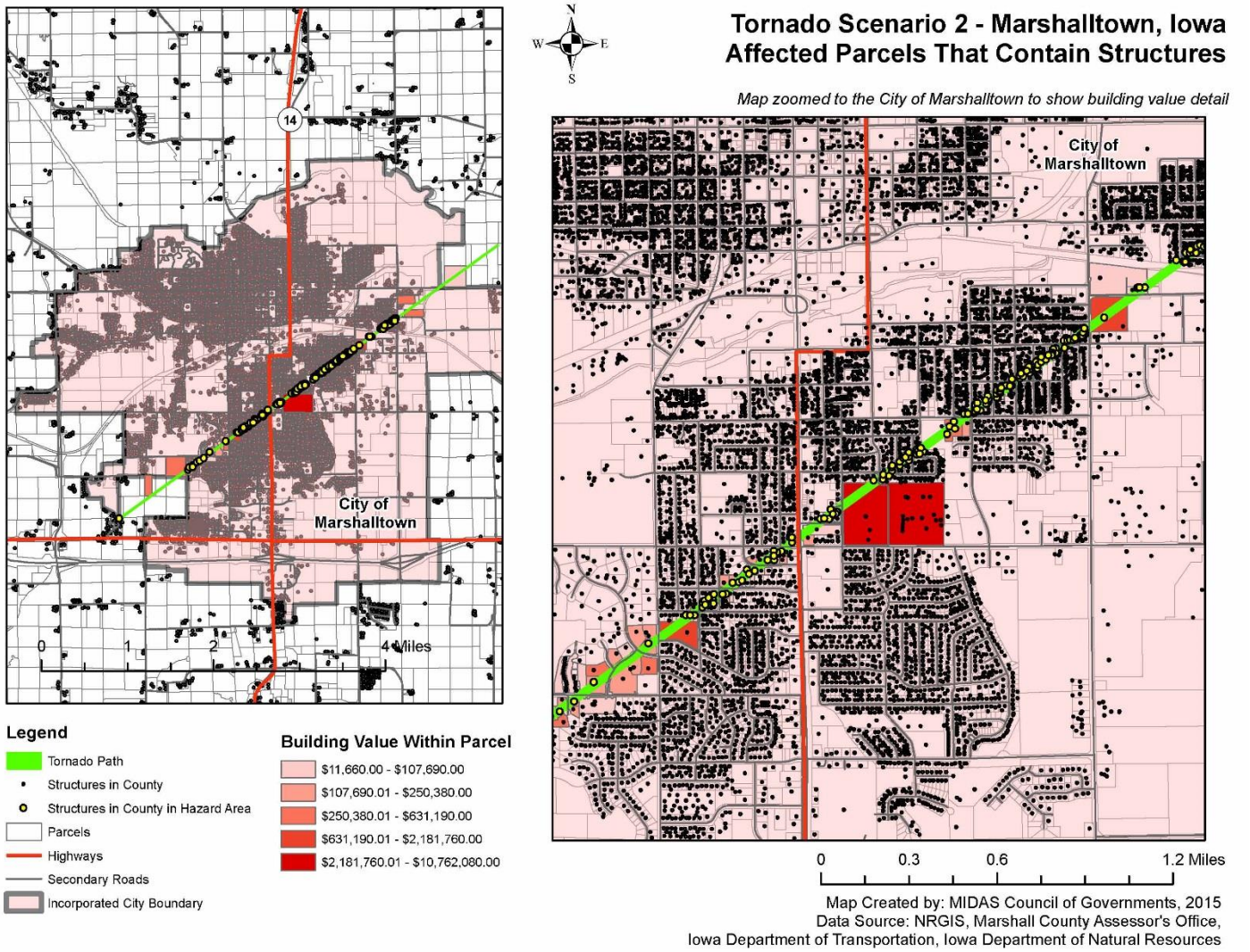
F2 Tornado Scenario 2: Marshalltown, IA

The F2 tornado touches down near the southwest corner of town just outside of the incorporated city limits on the southwest side of town. At first, it affects a few agricultural parcels (most of which have no dwellings or buildings), but then it enters a more populated area of the city, affecting many residential structures. Marshalltown High School and Lennox Industries are in the direct path of the tornado. The tornado continues northeast and other of the incorporated area. The tornado stayed on the ground for approximately 5 miles. A total of 235 buildings would be in the path of the tornado with residential occupancy being at the most risk. Buildings in the path of the tornado would sustain $10,617,051.0 in damages if 30% damage were incurred.

Tornado Potential Property Loss Estimates Scenario 2

Occupancy	Parcels With Value Affected Within Scenario 2	Building Value - Exposure	30% Damage
Agriculture	2	$786,560	$235,968.0
Residential	218	$18,056,790	$5,417,037.0
Commercial	9	$3,163,480	$949,044.0
Industrial	1	$107,690	$32,307.0
Exempt	5	$13,275,650	$3,982,695.0
Total	235	$35,390,170	$10,617,051.0
Structures: 173			

Source: Marshall County Assessor's Office, Iowa Department of Natural Resources



F2 Tornado Scenario 3: Unincorporated Marshall County, IA

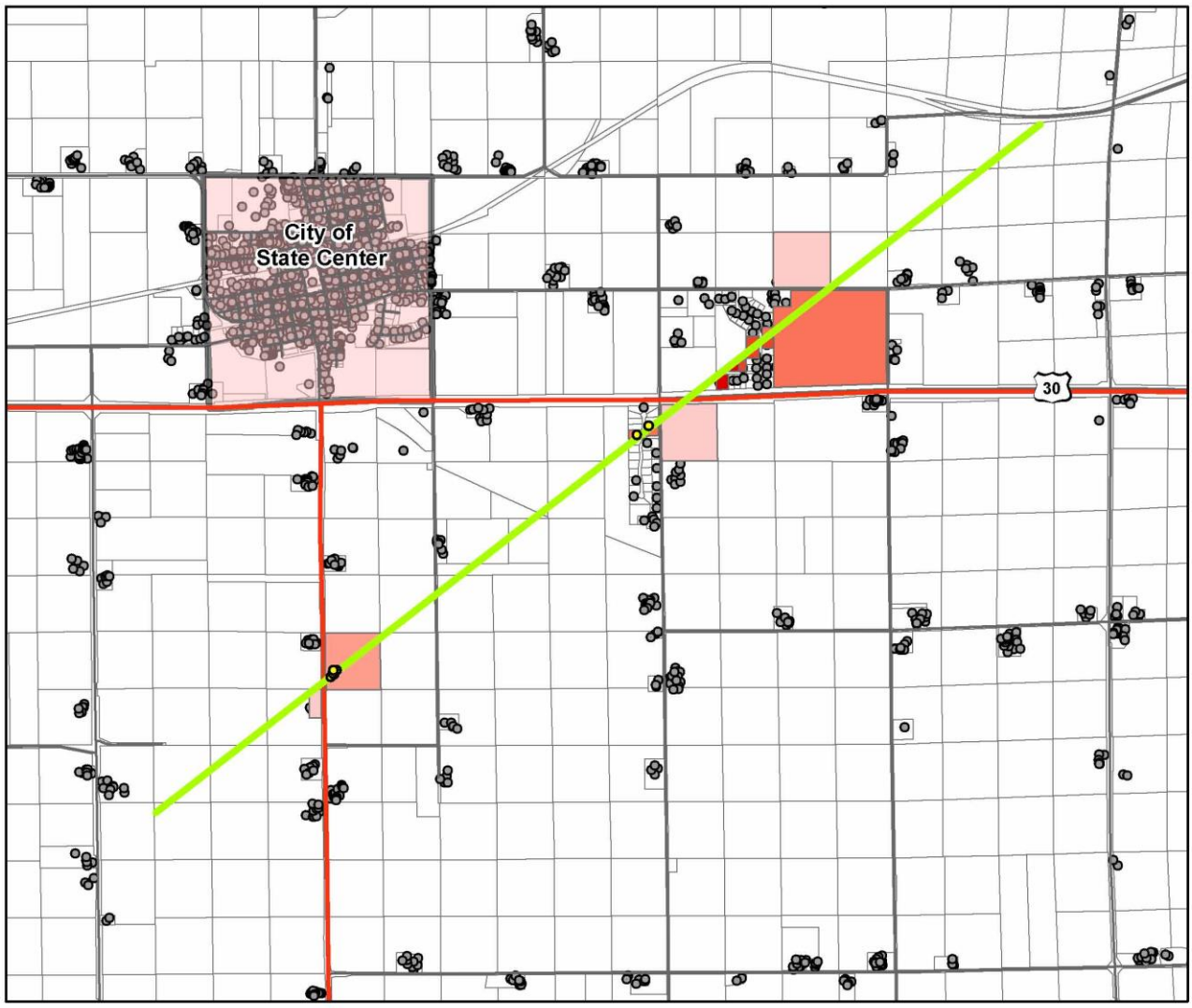
The F2 tornado touches down approximately 1.5 miles southwest of State Center near Cooper Avenue. It moves on a northeast path, affecting a few agricultural parcels (with structures) and then also moves through several rural residential areas near Lincoln Valley Golf Course. Many structures exist in this area that could be affected if the tornado were to stay on the ground and hover for any length of time. The tornado then continues northeast into more agricultural fields, causing little additional damage. The tornado stays on the ground for approximately 5 miles. A total of 13 structures would be in the path of the tornado with rural residential occupancy being at the most risk. Buildings in the path of the tornado would sustain a total of $606,546.0 in damages if 30% damage were incurred.

Tornado Potential Property Loss Estimates Scenario 3

Occupancy	Parcels With Value Affected Within Scenario 3	Building Value - Exposure	30% Damage
Agriculture	2	$85,170	$25,551.0
Residential	9	$1,721,050	$516,315.0
Commercial	2	$215,600	$64,680.0
Industrial	0	0	
Exempt	0	0	
Total	13	$2,021,820	$606,546.0
Structures: 7			

Source: Marshall County Assessor's Office, Iowa Department of Natural Resources

Tornado Scenario 3 - Unincorporated Marshall County, Iowa
Affected Parcels That Contain Structures



0 0.325 0.65 1.3 Miles

Legend

- Tornado Path
- Structures in County
- Structures in Hazard Area
- Highways
- Secondary Roads
- Parcels
- Incorporated City Boundary

Building Value Within Affected Parcel

- $1,500.00 - $21,600.00
- $21,600.01 - $83,670.00
- $83,670.01 - $194,000.00
- $194,000.01 - $225,340.00
- $225,340.01 - $280,890.00

N
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S

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office,
Iowa Department of Transportation, Iowa Department of Natural Resources

Hazard: Thunderstorms, Lightning, and Hail
Jurisdictions: County-wide
Score: 17

According to NCDC data, Marshall County experienced a total of 265 thunderstorm, thunderstorm wind, hail, lightning, or heavy rain events from 1960 to 2014 (the time frame for which data was available). Note that these events are a combined total of all of the thunderstorm, lightning, and hail events listed in Appendix G. These events caused a total of $3,652,500 in property damages and $1,487,000 in crop damages. Using this data, an average annual countywide loss estimate was calculated as follows:

Total Thunderstorm, Lightning, and Hail Damage History ($5,139,500) / Number of Years of Record (54.6 years) =
Average Annual Countywide Loss Estimate ($94,130.04)

Based on previous data, Marshall County may experience $94,130.04 in damages related to Thunderstorms, Lightning, or Hail in any given year. Because thunderstorms, lightning, and hail were considered at the jurisdictional level rather than the county level, this calculation has also been broken down for each jurisdiction based on data for total damages from the NCDC. See Table 4.3.1.3 for more information.

Table 4.3.1.3. Average Annual Loss Estimate for Thunderstorm, Lightning, and Hail

Jurisdiction	Time Period	# of Events	Total Damages	Average Annual Loss Estimate
Albion	4/1960 – 9/2014 (54.6 years)	8	$166,000	$3,180.08
Clemons		4	$290,000	$5,555.56
Ferguson		4	$18,000	$344.83
Gilman		11	$171,000	$3,275.86
Haverhill		5	$89,100	$1,706.90
Laurel		7	$90,000	$1,724.14
Le Grand		4	$63,500	$1,216.48
Liscomb		7	$180,000	$3,448.28
Marshalltown		97	$2,186,000	$41,877.39
Melbourne		11	$238,000	$4,559.39
Rhodes		6	$67,000	$1,283.52
St. Anthony		7	$400,000	$7,662.84
State Center		47	$711,000	$13,620.69
Marshall County Unincorporated		27	--	--

Thunderstorms, lightning, and hail can affect a large portion of the county at once. In addition, these storms can be unpredictable and difficult to analyze with spatial analysis software. Because of these circumstances, it was not possible to provide an accurate potential property loss estimate

using spatial analysis software. One average, Task Force members across jurisdictions estimated that between 51-75% of people and property might be affected in Marshall County during a thunderstorm, lightning, or hail event. It is not likely that 75% of structures in Marshall County would face significant or total damage from this type of event. Thunderstorms, lightning, and hail storms have the potential to significantly affect agricultural crops such as corn and beans; hail can strip the plant of its leaves. Hail can also do considerable damage to vehicles and buildings. 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/manufactured homes are vulnerable to the impacts of thunderstorms. Sudden strong winds often accompany a severe thunderstorm and may blow down trees across roads and power lines or cause damage to roofs, windows, or buildings. A table showing the total parcels with value of all jurisdictions in the county and value of structures that could be affected is included in Table 4.3.1.2 of this chapter.

All critical facilities in all jurisdictions are vulnerable to this hazard. These critical facilities include, but are not limited to, schools, health care facilities, police and fire stations, water towers, lift stations, city and county buildings, and sirens. Severe storms can cause damage to power lines, roofs, windows, and building exteriors. Heavy downpours sometimes associated with thunderstorms can result in flash flooding or river flooding. A power loss from thunderstorms could result in a shutdown of critical facilities could occur for days if damage to utility infrastructure is significant. Cultural facilities are vulnerable to all of the effects just described. Cultural facilities include restaurants, parks, community centers, museums, and businesses.

Hazard: Extreme Heat
Jurisdictions: County-wide
Score: 17

According to NCDC Climate Data, Marshall County experienced 39 instances of extreme heat from 1993 -2014. Loss estimates from these events were not available, therefore an average annual countywide loss estimate was not able to be calculated.

Like other county-wide hazards with a wide event scope, extreme heat tends to affect the whole county, and beyond, when it occurs. Because of this hazard's characteristics, it was not able to be analyzed using spatial analysis software. The Task Force estimated that between 75-100% of people and property might be affected in Marshall County during an extreme heat event; however, it's not likely that this amount of structures in Marshall County would face significant or total damage from extreme heat. Effects of extreme heat are not often tied to structural damage. Those most at risk of extreme heat include elderly people, small children, chronic invalids, those on certain medications or drugs (especially tranquilizers and anticholinergics), and persons with weight and alcohol problems. Healthy individuals working outdoors in the sun and heat are also vulnerable. Individuals and families with low budgets as well as inner city dwellers can also be susceptible due to poor access to air-conditioned housing. A table showing the total parcels with

value of all jurisdictions in the county and value of structures that could be affected is included in Table 4.3.1.2 of this chapter.

All critical facilities in all jurisdictions are vulnerable to this hazard. However, structural issues are not the most common issues associated with extreme heat. Extreme heat may cause an overloading of the power grid from increased air conditioning use; a power loss may result in a shutdown of critical facilities functions for several hours. Critical facilities that are vulnerable to extreme heat in the conditions just described include, but are not limited to, schools, health care facilities, police and fire stations, water towers, lift stations, city and county buildings, and sirens. Cultural facilities in Marshall County may provide respite to those looking to get away from the heat. Extreme heat could have a negative effect on outdoor recreational activities.

Medium Priority Hazards

Hazard: Radiological
Jurisdictions: County-wide
Score: 14

Since the Duane Arnold Energy Center near Palo, Iowa began operating in 1974, there have been no radiological incidents that have occurred. Since there are no historical incidents, an average annual countywide loss estimate was not able to be calculated.

There are four emergency classifications that are used to describe an emergency event involving the nuclear power plant. The two least serious of the four, unusual event and alert, would not involve Marshall County because no radioactive materials would be released (Iowa Emergency Management Association 2014). An event is classified as a site area emergency when radioactive materials may have been released into the air or water, but these materials would not be expected to exceed EPA Protective Action Guidelines in areas beyond the nuclear site. Marshall County would be affected in the most serious incident of the four classification, a general emergency. In this event, the plant would have released radiation that goes beyond the plant and evacuation may be necessary. The amount and extent of injuries will vary depending on the amount of radioactive materials released. Since US Highway 30 is an evacuation route, Marshall County may experience people traveling through the county who have been exposed to radiation. Damage to or contamination of structures or property would also vary depending on the incident. A table showing the total parcels with value of all jurisdictions in the county and value of structures that could be affected is included in Table 4.3.1.2 of this chapter.

All critical facilities in all jurisdictions are vulnerable to this hazard. These critical facilities include, but are not limited to, schools, health care facilities, police and fire stations, water towers, lift stations, city and county buildings, and sirens. Highway 30 in Marshall County is included in the emergency evacuation route in the event of an incident. The county could expect to experience

increased vehicle traffic, increased demand for health care services, and increased need for emergency shelter and supplies. Cultural facilities in the county could also be affected. A shut down of many recreational facilities could occur in the short term. Other facilities such as gas stations and restaurants could assist evacuees and residents during the emergency. In the long term, businesses could be negatively affected by a radiological incident if the county loses population and people are not able to resettle in the region due to radiation concerns. Again, the potential for an event to occur is rare. Other counties would experience more significant effects before Marshall County.

Hazard: Hazardous Materials
Jurisdictions: All jurisdictions
Score: 13

Fixed Hazardous Materials

According to the Iowa DNR, hazardous materials spills throughout Marshall County are fairly common. From 1995 to 2014, the county experienced a total of 204 hazardous spills. 71% (144) of these spills occurred in Marshalltown alone. Of the total spills, 62% of these events involved fixed incidents and 22% involved transportation of hazardous materials. Other incident types included railroad incidents, manure, and unknown. There are no estimates of property damage available, so an average annual countywide loss estimate was not able to be calculated.

Hazardous materials hazard areas are quite expansive for most cities. Note that the hazardous materials hazard area is a buffer of two miles that was drawn around all Tier II hazardous materials facilities as defined by the NRGIS GIS data set provided by the Iowa DNR. Tier II facilities are considered more hazardous than other facilities due to the types of chemicals that are stored at the facility or the amount of chemicals stored at the facility. The Marshall County Emergency Manger and the Region 5 Local Emergency Planning Commission (LEPC) determined that a buffer area of two miles was sufficient to account for all effects due to a hazardous materials incident involving a Tier II facility. If a hazardous materials incident did occur, the affected area would vary depending on the type of material involved, amount of material, and extent of the accident.

The following jurisdictions have critical facilities that fall within the hazardous materials hazard area:

- Albion (all critical facilities in hazard area)
- Clemons (no critical facilities in hazard area)
- Ferguson (all critical facilities in hazard area)
- Gilman (no critical facilities in hazard area)
- Haverhill (all critical facilities in hazard area)
- Laurel (all critical facilities in hazard area)
- Le Grand (all critical facilities in hazard area)
- Liscomb (all critical facilities in hazard area)
- Marshalltown (all critical facilities in hazard area)

- Melbourne (all critical facilities in hazard area)
- Rhodes (all critical facilities in hazard area)
- St. Anthony (no critical facilities in hazard area)
- State Center (all critical facilities in hazard area)

Cultural facilities could also be impacted by a hazardous materials incident. Everyday recreation activities that exist throughout the county such as a bike trails, recreation trails, city park recreation areas, aquatic centers, and Grimes Farm / Conservation Center could also be affected.

Certain jurisdictions are more prone to hazardous materials spills than others. To better understand this difference in risk across jurisdictions, vulnerability to fixed hazardous facilities was assessed using ArcGIS spatial analysis software. GIS data for hazardous facilities was obtained from the NRGIS library. The data set was prepared by the Iowa DNR using the same data that is available on the Iowa DNR Facilities Explorer website. A two mile buffer was drawn around each Tier II hazardous materials facility to identify the primary areas of impact that may be affected by a fixed hazardous materials incident. The Marshall County Assessor's office provided parcel level assessor data, the Iowa Department of Natural Resources provided structural location data, and parcels and structures were overlaid with the fixed hazardous materials hazard area to analyze how many parcels and structures in each jurisdiction might be affected by this type of hazard.

See Appendix I for the location of fixed hazardous materials hazard areas in each community. Vulnerability assessments for jurisdictions that could be affected by fixed hazardous materials incidents are included in the following tables.

Fixed Hazardous Materials Potential Property Loss Estimates by Jurisdiction

Albion

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	16	16	100%	$531,730	$531,730	100%	505	100%	505
Residential	208	208	100%	$11,174,290	$11,174,290	100%			
Commercial	11	11	100%	$1,018,590	$1,018,590	100%			
Industrial	4	4	100%	$733,460	$733,460	100%			
Exempt	8	8	100%	$859,747	$859,747	100%			

The following types of structures in Albion are located in the hazard area according to data from the IDNR: 29 Agricultural, 401 Residential, 29 Commercial, and 21 Exempt

Clemons

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	3	0	0%	$13,080	0	0%	148	0%	0
Residential	70	0	0%	$2,685,670	0	0%			
Commercial	3	0	0%	$317,330	0	0%			
Industrial	0	0	0%	0	0	0%			
Exempt	6	0	0%	$231,970	0	0%			

No structures in Clemons exist in the hazard area according to data from the IDNR

Ferguson

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	3	3	100%	$69,670	$69,670	100%	126	100%	126
Residential	55	55	100%	$1,490,860	$1,490,860	100%			
Commercial	2	2	100%	$76,480	$76,480	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	4	4	100%	$396,220	$396,220	100%			

The following types of structures in Ferguson are located in the hazard area according to data from the IDNR: 11 Agricultural, 138 Residential, 4 Commercial, and 8 Exempt

Gilman

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	0	0%	$336,930	0	0%	509	0%	0
Residential	211	0	0%	$10,269,460	0	0%			
Commercial	29	0	0%	$1,811,820	0	0%			
Industrial	0	0	0%	0	0	0%			
Exempt	10	0	0%	$567,596	0	0%			

No structures in Gilman exist in the hazard area according to data from the IDNR

Haverhill

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	0	0	0%	0	0	0%	173	100%	173
Residential	67	67	100%	$5,103,900	$5,103,900	100%			
Commercial	6	6	100%	$1,179,420	$1,179,420	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	4	4	100%	$490,107	$490,107	100%			

The following types of structures in Haverhill are located in the hazard area according to data from the IDNR: 110 Residential, 23 Commercial, and 12 Exempt

Laurel

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	0	0	0%	0	0	0%	239	100%	239
Residential	106	106	100%	$5,705,410	$5,705,410	100%			
Commercial	15	15	100%	$403,940	$403,940	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	10	10	100%	$1,861,025	$1,861,025	100%			

No structures in Laurel exist in the hazard area according to data from the IDNR

Le Grand

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1	1	100%	$48,870	$48,870	100%	938	100%	938
Residential	304	304	100%	$25,732,600	$25,732,600	100%			
Commercial	18	18	100%	$1,325,490	$1,325,490	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	10	10	100%	$4,343,122	$4,343,122	100%			

The following types of structures in Le Grand are located in the hazard area according to data from the IDNR: 13 Agricultural, 542 Residential, 98 Commercial, and 33 Exempt

Liscomb

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	5	100%	$293,450	$293,450	100%	301	100%	301
Residential	114	114	100%	$4,601,990	$4,601,990	100%			
Commercial	13	13	100%	$1,762,870	$1,762,870	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	6	6	100%	$253,784	$253,784	100%			

The following types of structures in Liscomb are located in the hazard area according to data from the IDNR: 42 Agricultural, 208 Residential, 26 Commercial, and 12 Exempt

Marshalltown

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	16	16	100%	$2,170,990	$2,170,990	100%	27,552	100%	27,552
Residential	8770	8770	100%	$671,208,029	$671,208,029	100%			
Commercial	833	833	100%	$201,562,932	$201,562,932	100%			
Industrial	59	59	100%	$66,153,968	$66,153,968	100%			
Exempt	242	242	100%	$146,023,248	$146,023,248	100%			

The following types of structures in Marshalltown are located in the hazard area according to data from the IDNR: 119 Agricultural, 13,678 Residential, 1,603 Commercial, 104 Industrial, and 553 Exempt

Melbourne

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	2	2	100%	$82,020	$82,020	100%	830	100%	830
Residential	286	286	100%	$ 19,916,690	$ 19,916,690	100%			
Commercial	32	32	100%	$ 2,829,089	$ 2,829,089	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	8	8	100%	$ 637,676	$ 637,676	100%			

The following types of structures in Melbourne are located in the hazard area according to data from the IDNR: 9 Agricultural, 477 Residential, 119 Commercial, and 18 Exempt

Rhodes

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	13	13	100%	$621,600	$621,600	100%	305	100%	305
Residential	131	131	100%	$6,297,350	$6,297,350	100%			
Commercial	12	12	100%	$84,500	$84,500	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	4	4	100%	$84,346	$84,346	100%			

The following types of structures in Rhodes are located in the hazard area according to data from the IDNR: 52 Agricultural, 106 Residential, 17 Commercial, and 7 Exempt

St. Anthony

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1	0	0%	$50,960	$0	0%	102	0%	0
Residential	55	0	0%	$1,147,750	$0	0%			
Commercial	9	0	0%	$1,175,090	$0	0%			
Industrial	0	0	0%	0	$0	0%			
Exempt	2	0	0%	$17,046	$0	0%			

The following types of structures in St. Anthony are located in the hazard area according to data from the IDNR: 5 Agricultural, 106 Residential, 17 Commercial, and 7 Exempt

State Center

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	5	100%	$219,840	$219,840	100%	1,468	100%	1,468
Residential	534	534	100%	$41,409,500	$41,409,500	100%			
Commercial	73	73	100%	$4,781,699	$4,781,699	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	18	18	100%	$3,793,080	$3,793,080	100%			

The following types of structures in State Center are located in the hazard area according to data from the IDNR: 31 Agricultural, 106 Residential, 17 Commercial, and 7 Exempt

Marshall County

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1689	753	45%	$154,644,440	$70,414,670	46%	7,452	18%	1341
Residential	1868	1020	55%	$194,278,704	$104,488,904	54%			
Commercial	74	52	70%	$21,902,110	$16,978,370	78%			
Industrial	81	26	32%	$32,311,340	$9,829,120	30%			
Exempt	61	32	52%	$7,929,068	$4,857,858	61%			

The following types of structures in Marshall County are located in the hazard area according to data from the IDNR: 4,318 Agricultural, 2,679 Residential, 183 Commercial, and 93 Exempt

Pipeline Incidents

Pipelines are also classified as fixed hazardous materials, although this risk was assessed separately from fixed hazardous materials facilities. According to the USDOT Pipeline and Hazardous Materials Safety Administration (2014), Marshall County has experienced no pipeline incidents in the last 20 years. An average annual countywide loss estimate was not calculated due to no historical occurrences with which to collect historic loss estimates.

Cultural assets of communities can be affected by a pipeline incident. As described previously, outdoor recreation activities and events are particularly vulnerable.

The following jurisdictions have vulnerability to a pipeline incident based on the location of a pipeline hazard area within their jurisdictional boundaries: Albion (natural gas), Clemons (natural gas), Le Grand (natural gas and ammonia), Liscomb (natural gas), Marshalltown (natural gas), Melbourne (natural gas), Rhodes (natural gas), St. Anthony (natural gas), State Center (natural gas), and Marshall County Unincorporated (natural gas and ammonia).

The following jurisdictions have critical facilities that fall within the pipeline hazard area:

- Albion (all critical facilities in hazard area)
- Clemons (all critical facilities in hazard area)
- Le Grand (all critical facilities in hazard area)
- Liscomb (all critical facilities in hazard area)
- Melbourne (all critical facilities in hazard area)
- Rhodes (all critical facilities in hazard area)
- St. Anthony (all critical facilities in hazard area)
- State Center (all critical facilities in hazard area)

Note that the pipeline hazard area is a buffer of one mile that is drawn around all pipelines as defined by the NRGIS GIS data set provided by the Iowa DNR. In the event of a hazardous materials spill, not all of these facilities may be affected. The affected area will vary depending on the size of each facility, type of material involved, and extent of the accident. It is not likely that a pipeline incident would cause total loss of all properties that have been identified as within the hazard area.

To better understand the difference in risk across jurisdictions, vulnerability to pipeline hazards was assessed using ArcGIS spatial analysis software. GIS data for pipelines was obtained from the NRGIS library and checked for accuracy with the US Department of Transportation Pipeline and Hazardous Materials Safety Administration. A one mile buffer was drawn around each pipeline to identify areas that may be affected by a pipeline incident. Immediate impacts of a pipeline failure can occur within a ½ mile area of the pipeline, and secondary impacts can occur within one mile of the incident. The Marshall County Assessor's office provided parcel level assessor data, and parcels were overlaid with pipeline data to analyze how many parcels in each jurisdiction might be affected by a pipeline incident.

Although there are varying degrees of danger associated with the three types of product that are transported through Marshall County (ammonia and natural gas), a one mile buffer was used for all types of product. There are many risks associated with all of these products that could impact an area beyond one mile away from the pipeline. At a minimum, a one mile buffer addresses the area most likely to be affected by a pipeline incident.

Finally, only jurisdictions that had a pipeline hazard risk within their jurisdiction were included in the vulnerability assessment. The following jurisdictions were not considered in the vulnerability assessment because they do not have a pipeline hazard area within their jurisdictional boundaries: Ferguson, Gilman, Haverhill, and Laurel. See the county-wide map of pipeline hazards in Figure 4.1.11 for more details. See Appendix J for the location of pipeline hazard areas in each community. Vulnerability assessments for jurisdictions that could be affected by pipeline incidents are included in the following tables.

Pipeline Incident Potential Property Loss Estimates by Jurisdiction

Albion

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	16	16	100%	$531,730	$531,730	100%	505	100%	505
Residential	208	208	100%	$11,174,290	$11,174,290	100%			
Commercial	11	11	100%	$1,018,590	$1,018,590	100%			
Industrial	4	4	100%	$733,460	$733,460	100%			
Exempt	8	8	100%	$859,747	$859,747	100%			

The following types of structures in Albion are located in the hazard area according to data from the IDNR: 29 Agricultural, 401 Residential, 29 Commercial, and 21 Exempt

Clemons

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	3	3	100%	$13,080	$13,080	100%	148	100%	148
Residential	70	70	100%	$2,685,670	$2,685,670	100%			
Commercial	3	3	100%	$317,330	$317,330	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	6	6	100%	$231,970	$231,970	100%			

The following types of structures in Clemons are located in the hazard area according to data from the IDNR: 7 Agricultural, 144 Residential, 24 Commercial, and 13 Exempt

Le Grand

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1	1	100%	$48,870	$48,870	100%	938	24%	225
Residential	304	230	76%	$25,732,600	$18,447,640	72%			
Commercial	18	15	83%	$1,325,490	$886,440	67%			
Industrial	0	0	0%	0	0	0%			
Exempt	10	10	100%	$4,343,122	$4,343,122	100%			

The following types of structures in Le Grand are located in the hazard area according to data from the IDNR: 12 Agricultural, 144 Residential, 24 Commercial, and 13 Exempt

Liscomb

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	5	100%	$293,450	$293,450	100%	301	100%	301
Residential	114	114	100%	$4,601,990	$4,601,990	100%			
Commercial	13	13	100%	$1,762,870	$1,762,870	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	6	6	100%	$253,784	$253,784	100%			

The following types of structures in Liscomb are located in the hazard area according to data from the IDNR: 42 Agricultural, 208 Residential, 26 Commercial, and 12 Exempt

Marshalltown

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	16	5	31%	$2,170,990	$527,810	24%	27,552	4%	1102
Residential	8770	492	6%	$671,208,029	$47,724,160	7%			
Commercial	833	0	0%	$201,562,932	0	0%			
Industrial	59	0	0%	$66,153,968	0	0%			
Exempt	242	3	1%	$146,023,248	$312,730	.2%			

The following types of structures in Marshalltown are located in the hazard area according to data from the IDNR: 13 Agricultural, 736 Residential, and 8 Exempt

Melbourne

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	2	2	100%	$82,020	$82,020	100%	830	100%	830
Residential	286	286	100%	$ 19,916,690	$ 19,916,690	100%			
Commercial	32	32	100%	$ 2,829,089	$ 2,829,089	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	8	8	100%	$ 637,676	$ 637,676	100%			

The following types of structures in Melbourne are located in the hazard area according to data from the IDNR: 9 Agricultural, 477 Residential, 119 Commercial, and 18 Exempt

Rhodes

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	13	13	100%	$621,600	$621,600	100%	305	100%	305
Residential	131	131	100%	$6,297,350	$6,297,350	100%			
Commercial	12	12	100%	$84,500	$84,500	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	4	4	100%	$84,346	$84,346	100%			

The following types of structures in Rhodes are located in the hazard area according to data from the IDNR: 52 Agricultural, 106 Residential, 17 Commercial, and 7 Exempt

St. Anthony

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1	1	100%	$50,960	$50,960	100%	102	100%	102
Residential	55	55	100%	$1,147,750	$1,147,750	100%			
Commercial	9	9	100%	$1,175,090	$1,175,090	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	2	2	100%	$17,046	$17,046	100%			

The following types of structures in St. Anthony are located in the hazard area according to data from the IDNR: 5 Agricultural, 106 Residential, 17 Commercial, and 7 Exempt

State Center

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	5	100%	$219,840	$219,840	100%	1,468	100%	1,468
Residential	534	534	100%	$41,409,500	$41,409,500	100%			
Commercial	73	73	100%	$4,781,699	$4,781,699	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	18	18	100%	$3,793,080	$3,793,080	100%			

The following types of structures in State Center are located in the hazard area according to data from the IDNR: 31 Agricultural, 106 Residential, 17 Commercial, and 7 Exempt

Marshall County

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1689	481	28%	$154,644,440	$42,585,280	28%	7,452	4%	298
Residential	1868	460	25%	$194,278,704	$45,719,990	24%			
Commercial	74	21	28%	$21,902,110	$7,564,550	35%			
Industrial	81	15	19%	$32,311,340	$9,501,360	29%			
Exempt	61	16	26%	$7,929,068	$965,210	12%			

The following types of structures in Marshall County are located in the hazard area according to data from the IDNR: 2,903 Agricultural, 1,430 Residential, 72 Commercial, and 29 Exempt

Hazard: Drought
Jurisdictions: County-wide
Score: 11

NCDC data indicates that Marshall County has suffered nine periods of drought conditions from 2000 to 2013. See Table 4.3.1.4 for a summary of dates and property and crop damage totals. Note that the totals listed for property and crop damage are for all counties affected by this hazard event.

Table 4.3.1.4. Marshall County Drought Events From 2000-2013

Event Number	Date	Property Damage	Crop Damage
1	8/14/2000 9/1/2000		$4,690,000 $5,030,000
2	8/1/2001		$11,350,000
3	8/1/2003	$12,650,000	
4	7/1/2012 8/1/2012 9/1/2012 10/1/2012		$90,000,000 $6,000,000
5	8/1/2013		$21,000,000
	Total Damages:	$12,650,000	$138,070,000

The data shows that Marshall County has experienced far more crop damage related to drought events than property damage. Using this data, on average, an average annual countywide drought loss estimate was calculated as follows:

Total Drought Damage History ($150,720,000) / Number of Years of Record (13 years) = Average Annual Loss Estimate ($11,593,846.15).
Based on previous data, Marshall County may experience $11,593,846.15 in damages related to drought in any given year. Note that the average annual loss estimate was based upon damage totals that include more counties than just Marshall County. No county-specific information is available through NCDC, therefore, the loss estimate was calculated based upon best available data. Negative impacts of drought are primarily environmental and economic. According to the 2012 Agriculture Census, Marshall County has 882 farms which use approximately 312,402 acres of land in the county (National Agricultural Statistics Service 2015). Agricultural land accounts for approximately 85% of the land use in the county. The county has a high exposure to this hazard. In addition to agricultural effects, drought can cause damage to roads, structural foundation, and it can increase the risk of grass and wildland fires.

Because drought is a widespread event and the fact that a drought would be unlikely to cause anything more than minimal damage to structures in the county, a spatial analysis was not performed. A table showing the total parcels with value of all jurisdictions in the county and value of structures that could be affected is included in Table 4.3.1.2 of this chapter. Drought typically affects crops and cropland more than it affects structures, but all critical facilities in the area could still experience effects. These critical facilities include, but are not limited to, schools, health care

facilities, police and fire stations, water towers, lift stations, city and county buildings, and sirens. If a drought event were to occur in Marshall County, crops and grassland areas may be more susceptible to fire, water for fire suppression may be limited, and jurisdictions may have to limit water consumption or look for alternative water sources. Cultural facilities would likely not be impacted by drought unless water usage was limited or a facility was affected by a grass or wildland fire.

Hazard: Infrastructure Failure
Jurisdictions: All jurisdictions
Score: 11

There is no historic data available on previous losses regarding infrastructure failure. Therefore, no countywide or jurisdictional loss estimate was calculated.

Jurisdictions in Marshall County have varying vulnerabilities to infrastructure failure. Infrastructure failure can include communication failure, energy failure, structural failure and structural fire. There are a variety of infrastructure failures that affect Marshall County. Sewer system failure, power failure, bridge failure, and infrastructure damaged by flooding are just a few of these issues.

There are a variety of infrastructure failures that affect Marshall County. Water main breaks, sewer system backups, power failures, bridge failures, and infrastructure damaged by flooding are just a few of these issues. One of the most common causes of infrastructure failure in Marshall County is related to sewer and water systems. Many of the municipalities in Marshall County have older sewer systems. During prolonged wet weather periods with substantial rainfall, sewer systems can experience too much inflow and infiltration, which causes system overloading. This forces cities to bypass the treatment facility and pump untreated wastewater into open streams. Many cities in Marshall County also identified to infrastructure failure problems due to power loss during wind and ice storms.

On average, Task Force members scored vulnerability to infrastructure failure as a 2, meaning that 25-50% of people and property might be affected by an event. Infrastructure failures, however, would rarely result in total or significant loss of a property. Because of the varying effects of infrastructure failure, a spatial analysis was not completed for this hazard. All residents in all jurisdictions could be potentially affected by this type of hazard. A table showing the total parcels with value of all jurisdictions in the county and value of structures that could be affected is included in Table 4.3.1.2 of this chapter.

In general, all critical facilities in all jurisdictions could be vulnerable to an infrastructure failure. A power failure could impact police stations and emergency service personnel's ability to respond to emergencies. Failure of bridges or other road infrastructure could increase response times or limit transportation options or affect delivery of emergency supplies for all residents. Cultural facilities

in Marshall County are also vulnerable to infrastructure failures. Power losses and sewer backups can affect businesses and recreational facilities.

Hazard: Transportation Incident
Jurisdictions: All jurisdictions
Score: 10

Air Transportation Incident

Four airports exist in Marshall County near or in the cities of Marshalltown, Melbourne, Albion, and Liscomb. See Figure 4.1.8 for a map of airports in the county. According to the National Transportation Safety Board, there have been no air transportation incidents in Marshall County. This includes incidents involving these airports or any other flights that have included Marshall County on the flight path. Therefore, no countywide or jurisdictional loss estimate was calculated. A spatial analysis for this hazard was also not completed due to its extremely targeted and limited effect on any jurisdiction in Marshall County that may experience an air transportation incident. Generally, all critical facilities and cultural facilities could be impacted by such an event, but impacts would be small, targeted, and would likely not last for a long period of time.

Rail Transportation Incident

Historic data for rail transportation incidents does not include information on monetary losses. Therefore, no countywide or jurisdictional loss estimate was calculated.

Jurisdictions in Marshall County have varying vulnerabilities to transportation incidents. The following jurisdictions have train tracks running within their jurisdictional boundaries and are susceptible to an incident involving a train derailment: Le Grand (through the southern portion of the city), Marshalltown (through the center of town), State Center (through the center of town), and Marshall County (throughout the county). The US has seen an increase in train derailments of crude oil shipments that have resulted in explosions, fires, injuries, and damages.

Vulnerability to rail transportation incidents was assessed using ArcGIS spatial analysis software. A one mile buffer was drawn around the Union Pacific Railroad line that runs through Marshall County. This rail line could carry a variety of hazardous materials including oil, ethanol, and even radiological materials. Accident reports from the National Transportation Safety Board (NTSB) indicate that areas up to one mile away from the site of an accident can be affected through voluntary evacuations. The Marshall County Assessor's office provided parcel level assessor data, the IDNR provided structural data, and parcels and structures were overlaid with the one mile buffer area to analyze how many parcels and structures in each jurisdiction might be affected by this type of hazard.

Only jurisdictions that had a rail transportation incident risk within their jurisdiction were included in the vulnerability analysis. The only jurisdictions facing this risk include: Le Grand, Marshalltown,

State Center, and Marshall County. See Appendix K for maps of jurisdictions that are vulnerable to this hazard.

Rail Transportation Incident Potential Property Loss Estimates by Jurisdiction

Le Grand – (100% of city within hazard area)

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1	1	100%	$48,870	$48,870	100%	938	100%	938
Residential	304	304	100%	$25,732,600	$25,732,600	100%			
Commercial	18	18	100%	$1,325,490	$1,325,490	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	10	10	100%	$4,343,122	$4,343,122	100%			

The following types of structures in Le Grand are located in the hazard area according to data from the IDNR: 13 Agricultural, 542 Residential, 98 Commercial, and 33 Exempt

Marshalltown

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	16	10	63%	$2,170,990	$1,677,790	77%	27,552	31%	8,541
Residential	8770	6030	69%	$671,208,029	$394,136,223	59%			
Commercial	833	599	72%	$201,562,932	$108,690,187	54%			
Industrial	59	55	93%	$66,153,968	$65,954,868	100%			
Exempt	242	193	80%	$146,023,248	$114,110,889	78%			

The following types of structures in Marshalltown are located in the hazard area according to data from the IDNR: 77 Agricultural, 8,947 Residential, 912 Commercial, 993 Industrial, and 359 Exempt

State Center – (100% of city within hazard area)

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	5	100%	$219,840	$219,840	100%	1,468	100%	1,468
Residential	534	534	100%	$41,409,500	$41,409,500	100%			
Commercial	73	73	100%	$4,781,699	$4,781,699	100%			
Industrial	0	0	0%	0	0	0%			
Exempt	18	18	100%	$3,793,080	$3,793,080	100%			

The following types of structures in State Center are located in the hazard area according to data from the IDNR: 31 Agricultural, 927 Residential, 143 Commercial, and 78 Exempt

Marshall County

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1689	143	8%	$154,644,440	$16,853,520	11%	7,452	1%	75
Residential	1868	243	13%	$194,278,704	$25,389,700	13%			
Commercial	74	13	18%	$21,902,110	$2,114,940	10%			
Industrial	81	2	2%	$32,311,340	$440,600	1%			
Exempt	61	8	13%	$7,929,068	$624,535	8%			

The following types of structures in Marshall County Unincorporated are located in the hazard area according to data from the IDNR: 959 Agricultural, 558 Residential, 46 Commercial, 2 Industrial, and 20 Exempt

All critical facilities in State Center and Le Grand are located within the rail transportation hazard area. State Center has the following critical facilities located adjacent to the railroad tracks: County Government Facilities, Transportation Facilities, and Grocery Store. Cultural facilities could also be impacted by a rail transportation event.

Highway Transportation Incident

Data was collected on accidents that occurred in Marshall County from 2005 to 2014; however, no data on losses was included. Therefore, no countywide or jurisdictional loss estimates were calculated.

All jurisdictions are vulnerable to transportation incidents involving highways, but the degree of vulnerability varies. See Chapter 4.2, Hazard Profiles and Risk Assessment, of this plan for a discussion of vulnerability among jurisdictions. An accident can occur anywhere in the county. The intensity of the accident can also vary. Given the variability of this hazard, a spatial analysis

considering potential loss estimates was not calculated. Spatial analysis software was used to display the Average Annual Daily Traffic (AADT) and to count the number of accidents that occurred in different areas of the county between 2005 and 2014. See Chapter 4.2 for this information.

Incidents involving highway accidents could result in injuries, fatalities, closed roads, rerouted traffic, and a strain on the capacity of emergency service personnel who must respond to the incident. In general, all critical facilities in all jurisdictions could be vulnerable to transportation incident. Highway accidents could affect the flow of traffic and ability of residents to travel within and out of the jurisdiction. For those cities vulnerable to railway transportation incidents, large areas of the city could be affected by a train derailment.

Hazard: Terrorism
Jurisdictions: All jurisdictions
Score: 10

There is no historical data for previous structural losses due to terrorism in Marshall County. Therefore, a loss estimate was not completed for this hazard. Terrorism is extremely unpredictable. It is not easy to simulate the location or intensity of a terroristic event. A spatial analysis for this hazard was not calculated for this reason. A table showing the total parcels with value of all jurisdictions in the county and value of structures that could be affected is included in Table 4.3.1.2 of this chapter.

It is possible that critical facilities in multiple jurisdictions might be affected in the event of a terroristic action in Marshall County. Emergency service personnel would be taxed with responding to any unrest or disturbance. If an incident was large enough, personnel from surrounding jurisdictions would be called upon the assist. Health care facilities would be impacted if there were any injuries. Generally, all critical facilities in all jurisdictions could become the target of a terroristic threat or action. Cultural facilities may be shut down temporarily.

Hazard: Grass or Wildland Fire
Jurisdictions: All jurisdictions
Score: 10

Marshall County has a large amount of land use that is dedicated to cropland, which exposes the county to potential vulnerabilities related to grassland or wildland fires. There is no data that represents previous property or crop damages in the county due to grass or wildland fires. Therefore, a loss estimate was not able to be calculated using historical data.

Generally, grass and wildland fires do not pose a significant risk to structures. Fire departments typically respond quickly and have the necessary fire suppression tools to quickly put the fires out.

Some jurisdictions in Marshall County are more vulnerable to grass or wildland fires that others due to the large amount of cropland in the surrounding areas. The following jurisdictions have critical facilities that fall within the grass and wildland fire hazard area:

- Albion (City Shop in hazard area)
- Clemons (Fire Station in hazard area)
- Ferguson (Lift Station and Fire Station in hazard area)
- Gilman (no critical facilities in hazard area)
- Haverhill (Fire Station and Co-Op in hazard area)
- Laurel (City Hall, Maintenance Building/Community Center, Co-Op, and Lagoon in hazard area)
- Le Grand (School Bus Barn, Café, High School, Water Tower, and Sewer Lagoon in hazard area)
- Liscomb (Water/Sewer facility in hazard area)
- Melbourne (Water Tower and Water and Waste Water Plant in hazard area)
- Rhodes (Fire Station in hazard area)
- St. Anthony (no critical facilities in hazard area)
- State Center (County Government Facility, Potable Water Infrastructure, Electrical Infrastructure, and Outdoor Recreation Facilities are located in the hazard area)

Vulnerability to Grass and Wildland Fires was assessed using ArcGIS spatial analysis software. Parcel-level data from the Marshall County Assessor's office was used to identify all agricultural land use parcels. A 100 foot buffer was drawn around each agricultural parcel to represent areas that could be affected by a grass or wildland fire. While there can be other types of land use that are susceptible to grass and wildland fires, members of the Task Force and Marshall County EMA identified agricultural fields and other open areas associated with agriculture to be the most common areas of grass or wildland fire occurrence in the county. For the purposes of this analysis, the location of agricultural parcels was used to define the hazard area. The 100-foot buffer represents the area in which a fire may spread if mitigation efforts are not present. According to the Insurance Institute for Business and Home Safety (2015), "defensible space zones" consist of the 100 foot area around any structure where the chances of ground fire can be mitigated. The 100-foot buffer was put around agricultural land uses to represent additional areas with potential risk for the fire to spread if mitigation measures are not in place. Most jurisdictions expressed confidence in the fire departments' ability to respond to and control grass or wildland fires quickly.

Note that the grass and wildland fire hazard area is a buffer of 100 feet that is drawn around all agricultural parcels as defined by the Marshall County Assessor's Office data. In the event of a grass or wildland fire, not all of these facilities may be affected. Most affected structures would not experience a total loss of the property from a grass or wildland fire.

See Appendix O for the location of grass and wildland fire areas in each community. Vulnerability assessments for jurisdictions that could be affected by grass or wildland fires are included in the following tables.

Grass and Wildland Fire Potential Property Loss Estimates by Jurisdiction

Albion

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	16	16	100%	$531,730	$531,730	100%	505	34%	172
Residential	208	47	23%	$11,174,290	$2,886,820	26%			
Commercial	11	2	18%	$1,018,590	$261,140	26%			
Industrial	4	1	25%	$733,460	$70,930	10%			
Exempt	8	1	13%	$859,747	$24,139	3%			

The following types of structures in Albion are located in the hazard area according to data from the IDNR: 29 Agricultural, 50 Residential, 4 Exempt, and 4 Commercial

Clemons

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	3	3	100%	$13,080	$13,080	100%	148	54%	80
Residential	70	21	30%	$2,685,670	$822,640	31%			
Commercial	3	1	33%	$317,330	$28,157	9%			
Industrial	0	0	0%	0	0	0%			
Exempt	6	3	50%	$231,970	$33,980	15%			

The following types of structures in Clemons are located in the hazard area according to data from the IDNR: 7 Agricultural, 33 Residential, 3 Exempt, and 3 Commercial

Ferguson

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	3	3	100%	$69,670	$69,670	100%	126	12%	15
Residential	55	20	36%	$1,490,860	$541,860	36%			
Commercial	2	1	50%	$76,480	$53,250	70%			
Industrial	0	0	0%	0	0	0%			
Exempt	4	1	25%	$396,220	$63,400	16%			

The following types of structures in Ferguson are located in the hazard area according to data from the IDNR: 11 Agricultural, 13 Residential, and 2 Commercial

Gilman

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	5	100%	$336,930	$336,930	100%	509	26%	132
Residential	211	51	24%	$10,269,460	$2,890,780	28%			
Commercial	29	5	17%	$1,811,820	$365,220	20%			
Industrial	0	0	0%	0	0	0%			
Exempt	10	1	10%	$567,596	$27,564	5%			

The following types of structures in Gilman are located in the hazard area according to data from the IDNR: 12 Agricultural, 40 Residential, 6 Exempt, and 3 Commercial

Haverhill

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	0	0	0%	0	0	0%	173	33%	57
Residential	67	24	36%	$5,103,900	$2,251,900	44%			
Commercial	6	2	33%	$1,179,420	$1,022,420	87%			
Industrial	0	0	0%	0	0	0%			
Exempt	4	1	25%	$490,107	$209,240	43%			

The following types of structures in Haverhill are located in the hazard area according to data from the IDNR: 15 Residential and 2 Commercial

Laurel

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	0	0	0%	0	0	0%	239	22%	53
Residential	106	35	33%	$5,705,410	$2,083,240	37%			
Commercial	15	5	33%	$403,940	$176,270	44%			
Industrial	0	0	0%	0	0	0%			
Exempt	10	6	60%	$1,861,025	$1,738,657	93%			

The following types of structures in Laurel are located in the hazard area according to data from the IDNR: 29 Residential, 8 Exempt, and 5 Commercial

Le Grand

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1	1	100%	$48,870	$48,870	100%	938	15%	141
Residential	304	88	29%	$25,732,600	$8,175,100	32%			
Commercial	18	5	28%	$1,325,490	$585,680	44%			
Industrial	0	0	0%	0	0	0%			
Exempt	10	3	30%	$4,343,122	$3,672,465	85%			

The following types of structures in Le Grand are located in the hazard area according to data from the IDNR: 13 Agricultural, 88 Residential, 5 Exempt, and 14 Commercial

Liscomb

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	5	100%	$293,450	$293,450	100%	301	28%	84
Residential	114	29	25%	$4,601,990	$1,522,160	33%			
Commercial	13	2	15%	$1,762,870	$1,550,650	88%			
Industrial	0	0	0%	0	0	0%			
Exempt	6	1	17%	$253,784	$5,000	2%			

The following types of structures in Liscomb are located in the hazard area according to data from the IDNR: 42 Agricultural, 13 Residential, and 2 Commercial

Marshalltown

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	16	16	100%	$2,170,990	$2,170,990	100%	27,552	32%	8,817
Residential	8770	700	8%	$671,208,029	$89,521,496	13%			
Commercial	833	75	9%	$201,562,932	$42,149,487	21%			
Industrial	59	10	17%	$66,153,968	$23,278,821	35%			
Exempt	242	29	12%	$146,023,248	$37,842,930	26%			

The following types of structures in Marshalltown are located in the hazard area according to data from the IDNR: 119 Agricultural, 352 Residential, 18 Exempt, and 40 Commercial

Melbourne

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	2	2	100%	$82,020	$82,020	100%	830	16%	133
Residential	286	48	17%	$19,916,690	$4,144,500	21%			
Commercial	32	6	19%	$ 2,829,089	$250,519	9%			
Industrial	0	0	0%	0	0	0%			
Exempt	8	2	25%	$ 637,676	$169,710	27%			

The following types of structures in Melbourne are located in the hazard area according to data from the IDNR: 9 Agricultural, 21 Residential, 2 Exempt, and 3 Commercial

Rhodes

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	13	13	100%	$621,600	$621,600	100%	305	23%	70
Residential	131	40	31%	$6,297,350	$2,029,670	32%			
Commercial	12	0	0%	$84,500	0	0%			
Industrial	0	0	0%	0	0	0%			
Exempt	4	0	0%	$84,346	0	0%			

The following types of structures in Rhodes are located in the hazard area according to data from the IDNR: 56 Agricultural, 32 Residential, and 1 Exempt

St. Anthony

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1	1	100%	$50,960	$50,960	100%	102	21%	21
Residential	55	18	33%	$1,147,750	$440,730	38%			
Commercial	9	4	44%	$1,175,090	$1,126,130	96%			
Industrial	0	0	0%	0	0	0%			
Exempt	2	0	0%	$17,046	0	0%			

The following types of structures in St. Anthony are located in the hazard area according to data from the IDNR: 5 Agricultural, 15 Residential, and 2 Exempt

State Center

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	5	100%	$219,840	$219,840	100%	1,468	22%	323
Residential	534	51	10%	$41,409,500	$5,453,370	13%			
Commercial	73	11	15%	$4,781,699	$917,960	19%			
Industrial	0	0	0%	0	0	0%			
Exempt	18	4	22%	$3,793,080	$2,560,880	68%			

The following types of structures in State Center are located in the hazard area according to data from the IDNR: 31 Agricultural, 26 Residential, 2 Exempt, and 17 Commercial

Marshall County

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1689	1689	100%	$154,644,440	$154,644,440	100%	7,452	14%	1,043
Residential	1868	1573	84%	$194,278,704	$163,453,444	84%			
Commercial	74	65	88%	$21,902,110	$18,863,290	86%			
Industrial	81	79	98%	$32,311,340	$31,870,740	99%			
Exempt	61	50	82%	$7,929,068	$7,135,009	90%			

The following types of structures in Marshall County are located in the hazard area according to data from the IDNR: 10,901 Agricultural, 2,308 Residential, 62 Exempt, and 72 Commercial

Low Priority Hazards

Hazard: Flash Flood
Jurisdictions: All jurisdictions
Score: 9

NCDC data indicates that 20 flash flood events in Marshall County have historically caused a total of $1,360,000 in property damage and $355,000 in crop damage from 2002 to 2014 (the time frame for which data is available). Using this data, an average annual countywide flood loss estimate was calculated as follows:

Total Flash Flood Damage History ($1,715,000) / Number of Years of Record (12 years) = Average Annual Countywide Flood Loss Estimate ($142,916.67)

Based on previous data, Marshall County may experience $142,916.67 in damages related to flash flooding in any given year.

Because flash flooding is considered at the jurisdictional level for this plan, average annual flood loss estimates have also been calculated by jurisdiction based on data from the NCDC.

Table 4.3.1.6. Average Annual Loss Estimate for Flash Flooding

Jurisdiction	Time Period	# of Events	Total Damages	Average Annual Loss Estimate
Albion	6/2002 – 6/2014 (12 years)	0	--	--
Clemons		1	$25,000	$2,083.33
Ferguson		0	--	--
Gilman		0	--	--
Haverhill		1	$100,000	$8,333.33
Laurel		0	--	--
Le Grand		0	--	--
Liscomb		0	--	--
Marshalltown		7	$515,000	$42,916.66
Melbourne		0	--	--
Rhodes		1	$5,000	$416.67
St. Anthony		1	$25,000	$2,083.33
State Center		2	$50,000	$4,166.67
Marshall County Unincorporated		2	$425,000	$35,416.67

The following jurisdictions noted that they experience flash flooding. These communities have critical facilities that may be affected by flash flooding:

- Clemons (no critical facilities in hazard area)
- Liscomb (no critical facilities in hazard area. Water/Sewer facilities located near hazard area)
- Melbourne (no critical facilities in hazard area)
- St. Anthony (no critical facilities in hazard area)

No flash flood in Marshall County has resulted in any reported deaths or injuries. 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. Flash floods occur in all fifty states in the U.S. Particularly at risk are those in low-lying areas, areas that are close to dry creek beds or drainage ditches and areas that are near water bodies 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. Cultural facilities such as outdoor recreation and city park areas can be particularly affected by flash flooding.

Flash flooding risk, locations, and number and extent of incidents vary across jurisdictions. Because of these variations, vulnerability to flash flooding was assessed using ArcGIS and maps collected from the Task Force. The Marshall County Assessor's office provided parcel level assessor data, the Iowa Department of Natural resources provided structural data, and parcels and structures were overlaid with areas that the Task Force marked as being prone to flash flooding to analyze how many parcels with value and structures in each jurisdiction may be impacted by flash flooding. These maps are available in Appendix D. Note that this method does not take into account any type of elevation or flood protection measures that may have been implemented on individual structures or parcels. These areas may not be the only areas that are prone to flash flooding in a community. Conversely, even though flash flooding is occurring in these areas, data is not available regarding the extent, depth, or duration of flooding.

Finally, only jurisdictions that had a flash flooding risk within their jurisdiction and completed a flash flood map had their vulnerability analysis completed using the parcel overlay method. Another method was used for other jurisdictions that scored flash flooding on the risk assessment but did not complete a flash flooding map. For communities that scored flash flooding on the risk assessment but did not complete a flash flooding map, the Marshall County assessor data was used to obtain the number of parcels with value and the total value of parcels in different land use classes. Then, a community's vulnerability risk assessment score was used to establish an estimated percentage of people that may be affected by flash flooding. For example, if a community estimated that 26-50% of people and property might be affected, the vulnerability analysis would note that a maximum of 50% of property might be affected by flash flooding according to the available parcel data. Note that this method is only approximate and does not take into

consideration any spatial information about flash flooding problems in a community. It is simply an estimate based on available information. The following section includes the vulnerability analysis for each jurisdiction.

Flash Flooding Potential Property Loss Estimates by Jurisdiction

Clemons

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	3	2	66%	$13,080	$9,940	76%	148	26%	38
Residential	70	4	6%	$2,685,670	$224,940	8%			
Commercial	3	1	33%	$317,330	$28,157	9%			
Industrial	0	0	0	0	0	0			
Exempt	6	2	33%	$231,970	$3,150	1%			

The following types of structures in Clemons are located in the hazard area according to data from the IDNR: 5 Agricultural, 1 Residential, and 5 Exempt

Liscomb

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	1	20%	$293,450	$13,890	5%	301	4%	12
Residential	114	0	0	$4,601,990	0	0			
Commercial	13	0	0	$1,762,870	0	0			
Industrial	0	0	0	0	0	0			
Exempt	6	0	0	$253,784	0	0			

No structures in Liscomb exist in the hazard area according to data from the IDNR

Marshalltown

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	16	0	0	$2,170,990	0	0	27,552	1%	276
Residential	8770	153	2%	$671,208,029	$8,730,630	1%			
Commercial	833	15	2%	$201,562,932	$1,692,770	1%			
Industrial	59	10	17%	$66,153,968	$31,441,920	48%			
Exempt	242	2	1%	$146,023,248	$1,185,810	1%			

The following types of structures in Marshalltown are located in the hazard area according to data from the IDNR: 191 Residential, 16 Commercial, 3 Industrial, and 11 Exempt

Melbourne

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	2	0	0	$82,020	0	0	830	0%	0
Residential	286	9	3%	$ 19,916,690	$579,890	3%			
Commercial	32	0	0	$ 2,829,089	0	0			
Industrial	0	0	0	0	0	0			
Exempt	8	0	0	$ 637,676	0	0			

The following types of structures in Melbourne are located in the hazard area according to data from the IDNR: 2 Residential

St. Anthony

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1	0	0	$50,960	0	0	102	14%	14
Residential	55	0	0	$1,147,750	0	0			
Commercial	9	0	0	$1,175,090	0	0			
Industrial	0	0	0	0	0	0			
Exempt	2	0	0	$17,046	0	0			

No structures in St. Anthony exist in the hazard area according to data from the IDNR

Marshall County

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1689	28	2%	$154,644,440	$2,601,540	2%	7,452	1%	75
Residential	1868	49	3%	$194,278,704	$5,436,080	3%			
Commercial	74	1	1%	$21,902,110	$45,920	0			
Industrial	81	0	0	$32,311,340	0	0			
Exempt	61	5	8%	$7,929,068	$555,965	7%			

The following types of structures in Marshall County Unincorporated Area are located in the hazard area according to data from the IDNR: 81 Agricultural, 93 Residential, 2 Commercial, and 7 Exempt

Jurisdictions that had their vulnerability analysis calculated based on a more approximate method that was described earlier include: Albion, Ferguson, Gilman, Haverhill, Laurel, Le Grand, Rhodes, and State Center. These communities either noted that there were no specific areas of the city in which flash flooding occurred on a regular basis, or they noted that flash flooding was not a significant problem. An estimate of the maximum possible vulnerability for each of these communities is described below. Again, note that the following are simply estimated since spatial data was not available.

Albion: Total value of structures in city ($14,317,817) x flash flooding risk assessment maximum vulnerability for score of 1 (24%) = Total vulnerability of $3,436,276.08

Ferguson: Total value of structures in city ($2,033,230) x flash flooding risk assessment maximum vulnerability for score of 1 (24%) = Total vulnerability of $487,975.20

Gilman: Total value of structures in city ($12,985,806) x flash flooding risk assessment maximum vulnerability for score of 1 (24%) = Total vulnerability of $3,116,593.44

Haverhill: Total value of structures in city ($3,116,593) x flash flooding risk assessment maximum vulnerability for score of 1 (24%) = Total vulnerability of $747,982.32

Laurel: Total value of structures in city ($7,970,375) x flash flooding risk assessment maximum vulnerability for score of 1 (24%) = Total vulnerability of $1,912,890

Le Grand: Total value of structures in city ($31,450,082) x flash flooding risk assessment maximum vulnerability for score of 1 (24%) = Total vulnerability of $7,548,019.68

Rhodes: Total value of structures in city ($7,087,796) x flash flooding risk assessment maximum vulnerability for score of 1 (24%) = Total vulnerability of $1,701,071.04

State Center: Total value of structures in city ($50,204,119) x flash flooding risk assessment maximum vulnerability for score of 1 (24%) = Total vulnerability of $12,048,988.56

Hazard: River Flooding
Jurisdictions: All jurisdictions
Score: 8

According to NCDC data, Marshall County experienced 55 flood events from 1996 – 2008 (the time frame for which data was available). These events caused a total of $2,716,070 in property damage and $273,581,040 in crop damage. Using this data, an average annual countywide flood loss estimate was calculated as follows:

Total Flood Damage History ($276,297,110) / Number of Years of Record (12.2 years) =
Average Annual Countywide Flood Loss Estimate ($22,647,304.10)

Based on previous data, Marshall County may experience $22,647,304.10 in damages related to river flooding in any given year.

Jurisdictions in Marshall County experience varying levels of vulnerability to river flooding. The location of critical facilities in the special flood hazard area of each jurisdiction is as follows:

- Albion (no critical facilities in hazard area)
- Clemons (no critical facilities in hazard area)
- Ferguson (no critical facilities in hazard area)
- Gilman (no critical facilities in hazard area)
- Haverhill (no critical facilities in hazard area)
- Laurel (no critical facilities in hazard area)
- Le Grand (no critical facilities in hazard area. Lagoon is nearby but not located within hazard area)
- Liscomb (Water/Sewer stations located in hazard area)
- Melbourne (no critical facilities in hazard area)
- Rhodes (no critical facilities in hazard area)
- St. Anthony (no critical facilities in hazard area)
- State Center (two outdoor recreation facilities located in hazard area. Electrical infrastructure is nearby but not located within hazard area)

Nearly all cultural facilities are also vulnerable to the effects of river flooding. Infrastructure, including roads and sewer systems, can be affected from river flooding and can require costly repairs and expedited maintenance schedules.
Vulnerability to river flooding was assessed using ArcGIS and the FEMA National Flood Hazard Layer obtained from the FEMA Map Service Center. The Marshall County Assessor's office provided

parcel level assessor data, and parcels were overlaid with the National Flood Hazard Layer to analyze how many parcels in each jurisdiction existed within the special flood hazard area. Note that this method does not take into account any type of elevation or flood protection measures that may have been implemented on individual structures or parcels. This method also did not consider any letters of map amendment (LOMAs) or letters of map revision (LOMRs) that may have been approved for individual properties.

This vulnerability assessment only considers parcels within the designated SFHA, but risk of flooding exists outside of these boundaries. Many of the jurisdictions in Marshall County have portions of their communities that have Zone A special flood hazard areas. Zone A flood depths are not known and flooding may be likely to occur outside of the special flood hazard area in the event of a flood. This assessment does not consider this possibility. To view the special flood hazard area spatial analysis that was conducted for each jurisdiction, see Appendix L. See Appendix E for digital flood insurance rate maps for each jurisdiction.

River Flooding Potential Property Loss Estimates by Jurisdiction

Albion

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	16	4	25%	$531,730	$239,050	45%	505	14%	71
Residential	208	1	.5%	$11,174,290	$17,253	.1%			
Commercial	11	0	0%	$1,018,590	0	0%			
Industrial	4	0	0%	$733,460	0	0%			
Exempt	8	0	0%	$859,747	0	0%			

No structures in Albion exist in the hazard area according to data from the IDNR

Clemons

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	3	3	100%	$13,080	$13,080	100%	148	48%	71
Residential	70	2	3%	$2,685,670	$26,450	.1%			
Commercial	3	1	33%	$317,330	$28,157	9%			
Industrial	0	0	0%	0	0	0%			
Exempt	6	2	33%	$231,970	$3,150	1%			

No structures in Clemons exist in the hazard area according to data from the IDNR

Ferguson

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	3	0	0%	$69,670	0	0%	126	0%	0
Residential	55	0	0%	$1,490,860	0	0%			
Commercial	2	0	0%	$76,480	0	0%			
Industrial	0	0	0%	0	0	0%			
Exempt	4	0	0%	$396,220	0	0%			

No structures in Ferguson exist in the hazard area according to data from the IDNR

Gilman

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazar d Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	2	40%	$336,930	$19,416	6%	509	5%	25
Residential	211	0	0%	$10,269,460	0	0%			
Commercial	29	0	0%	$1,811,820	0	0%			
Industrial	0	0	0%	0	0	0%			
Exempt	10	0	0%	$567,596	0	0%			

No structures in Gilman exist in the hazard area according to data from the IDNR

Haverhill

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	0	0	0%	0	0	0%	173	0%	0
Residential	67	0	0%	$5,103,900	0	0%			
Commercial	6	0	0%	$1,179,420	0	0%			
Industrial	0	0	0%	0	0	0%			
Exempt	4	0	0%	$490,107	0	0%			

No structures in Haverhill exist in the hazard area according to data from the IDNR

Laurel

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	0	0	0%	0	0	0%	239	5%	12
Residential	106	5	5%	$5,705,410	$542,192	10%			
Commercial	15	0	0%	$403,940	0	0%			
Industrial	0	0	0%	0	0	0%			
Exempt	10	0	0%	$1,861,025	0	0%			

The following types of structures in Laurel are located in the hazard area according to data from the IDNR: 3 Residential

Le Grand

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1	0	0%	$48,870	0	0%	938	0%	0
Residential	304	0	0%	$25,732,600	0	0%			
Commercial	18	0	0%	$1,325,490	0	0%			
Industrial	0	0	0%	0	0	0%			
Exempt	10	0	0%	$4,343,122	0	0%			

No structures in Le Grand exist in the hazard area according to data from the IDNR

Liscomb

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	1	20%	$293,450	$95,556	33%	301	6%	18
Residential	114	0	0%	$4,601,990	0	0%			
Commercial	13	0	0%	$1,762,870	0	0%			
Industrial	0	0	0%	0	0	0%			
Exempt	6	0	0%	$253,784	0	0%			

No structures in Liscomb exist in the hazard area according to data from the IDNR

Marshalltown

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	16	9	56%	$2,170,990	$880,310	41%	27,552	17%	4,684
Residential	8770	383	4%	$671,208,029	$ 35,562,420	5%			
Commercial	833	37	4%	$201,562,932	$20,855,960	10%			
Industrial	59	2	3%	$66,153,968	$2,669,400	4%			
Exempt	242	24	10%	$146,023,248	$49,844,335	34%			

The following types of structures in Marshalltown are located in the hazard area according to data from the IDNR: 15 Agricultural, 51 Residential, 5 Commercial, and 65 Exempt

Melbourne

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	2	0	0%	$82,020	0	0%	830	0%	0
Residential	286	0	0%	$ 19,916,690	0	0%			
Commercial	32	0	0%	$ 2,829,089	0	0%			
Industrial	0	0	0%	0	0	0%			
Exempt	8	0	0%	$ 637,676	0	0%			

No structures in Melbourne exist in the hazard area according to data from the IDNR

Rhodes

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	13	0	0%	$621,600	0	0%	305	0%	0
Residential	131	0	0%	$6,297,350	0	0%			
Commercial	12	0	0%	$84,500	0	0%			
Industrial	0	0	0%	0	0	0%			
Exempt	4	0	0%	$84,346	0	0%			

No structures in Rhodes exist in the hazard area according to data from the IDNR

St. Anthony

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1	0	0%	$50,960	0	0%	102	.8%	8
Residential	55	3	5%	$1,147,750	$69,650	6%			
Commercial	9	0	0%	$1,175,090	0	0%			
Industrial	0	0	0%	0	0	0%			
Exempt	2	0	0%	$17,046	0	0%			

The following types of structures in St. Anthony are located in the hazard area according to data from the IDNR: 1 Residential

State Center

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	5	2	40%	$219,840	$24,960	11%	1,468	6%	88
Residential	534	2	.4%	$41,409,500	$292,020	.7%			
Commercial	73	5	7%	$4,781,699	$148,340	3%			
Industrial	0	0	0%	0	0	0%			
Exempt	18	1	6%	$3,793,080	$4,090	.1%			

The following types of structures in State Center are located in the hazard area according to data from the IDNR: 6 Agricultural, 5 Commercial, and 5 Exempt

Marshall County

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1689	577	34%	$154,644,440	$48,532,880	31%	7,452	6%	447
Residential	1868	280	15%	$194,278,704	$30,648,670	16%			
Commercial	74	25	34%	$21,902,110	$3,221,980	15%			
Industrial	81	29	36%	$32,311,340	$8,600,490	27%			
Exempt	61	19	31%	$7,929,068	$4,701,725	59%			

The following types of structures in Marshall County (Unincorporated) are located in the hazard area according to data from the IDNR: 146 Agricultural, 102 Residential, 131 Commercial, 1 Industrial, and 20 Exempt

Hazard: Dam/Levee Failure
Jurisdictions: All jurisdictions
Score: 8

Dam Failure

Marshall County has a total of 20 dams. 17 of these dams are Low Hazard Dams and three are Moderate Hazard Dams. According to the Iowa Department of Natural Resources, the majority of dams in the county were built for the purposes of fire protection, stock or small fish ponds. Three dams were built for the purposes of recreation, and two were built for the purposes of flood control. There are an additional 17 dams within five miles of the Marshall County boundaries. One of those dams is a moderate classification dam but poses a minimal risk to downstream communities in Marshall County. See Figure 4.1.6 in this plan for a map of dams in Marshall County and adjacent counties.

No dam in Marshall County has ever experienced a failure, therefore an average annual countywide loss estimate was not able to be calculated. Regarding critical facilities in the hazard area, all of Ferguson's critical facilities and some of Marshalltown's critical facilities (East of State Highway 14 and just North of US Highway 30) are located in the dam hazard area. See the Community Assets Section of this plan for more information on Marshalltown's critical facilities. Cultural facilities, including recreation areas (lakes, trails) could be significantly affected by a dam failure. Many dams in the county were built for the purposes of recreation. If a dam failure occurred, it may cause the water level in one lake to drop or drain completely. Natural areas and recreation trails may be temporarily damaged. These damages would be isolated to the small area near the failed dam.

To better analyze vulnerability to dam failure for individual jurisdictions, a spatial analysis was completed using ArcGIS software. For dams that were classified as "Low Hazard" within and bordering Marshall County, a ½ mile buffer was drawn around each dam, and parcels within this buffer area with value were selected. "Moderate Hazard" dams were given a one mile buffer, and parcels within that buffer with value were selected. The increased buffer area represents a slightly higher risk of neighboring parcels being affected if dam failure were to occur. Dams in adjacent counties were also considered in this analysis if their buffer area extended into Marshall County. All parcels with value within dam hazard areas were considered in the vulnerability assessment.

Data was obtained from the Iowa Department of Natural Resources regarding the locations of structures in Marshall County. Structural location data was overlaid with the hazard area, and the number of structures in the hazard area was analyzed based on the land use class of the parcel in which it was located.

Please note that not all of the parcels included this analysis would be affected if a dam failure were to occur. The map in Appendix M shows elevation data, location of floodplains, and the location of rivers and streams, but there is no specific data available to tell us the exact flow direction or water depth in the event of a dam failure. For this reason, even if some parcels within the hazard area appeared to be at a higher elevation than the dam and at less risk for flooding by a dam failure, they

were still included in the analysis. Spatial results are displayed in the map in Appendix M. The parcel analysis for parcels that are vulnerable to dam failure is included in the following table. For a map with dam names, see Figure 4.1.6 in this plan. Please note that the vulnerability analysis for dam failure was not broken down by jurisdiction; the majority of vulnerable parcels are in the unincorporated areas of Marshall County.

As noted in other sections of this plan, the vast majority of Marshall County's dams are classified as low risk by National Inventory of Dams. This vulnerability analysis likely represents a worst-case scenario; however, the risk of dam failure is low. If failure did occur, damage beyond the dam itself and the property on which it is located would be unlikely.

Dam Failure Potential Property Loss Estimates – All Parcels in Marshall County Incorporated Areas and Unincorporated Areas

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	1759	82	5%	$159,083,580	$7,468,740	5%	7,452	2%	149
Residential	12,783	1937	15%	$1,001,098,373	$221,783,086	22%			
Commercial	1130	178	16%	$240,231,360	$91,132,155	38%			
Industrial	144	7	5%	$99,198,768	$8,958,620	9%			
Exempt	394	47	12%	$167,570,286	$22,482,201	13%			

Structures in Dam Failure Hazard Area - All Structures in Marshall County Incorporated Areas and Unincorporated Areas

Parcel Use	Number of Structures in Hazard Area
Agricultural	382
Residential	2305
Commercial	571
Industrial	11
Exempt	108
Total	**3377**

Levee Failure

According to the National Levee Database, Marshall County has a three-levee system located in the City of Marshalltown. The levees are located on the right and left descending banks of Linn Creek, right and left descending banks of Anson Creek, and the right descending bank of the Iowa River (US Army Corps of Engineers 2015). The levees' are 5.51, 2.32, and 1.28 miles in length. The levee system was completed in 1975 and were authorized by the Flood Control Act of 1965. The levee

system has a total of 1361.3 leveed area acreage. No levee in Marshall County has ever experienced a failure, therefore an average annual countywide loss estimate was not able to be calculated.

Vulnerability to levee failure was assessed using ArcGIS spatial analysis software. GIS data for the area that is protected by a levee in the City of Marshalltown was obtained from the National Flood Hazard Layer obtained from the FEMA Map Service Center. The Marshall County Assessor's office provided parcel level assessor data, and parcels were overlaid with the National Flood Hazard Layer to analyze how many parcels in each jurisdiction existed within the area that is protected by the levee as defined by the flood hazard zone. Note that this method does not take into account any type of elevation or flood protection measures that may have been implemented on individual structures or parcels. This method also does not take into account any Letters of Map Amendment (LOMAs) that may be present in the area. Only the critical facilities located in the north central and the northeast area of the city are located in the levee failure hazard area.

Finally, only the City of Marshalltown was included in the vulnerability analysis of levee failure because only one levee exists in Marshall County. The map in Appendix N shows the areas of the City of Marshalltown that may be affected by a levee failure. The parcel analysis for parcels that are vulnerable to levee failure is included in the following table.

Levee Failure Potential Property Loss Estimates – City of Marshalltown

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People (2010)		
	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	% Total Area of City in Hazard Area	Total People Affected
Agricultural	16	2	13%	$2,170,990	$159,660	7%			
Residential	8770	672	8%	$671,208,029	$26,332,940	4%			
Commercial	833	91	11%	$201,562,932	$14,494,792	72%	27,552	11%	3,031
Industrial	59	22	37%	$66,153,968	$32,999,295	50%			
Exempt	242	21	9%	$146,023,248	$9,929,296	7%			

Structures in Levee Failure Hazard Area - All Structures in Marshalltown

Parcel Use	Number of Structures in Hazard Area
Agricultural	16
Residential	964
Commercial	130
Industrial	25
Exempt	78
Total	**1213**

Hazard: Earthquake
Jurisdictions: County-wide
Score: 8

Marshall County has never experienced a significant earthquake event (USGS 2015). Therefore, a loss estimate was not completed for this hazard. This hazard was also not spatially analyzed because the extent of any earthquake that Marshall County would experience would not cause structural damage.

An earthquake event would likely not affect emergency personnel, critical facilities, or vulnerable populations. The Task Force members estimated that fewer than 25% of the people in Marshall County would be affected by an earthquake in Marshall County.

Hazard: Human Disease
Jurisdictions: All jurisdictions
Score: 7

Human disease epidemics generally do not cause structural damage, and there is no historical data for previous structural losses due to human disease epidemics. Therefore, a loss estimate was not completed for this hazard. This hazard was also not spatially analyzed because it does not typically cause structural damage.

Health care facilities and emergency service personnel would likely be affected in the event of a human disease epidemic. Vulnerable populations including the elderly, young, and people with medical conditions tend to be affected most. The Task Force members in a majority of jurisdictions estimated that fewer than 25% of the people in Marshall County are vulnerable to a pandemic human disease.

Hazard: Animal/Plant/Crop Disease
Jurisdictions: County-wide
Score: 7

Marshall County has a large amount of land use that is dedicated to cropland and agriculture which exposes the county to potential vulnerabilities related to animal/plant/crop disease. There is no data that represents previous property or crop damages in the county due to animal/plant/crop disease. Therefore, a loss estimate was not able to be calculated using historical data. This hazard was also not spatially analyzed because the hazard does not typically cause structural damage.

For a map of the location of agricultural land uses, feed lots, and confined animal feeding operations, see Figure 4.1.4. In general, no critical facilities in any jurisdictions would be directly

impacted by animal/plant/crop disease. If an outbreak of animal/plant/crop disease did occur, the county would likely rely heavily on state and federal entities to mitigate the risk of the disease spreading. The Task Force estimated that less than 25% of people and property in the county would be affected in the event of an animal/plant/crop disease outbreak.

4.3.2: 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 "county-wide" can affect all of the people, structure, critical facilities, infrastructure, and other assets identified in this section. As a reminder, the planning boundary-wide hazards include—in no particular order:

- Animal/Plant/Crop Disease
- Drought
- Earthquake
- Extreme Heat
- Radiological
- Severe Winter Storm
- Wind Storms

The hazards that have different effects on different jurisdictions and require more specific analysis include—in no particular order:

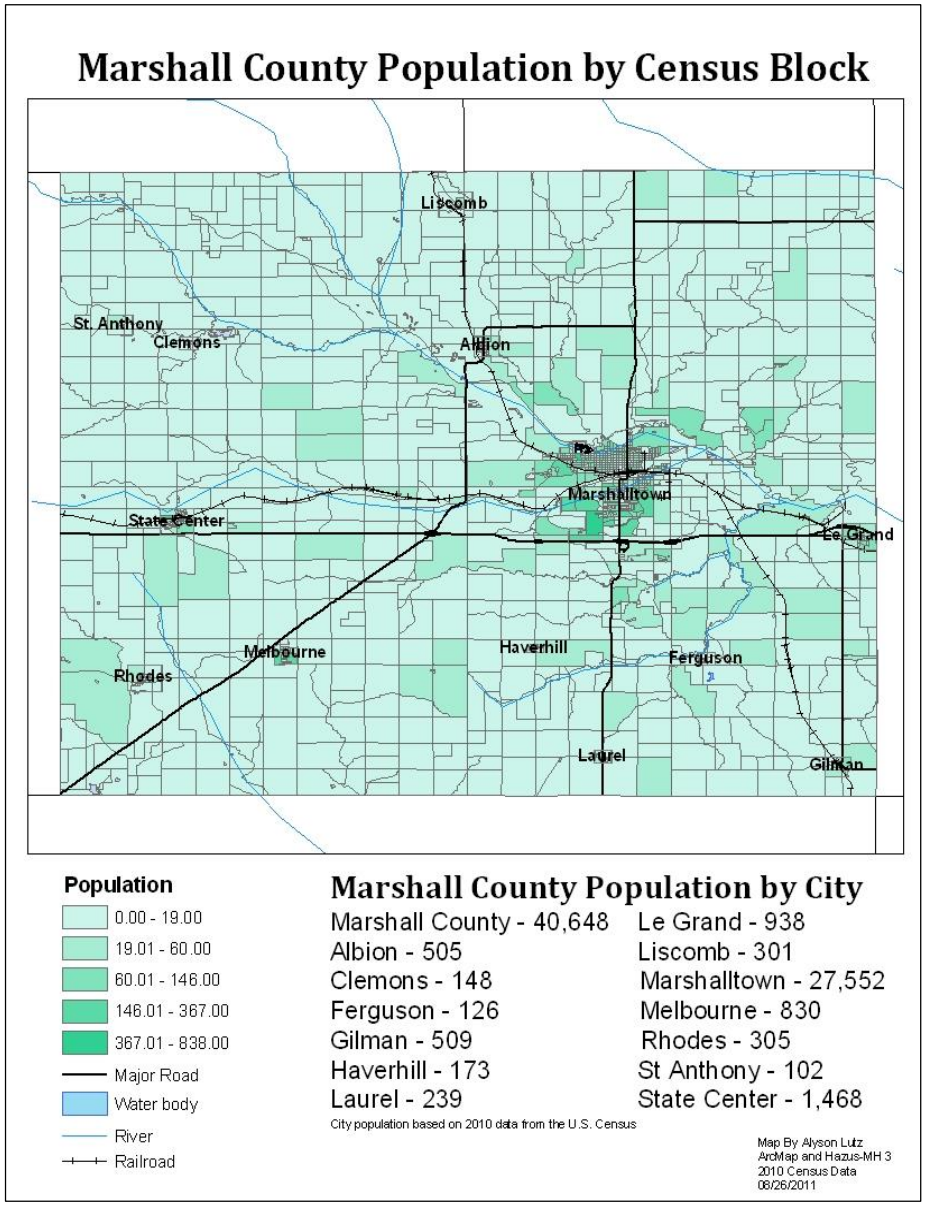
- Dam/Levee Failure
- Flash Flooding
- Grass or Wildland Fire
- Hazardous Materials Incident
- Human Disease Epidemic
- Infrastructure Failure
- River Flooding
- Terrorism
- Thunderstorms, Lightning, and Hail
- Tornadoes
- Transportation Incident

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 4.3.2.1 below for the population distribution across Marshall County.

Figure 4.3.2.1: Marshall County Population by Jurisdiction and Census Block

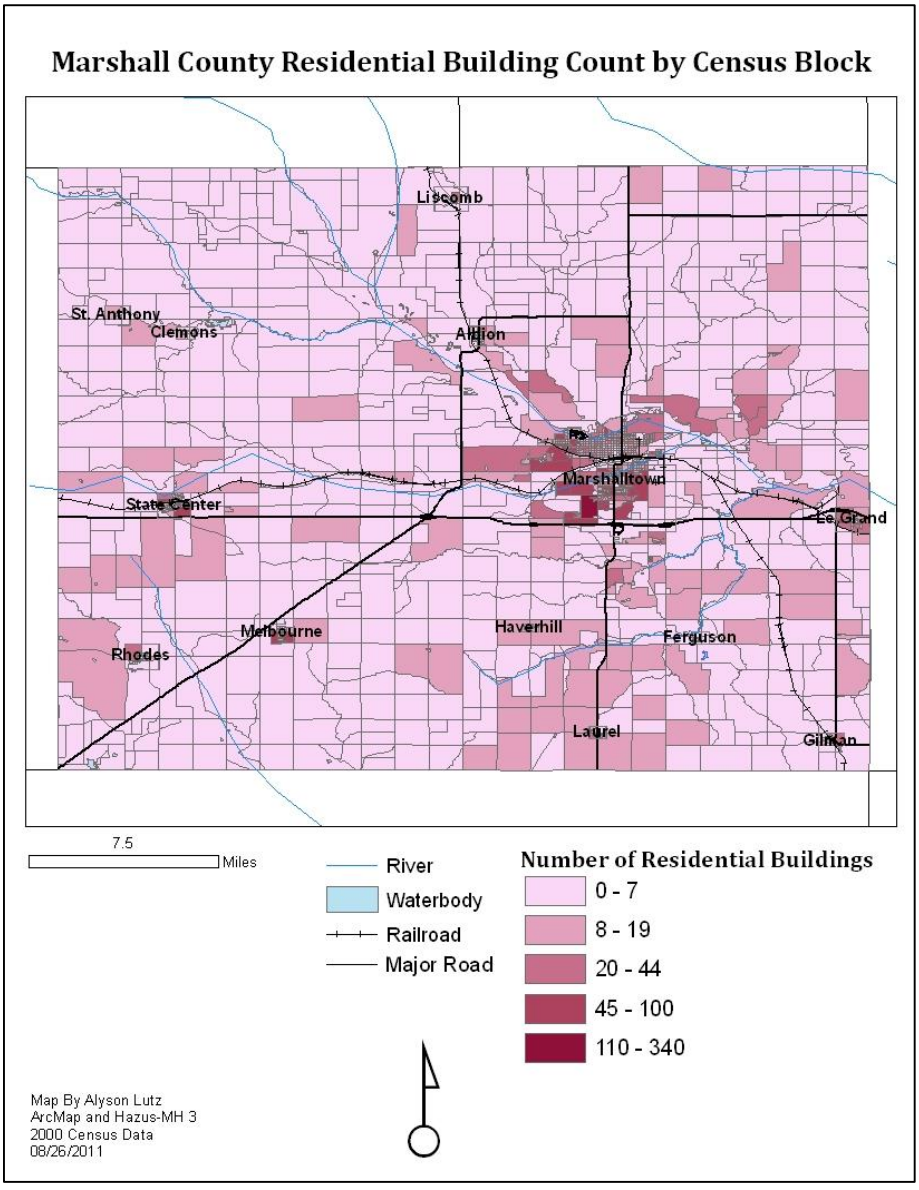


The largest concentration of people in Marshall County is in its incorporated cities. Marshalltown and State Center have the highest populations. The rest of the population is evenly spread among the smaller cities and the unincorporated areas throughout the county.

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 4.3.2.2 below features residential structures.

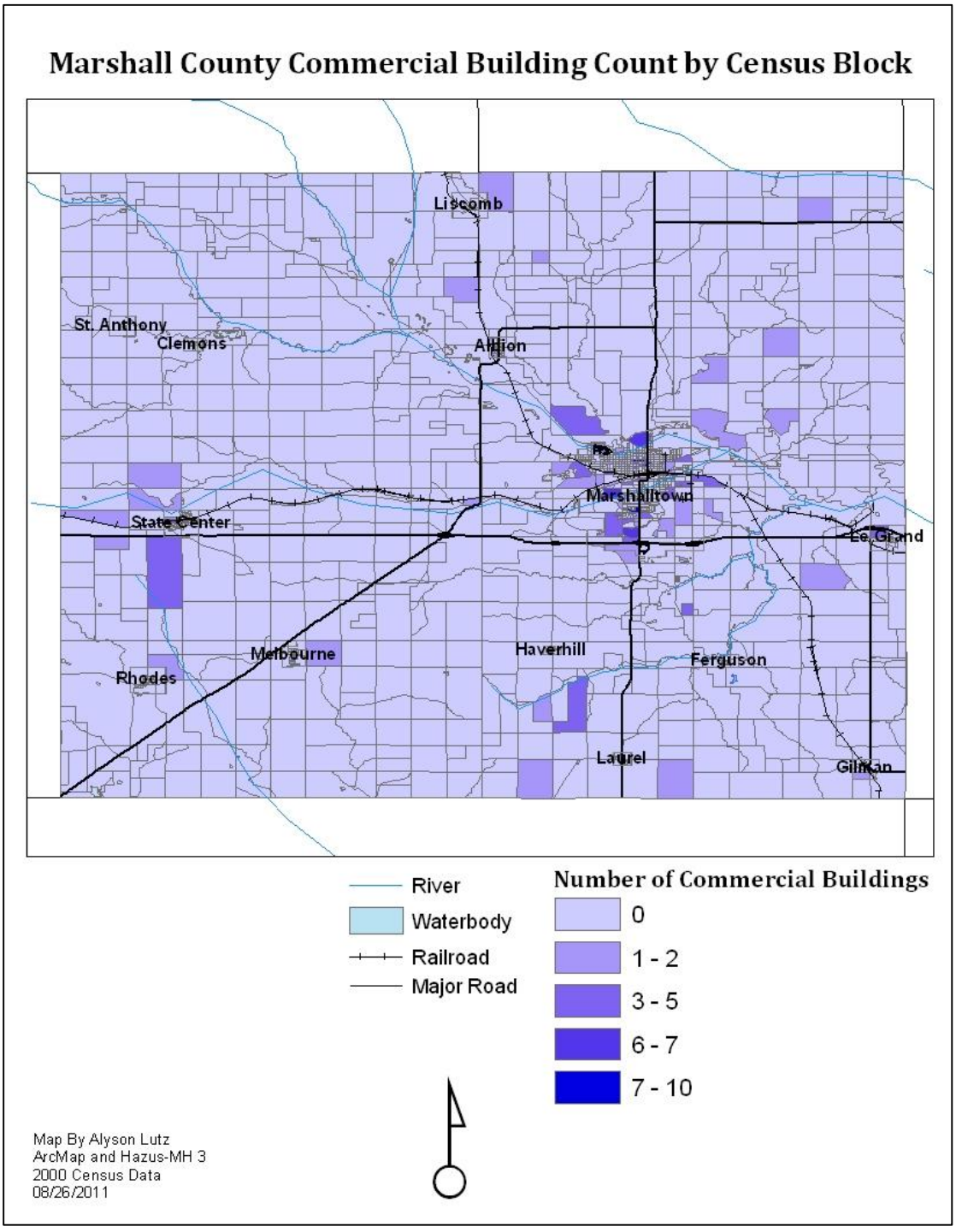
Figure 4.3.2.2: Marshall County Residential Building Count by Census Block



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.

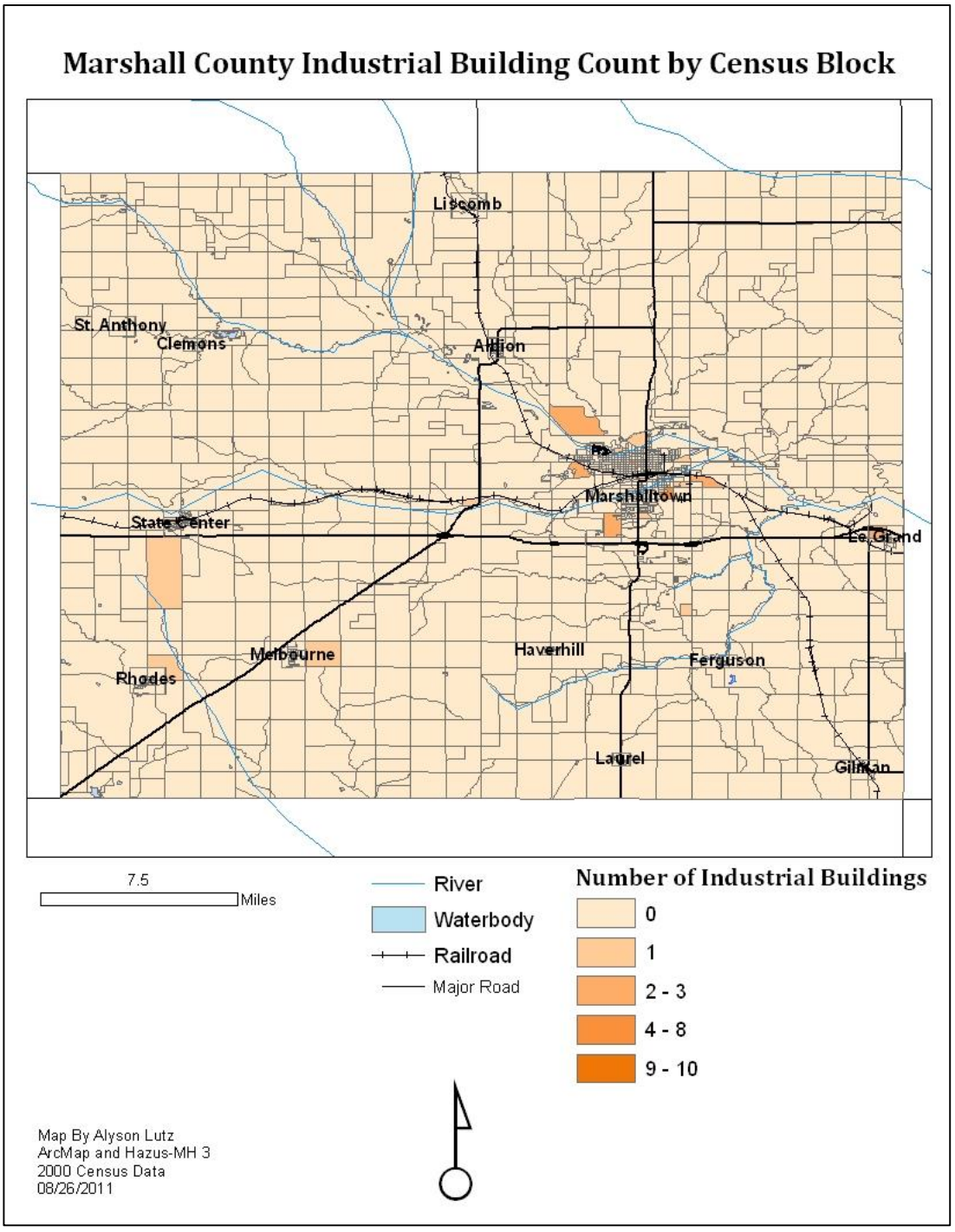
The second structure type, commercial, somewhat resembles the patterns of residential development. Most other commercial buildings are scattered in unincorporated portions of the county. The highest concentrations of buildings in one census block, though, is seven to ten so there are a few dense areas of commercial buildings. Generally, Marshall County's largest cities have higher concentrations but there are also denser areas in the unincorporated, city periphery.

Figure 4.3.2.3: Marshall County Commercial Building Count by Census Block



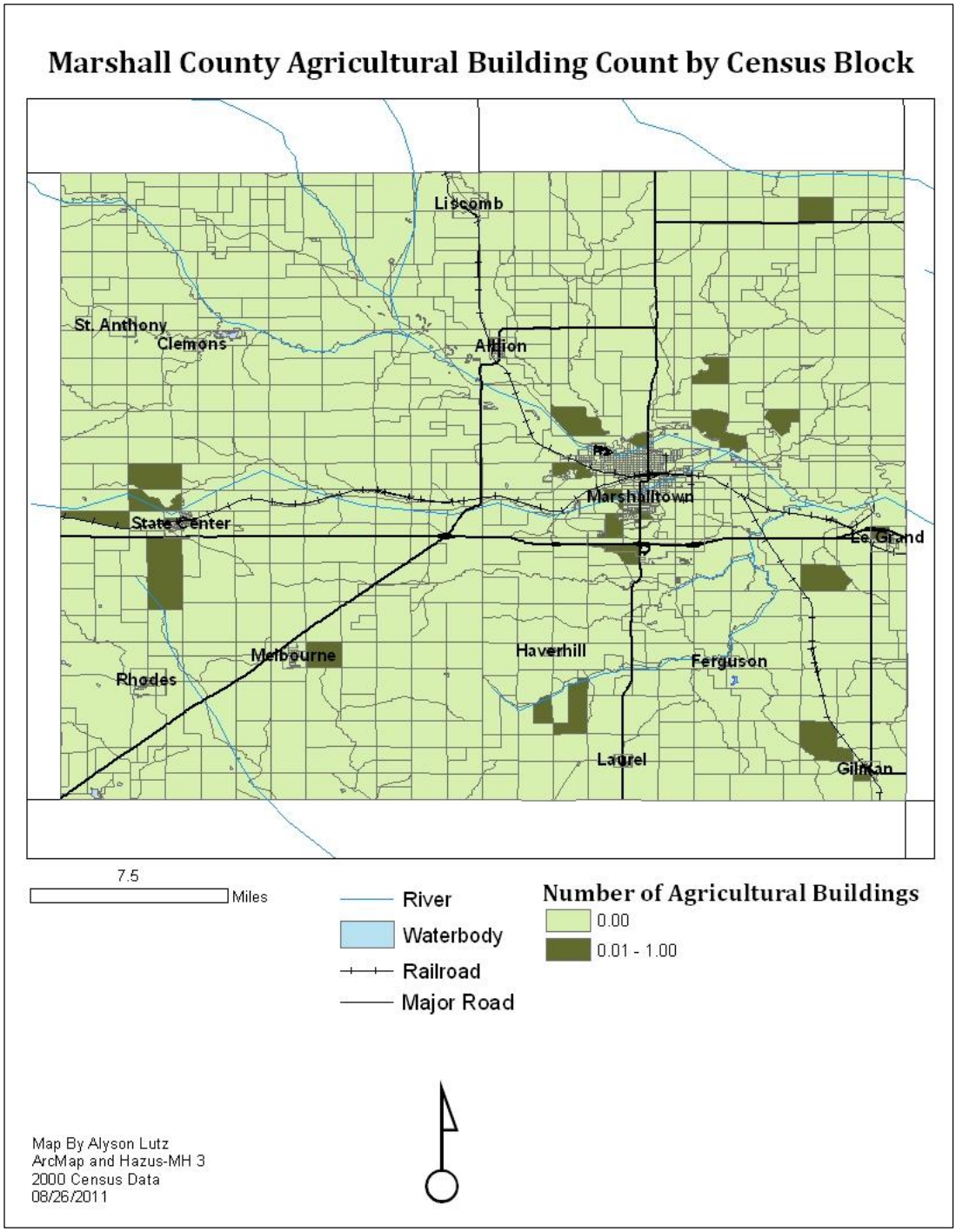
The concentration of industrial buildings is also not very dense with the highest concentration ranging from nine to ten buildings. Refer to Figure 4.3.2.4. There is just one area that stands out as the densest industrial area, that being Marshalltown. There are some other areas with one industrial building 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 4.3.2.4: 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 4.3.2.5 for the location of agricultural buildings in Marshall County.

Figure 4.3.2.5: Marshall County Agricultural Building Count by Census Block



Historic Assets

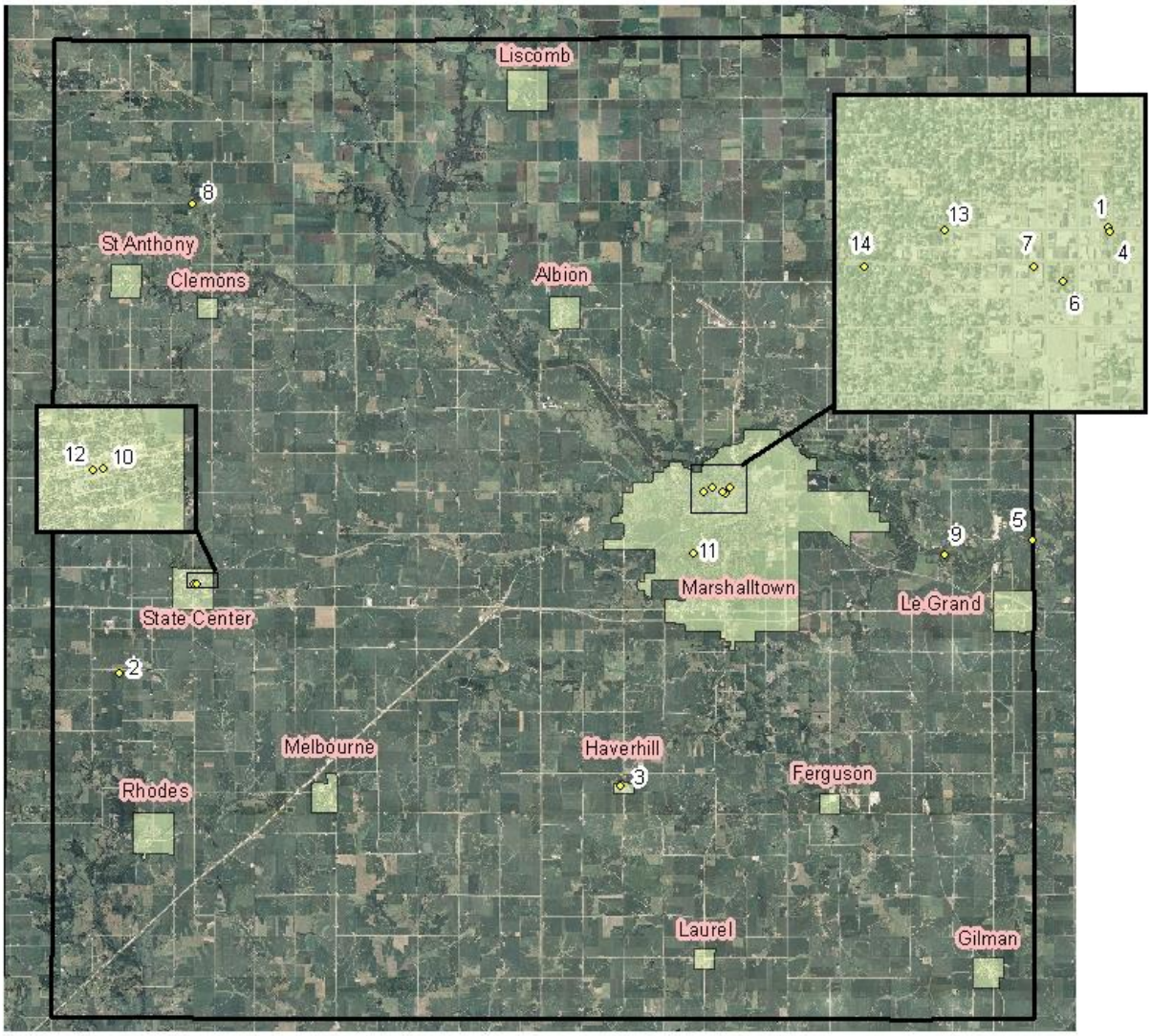
The 14 historic sites are spread across only some parts of Marshall County. There is one major cluster of historic sites in the city of Marshalltown, which can be seen in the call out in Figure 4.3.2.6 on the next page. This cluster contains a majority of the sites in the county. Because these historic 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 4.3.2.6. This map shows the location of each historic site with its corresponding number in the list above as its identifier.

Figure 4.3.2.6: 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	Skate 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:

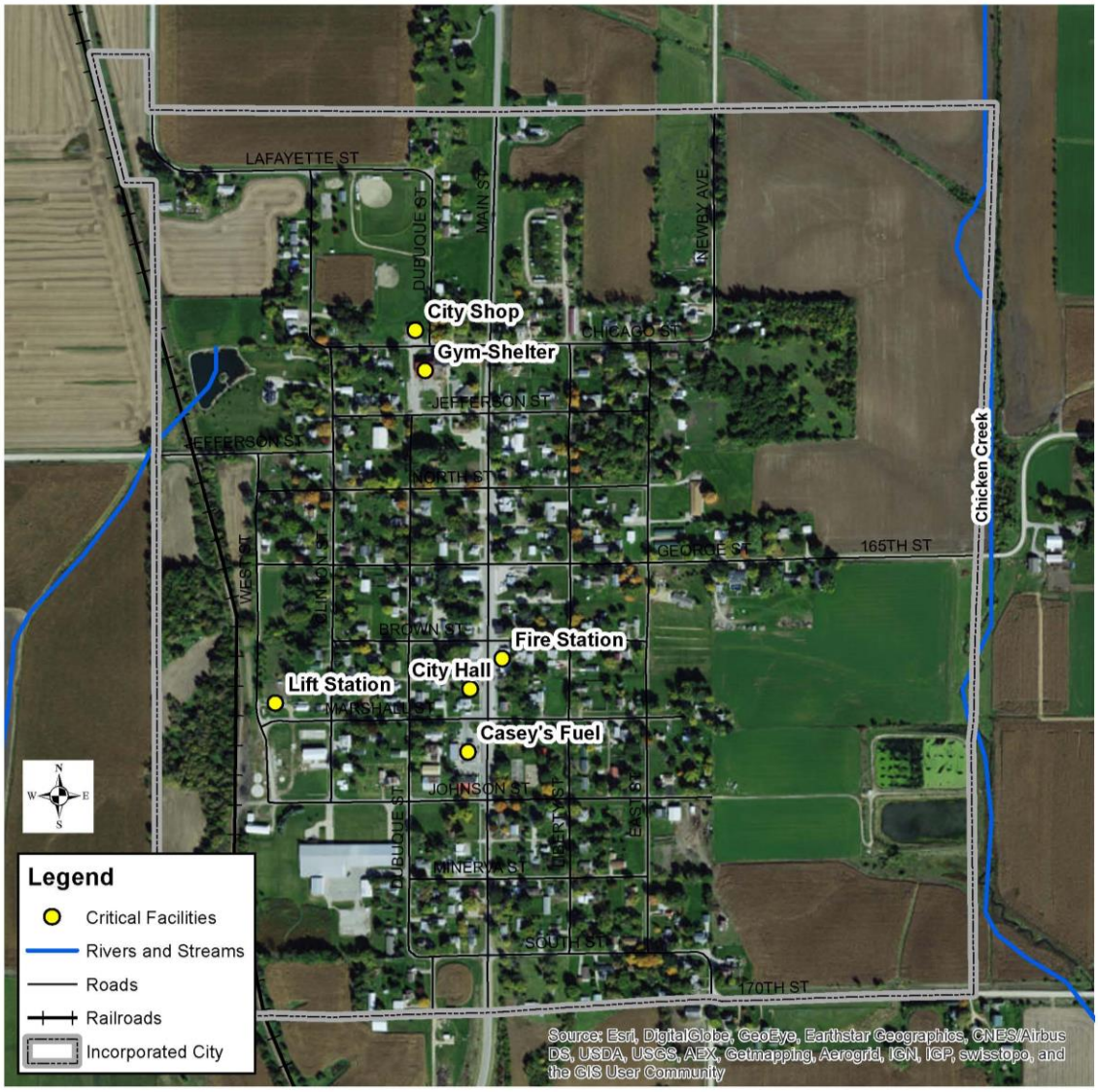
1 Fire station
2 City hall
3 Lift station
4 Pump house
5 Casey's fuel
6 Gym shelter
7 City shop

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 4.3.2.7 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 4.3.2.7: 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 Department

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. Out of town school
9. Out of town bank
10. Out of town grocery store

All of these facilities are extremely important to Clemons during and after a hazard event. These ten 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 4.3.2.8.

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 4.3.2.8: 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
7 Ferguson Church

Refer to Figure 4.3.2.9 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 4.3.2.9: 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. Union Pacific 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 4.3.2.10.

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 4.3.2.10: 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 of Haverhill identified are listed below. Refer to Figure 4.3.2.11 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 4.3.2.11: 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:

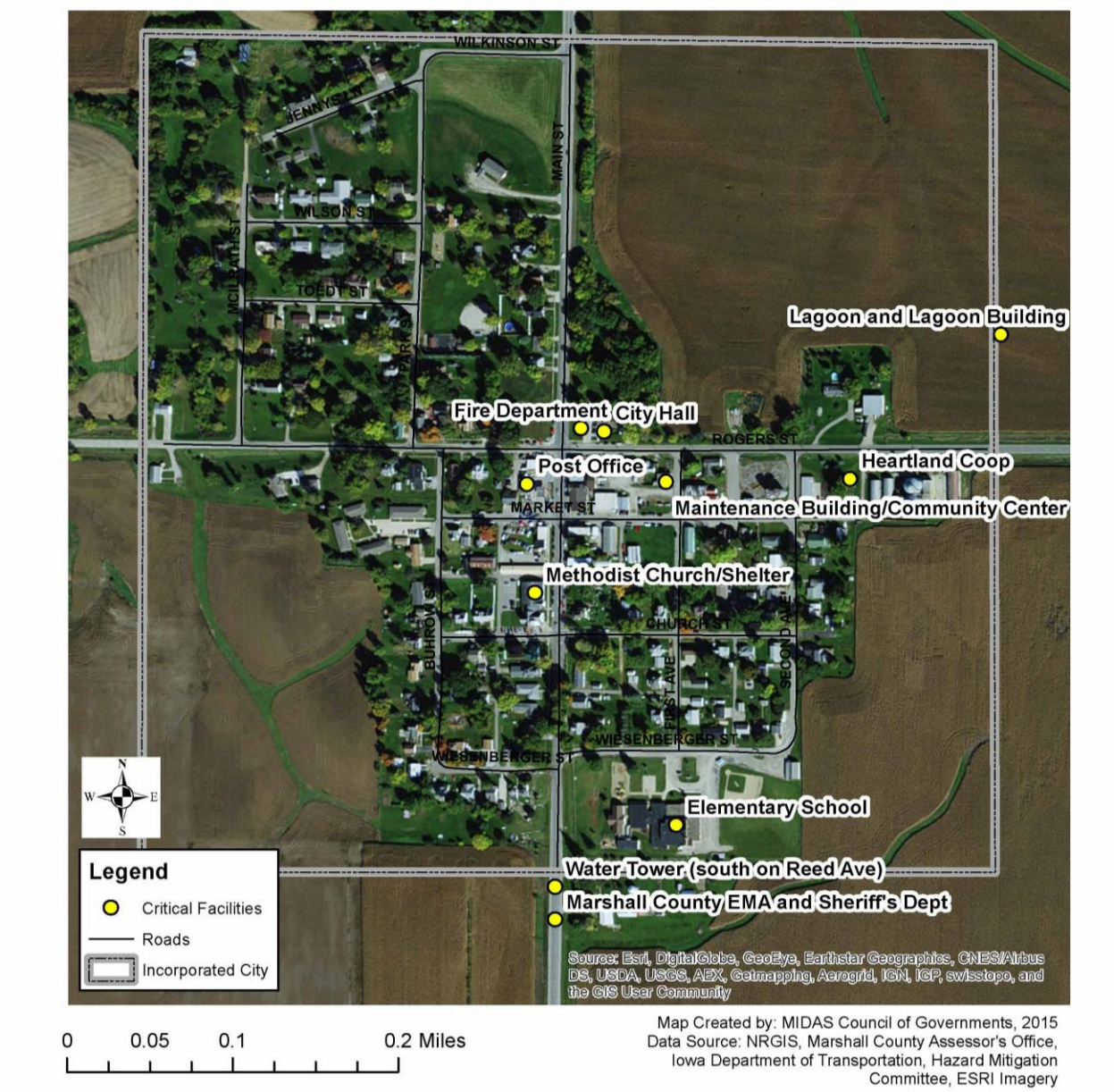
1. Antique shop
2. Appel Ball Park
3. Elementary School
4. Fire Dept
5. Hair salon
6. Library
7. Phone Company
8. School ball park and play ground
9. Senior housing
10. USPS
11. Verg's Garage
12. Wilkenson Park

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 4.3.2.12 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 4.3.2.12: 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 Three historic houses
2 Agricultural land
3 Ball fields
4 Band shell
5 Bank
6 Car wash
7 Union Pacific Railroad
8 Good Luck, Inc. Convenience Store
9 City buildings
10 City park
11 Community center
13 East Marshall High School
14 Fire station
15 Floodplain insurance
16 Friends Church
18 Innovative Salon
19 Laundromat
20 Le Grand Farm Service
21 Le Grand Sanitation
22 Library
23 Lincoln Highway
25 Maintenance building
26 Mick'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

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 4.3.2.13 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 Good Luck Inc. Convenience Store
10 Sunrise café
11 Bank
12 Le Grand Friends Church

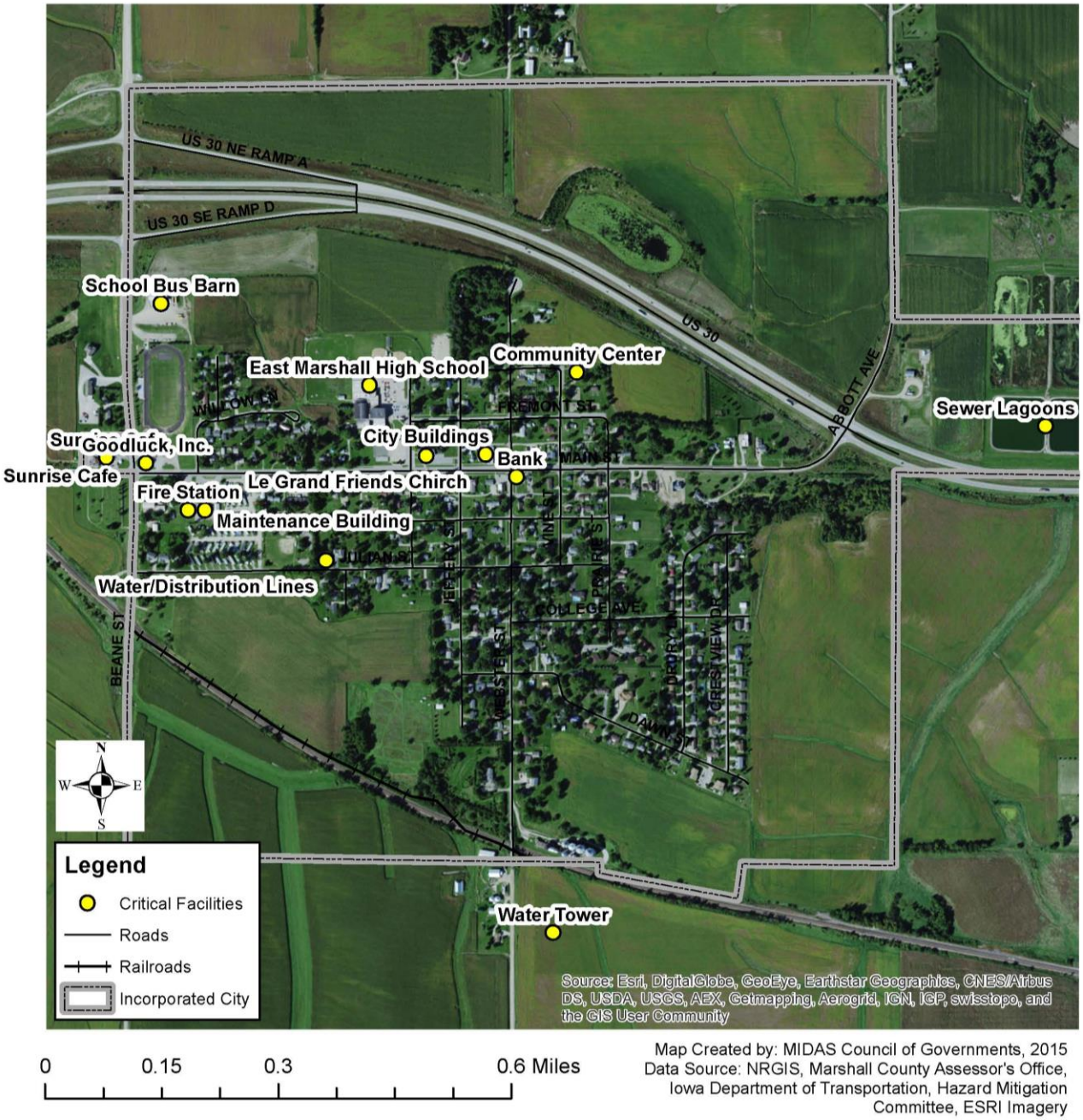
The vulnerable populations living in Le Grand were also identified. This city has the most unique set of vulnerable populations in the county, including:

1 Residents in the trailer 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 4.3.2.13: 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 One bar
2 Cemetery
3 City parks
4 County road lead from town
5 Good in town roads
6 Hardin County Savings Bank
7 Historic items at community building
8 Iowa River
9 Liscomb Church of Christ
10 Mid-Iowa Coop
11 New water mains
12 Out of town business
13 Peoplerides
14 School bus
15 Treatment system
16 Two parks
17 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 4.3.2.14 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 – CIH 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 4.3.2.14: 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:

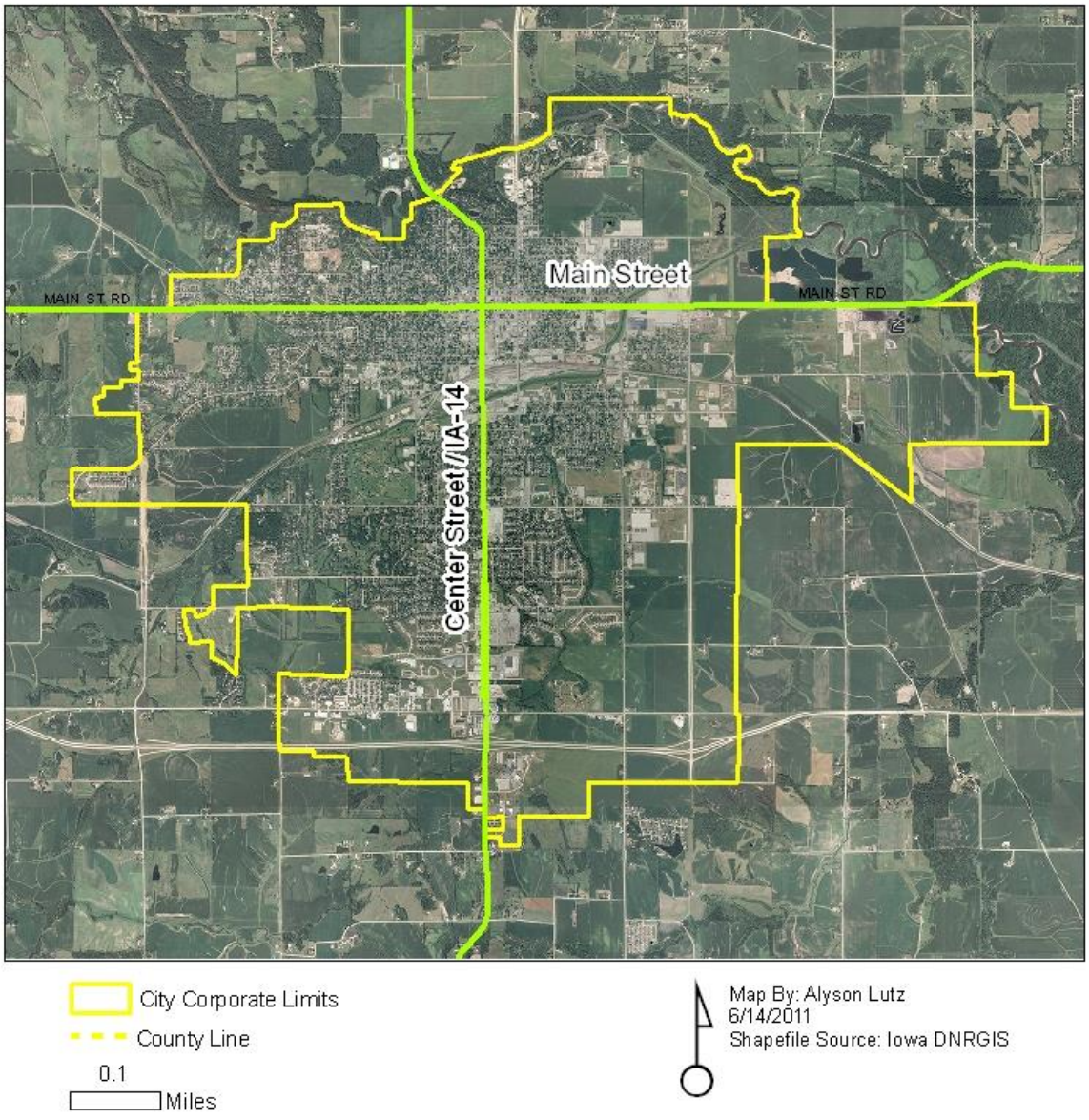
1. Schools, College, AEA 267
2. Police, Fire, EMS
3. City hall
4. Hospital, Iowa Veterans Home
5. E.O.S. Mobile Command
6. Public transit
7. Water works
8. Electric plant
9. Food services
10. Mall
11. Sewage Treatment Plant
12. Dialysis Center

These twelve 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 4.3.2.15. , 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 – CIH
5. Facilities for care of the handicapped – CIRSI, Quakerdale
6. Hospice Facilities

Figure 4.3.2.15: 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 Two ball diamonds
2 Two parks
3 Bank
4 Bike trail
5 Two churches
6 Co-op
7 Door manufacturing
8 Feed mill
9 Fertilizer plant
10 Fire department
11 Gateway to farm processing plant
12 Highway 330
13 Library
14 Recreation Center/Pool
15 Mousehole Days
16 Post office
17 Repair shop
18 Truck Stop/Travel Center
19 Rural water
20 Surrounding farmland
21 Mid-Iowa Enterprise
22 Veterinarian

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 Mid West One Bank
9 US Postal Service

All of these facilities are important to Melbourne during and after a hazard event. These nine 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 4.3.2.16.

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. Emcar Properties (apartments)
2. Upchurch rentals (trailer court)
3. Steelsmith Apartments
4. Jacob Bros Apartments (3 buildings)
5. Elderly in homes
6. Buckridge Apartments
7. Bexter Property Management (apartments)

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 4.3.2.16: 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.

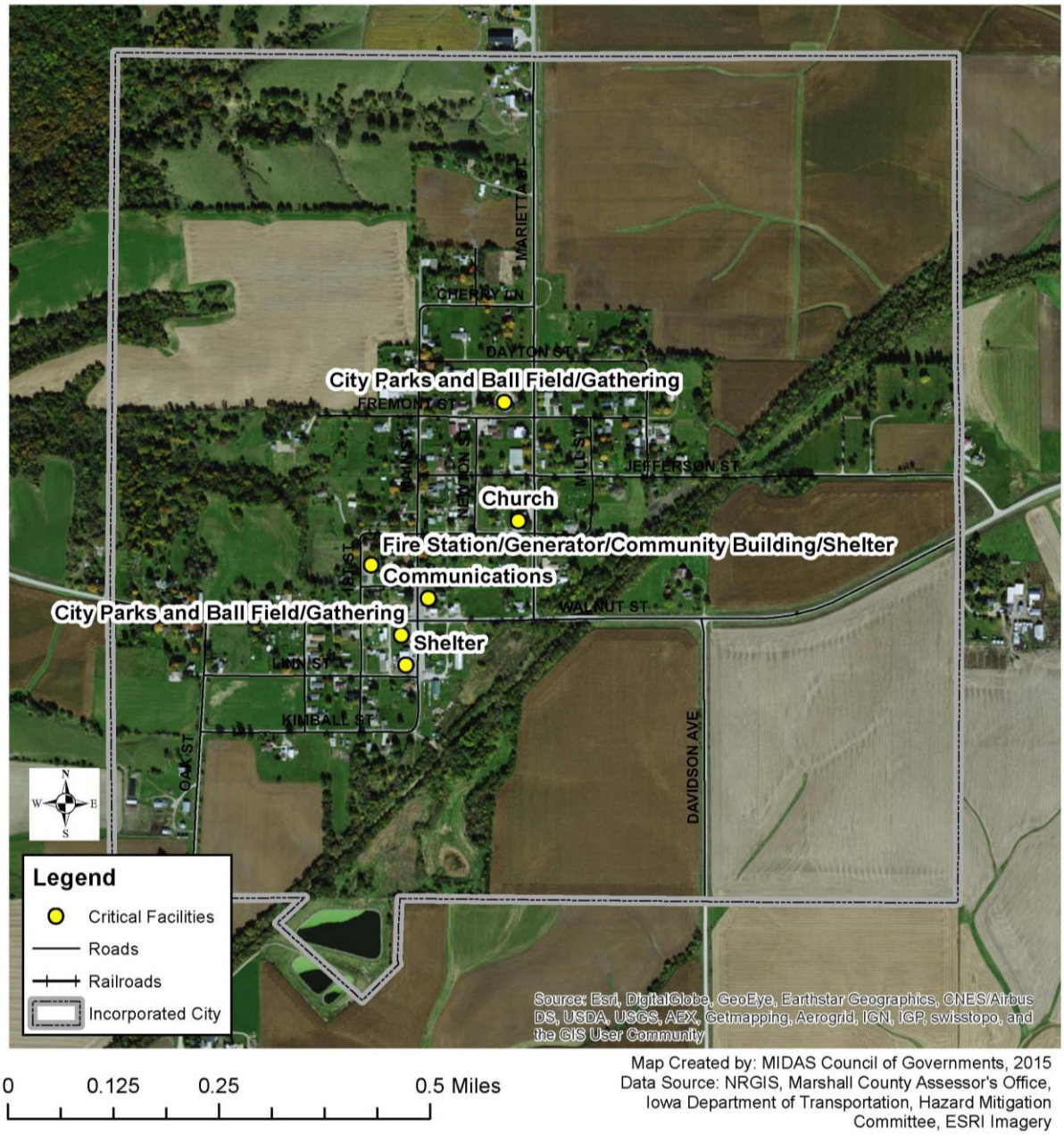
1 Auto repairs
2 Ball field
3 Bar
4 City parks
5 Iowa River
6 Limestone
7 Major highway close by
8 Methodist Church
9 New filtration system
10 Post Office
11 Water tower
12 Wild animal habitat

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 4.3.2.17. The only vulnerable population identified for the City of Rhodes is elderly in private homes.

Figure 4.3.2.17: 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 Flatheads Bar and Grill
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 4.3.2.18 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 4.3.2.18: 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 St. Andrews Bar/Grill
30 Nucara Pharmacy

The city's critical facilities were also identified at this meeting but in a separate activity. Several 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 CIH 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 4.3.2.19. Because many of these facilities have multiple locations, please refer to the reference numbers provide in the map key in Figure 4.3.2.19.

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 4.3.2.19: State Center's Critical Facilities



Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Transportation, Hazard Mitigation Committee, ESRI Imagery

Critical Facilities Key

1 County government facilities, equipment, and vehicles
2 Transporation facilities
3 Communication infrastructure
4 Potable water infrastructure
5 Major pipelines
6 Electrical infrastructure
7 Grocery store
8 Hardware stores and businesses with disaster supplied
9 Facilities at the County's seventeen outdoor recreation areas
10 Police Department

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 identified in Marshall County.

1 27 Park Areas
2 4 boat camps
3 Airport
5 Animal Rescue League
6 Banger
7 Bike Paths
8 Bridges/Roads
9 Cemeteries
10 Central Iowa Water
11 Conservation Center
12 Consumer's Energy
13 Co-ops
14 County Engineer Sheds
15 Courthouse
16 Dillon
17 Dunbar
18 Electrical Grids
19 Farm Ponds
20 Farmland
21 Collisons
22 Green Castle Lake
23 Green Mountain
24 Marshall Gun Club
25 Izaak Walton
26 Highways and Roads
27 Historical society
28 IKES
29 International Ingredients
30 Iowa River
31 Iowa River Greenbelt
32 Jail
33 KOCH Nitrogen
34 Lamoille
35 Landfill
36 Lincoln Valley
37 Livestock
38 Micogen
39 Pipelines
40 Railroad
41 Rural water towers
42 Sand Lake
43 Schools
44 Spread All
45 Swift Greenhouse
46 Timber Valley
47 Trails and Parks
48 Van Cleve
49 Walker Construction
50 Wind farms
51 Wolf Lake
52 Henderson Marsh Dam
53 Substations
54 Communication Towers
55 EMA-EOC
56 Comm. Center/Police Dept.

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.

East Marshall Community School District

East Marshall Community School District has facilities in the Cities of Ferguson, Gilman, Laurel, and Le Grand in Marshall County. School district assets include Laurel Primary School, East Marshall Middle School, and East Marshall Senior High School. The school district participated in the previous Multi-Jurisdictional Hazard Mitigation Plan for Marshall County. See Figure 4.3.2.20 for the locations of school district facilities.

GMG Community School District

GMG Community School District has facilities in Green Mountain in Marshall County. Other school district facilities are located in Tama County, Iowa. School district assets in Marshall County include the GMG Athletic Facility and the GMG Elementary School. The school district did not participate in the previous Multi-Jurisdictional Hazard Mitigation Plan for Marshall County but is participating in the plan update. See Figure 4.3.2.21 for the locations of school district facilities.

Marshalltown Community School District

Marshalltown Community School District has facilities in the City of Marshalltown in Marshall County. School district assets include Franklin Elementary School, Rogers Elementary School, BR Miller Middle School, Woodbury Elementary School, the Marshalltown School District Bus Barn, Anson Middle School, Anson Elementary School, Marshalltown High School, Fisher Elementary School, JC Hoglan Elementary School, Marshalltown Learning Academy, and Lenihan Intermediate School. The school district participated in the previous Multi-Jurisdictional Hazard Mitigation Plan for Marshall County. See Figure 4.3.2.22 and 4.3.2.23 for the locations of school district facilities.

West Marshall Community School District

West Marshall Community School District has facilities in the City of State Center in Marshall County. School district assets include West Marshall High School, West Marshall Middle School, West Marshall Elementary School, West Marshall Bus Barn, and West Marshall Administration. The school district did not participate in the previous Multi-Jurisdictional Hazard Mitigation Plan for Marshall County. See Figure 4.3.2.24 for the locations of school district facilities.

Figure 4.3.2.20: East Marshall Community School District
Location of Buildings and FEMA Flood Zone Boundaries

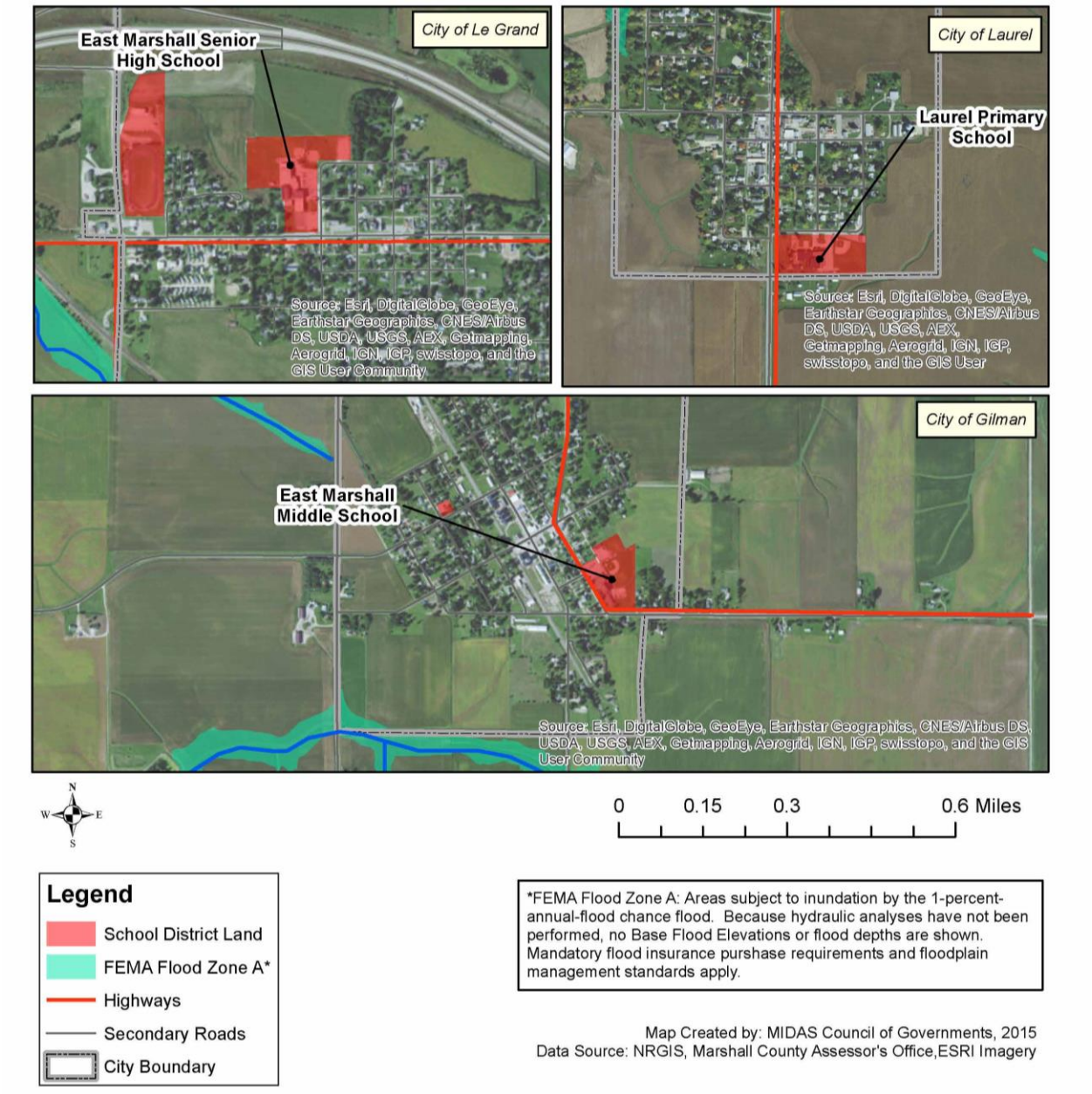


Figure 4.3.2.21: GMG Community School District
Location of Buildings and FEMA Flood Zone Boundaries

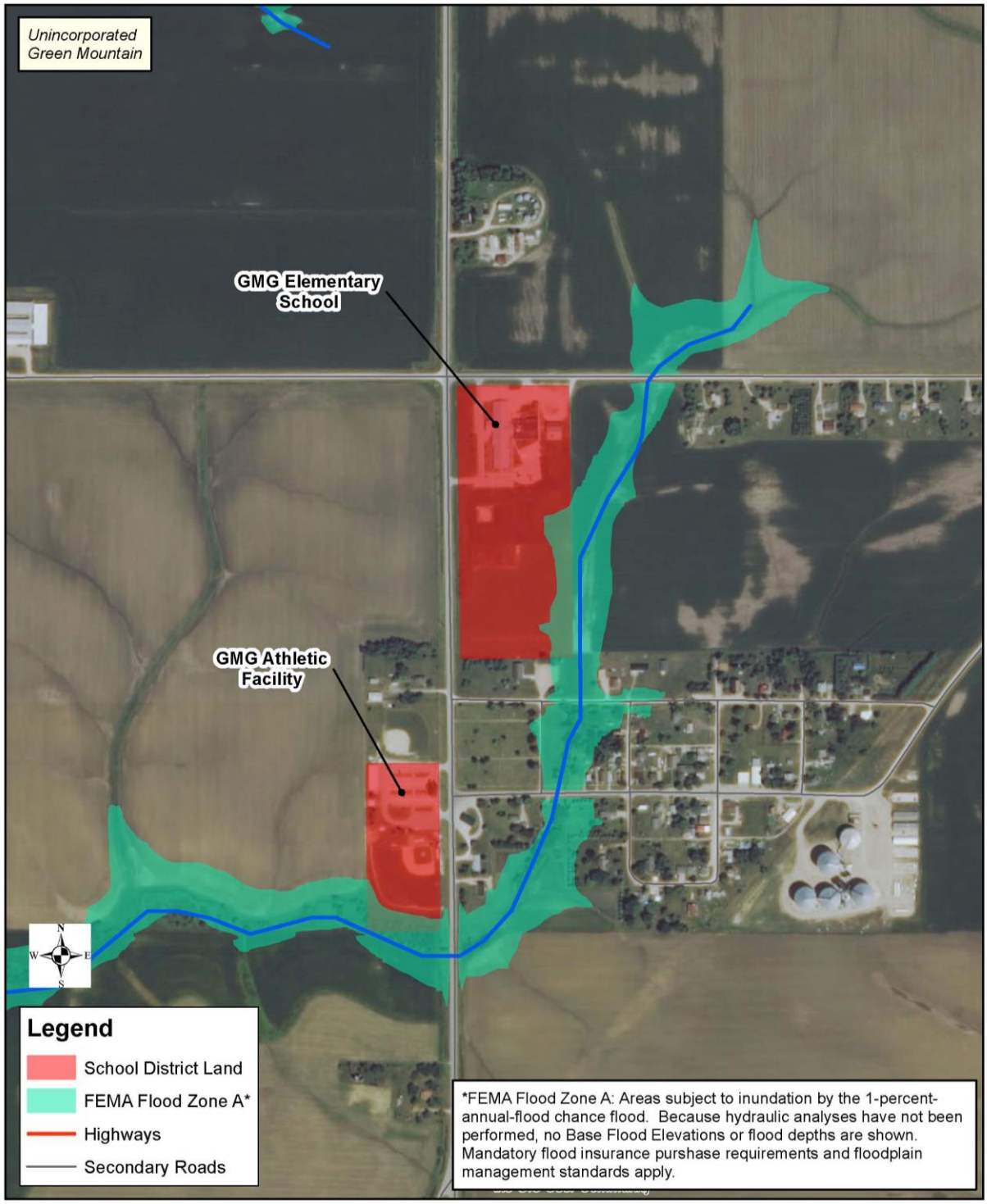


Figure 4.3.2.22: Marshalltown Community School District
Location of Buildings and FEMA Flood Zone Boundaries (1)

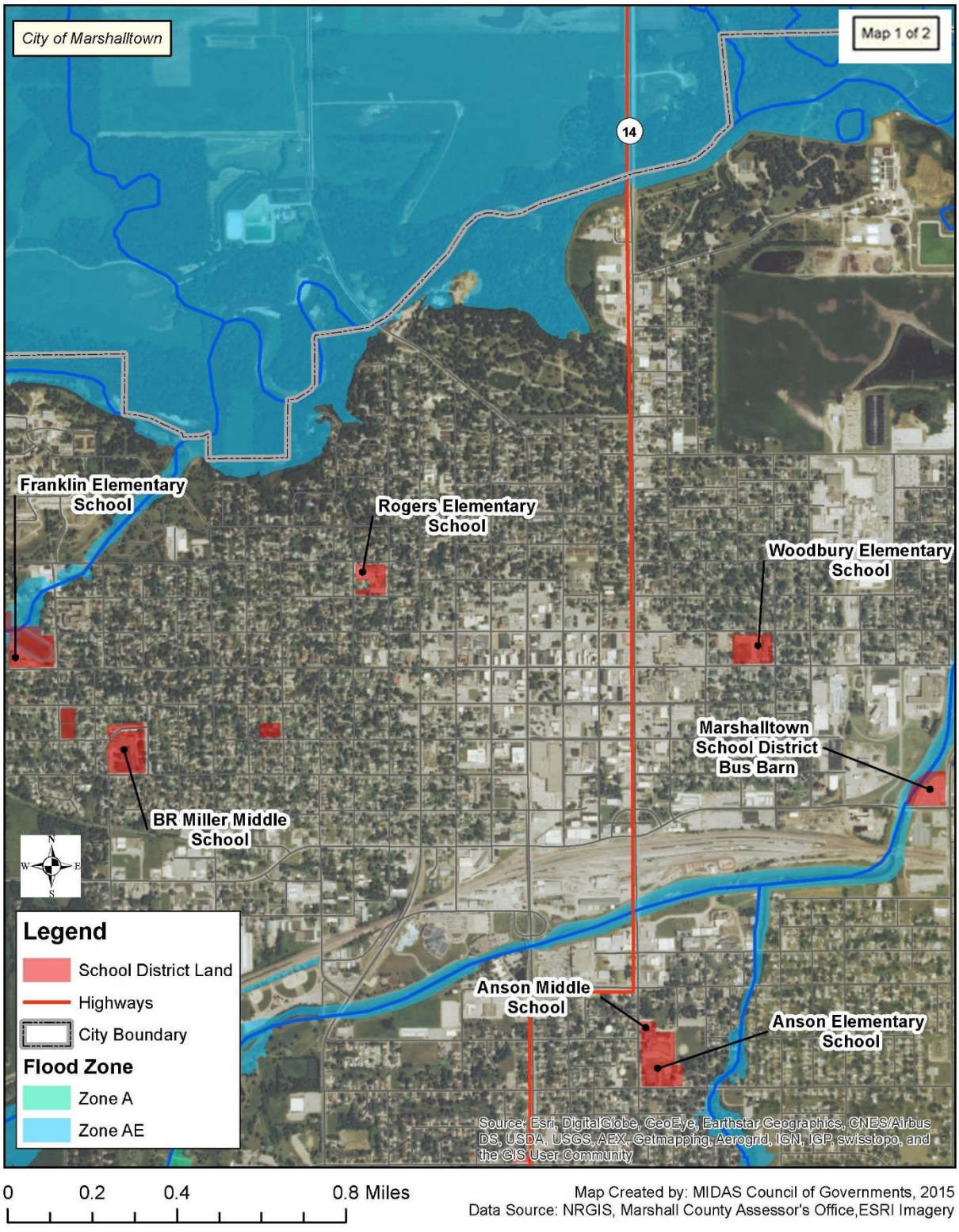


Figure 4.3.2.23: Marshalltown Community School District
Location of Buildings and FEMA Flood Zone Boundaries (2)

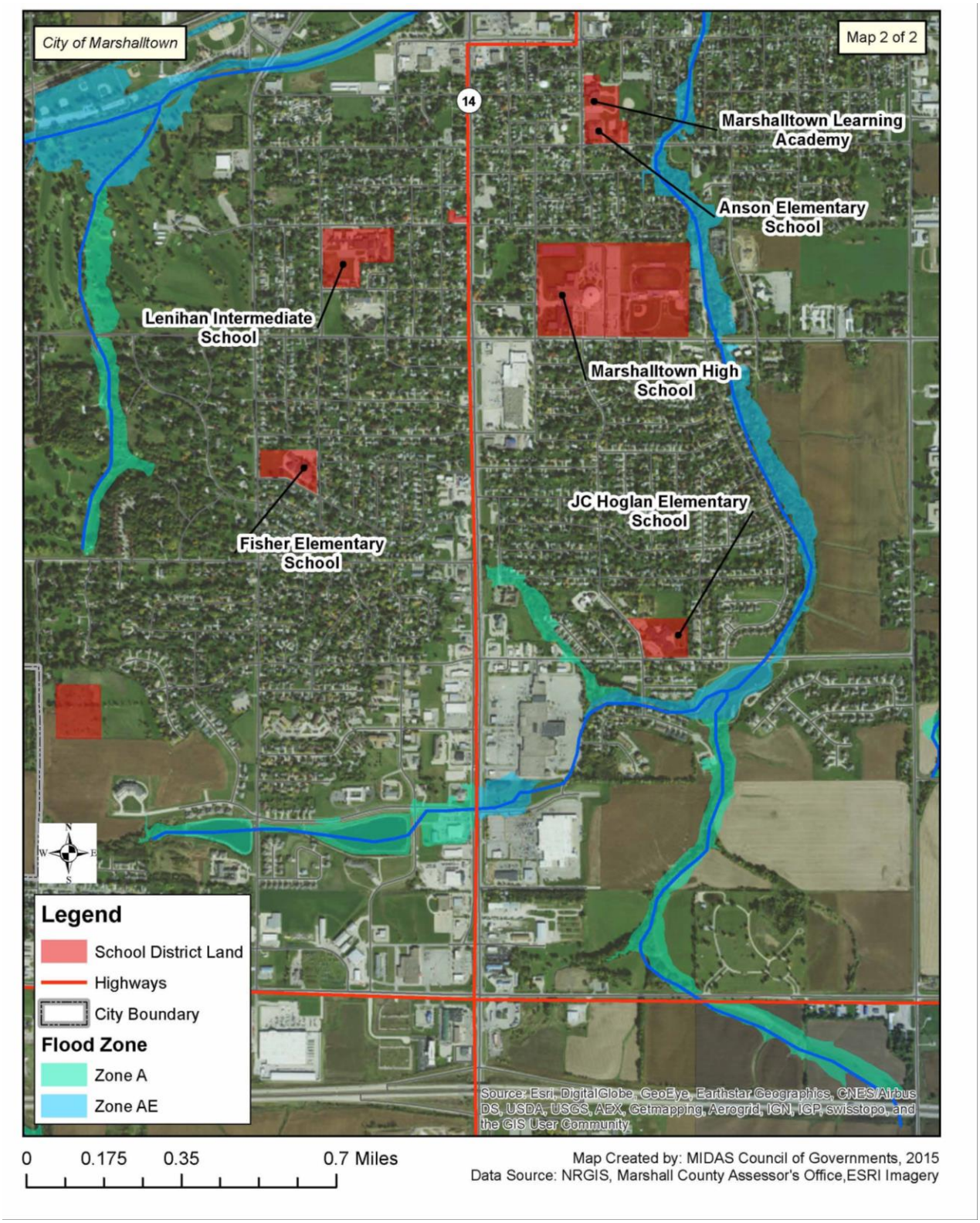
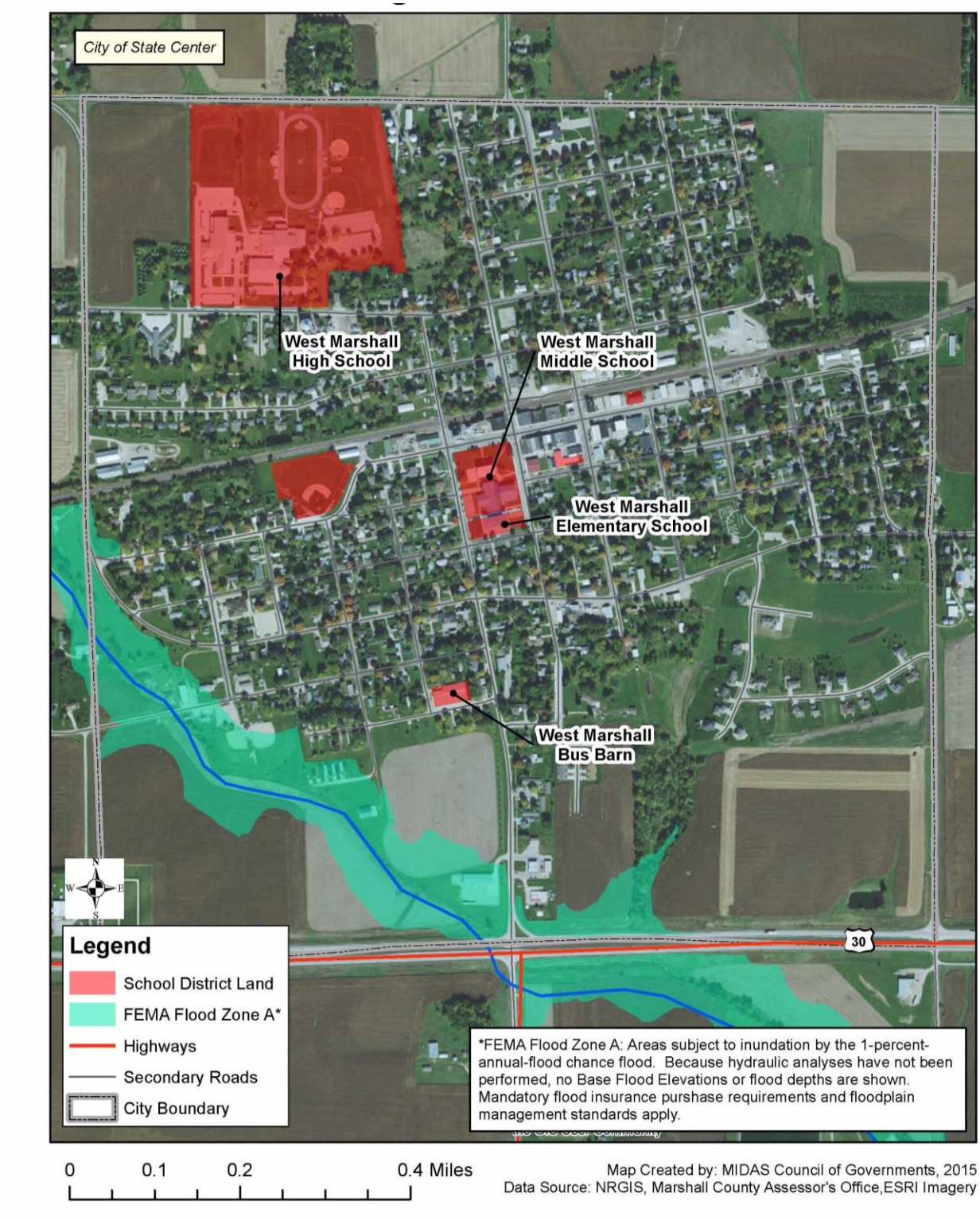


Figure 4.3.2.24: West Marshall Community School District
Location of Buildings and FEMA Flood Zone Boundaries

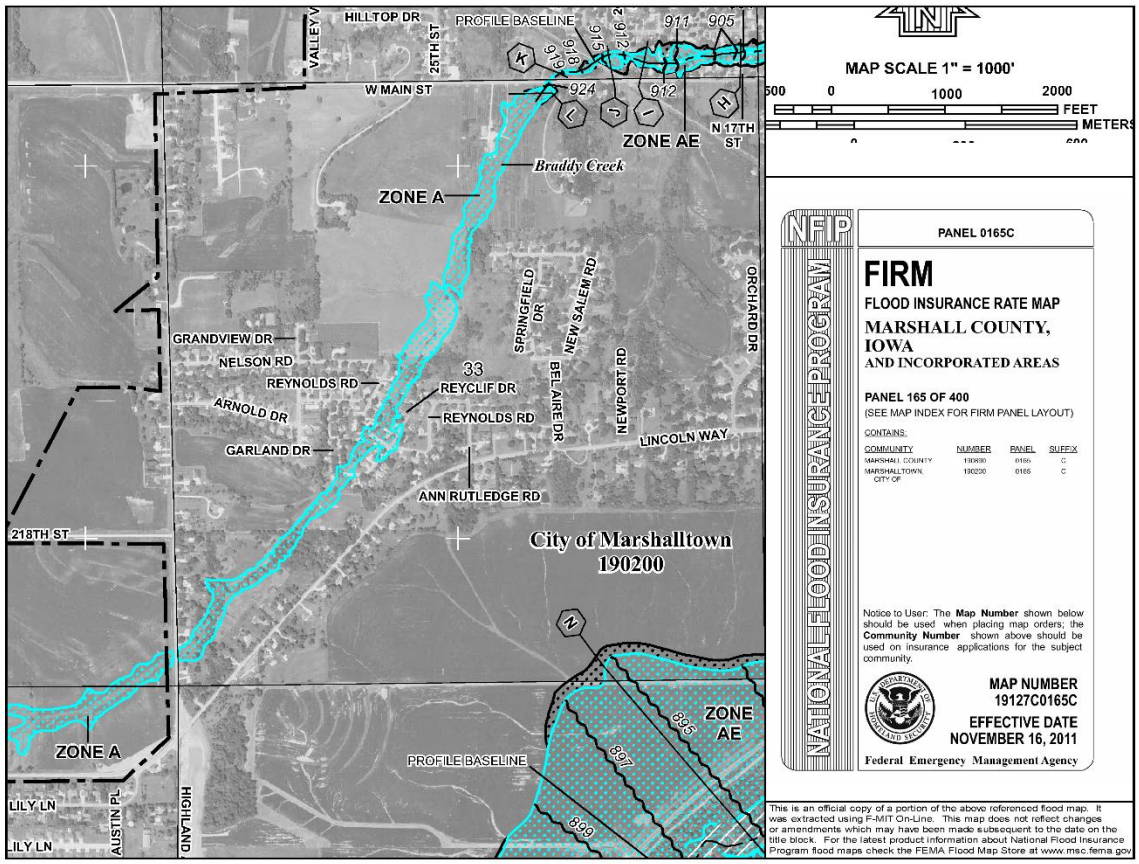


4.3.3: Repetitive Loss Properties

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.*

Marshalltown is the only city in the county that contains repetitive loss structures. According to Iowa Homeland Security, Marshalltown has a total of two repetitive loss properties that are both classified as residential land use (Iowa HSEMD 2015). Seven out of fourteen jurisdictions in Marshall County are participating in the National Flood Insurance Program (NFIP). Among them, there are 67 NFIP policies in force with a total of $12,331,400 of insurance coverage as of 04/30/2015 (NFIP Bureau Net 2015). Marshalltown contains 45 of these policies. Figure 4.3.3.1 shows a general area of the location of one of the repetitive loss properties in Marshalltown. The other repetitive loss location could not be shown in a FIRMette due to privacy concerns. See Appendix L for FIRMettes of all areas within incorporated Marshalltown.

Figure 4.3.3.1. FIRMette of Area of Marshalltown



Chapter 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 Task Force 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 Task Force 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.*

The Task Force used the four main goals that were developed during the previous planning process as a basis for the plan update. The previous planning process created these goals based on the results of the risk assessment, a review of mitigation goals from the 2007 Iowa Hazard Mitigation Plan, and a review of a past hazard mitigation plan for Marshall County and certain communities in the county. The review of goals ensured that this plan's mitigation strategy was integrated or aligned with existing plans and policies. The four goals are as follows:

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.

The Task Force was given the opportunity to change these goals but ultimately chose not to do so. All task force members agreed that these four goals adequately fit their jurisdiction's specific needs and gave them enough leeway to develop actions. This agreement is a change from the previous plan, which allowed jurisdictions to change the basic goals to meet their needs or to disregard the basic goals and create different goals that better represented their needs.

At the county-wide Hazard Mitigation Meeting 2, Task Force members were given lists of ideas for potential mitigation actions that jurisdictions could draw from. These lists were generated from FEMA publications and actions that were included in previous multi-jurisdictional hazard mitigation plans in Iowa. The lists separated mitigation action ideas by hazard and by popular topic such as tree trimming, warning sirens, fire department actions, and sewer system and drainage, and storm shelters. These lists complemented the results of the risk assessment and gave communities a variety of ideas to consider.

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, mitigation actions, action plan, and action prioritization will be listed and discussed. All jurisdictions established mitigation actions under the same set of goals; however, several jurisdictions have mitigation actions that are unique to the jurisdiction's specific needs. The variance in hazard coverage, population, and structures require that each jurisdiction determine their own actions rather than determining a set of actions that blanket the entire planning area.

Each community's action plan consists of the following information for each action: hazards addressed, responsible party/department, estimated cost, potential funding source, mitigation measure category, estimated start date, and target completion date. Communities were given an exhaustive list of potential responsible parties/departments and potential funding sources to help them plan out each action. Several of the action plan categories were separated into ranges to make action planning easier. For the estimated cost of each action, communities chose from the following ranges of costs: Minimal ($9,999 or less), Low ($10,000 to $99,999), Moderate ($100,000 to $299,999), or High ($300,000 or more). If communities provided a more accurate cost assessment, that cost is listed in the action plan. For the start date of each action, communities chose from the following ranges: Ongoing (progress is already being made on this action), Within 1 year of plan adoption, 2 to 4 years from plan adoption, or 5 or more years from plan adoption. All of this information is presented in the action plans in this chapter.

Action Prioritization

Mitigation actions were prioritized based on four criteria: Risk Assessment Score, Estimated Project State Date, the STAPLEE Economic Score, and Local Significance.

At the beginning of the hazard mitigation planning process, Task Force members ranked hazards based on their historical occurrence, probability of occurrence in any given year, vulnerability, severity of impact, and speed of onset. Scores varied from a minimum of 5 points to a maximum of 20 points. Based on the hazard(s) that each mitigation action addressed, actions were assigned a risk assessment priority score. Hazards that received a risk assessment score of 17-20 received a priority score of 4, a risk assessment score of 13-16 received a priority score of 3, a risk assessment score of 9-12 received a priority score of 2, and a risk assessment score of 5-8 received a priority score of 1. If a mitigation action addressed more than one hazard, a risk assessment priority score was assigned based on the highest-scoring hazard in the risk assessment. Scoring criteria is provided in Table 5.1.1.

Table 5.1.1: Hazard Risk Assessment Priority Scoring Criteria

Hazard Risk Assessment Score	Priority Score
Risk assessment score of 17-20	4
Risk assessment score of 13-16	3
Risk assessment score of 9-12	2
Risk assessment score of 5-8	1

Task Force members also completed an action plan for each mitigation action. Within this plan, communities estimated a start date for each action, which was the second criteria used to prioritize each mitigation action. Estimated start date was based on local economic conditions, ease of implementation, and potential grant funds. Scoring criteria is provided in Table 5.1.2.

Table 5.1.2: Estimated Project Start Date Scoring Criteria

Estimated Project Start Date	Score
Already implemented (ongoing)	4
Within 1 year of plan adoption	3
2-4 years from plan adoption	2
5 or more years from plan adoption	1

Although the entire STAPLEE Analysis can be useful in evaluating mitigation actions, most of the actions are scored similarly with only two or three questions determining a difference in scores. The Economic criterion of the STAPLEE Analysis generally shows the greatest variance in scores and, for the most part, shows if a mitigation action can be funded with the local budget, making it more likely to be implemented than mitigation actions requiring outside funding. Table 5.1.3on the following page shows the Economic STAPLEE scoring criteria that was used to prioritize each mitigation action. Communities answered yes, no, maybe, or not applicable for each Economic STAPLEE scoring criteria. A “yes” or “no” answer resulted in a positive or negative score. A “maybe” or “not applicable” answer resulted in no point being awarded.

Table 5.1.3: Economic STAPLEE Scoring Criteria

STAPLEE Questions	Score
Benefit of Action Will there be an economic benefit to the action?	Yes = +1 No = -1
Cost of Action Does the cost seem reasonable for the size of the problem and likely benefit?	Yes = +1 No = -1
Contributes to Economic Goals Does the action contribute to the community's economic goals?	Yes = +1 No = -1
Outside Funding Required Will there be outside funding required?	Yes = -1 No = +1

Finally, Task Force members were asked to identify which mitigation actions they felt were most important to implement based on local knowledge of needs. These actions were given one point.

Based on the four prioritization criteria discussed, final mitigation action prioritization scores had the potential to range from 2 – 12 points.

Mitigation action prioritization results are included in Appendix B. The following section contains each jurisdiction's goals, mitigation actions, action plan, and action prioritization. The final prioritization score of each mitigation action is included next to each mitigation action in parentheses. A ranked list of mitigation actions for each jurisdiction is included at the end of each jurisdiction's action plan.

Plan Update

The plan orders mitigation action prioritizations in a slightly different way than the previous 2012 Marshall County hazard mitigation plan. First, in the previous plan, many action prioritization scores were equal. The new plan update employed a different prioritization strategy that provided variation among scores and better connected prioritization with risk assessment scores. Second, some prioritization scores may have changed due to changes in priorities among jurisdictions. Some cities such as Le Grand decided to delete the purchase of a new emergency siren because the action would have been expensive and the current siren was adequate. Instead the city plans to find a backup power source for the siren since it currently does not have a backup power source. Now, the city plans to pursue other, higher-priority actions such as lagoon improvements and water tower updates. Details on these changes are included in the following chapter's action plans and in Appendix P with the Action Updates.

Albion

Goal 1: Protect the health and safety of residents and visitors

Mitigation Action 1.1: Bigger rural water line for backup water (6)

Plan for implementation and administration:	Install a large water line for backup water in case of emergency. The current water line is only 2 inches wide.
Hazards Addressed:	Drought, Infrastructure Failure
Responsible Party/Dept.:	City of Albion Water Department
Partners:	To be identified
Potential Funding Source:	CDBG, SRF
Estimated cost:	$300,000 or more
Mitigation Measure Category:	Structural Mitigation
Benefits (loss avoided):	Larger capacity for back up water needs in drought events
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2022

Mitigation Action 1.2: Water well improvements (7)

Plan for implementation and administration:	Raise existing wellhead above flood level; dig additional well in high elevation location; build a new treatment building. This project is in progress and will likely be finished within a year of plan adoption.
Hazards Addressed:	River Flooding, Infrastructure Failure
Responsible Party/Dept.:	City of Albion Water Department
Partners:	To be identified
Potential Funding Source:	CDBG, SRF, others to be identified
Estimated cost:	$300,000 or more
Mitigation Measure Category:	Structural Mitigation
Benefits (loss avoided):	Wells will be out of the way of potential flood damage, and increase in water provided to city.
Estimated Start Date:	Ongoing
Target Completion Date:	2016

Mitigation Action 1.3: Construct a safe room that doubles as communications storage and backup (5)

Plan for implementation and administration:	Add safe room to City Hall and outfit with capabilities to administer communications.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Albion Public Safety Department
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, others to be identified
Estimated cost:	$100,000 to $299,999
Mitigation Measure Category:	Structural Mitigation
Benefits (loss avoided):	Life safety for vulnerable residents and visitors to Albion
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2022

Mitigation Action 1.4: Purchase warning siren with backup power and remote triggering (7)

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. The current siren now has backup power through a generator that powers the fire station. The city will work with Marshall County EMA to get remote triggering capabilities for the siren in the future.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Albion Public Safety Department
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Albion General Funds, FEMA HMGP, others to be identified
Estimated cost:	$10,000 to $99,999
Mitigation Measure Category:	Emergency Services Protection
Benefits (loss avoided):	Life safety of Albion residents and visitors, use of siren even if there is a power outage
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2022

Mitigation Action 1.5: Address sewer backup issues (4)

Plan for implementation and administration:	The city needs to replace a sewer line that is prone to flash flooding. When flash flooding occurs after 2-4 inches of rain at a time, an area of the sewer line backs up and must be drained by the city. Two houses are affected by this backup and have sewer shutoff valves that they can close until the city drains the flooded area.
Hazards Addressed:	Infrastructure Failure, Flash Flooding
Responsible Party/Dept.:	City of Albion
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Albion, others to be identified
Estimated cost:	$100,000 to $299,999
Mitigation Measure Category:	Property Protection
Benefits (loss avoided):	Life safety of Albion residents and visitors, use of siren even if there is a power outage
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2022

Albion Mitigation Action Prioritization

1. **Mitigation Action 1.2:** Water well improvements (7)
2. **Mitigation Action 1.4:** Purchase warning siren with backup power and remote triggering (7)
3. **Mitigation Action 1.1:** Bigger rural water line for backup water (6)
4. **Mitigation Action 1.3:** Construct a safe room that doubles as communications storage and backup (5)
5. **Mitigation Action 1.5:** Address sewer backup issues (4)

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 (7)

Plan for implementation and administration:	Keep existing culverts in good condition and add new culverts where they are needed in the city. There are two areas in the city where new culverts need to be added. One area of the city near Market Avenue needs a new culvert because flooding occurs and affects one house, driveway, and the road. This area is right along the boundaries of where county maintenance ends and city maintenance begins.
Hazards Addressed:	Flash Flooding, River Flooding
Responsible Party/Dept.:	City of Clemons Maintenance Department
Partners:	Engineering firm, others to be identified
Potential Funding Source:	City General Funds, County Roads Department, FEMA HMGP
Estimated cost:	$10,000 - $99,999
Benefits (loss avoided):	Reduces potential damages due to flash or river flooding
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2018

Mitigation Action 1.2: Add lift station (7)

Plan for implementation and administration:	Add a lift station to the City's sanitary sewer when and where it is needed. The current lift station was built in the late 1970s. It is expensive to operate and is capable of failing. During heavy rains, the city has to watch the facility and make sure it doesn't fail.
Hazards Addressed:	Infrastructural Failure, Flash Flooding, River Flooding, Thunderstorm/ Lightning/Hail
Responsible Party/Dept.:	City of Clemons Water and Sewer Superintendent
Partners:	To be identified
Potential Funding Source:	CDBG, Budget (sewer line item)
Estimated cost:	$100,000 to $299,999
Benefits (loss avoided):	Eliminate potential sanitary sewer backups into structures
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2018

Mitigation Action 1.3: Flood-proof wastewater treatment facility (6)

Plan for implementation and administration:	The wastewater treatment facility is prone to flooding. Water has gotten as far as the edge of the driveway of the facility and the access road to the plant is also prone to flooding. The city will meet with an engineer to determine what can be done about the problem.
Hazards Addressed:	River Flooding
Responsible Party/Dept.:	City of Clemons City Maintenance, Water Department

Partners:	To be identified
Potential Funding Source:	FEMA HMGP, CDBG, Budget (sewer line item)
Estimated cost:	$10,000 - $99,999
Benefits (loss avoided):	Decreased risk of infrastructure failure due to flooding
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2018

Goal 2: Protect the health and safety of residents and visitors

Mitigation Action 2.1: Ensure that people in the community have access to weather updates (11)

Plan for implementation and administration:	Most people in the city have access to either weather radios, smart phones, or a desktop computer. The city will include information in their newsletter or a flyer about how to get weather information.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Clemons Fire Department
Partners:	To be identified
Potential Funding Source:	City General Funds, others to be identified
Estimated cost:	Less than $10,000
Benefits (loss avoided):	Life safety of Clemons residents
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing

Mitigation Action 2.2: Remove junk cars and farm machinery (9)

Plan for implementation and administration:	Remove blight in town that contains hazardous waste to prevent an incident
Hazards Addressed:	Hazardous Materials
Responsible Party/Dept.:	City of Clemons Mayor
Partners:	Local fire and EMS, Others to be identified
Potential Funding Source:	City General Funds, others to be identified
Estimated cost:	Less than $10,000
Benefits (loss avoided):	Reduce risk of possible hazardous materials incident
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.3: Address derelict houses and buildings (7)

Plan for implementation and administration:	The city will work with homeowners and property owners in the city to decrease derelict houses and materials being stored in yards. This action will decrease future risk of hazardous materials and unnecessary debris.
Hazards Addressed:	Hazardous Materials
Responsible Party/Dept.:	City of Clemons Mayor, Fire Department
Partners:	Iowa DNR, others to be identified
Potential Funding Source:	USDA, City General Funds

Estimated cost:	Less than $10,000
Benefits (loss avoided):	Decrease of risk of hazardous materials spills
Mitigation Measure Category:	Property Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Clemons Mitigation Action Prioritization

1. **Mitigation Action 2.1:** Ensure that people in the community have access to weather updates (11)
2. **Mitigation Action 2.2:** Remove junk cars and farm machinery (9)
3. **Mitigation Action 1.1**: Maintain existing culverts and add new culverts (7)
4. **Mitigation Action 1.2:** Add lift station (7)
5. **Mitigation Action 2.3:** Address derelict houses and buildings (7)
6. **Mitigation Action 1.3:** Flood-proof wastewater treatment facility (6)

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 and purchase new emergency sirens (8)

Plan for implementation and administration:	A new siren needs to be purchased and installed on a pole at the fire station. Ideally, the siren would have audio capabilities. Upgrading and purchasing new sirens would greatly improve public safety.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Ferguson City Council
Partners:	To be identified
Potential Funding Source:	City of Ferguson, FEMA HMGP, City Grants, others to be identified
Estimated cost:	$10,000 to $99,999
Benefits (loss avoided):	Life safety of Ferguson residents and visitors
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2018

Mitigation Action 1.2: Electronically connect city emergency sirens to the command center (8)

Plan for implementation and administration:	The city would like to add electronic activation of warning sirens through the command center.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Ferguson City Council
Partners:	To be identified
Potential Funding Source:	City of Ferguson, FEMA HMGP, City Grants, others to be identified
Estimated cost:	$10,000 to $99,999
Benefits (loss avoided):	Life safety of Ferguson residents and visitors

Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2018

Mitigation Action 1.3: Purchase generator (7)

Plan for implementation and administration:	Purchase generator for Ferguson's Community Center which doubles as a shelter.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Ferguson Community Center Board
Partners:	Emergency Services, others to be identified
Potential Funding Source:	City of Ferguson City Grants, Community Foundation, FEMA HMGP, others to be identified
Estimated cost:	$10,000 to $99,999
Benefits (loss avoided):	Power generation to maintain the function of the community center
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Mitigation **Action 1.4**: Tear down dilapidated structures in the city (9)

Plan for implementation and administration:	Tear down dilapidated structures in the city. These structures could easily be damaged by fire or wind.
Hazards Addressed:	Infrastructure Failure, Wind Storm
Responsible Party/Dept.:	City of Ferguson City Council
Partners:	To be identified
Potential Funding Source:	City of Ferguson City Council
Estimated cost:	$10,000 to $99,999
Benefits (loss avoided):	Life safety and property damage
Mitigation Measure Category:	Property Protection
Estimated Start Date:	Ongoing
Target Completion Date:	2020

Goal 2: Protect the health and safety of Marshall County residents and visitors.

Mitigation Action 2.1: Continue mutual aid with other fire departments (10)

Plan for implementation and administration:	Continue mutual aid with other fire departments by making sure that all 28E agreements are kept up to date.
Hazards Addressed:	Grass and Wildland Fire, Infrastructure Failure, Hazardous Materials, Terrorism
Responsible Party/Dept.:	City of Ferguson Fire Department
Partners:	To be identified
Potential Funding Source:	City of Ferguson Property Tax
Estimated cost:	$10,000 to $99,999

Benefits (loss avoided):	Property protection
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	2020

Mitigation Action 2.2: Identify a storm shelter in the community and make signs informing residents of its location (9)

Plan for implementation and administration:	Identify a storm shelter in the community and make signs informing residents of its location. The shelter could be located at the Ferguson Community Center, Fire Station, and/or the Ferguson Church.
Hazards Addressed:	Tornado, Thunderstorm/Lighting/Hail, Windstorm
Responsible Party/Dept.:	City of Ferguson City Council
Partners:	To be identified
Potential Funding Source:	City of Ferguson Property Tax, City General Funds
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Ferguson residents
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	2020

Mitigation Action 2.3: Post signs in the parks to notify the public where to go during severe weather (9)

Plan for implementation and administration:	Post signs in the parks to notify the public where to go during severe weather. Signs will be posted at the park at the community center and at the little league park.
Hazards Addressed:	Tornado, Thunderstorm/Lighting/Hail, Windstorm
Responsible Party/Dept.:	City of Ferguson City Council
Partners:	To be identified
Potential Funding Source:	City of Ferguson Property Tax, City General Funds
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Ferguson residents
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	2020

Mitigation Action 2.4: Enforce burn bans when they are issued (8)

Plan for implementation and administration:	Enforce burn bans when they are issued
Hazards Addressed:	Grass and Wildland Fire, Infrastructure Failure
Responsible Party/Dept.:	City of Ferguson Fire Department, City Council
Partners:	To be identified
Potential Funding Source:	City of Ferguson Property Tax, City General Funds
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Prevent structural and grass and wildland fires
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 3: Educate Marshall County 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.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Ferguson City Clerk
Partners:	To be identified
Potential Funding Source:	City of Ferguson General Funds
Estimated cost:	$9,999 or less
Benefits (loss avoided):	All public information will be readily available
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 3.2: Public education on open burning (7)

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
Hazards Addressed:	Grass and Wildland Fire
Responsible Party/Dept.:	City of Ferguson Fire Department, City Council
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Ferguson General Fund
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Ferguson residents and visitors
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	2020

Mitigation Action 3.3: Educate the public on the Emerald Ash Borer (6)

Plan for implementation and administration:	The city will include items in their newsletter warning residents of the Emerald Ash Borer and what they can do to spot, treat, and prevent problems associated with it.
Hazards Addressed:	Animal/Plant/Crop Disease
Responsible Party/Dept.:	City of Ferguson City Council
Partners:	To be identified
Potential Funding Source:	City of Ferguson General Fund
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Prevent the spread of the Emerald Ash Borer
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	2020

Mitigation Action 3.4: Encourage citizens to enroll in weather alerts (9)

Plan for implementation and administration:	The city will post a sign at the post office concerning the Alert Iowa system.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Ferguson Fire Department, City Council
Partners:	To be identified
Potential Funding Source:	City of Ferguson General Fund
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Ferguson residents
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	2020

Mitigation Action 3.5: Build public awareness to "Call Before You Dig" (9)

Plan for implementation and administration:	Be sure people are aware they need to call 811 on Iowa One before they dig.
Hazards Addressed:	Hazardous Materials, Infrastructure Failure
Responsible Party/Dept.:	City of Ferguson City Council
Partners:	To be identified
Potential Funding Source:	City of Ferguson General Fund
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Prevention of pipeline and other hazardous materials incidents
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	2020

Goal 4: The continuity of operations will not be significantly disrupted by disasters in Marshall County.

Mitigation Action 4.1: Further emergency education and training opportunities between jurisdictions (8)

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
Hazards Addressed:	All
Responsible Party/Dept.:	City of Ferguson Fire Department, City Council
Partners:	Marshall County Emergency Management, Marshall County jurisdictions, others to be identified
Potential Funding Source:	City of Ferguson General Funds
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Personnel will serve better in events with proper training and cooperation with other jurisdictions
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	2020

Ferguson Mitigation Action Prioritization

1. **Mitigation Action 2.1:** Continue mutual aid with other fire departments (10)
2. Mitigation **Action 1.4**: Tear down dilapidated structures in the city (9)
3. **Mitigation Action 2.3:** Post signs in the parks to notify the public where to go during severe weather (9)
4. **Mitigation Action 3.1:** Add hazard information inserts to water bills and city newsletter (9)
5. **Mitigation Action 3.4:** Encourage citizens to enroll in weather alerts (9)
6. **Mitigation Action 3.5:** Build public awareness to "Call Before You Dig" (9)
7. **Mitigation Action 2.2:** Identify a storm shelter in the community and make signs informing residents of its location (9)
8. **Mitigation Action 1.1:** Upgrade and purchase new emergency sirens (8)
9. **Mitigation Action 1.2:** Electronically connect city emergency sirens to the command center (8)
10. **Mitigation Action 2.4:** Enforce burn bans when they are issued (8)
11. **Mitigation Action 3.3:** Educate the public on the Emerald Ash Borer (6)
12. **Mitigation Action 4.1:** Further emergency education and training opportunities between jurisdictions (8)
13. **Mitigation Action 1.3**: Purchase generator (7)
14. **Mitigation Action 3.2:** Public education on open burning (7)

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 (9)

Plan for implementation and administration:	Purchase new and update equipment as needed for fire department, including fire truck pumper. The city purchased a new fire truck 2 to 3 years ago and is still looking for additional equipment.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Gilman City Council, Fire Department
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Gilman General Funds, Townships, Assistance to Firefighters Grants
Estimated cost:	$10,000 to $99,999
Benefits (loss avoided):	Up-to-date equipment for fire department in Gilman
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 2: Protect the health and safety of Gilman residents and visitors.

Mitigation Action 2.1: Remove debris from abandoned properties (8)

Plan for implementation and administration:	Remove blight in town that contains hazardous waste to prevent an incident. The city currently maintains these properties by providing lawn mowing

	service and general upkeep. Additional steps can be made on removing debris with the cooperation of homeowners.
Hazards Addressed:	Hazardous Materials, Infrastructure Failure
Responsible Party/Dept.:	City of Gilman City Council, Clerk
Partners:	Local fire and EMS, others to be identified
Potential Funding Source:	City of Gilman General Funds, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Reduce risk of possible hazardous materials incident
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

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 (9)

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.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Gilman City Clerk
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Gilman General Funds, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Gilman residents and visitors
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Gilman Mitigation Action Prioritization

1. **Mitigation Action 1.1:** Update fire rescue equipment (9)
2. **Mitigation Action 3.1:** Public education sessions on warning siren (9)
3. **Mitigation Action 2.1:** Remove debris from abandoned properties (8)

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: Replace drainage tile lines in city limits (9)

Plan for implementation and administration:	The city needs to replace drainage tile lines within the city limits. These lines have not been replaced or serviced for several decades.
Hazards Addressed:	Flash Flooding, Infrastructure Failure, Thunderstorms/Lightning/Hail
Responsible Party/Dept.:	City of Haverhill City Council
Partners:	To be determined
Potential Funding Source:	City of Haverhill General Funds, FEMA HMGP, CDBG
Estimated cost:	$10,000 - $99,999 (closer to $50,000)
Benefits (loss avoided):	Reduces flash flooding from surface runoff and prolonged periods of rainfall
Mitigation Measure Category:	Prevention
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Goal 2: Protect the health and safety of Marshall County residents and visitors.

Mitigation Action 2.1: Emergency equipment upgrades for first responders (11)

Plan for implementation and administration:	Update or replace substandard emergency equipment in emergency departments. The city will purchase equipment on an as needed basis.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Haverhill Fire Department
Partners:	Local EMS, others to be identified
Potential Funding Source:	City of Haverhill General Funds, others to be identified
Estimated cost:	Less than $10,000
Benefits (loss avoided):	Emergency personnel will have reliable communication capabilities
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing – as needed
Target Completion Date:	Ongoing – as needed

Mitigation Action 2.2: Improve roads (8)

Plan for implementation and administration:	Improve roads that are identified as problematic or critical during and immediately following flood events. Regular road maintenance is also included in this action. A main street running through Haverhill is a "farm to market" road; the county helps maintain this road.
Hazards Addressed:	River Flooding, Infrastructure Failure
Responsible Party/Dept.:	City of Haverhill City Council
Partners:	Iowa Department of Transportation, Marshall County Engineer, City Road Use Tax, others to be identified

Potential Funding Source:	FEMA HMGP, Marshall County, and others to be identified
Estimated cost:	Less than $10,000
Benefits (loss avoided):	Prevent road and vehicle damage and preserve the mobility of Haverhill residents during and immediately following a flood event
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing – as needed
Target Completion Date:	Ongoing – as needed

Goal 3: Educate Marshall County citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Public education sessions on hazard procedures (6)

Plan for implementation and administration:	Create a program to educate Haverhill residents about how to be warned during hazard events and procedures to follow through informational flyers, meetings, or other interactive media like drills and workshops
Hazards Addressed:	All
Responsible Party/Dept.:	City of Haverhill mayor
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Haverhill General Funds
Estimated cost:	Less than $10,000
Benefits (loss avoided):	Life safety of Haverhill residents and visitors
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2022

Goal 4: The continuity of operations will not be significantly disrupted by disasters in Marshall County.

Mitigation Action 4.1: Mutual aid for disaster clean-up (11)

Plan for implementation and administration:	Hold sessions to coordinate mutual aid between jurisdictions for disaster cleanup. The city will maintain all current 28E agreements. To aid in disaster cleanup, the city also received help from farmers in the surrounding area who use their equipment to remove debris. Farmers played a big role in cleanup from the 2011 episode of straight line winds in the area.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Haverhill Mayor, City Council
Partners:	Marshall County Emergency Management, Marshall County jurisdictions, Others to be identified
Potential Funding Source:	City of Haverhill General Funds
Estimated cost:	Less than $10,000
Benefits (loss avoided):	Cleanup procedures will be more efficient and effective with cooperation
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing – as needed
Target Completion Date:	Ongoing – as needed

Haverhill Mitigation Action Prioritization

1. **Mitigation Action 2.1:** Emergency equipment upgrades for first responders (11)
2. **Mitigation Action 4.1:** Mutual aid for disaster clean-up (11)
3. **Mitigation Action 1.1:** Replace drainage tile lines in city limits (9)
4. **Mitigation Action 2.2:** Improve roads (8)
5. **Mitigation Action 3.1:** Public education sessions on hazard procedures (6)

Laurel

Goal 1: Minimize losses to existing and future structures within the hazard area. Critical facilities and identified assets are high priority structures.

Mitigation Action 1.1: Continue to participate in the NFIP and continue to update and enforce the floodplain ordinance (11)

Plan for implementation and administration:	Continue to participate in the NFIP and continue to update and enforce the floodplain ordinance.
Hazards Addressed:	River Flooding
Responsible Party/Dept.:	City of Laurel City Clerk
Partners:	To be determined
Potential Funding Source:	City General Funds
Estimated cost:	$9,999 or less
Mitigation Measure Category:	Prevention
Benefits (loss avoided):	Property in Laurel will be protected from flood damage
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 2: Protect the health and safety of Marshall County residents and visitors

Mitigation Action 2.1: New emergency siren (9)

Plan for implementation and administration:	Purchase and install a new warning siren with backup power.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Laurel Public Works, Fire Department
Partners:	To be identified
Potential Funding Source:	City of Laurel, FEMA HMGP, State/Federal Grants, and others to be identified
Estimated cost:	$10,000 to $99,999
Mitigation Measure Category:	Emergency Services Protection
Benefits (loss avoided):	Life safety of Laurel residents and visitors
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2020

Mitigation Action 2.2: Continue to participate in Alert Iowa (8)

Plan for implementation and administration:	The city will continue to participate in the Alert Iowa system with the help of Marshall County EMA.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Laurel City Clerk
Partners:	Marshall County EMA, others to be identified
Potential Funding Source:	No cost
Estimated cost:	No cost
Mitigation Measure Category:	Public Education and Awareness
Benefits (loss avoided):	Life safety of Laurel residents and visitors
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.3: Continue to host a community household hazardous materials drop-off program (9)

Plan for implementation and administration:	The city will continue its work in hosting a community household hazardous materials drop-off program.
Hazards Addressed:	Hazardous Materials
Responsible Party/Dept.:	City of Laurel City Clerk
Partners:	To be determined
Potential Funding Source:	No cost
Estimated cost:	No cost
Mitigation Measure Category:	Prevention
Benefits (loss avoided):	Prevention of hazardous materials spills or improper disposal
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 3: The continuity of operations will not be significantly disrupted by disasters in Marshall County.

Mitigation Action 3.1: Purchase generators (10)

Plan for implementation and administration:	Purchase portable generators for Laurel's identified critical facilities (ie: fire station, lift station, wastewater facilities, shelters, other critical facilities).
Hazards Addressed:	All
Responsible Party/Dept.:	City of Laurel City Utility
Partners:	Emergency Services, others to be Identified
Potential Funding Source:	City of Laurel, FEMA HMGP, State/Federal Grants, and others to be identified
Estimated cost:	$10,000 to $99,999, possibly around $35,000
Mitigation Measure Category:	Emergency Services Protection
Benefits (loss avoided):	Power generation to maintain the function of critical facilities
Estimated Start Date:	Ongoing
Target Completion Date:	2020

Mitigation Action 3.2: Continue mutual aid agreements with other fire departments (11)

Plan for implementation and administration:	Continue mutual aid agreements with other fire departments.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Laurel Fire Department
Partners:	Other fire departments, others to be identified
Potential Funding Source:	No cost
Estimated cost:	No cost
Mitigation Measure Category:	Emergency Services Protection
Benefits (loss avoided):	Marshall County residents will have adequate fire protection for fire events.
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 3.3: Ensure that fire personnel are properly trained (11)

Plan for implementation and administration:	Ensure that fire personnel are properly trained
Hazards Addressed:	All
Responsible Party/Dept.:	City of Laurel Fire Department Chief
Partners:	To be identified
Potential Funding Source:	City General Funds
Estimated cost:	$9,999 or less, possibly around $1,200
Mitigation Measure Category:	Emergency Services Protection
Benefits (loss avoided):	Resident and property protection during all hazard events
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 3.4: Improve aging water/sewer lines (9)

Plan for implementation and administration:	Improve aging water/sewer lines
Hazards Addressed:	Infrastructure Failure, Flash Flooding, Thunderstorms/Lightning/Hail
Responsible Party/Dept.:	City of Laurel City Utility
Partners:	Region 6 Planning Commission, others to be identified
Potential Funding Source:	State/Federal Grants and Loans
Estimated cost:	$100,000 to $299,999
Mitigation Measure Category:	Structural Mitigation
Benefits (loss avoided):	Risk of infrastructure failure will be lessened
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2022

Laurel Mitigation Action Prioritization

1. **Mitigation Action 2.2:** Continue to participate in Alert Iowa (11)
2. **Mitigation Action 3.2**: Continue mutual aid agreements with other fire departments (11)
3. **Mitigation Action 3.3**: Ensure that fire personnel are properly trained (11)
4. **Mitigation Action 3.1**: Purchase generators (10)

5. **Mitigation Action 2.3:** Continue to host a community household hazardous materials drop-off program (9)
6. **Mitigation Action 2.1:** New emergency siren (9)
7. **Mitigation Action 3.4**: Improve aging water/sewer lines (9)
8. **Mitigation Action 1.1:** Continue to participate in the NFIP and continue to update and enforce the floodplain ordinance (8)

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 (7)

Plan for implementation and administration:	Improve and update all city buildings to current structural and technological standards.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand City Council, Mayor, Clerk
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Le Grand Local Options Sales Tax, City General Fund, Fundraisers, others to be identified
Estimated cost:	$100,000 to $299,999
Benefits (loss avoided):	City personnel will have reliable offices and systems in place for a hazard event
Mitigation Measure Category:	Property Protection
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2018

Mitigation Action 1.2: Purchase generators for all critical facilities (8)

Plan for implementation and administration:	Purchase generators for city use in all critical facilities.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand City Council, Mayor, Clerk, Public Works, Maintenance Supervisor
Partners:	To be identified
Potential Funding Source:	City of Le Grand Local Options Sales Tax, FEMA/HUD/HSEMD, Federal/State Grants, others to be identified
Estimated cost:	$10,000 to $99,999
Benefits (loss avoided):	Power generation to maintain the function of critical facilities
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2018

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.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand City Council, Mayor, Clerk
Partners:	Marshall County Emergency Management
Potential Funding Source:	City of Le Grand General Fund, Local Options Sales Tax, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Maintain communication abilities in critical facilities
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 1.4: Identify each critical facility's function in a hazard event (10)

Plan for implementation and administration:	Hold a meeting to assign functions and purposes during a hazard event.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand City Council, Mayor, Clerk
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Le Grand General Fund, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	All facilities with a known function during hazards to make aid more efficient and effective
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Goal 2: Protect the health and safety of Marshall County residents and visitors.

Mitigation Action 2.1: Construct safe room (6)

Plan for implementation and administration:	Construct a safe room for trailer court, low income renters, and community members.
Hazards Addressed:	Tornado, Thunderstorm/Lightning/Hail, Wind Storm
Responsible Party/Dept.:	City of Le Grand City Council, Mayor, Clerk
Partners:	To be identified
Potential Funding Source:	FEMA/HUD/ HSEMD, others to be identified
Estimated cost:	$100,000 to $299,999
Benefits (loss avoided):	Life safety of Le Grand trailer court and low income residents and other community members
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2021

Mitigation Action 2.2: Lagoon improvements (9)

Plan for implementation and administration:	Repair/update existing lagoon infrastructure. The city has already been issued a permit for the project and is working with an engineering firm. Final project design is still contingent on Iowa DNR approval.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	City of Le Grand City Council, Mayor, Clerk
Partners:	To be identified
Potential Funding Source:	SRF, CDBG, City Water/Sewer Fund, others to be identified
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Prevent damages due to possible sewer issues
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing
Target Completion Date:	2018

Mitigation Action 2.3: Hydrant improvements (7)

Plan for implementation and administration:	Update water hydrants as needed when water distribution line project is complete.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	City of Le Grand City Council, Mayor, Clerk, Water/Sewer
Partners:	To be identified
Potential Funding Source:	Water/Sewer, Local Options Sales Tax, FEMA/HUD/ HSEMD, others to be identified
Estimated cost:	$100,000 to $299,999
Benefits (loss avoided):	Ensure hydrants are in proper working order for fire hazards
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2018

Mitigation Action 2.4: Research backup power source for emergency siren (7)

Plan for implementation and administration:	The siren needs a backup power source. The city will look into an appropriate backup power source for their model of emergency siren.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand City Council, Mayor, Clerk
Partners:	To be identified
Potential Funding Source:	FEMA/HUD/ HSEMD, Local Options Sales Tax
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Le Grand residents
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2018

Mitigation Action 2.5: Encourage residents to purchase weather radios (8)

Plan for implementation and administration:	The city will use their monthly newsletter, local electronic sign, and the city website to educate the public and encourage discussion about the importance of weather radios.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand City Council, Mayor, Clerk

Partners:	To be identified
Potential Funding Source:	City of Le Grand General Fund, FEMA/HUD/ HSEMD
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Le Grand residents, dissemination of emergency information
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 2.6: Locate grants and subsidies for NOAA weather radios (10)

Plan for implementation and administration:	The city would like to provide weather radios for residents in the community by locating grants, subsidies, or other funding sources. The city will aim to successfully write grants and securing the ability to provide weather radios for residents.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand City Council, Mayor, Clerk
Partners:	To be identified
Potential Funding Source:	City of Le Grand General Fund, FEMA/HUD/ HSEMD
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Le Grand residents, dissemination of emergency information
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 2.7: Promote NOAA weather radios to new residents through welcome packets (10)

Plan for implementation and administration:	Promote NOAA weather radios to new residents through welcome packets. The city already distributes welcome packets to new residents when they start water/sewer service with the city.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand Clerk
Partners:	To be identified
Potential Funding Source:	City General Funds, Local Options Sales Tax
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Le Grand residents, dissemination of emergency information
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Goal 3: Educate Marshall County citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Public education program (9)

Plan for implementation and administration:	Create a program to educate Le Grand residents about the dangers of hazards, how to prepare, and about the Le Grand Emergency Plan through informational brochures and the welcome packet
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand Clerk

Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City General Funds, Local Options Sales Tax, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Accessible information for Le Grand residents and visitors
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 3.2: Create online forms of hazard information (10)

Plan for implementation and administration:	Update the city webpage to include the emergency procedures for the city
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand City Clerk
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Le Grand General Funds, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Le Grand residents and visitors
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 3.3: Create an emergency phone tree (10)

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.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand City Clerk
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Le Grand General Funds, other to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Ensuring all vulnerable populations and citizens will be notified and taken care of in an event. Regular updates will be needed.
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Goal 4: The continuity of operations will not be significantly disrupted by disasters in Marshall County.

Mitigation Action 4.1: Continued water tower updates and maintenance (9)

Plan for implementation and administration:	Continue water tower modifications to ensure efficiency and working order during emergencies where safe water is needed, such as flooding.
Hazards Addressed:	Infrastructure Failure, Flooding
Responsible Party/Dept.:	City of Le Grand Clerk, Water/Sewer, Public Works, City Council, Mayor
Partners:	To be identified
Potential Funding Source:	Water/Sewer Fund, Fee-based, Local Options Sales Tax, others to be identified
Estimated cost:	$300,000 or more

Benefits (loss avoided):	Ensure efficiency of tower and cleanliness of water from the tower
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing
Target Completion Date:	2016

Mitigation Action 4.2: Ensure online emergency system is working (9)

Plan for implementation and administration:	Continually test "E 911" system to make sure it is communicating with city officials and county sheriff.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand Clerk
Partners:	Marshall County Sheriff, Le Grand City officials
Potential Funding Source:	City General Fund, SRF, CDBG, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Ensure efficiency of emergency system
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 4.3: Mutual aid for disaster relief (11)

Plan for implementation and administration:	Hold sessions to coordinate mutual aid between jurisdictions and county for disaster relief and aid.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Le Grand Clerk, City Council, Mayor
Partners:	Marshall County Emergency Management, Marshall County jurisdictions, Others to be identified
Potential Funding Source:	City General Fund, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Aide will be more efficient and effective with cooperation
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	2016

Le Grand Mitigation Action Prioritization

1. **Mitigation Action 4.3:** Mutual aid for disaster relief (11)
2. **Mitigation Action 1.4:** Identify each critical facility's function in a hazard event (10)
3. **Mitigation Action 2.6:** Locate grants and subsidies for NOAA weather radios (10)
4. **Mitigation Action 2.7:** Promote NOAA weather radios to new residents through welcome packets (10)
5. **Mitigation Action 3.2:** Create online forms of hazard information (10)
6. **Mitigation Action 3.3:** Create an emergency phone tree (10)
7. **Mitigation Action 2.2:** Lagoon improvements (9)
8. **Mitigation Action 3.1:** Public education program (9)
9. **Mitigation Action 4.1:** Continued water tower updates and maintenance (9)
10. **Mitigation Action 4.2:** Ensure online emergency system is working (9)
11. **Mitigation Action 1.2:** Purchase generators for all critical facilities (8)
12. **Mitigation Action 1.3:** Install alternate communication devices in all critical facilities (8)

13. **Mitigation Action 2.5:** Encourage residents to purchase weather radios (8)
14. **Mitigation Action 1.1:** Improve and update all city buildings (7)
15. **Mitigation Action 2.3:** Hydrant improvements (7)
16. **Mitigation Action 2.4:** Research backup power source for emergency siren (7)
17. **Mitigation Action 2.1:** Construct safe room (6)

Liscomb

Goal 1: Protect the health and safety of Marshall County residents and visitors

Mitigation Action 1.1: New automatic emergency siren (9)

Plan for implementation and administration:	Purchase and install a new warning siren with backup power and remote activation.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Liscomb Fire Department
Partners:	Marshall County EMA, others to be identified
Potential Funding Source:	City of Liscomb Fire Department, FEMA HMGP
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Avoidance of injuries due to severe weather
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2016

Mitigation Action 1.2: Tornado/wind shelter (4)

Plan for implementation and administration:	The city would like to build a tornado shelter to protect residents from tornadoes and other severe weather. The city will look into a location.
Hazards Addressed:	Tornado, Wind Storms
Responsible Party/Dept.:	City of Liscomb City Council
Partners:	Marshall County EMA, others to be identified
Potential Funding Source:	Federal/State Grants, City of Liscomb General Funds
Estimated cost:	$100,000 - $299,999
Benefits (loss avoided):	Avoidance of injuries due to severe weather
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2021

Mitigation Action 1.3: Tear down dilapidated structures (7)

Plan for implementation and administration:	The city would like to tear down dilapidated structures and develop a property maintenance ordinance.
Hazards Addressed:	Infrastructure Failure, Hazardous Materials Incident
Responsible Party/Dept.:	City of Liscomb City Council
Partners:	Iowa DNR, others to be identified
Potential Funding Source:	Iowa DNR
Estimated cost:	$10,000 - $99,999

Benefits (loss avoided):	Fewer hazardous materials would be present in the community and structures that pose a hazard to the community would be removed.
Mitigation Measure Category:	Prevention
Estimated Start Date:	2 to 4 years of plan adoption
Target Completion Date:	Ongoing

Goal 2: Educate Marshall County citizens about the dangers of hazard and how they can be prepared.

Mitigation Action 2.1: Remind residents about current and potential hazards (8)

Plan for implementation and administration:	Publish reminders in monthly Mayor's newsletter.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Liscomb Mayor
Partners:	To be identified
Potential Funding Source:	No funding needed
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Residents will be more aware of potential hazards in the community
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing

Mitigation Action 2.2: CERT awareness (8)

Plan for implementation and administration:	Periodic notes regarding CERT in monthly Mayor's newsletter.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Liscomb Mayor
Partners:	To be identified
Potential Funding Source:	No funding needed
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Residents will be reminded of Community Emergency Response Teams (CERT) and their role during hazard events
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing

Goal 3: Minimize losses to existing and future structures within the hazard area. Critical facilities and identified assets are high priority structures.

Mitigation Action 3.1: Minimize flooding potential (6)

Plan for implementation and administration:	Review storm drainage paths. Maintain and improve these paths if necessary.
Hazards Addressed:	River Flooding, Flash Flooding

Responsible Party/Dept.:	City of Liscomb City Council
Partners:	Contractor, others to be identified
Potential Funding Source:	Federal/State Grants, City of Liscomb General Funds
Estimated cost:	$10,000 - $99,999
Benefits (loss avoided):	Decreased flooding will protect people and property
Mitigation Measure Category:	Property Protection
Estimated Start Date:	2 to 4 years of plan adoption
Target Completion Date:	2018

Mitigation Action 3.2: Reduce runoff and erosion (10)

Plan for implementation and administration:	Elevate area and improve runoff control around the sewage/lagoon.
Hazards Addressed:	Infrastructure Failure, Flash Flooding, Thunderstorm/Lightning/Hail
Responsible Party/Dept.:	City of Liscomb City Council
Partners:	Contractor, others to be identified
Potential Funding Source:	City of Liscomb Water/Sewer Funds
Estimated cost:	$10,000 - $99,999
Benefits (loss avoided):	Decrease in flooding and erosion
Mitigation Measure Category:	Property Protection
Estimated Start Date:	2 to 4 years of plan adoption
Target Completion Date:	2017

Goal 4: The continuity of county and local operations will not be significantly disrupted by disasters in Marshall County.

Mitigation Action 4.1: Ensure fire department response capacity (10)

Plan for implementation and administration:	Add training related to actions taken when Chief, Assistant Chief, or Officers are not available.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Liscomb Mayor
Partners:	To be identified
Potential Funding Source:	No funding needed
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Emergency services will continue to operate in the absence of key staff
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing

Mitigation Action 4.2: Encourage participation in local volunteer fire department/first responders (10)

Plan for implementation and administration:	Increase recruiting efforts and public awareness regarding the fire department and first responders.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Liscomb Mayor
Partners:	To be identified
Potential Funding Source:	No funding needed

Estimated cost:	$9,999 or less
Benefits (loss avoided):	Emergency services will be adequately staffed
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing

Liscomb Mitigation Action Prioritization

1. **Mitigation Action 3.2:** Reduce runoff and erosion (10)
2. **Mitigation Action 4.1:** Ensure fire department response capacity (10)
3. **Mitigation Action 4.2:** Encourage participation in local volunteer fire department/first responders (10)
4. **Mitigation Action 1.1:** New automatic emergency siren (9)
5. **Mitigation Action 2.1:** Remind residents about current and potential hazards (8)
6. **Mitigation Action 2.2:** CERT awareness (8)
7. **Mitigation Action 1.3:** Tear down dilapidated structures (7)
8. **Mitigation Action 3.1:** Minimize flooding potential (6)
9. **Mitigation Action 1.2:** Tornado/wind shelter (4)

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 (9)

Plan for implementation and administration:	Identify repairs and construct flood protection for critical sewer infrastructure and levees
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	City of Marshalltown Sewer/Public Works Department
Partners:	Engineering firm, County Engineer, others to be identified
Potential Funding Source:	City Bonds, Utility Revenue, FEMA HMGP, others to be identified
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Prevent the loss of critical infrastructure and the damages associated with their loss
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 1.2: Structural inspections of levee (11)

Plan for implementation and administration:	Hire a consultant to complete a structural study to survey the state of the levee in Marshalltown
Hazards Addressed:	River Flooding, Flash Flooding

Responsible Party/Dept.:	City of Marshalltown Public Works
Partners:	Engineering Companies, County Engineer, others to be identified
Potential Funding Source:	None
Estimated cost:	None - provided by Army Corps of Engineers
Benefits (loss avoided):	Problems with the levee in town will be identified
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 1.3: Floodproof water treatment plant (6)

Plan for implementation and administration:	The Marshalltown water treatment plant was built in 1977. The facility is prone to flooding and needs to be floodproofed, but it also needs to be able to be accessed during a flood. Ideally, a concrete barrier near Sand Road would adequately floodproof the plant while still providing access.
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	City of Marshalltown Water Works
Partners:	To be identified
Potential Funding Source:	City Bonds, Utility Revenue, FEMA HMGP
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Limit the risk of infrastructure failure due to flooding
Mitigation Measure Category:	Property Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2020

Mitigation Action 1.4: Backup power for water treatment plant (9)

Plan for implementation and administration:	The Marshalltown water treatment plant does not currently have any backup power source in the event of a flood.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Marshalltown Water Works
Partners:	To be identified
Potential Funding Source:	City Bonds, Utility Revenue, FEMA HMGP
Total cost:	$300,000 or more
Benefits (loss avoided):	Limit the risk of infrastructure failure due to flooding
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 1.5: Purchase generator for the Central Iowa Healthcare facility (8)

Plan for implementation and administration:	Purchase generator for the Central Iowa Healthcare facility
Hazards Addressed:	All
Responsible Party/Dept.:	Marshalltown Hospital
Partners:	To be identified
Potential Funding Source:	Hospital, Hospital Foundation
Total cost:	$300,000 or more
Benefits (loss avoided):	Hospital can continue to operate during a power loss

Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Goal 2: Protect the health and safety of Marshall County residents and visitors.

Mitigation Action 2.1: Create boat ramps for emergency rescue (5)

Plan for implementation and administration:	Create boat ramps above and below the low head dam at Center Street on the Iowa River.
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	City of Marshalltown Public Works
Partners:	To be identified
Potential Funding Source:	City Bonds, FEMA HMGP
Estimated cost:	$100,000 - $299,999
Benefits (loss avoided):	Life safety of Marshalltown residents and visitors
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2018

Goal 3: Educate Marshall County 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 Marshalltown residents about the dangers of hazards and how to prepare through informational flyers, meetings, or other interactive media like drills and workshops
Hazards Addressed:	All
Responsible Party/Dept.:	City of Marshalltown - Multi-Agency
Partners:	To be identified, possibly other Marshall County jurisdictions
Potential Funding Source:	Marshall County EMA, City General Funds, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Marshalltown residents and visitors
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 4: The continuity of operations will not be significantly disrupted by disasters in Marshall County.

Mitigation Action 4.1: Further education and training opportunities between jurisdictions (10)

Plan for implementation and administration:	Hold meeting to establish cooperation between different city services and county on proper response to hazards
Hazards Addressed:	All
Responsible Party/Dept.:	City of Marshalltown
Partners:	Marshall County Emergency Management, Marshall County jurisdictions, Others to be identified
Potential Funding Source:	Marshall County, others to be identified
Estimated 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
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Marshalltown Mitigation Action Prioritization

Mitigation Action 3.1: Public education program (12)
Mitigation Action 1.2: Structural inspections of levee (11)
Mitigation Action 4.1: Further education and training opportunities between jurisdictions (10)
Mitigation Action 1.1: Flood protection and repairs for sewer lift station and levees (9)
Mitigation Action 1.4: Backup power for water treatment plant (9)
Mitigation Action 1.5: Purchase generator for the Central Iowa Healthcare facility (8)
Mitigation Action 1.3: Floodproof water treatment plant (6)
Mitigation Action 2.1: Create boat ramps for emergency rescue (5)

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: Sewer improvements (5)

Plan for implementation and administration:	Improve existing storm & sanitary sewer, In–place lining of sewer infrastructure
Hazard Addressed:	Infrastructure Failure
Responsible Party/Dept.:	City of Melbourne Public Works, City Council
Partners:	To be identified
Potential Funding Source:	SRF, CDBG, others to be identified
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Prevent damages due to possible sewer issues
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Mitigation Action 1.2: Demolish hazardous buildings in town (8)

Plan for implementation and administration:	Demolition of an old school building with asbestos
Hazard Addressed:	Infrastructure Failure
Responsible Party/Dept.:	Private Property Owners with City of Melbourne's Involvement
Partners:	Region 6 Planning Commission, others to be identified
Potential Funding Source:	State/Federal Grants, others to be identified
Estimated cost:	$100,000 to $299,999
Benefits (loss avoided):	Remove unsafe structures from the community to prevent hazardous materials incidents
Mitigation Measure Category:	Property Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 1.3: Update lagoon (3)

Plan for implementation and administration:	Update lagoon system per new DNR requirements as they arise.
Hazard Addressed:	Infrastructure Failure, Hazardous Materials
Responsible Party/Dept.:	City of Melbourne Public Works, City Council
Partners:	To be identified
Potential Funding Source:	SRF, CDBG, others to be identified
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Updating lagoon system limits chance of infrastructure failure
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Mitigation Action 1.4: Purchase backup generator for critical facilities (6)

Plan for implementation and administration:	The city does not currently have a backup generator for City Hall, and a new generator is needed for the fire station.
Hazard Addressed:	All
Responsible Party/Dept.:	City of Melbourne City Clerk, City Council, Fire Department
Partners:	To be identified
Potential Funding Source:	State/Federal Grants, FEMA HMGP, others to be identified
Estimated cost:	$10,000 to $99,999
Benefits (loss avoided):	Protection of critical service function in an emergency
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2021

Mitigation Action 1.5: Hazardous materials pick up program (5)

Plan for implementation and administration:	Set up a hazardous materials pickup program with waste management every 3-5 years.
Hazard Addressed:	Hazardous Materials
Responsible Party/Dept.:	City of Melbourne City Clerk, City Council

Partners:	To be identified
Potential Funding Source:	City of Melbourne General Fund
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Prevention of hazardous materials spills
Mitigation Measure Category:	Natural Resources Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 1.6: Continue to identify I and I sources and repair (10)

Plan for implementation and administration:	Continue to identify I and I sources and repair.
Hazard Addressed:	Infrastructure Failure
Responsible Party/Dept.:	City of Melbourne Public Works, City Council
Partners:	To be identified
Potential Funding Source:	City of Melbourne Water/Sewer Fund
Estimated cost:	$10,000 - $99,999
Benefits (loss avoided):	Prevention of infrastructure failure
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing
Target Completion Date:	2025

Goal 2: Educate Marshall County citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 2.1: Add hazard information articles to quarterly newsletter (7)

Plan for implementation and administration:	Add hazard articles to newsletter with public information like shelter schedule, meeting announcements, events, etc.
Hazard Addressed:	All
Responsible Party/Dept.:	City of Melbourne City Clerk
Partners:	To be identified
Potential Funding Source:	City of Melbourne General Fund
Estimated cost:	$9,999 or less
Benefits (loss avoided):	All public information will be readily available
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.2: Encourage more residents to sign up for Alert Iowa (7)

Plan for implementation and administration:	Continue publicizing to community how to sign up for program.
Hazard Addressed:	All
Responsible Party/Dept.:	City of Melbourne City Clerk
Partners:	To be identified
Potential Funding Source:	City of Melbourne General Fund

Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Melbourne residents
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.3: Develop public shelter plan and public information plan for shelter (6)

Plan for implementation and administration:	Set up a plan for who is responsible for opening shelters, staffing shelters, and getting out information to the public.
Hazard Addressed:	All
Responsible Party/Dept.:	City of Melbourne City Clerk, City Council, Fire Department
Partners:	To be identified
Potential Funding Source:	City General Fund, Fire Department
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Melbourne residents
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 2.4: Post signs at park/city locations that inform residents of shelter locations (6)

Plan for implementation and administration:	Post signs at park/city locations that inform residents of shelter locations
Hazard Addressed:	All
Responsible Party/Dept.:	City of Melbourne City Clerk, City Council, Public Works
Partners:	To be identified
Potential Funding Source:	City General Fund, County Foundation
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Melbourne residents
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Melbourne Mitigation Action Prioritization

1. **Mitigation Action 1.6**: Continue to identify I and I sources and repair (10)
2. **Mitigation Action 1.2**: Demolish hazardous buildings in town (8)
3. **Mitigation Action 2.1:** Add hazard information articles to quarterly newsletter (7)
4. **Mitigation Action 2.2:** Encourage more residents to sign up for Alert Iowa (7)
5. **Mitigation Action 1.4**: Purchase backup generator for critical facilities (6)
6. **Mitigation Action 2.3:** Develop public shelter plan and public information plan for shelter (6)
7. **Mitigation Action 2.4:** Post signs at park/city locations that inform residents of shelter locations (6)
8. **Mitigation Action 1.1:** Sewer improvements (5)
9. **Mitigation Action 1.5**: Hazardous materials pick up program (5)
10. **Mitigation Action 1.3**: Update lagoon (3)

Goal 1: Educate Marshall County citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 1.1: 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.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Rhodes City Clerk
Partners:	Marshall County Emergency Management, possibly other Marshall County jurisdictions
Potential Funding Source:	City of Rhodes General Funds, others to be identified
Estimated cost:	$9,999 or less, Less than $500
Benefits (loss avoided):	Life safety of Rhodes citizens
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2018

Mitigation Action 1.2: Purchase and install signs that direct residents to shelter location (8)

Plan for implementation and administration:	Inform Rhodes residents where their community shelter location is by purchasing and installing signs throughout the community that could direct residents to the shelter. The city clerk will also send out letters informing community members where to go for the shelter.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Rhodes City Clerk
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of Rhodes General Funds, others to be identified
Estimated cost:	$9,999 or less, Less than $500
Benefits (loss avoided):	
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2018

Rhodes Mitigation Action Prioritization

Mitigation Action 1.1: Inform residents of shelter areas in town (8)
Mitigation Action 1.2: Purchase and install signs that direct residents to shelter location (8)

Goal 1: Protect the health and safety of Marshall County residents and visitors.

Mitigation Action 1.1: Backup power for shelter and critical facilities (9)

Plan for implementation and administration:	Purchase portable generators for use in shelter and critical facilities.
Hazards Addressed:	All
Responsible Party/Dept.:	City of St Anthony City Council
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, City General Funds, others to be identified
Estimated cost:	$10,000 to $99,999
Benefits (loss avoided):	The ability to power critical facilities, shelters, and warning devices during a power outage
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 1.2: Recruiting emergency responders (12)

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).
Hazards Addressed:	All
Responsible Party/Dept.:	City of St Anthony City Council
Partners:	Marshall County Emergency Management, local emergency responders, Others to be identified
Potential Funding Source:	FEMA HMGP, City General Funds, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Personnel will serve better in events with proper training
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

St Anthony Mitigation Action Prioritization

1. **Mitigation Action 1.2:** Backup power for shelter and critical facilities (9)
2. **Mitigation Action 1.3:** Recruiting emergency responders (12)

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 (8)

Plan for implementation and administration:	Purchase and install warning siren with remote triggering and backup.
Hazards Addressed:	All
Responsible Party/Dept.:	City of State Center City Council
Partners:	To be identified
Potential Funding Source:	City of State Center, FEMA HMGP, Federal/State Grants, and others to be identified
Estimated cost:	$10,000 - $99,999
Benefits (loss avoided):	Life safety of State Center residents and visitors
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2016

Mitigation Action 1.2: New fire station (11)

Plan for implementation and administration:	It is difficult to store all of the city equipment in the current fire station. Often, trucks must be moved to respond to different emergencies. The current building is also too close to the train tracks.
Hazards Addressed:	All
Responsible Party/Dept.:	City of State Center Fire Department
Partners:	To be identified
Potential Funding Source:	City Bonds, FEMA HMGP
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Continued operation of emergency services
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	2020

Mitigation Action 1.3: Purchase new emergency response vehicle (12)

Plan for implementation and administration:	The city would like to purchase a Ranger ATV to use during responses to emergencies that occur during large community events with traffic. The city has one particularly large annual event, the Rose Festival, which attracts thousands over a week-long period. If the police, medical, and fire departments had access to a smaller vehicle that could better navigate crowds, they could respond to emergency situations faster.
Hazards Addressed:	All
Responsible Party/Dept.:	City of State Center Fire Department
Partners:	To be identified
Potential Funding Source:	City of State Center Fire Department, others to be identified
Estimated cost:	$10,000 - $99,999
Benefits (loss avoided):	Continued operation of emergency services

Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2015

Goal 2: Protect the health and safety of Marshall County residents and visitors

Mitigation Action 2.1: Backup power for critical facilities (9)

Plan for implementation and administration:	Purchase portable generators for use in city hall, the police station, the fire station, the water treatment plant, and West Marshall Schools. The city has its own power plant with large generators for power if there is a power outage outside of the city; State Center is the only town in the county that can generate their own power. In addition, most of the city's power lines are underground, but some lines still exist above ground. If these lines go down, it could cause issues in some locations. The city has mitigated the risk of a power failure, but generators could still help with additional circumstances.
Hazards Addressed:	All
Responsible Party/Dept.:	City of State Center Utilities
Partners:	West Marshall School District, others to be identified
Potential Funding Source:	Utility Revenue, FEMA HMGP, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	The ability to power critical facilities, shelters, and warning devices during a power outage
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2018

Mitigation Action 2.2: Construct a safe room (8)

Plan for implementation and administration:	Construct a safe room
Hazards Addressed:	All
Responsible Party/Dept.:	City of State Center City Council
Partners:	Marshall County Emergency Management, Others to be identified
Potential Funding Source:	FEMA HMGP, State Grants, others to be identified
Estimated cost:	$100,000 - $299,999
Benefits (loss avoided):	Life safety of State Center residents and visitors
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2020

Goal 3: Educate Marshall County residents about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Coordinate city public awareness (12)

Plan for implementation and administration:	Create a communication strategy between city and citizens
Hazards Addressed:	All
Responsible Party/Dept.:	City of State Center Police Department
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	City of State Center General funds, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Citizens will be informed before, during and after hazard events
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	2015

State Center Mitigation Action Prioritization

1. **Mitigation Action 1.3:** Purchase new emergency response vehicle (12)
2. **Mitigation Action 3.1:** Coordinate city public awareness (12)
3. **Mitigation Action 1.2:** New fire station (11)
4. **Mitigation Action 2.1:** Backup power for critical facilities (9)
5. **Mitigation Action 1.1:** New warning siren (8)
6. **Mitigation Action 2.2:** Construct a safe room (8)

Marshall County

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 (6)

Plan for implementation and administration:	Identify repairs and construct flood protection for levee and surrounding soft ground.
Hazards Addressed:	River Flooding
Responsible Party/Dept.:	Army Corps of Engineers, Iowa DNR, Marshall County Conservation
Partners:	County Engineer, others to be identified
Potential Funding Source:	FEMA HMGP, Army Corps of Engineers, others to be identified
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Prevent the loss of critical infrastructure and the damages associated with their loss
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Mitigation Action 1.2: Construct safe rooms in vulnerable areas of the county (7)

Plan for implementation and administration:	Construct safe rooms in fairgrounds, camp grounds, trailer courts, etc. Marshall County EMA has already begun working with fairgrounds on this action.
Hazards Addressed:	All
Responsible Party/Dept.:	Marshall County Fairgrounds, Conservation, Schools, Communities
Partners:	To be identified
Potential Funding Source:	State/Federal Grants, FEMA HMGP, County Foundation, and others to be identified
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Life safety of residents and visitors during tornado events
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Mitigation Action 1.3: Acquisition and elevation of structures (6)

Plan for implementation and administration:	Elevation of structures in flood plains and flood-prone areas. Marshall County EMA has worked with the Board of Supervisors on land north of Marshalltown near Garwin Road.
Hazards Addressed:	River Flooding
Responsible Party/Dept.:	Marshall County, residents
Partners:	Marshall County Engineer, Region 6 Planning, others to be identified
Potential Funding Source:	State/Federal Grants, FEMA HMGP, County Foundation
Estimated cost:	$100,000 - $299,999
Benefits (loss avoided):	Life safety for County residents and visitors
Mitigation Measure Category:	Property Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Mitigation Action 1.4: Laminated glass for use during hailstorms (7)

Plan for implementation and administration:	Secure funding to put up laminated glass to protect county buildings during hailstorms. The county just recently replaced their windows (just before the previous planning process began). If they need to be replaced again due to damage from a hazard event, the county will take that opportunity to replace the windows with laminated glass.
Hazards Addressed:	Thunderstorms/Lightning/Hailstorms
Responsible Party/Dept.:	Marshall County
Partners:	To be identified
Potential Funding Source:	State/Federal Grants, FEMA HMGP, County Foundation
Estimated cost:	$100,000 - $299,999 or higher
Benefits (loss avoided):	All county buildings will be properly protected during a hailstorm
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Mitigation Action 1.5: Plant windbreaks (9)

Plan for implementation and administration:	Plant windbreaks around the county and near county highways.
Hazards Addressed:	Severe Winter Storm, Wind Storm, Thunderstorm/Lightning/Hail
Responsible Party/Dept.:	County Conservation, Iowa DNR, Marshall County
Partners:	Iowa DOT, others to be identified
Potential Funding Source:	County Conservation Fundraisers, Iowa DOT, USDA
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Protect the county from excess wind and snow from surrounding fields
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing

Mitigation Action 1.6: Ground water protection (10)

Plan for implementation and administration:	Facilitate ground water protection measures to avoid damages due drought, extreme heat, or sink holes.
Hazards Addressed:	Drought, Extreme Heat
Responsible Party/Dept.:	Marshall County, Iowa DNR, Drainage District
Partners:	Marshall County Conservation, others to be identified
Potential Funding Source:	Water/Sewer Fund, Federal/State Grant, others to be identified
Estimated cost:	$100,00 - $299,999
Benefits (loss avoided):	Prevent damages due to natural hazards
Mitigation Measure Category:	Natural Resources Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 2: Protect the health and safety of Marshall County residents and visitors.

Mitigation Action 2.1: Coordinate public awareness (12)

Plan for implementation and administration:	Create a communication strategy between the county and city and work together on an emergency plan.
Hazards Addressed:	All
Responsible Party/Dept.:	All Marshall County Departments
Partners:	Marshall County jurisdictions, others to be identified
Potential Funding Source:	County General Funds, Marshall County EMA
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Citizens will be informed before, during and after hazard events
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.2: Courthouse security (8)

Plan for implementation and administration:	Purchase and install security measures such as cameras.
Hazards Addressed:	Terrorism
Responsible Party/Dept.:	Marshall County
Partners:	Local Marshalltown law enforcement
Potential Funding Source:	County General Funds, Federal/State Grants, others to be identified
Estimated cost:	$100,00 - $299,999
Benefits (loss avoided):	Catch suspicious activity near courthouse to prevent terrorism
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.3: Create a public information session and conservation (water) program (11)

Plan for implementation and administration:	Create a public information and conservation (water) program.
Hazards Addressed:	Drought
Responsible Party/Dept.:	Marshall County Conservation
Partners:	Iowa DNR, others to be identified
Potential Funding Source:	Marshall County Conservation
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Giving information about drought hazards and being prepared with the necessary supplies in case of an event
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing

Mitigation Action 2.4: Install radiology monitors in all county vehicles (5)

Plan for implementation and administration:	Install radiology monitors in county vehicles to detect radiological incidents across the whole county.
Hazards Addressed:	Radiological
Responsible Party/Dept.:	Marshall County, Marshall County EMA
Partners:	Des Moines Fire Department, others to be identified
Potential Funding Source:	Federal/State Grants
Estimated cost:	$100,000 - $299,999
Benefits (loss avoided):	Detect radiological incidents across the whole county
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 3: Educate Marshall County citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Public education program (10)

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. Marshall County EMA has also made this information available online.
Hazards Addressed:	All
Responsible Party/Dept.:	All Marshall County Departments
Partners:	Local businesses and churches, others to be identified
Potential Funding Source:	County General Funds, Marshall County EMA
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of Marshall County residents and visitors during hazards like thunderstorms and earthquakes
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

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. This training occurs on an annual basis.
Hazards Addressed:	All
Responsible Party/Dept.:	Marshall County EMA
Partners:	Local emergency responders, Others to be identified
Potential Funding Source:	Federal/State Grants, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Personnel will serve better in events with proper training and instruction
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 3.3: Animal/Crop/Plant and Human Disease Epidemic planning and training (7)

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 and create county plan to deal with outbreaks.
Hazards Addressed:	Animal/Plant/Crop Disease
Responsible Party/Dept.:	Marshall County Public Health, Conservation, EMA, Dept. of Human and Environmental Health, Iowa DNR
Partners:	Local emergency responders, County Veterinarian, others to be identified
Potential Funding Source:	Federal/State Grants, Marshall County EMA, General Funds
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Personnel will serve better in events with proper training and instruction
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 3.4: Train fire departments for grass fires and maintain needed equipment (9)

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.
Hazards Addressed:	Grass and Wildland Fire
Responsible Party/Dept.:	Marshall County EMA, All Community Fire Departments
Partners:	Marshall County Sherriff's Department, city fire departments, others to be identified
Potential Funding Source:	Federal/State Grants, Marshall County EMA, Railroad/Pipeline Property Tax
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Quick and proper response in grass fire situations
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

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 (8)

Plan for implementation and administration:	Install generators at sheds on secondary roads to fill fuel.
Hazards Addressed:	All
Responsible Party/Dept.:	All Marshall County Departments
Partners:	Others to be identified
Potential Funding Source:	Federal/State Grants, County General Funds, others to be identified
Estimated cost:	$300,000 or more
Benefits (loss avoided):	The ability to power fuel stations on secondary roads so people can still be mobile after a hazard
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2021

Mitigation Action 4.2: Elevate roads (7)

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).
Hazards Addressed:	River Flooding
Responsible Party/Dept.:	County Secondary Roads
Partners:	Iowa Department of Transportation, others to be identified
Potential Funding Source:	County General Funds, Federal/State Grants, Secondary Roads others to be identified
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Prevent road and vehicle damage and preserve the mobility of County residents during and immediately following a flood event
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 - 4 years from plan adoption

Target Completion Date:	2021

Mitigation Action 4.3: Improve communication systems (8)

Plan for implementation and administration:	Invest in communication mechanisms to support coordination of all critical facilities. Marshall County EMA has made this an ongoing action item.
Hazards Addressed:	All
Responsible Party/Dept.:	All Marshall County Departments
Partners:	County emergency response, Others to be identified
Potential Funding Source:	Federal/State Grants, County General Funds, others to be identified
Estimated cost:	$300,000 or more
Benefits (loss avoided):	The County will have reliable communication capabilities
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2021

Mitigation Action 4.4: Purchase/update snow removal equipment (9)

Plan for implementation and administration:	Purchase/update snow removal equipment for use following a severe winter storm.
Hazards Addressed:	Severe Winter Storm
Responsible Party/Dept.:	County Secondary Roads, County
Partners:	Others to be identified
Potential Funding Source:	County General Funds, Federal/State Grants
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Restore safety of county infrastructure immediately following a hazard event, as well as ensuring efficiency of equipment
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 4.5: Maintain quality of courthouse's technological equipment with temperature regulation (9)

Plan for implementation and administration:	Add air conditioning units to technology departments and server closets.
Hazards Addressed:	Extreme Heat, Infrastructure Failure
Responsible Party/Dept.:	Marshall County Information Technology
Partners:	Marshall County
Potential Funding Source:	County General Funds
Estimated cost:	$100,000 - $299,999
Benefits (loss avoided):	Protect technological instruments from heat damage
Mitigation Measure Category:	Property Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Marshall County Mitigation Action Prioritization

1. **Mitigation Action 2.1:** Coordinate public awareness (12)
2. **Mitigation Action 2.3:** Create a public information session and conservation (water) program (11)
3. **Mitigation Action 3.1:** Public education program (10)
4. **Mitigation Action 3.2:** CERT responder training (10)
5. **Mitigation Action 1.6:** Ground water protection (10)
6. **Mitigation Action 4.4:** Purchase/update snow removal equipment (9)
7. **Mitigation Action 4.5:** Maintain quality of courthouse's technological equipment with temperature regulation (9)
8. **Mitigation Action 1.5:** Plant windbreaks (9)
9. **Mitigation Action 3.4:** Train fire departments for grass fires and maintain needed equipment (9)
10. **Mitigation Action 2.2:** Courthouse security (8)
11. **Mitigation Action 4.1:** Purchase generators for critical facilities (8)
12. **Mitigation Action 4.3:** Improve communication systems (8)
13. **Mitigation Action 1.2:** Construct safe rooms in vulnerable areas of the county (7)
14. **Mitigation Action 3.3:** Animal/Crop/Plant and Human Disease Epidemic planning and training (7)
15. **Mitigation Action 4.2:** Elevate roads (7)
16. **Mitigation Action 1.4:** Laminated glass for use during hailstorms (7)
17. **Mitigation Action 1.1:** Reinforce levee and surrounding land (6)
18. **Mitigation Action 1.3:** Acquisition and elevation of structures (6)
19. **Mitigation Action 2.4:** Install radiology monitors in all county vehicles (5)

East Marshall Community School District

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 (3)

Plan for implementation and administration:	Maintain structural integrity of school buildings for the students, staff and public.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	East Marshall Community School District Board
Partners:	Marshall County Engineer, others to be identified
Potential Funding Source:	Bonds, School District Funds, Federal/State Grants, others to be identified
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Life safety of East Marshall students, staff and visitors
Mitigation Measure Category:	Prevention
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

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.

Hazards Addressed:	All
Responsible Party/Dept.:	East Marshall Community School District Board
Partners:	Marshall County Emergency Management, local fire, law enforcement, and emergency response personnel
Potential Funding Source:	School District Funds, Federal/State Grants, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Students will know proper procedures and exits during a hazard
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing – yearly
Target Completion Date:	Ongoing – yearly

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 (12)

Plan for implementation and administration:	Purchase/update snow removal equipment for use following a severe winter storm.
Hazards Addressed:	Severe Winter Storm
Responsible Party/Dept.:	East Marshall Community School District Board
Partners:	Cities of Laurel, Le Grand and Gilman, Marshall County Emergency Management, others to be identified
Potential Funding Source:	School District Funds, Local Options Sales Tax, others to be identified
Estimated cost:	$10,000 to $99,999
Benefits (loss avoided):	Restore safety of school infrastructure immediately following a hazard event, as well as ensuring efficiency of equipment
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing – revised according to needs yearly
Target Completion Date:	Ongoing – revised according to needs yearly

Mitigation Action 2.2: Create debris removal plan (9)

Plan for implementation and administration:	Develop a plan to remove debris and obstructions from school grounds immediately following a hazard event.
Hazards Addressed:	Wind Storm, Thunderstorm/Lightning / Hail, Tornado, Severe Winter Storm
Responsible Party/Dept.:	East Marshall Community School District Board, Public Works Supervisor
Partners:	Marshall County Emergency Management
Potential Funding Source:	School District Funds, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Restore safety of school grounds and infrastructure immediately following a hazard event
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2020

Goal 3: Protect the health and safety of Marshall County residents and visitors.

Mitigation Action 3.1: Ensure proper grounding of facilities during hazard events (11)

Plan for implementation and administration:	Have study done and properly ground any school facilities out of regulation for hazard events.
Hazards Addressed:	All
Responsible Party/Dept.:	East Marshall Community School District Board
Partners:	Marshall County Engineer, Others to be identified
Potential Funding Source:	School District Funds, others to be identified
Estimated cost:	$10,000 to $99,999
Benefits (loss avoided):	Life safety of East Marshall students, staff and visitors, as well as protection of electrical systems
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing – yearly
Target Completion Date:	Ongoing – yearly

Mitigation Action 3.2: Retrofit school buildings as shelters (4)

Plan for implementation and administration:	Retrofit 3 school buildings as community shelters for hazard events.
Hazards Addressed:	All
Responsible Party/Dept.:	East Marshall Community School District Board
Partners:	East Marshall Community School District, Others to be identified
Potential Funding Source:	School District Funds, Federal/State Grants, FEMA HMGP
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Life safety of East Marshall students and visitors
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Goal 4: Educate Marshall County residents about the dangers of hazards and how they can be prepared.

Mitigation Action 4.1: Public education sessions on safe room procedures (9)

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.
Hazards Addressed:	All
Responsible Party/Dept.:	East Marshall Community School District Board
Partners:	Marshall County Emergency Management, other Marshall County schools
Potential Funding Source:	School District Funds, Federal/State Grants, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Life safety of East Marshall students, visitors and city citizens

Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2020

Mitigation Action 4.2: Coordinate city public awareness and emergency plan (9)

Plan for implementation and administration:	Create a communication strategy between schools and public as well as write an emergency plan.
Hazards Addressed:	All
Responsible Party/Dept.:	East Marshall Community School District Board, City Council, City Clerk
Partners:	Marshall County Emergency Management, Others to be identified
Potential Funding Source:	School District Funds, Federal/State Grants, others to be identified
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Citizens will be informed before, during and after hazard events of school resources and safety of students
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2020

East Marshall Community School District Mitigation Action Prioritization

1. **Mitigation Action 1.2:** Complete required hazard drills every year (12)
2. **Mitigation Action 2.1:** Purchase/update snow removal equipment (12)
3. **Mitigation Action 3.1:** Ensure proper grounding of facilities during hazard events (11)
4. **Mitigation Action 4.1:** Public education sessions on safe room procedures (9)
5. **Mitigation Action 4.2:** Coordinate city public awareness and emergency plan (9)
6. **Mitigation Action 2.2**: Create debris removal plan (9)
7. **Mitigation Action 3.2:** Retrofit school buildings as shelters (4)
8. **Mitigation Action 1.1:** Reinforce school buildings (3)

GMG Marshall Community School District

Goal 1: Protect the health and safety of Marshall County residents and visitors

Mitigation Action 1.1: Provide elementary school as a shelter and place to coordinate emergency personnel during an emergency (12)

Plan for implementation and administration:	The school district would like to work with the city to use the elementary school as a shelter during an emergency and a place to coordinate emergency personnel. The school building is located near an anhydrous ammonia facility in Green Mountain. The school should be far enough away from the facility to be out of danger but close enough to provide a good location for emergency personnel to organize.
Hazards Addressed:	All
Responsible Party/Dept.:	GMG Elementary School Principal
Partners:	Marshall County EMA, others to be identified
Potential Funding Source:	None

Estimated cost:	None
Benefits (loss avoided):	Ensure that emergency services have staging facility for disasters
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 1.2: Purchase of a generator for elementary school (8)

Plan for implementation and administration:	The school district would like to purchase a generator to provide electricity to the school in the event of a power loss. The generator will be particularly important if the school is used as an emergency shelter.
Hazards Addressed:	All
Responsible Party/Dept.:	GMG School Board and Superintendent
Partners:	To be identified
Potential Funding Source:	State/Federal Grants, Local Options Sales Tax, FEMA HMGP
Estimated cost:	$10,000 - $99,999
Benefits (loss avoided):	Ensure that critical services can function during a power outage
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 - 4 years from plan adoption
Target Completion Date:	2019

Mitigation Action 1.3: Increase tree planting around school (7)

Plan for implementation and administration:	The school district would like to plant trees near the school to provide shade and protection from other weather events.
Hazards Addressed:	Drought, Extreme Heat, Infrastructure Failure
Responsible Party/Dept.:	GMG Elementary School Principal
Partners:	To be identified
Potential Funding Source:	State/Federal Grants, Local Options Sales Tax, School District Funds
Estimated cost:	$10,000 - $99,999
Benefits (loss avoided):	Minimize effects of extreme heat on infrastructure
Mitigation Measure Category:	Natural Resources Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2016

GMG Community School District Mitigation Action Prioritization

1. **Mitigation Action 1.1:** Provide elementary school as a shelter and place to coordinate emergency personnel during an emergency (12)
2. **Mitigation Action 1.2:** Purchase of a generator for elementary school (8)
3. **Mitigation Action 1.3:** Increase tree planting around school (7)

Goal 1: Minimize losses to existing and future school structures within hazard areas. Critical facilities and identified assets are high priority structures.

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
Hazards Addressed:	All
Responsible Party/Dept.:	Marshalltown Community School District Director of Buildings and Grounds
Partners:	Marshall County Engineer, others to be identified
Potential Funding Source:	School District General Funds, CDBG, others to be identified
Estimated cost:	Less than $10,000
Benefits (loss avoided):	Life safety of Marshalltown Schools' students, staff and visitors
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing – annually
Target Completion Date:	Ongoing – annually

Mitigation Action 1.2: Purchase backup power generators (8)

Plan for implementation and administration:	Expand backup power supply at all facilities to ensure power availability to facility and possibly rescue shelters. The school district is working with the Iowa Veterans Home on their catastrophic plan and partnering with the home to take residents in during a catastrophe.
Hazards Addressed:	All
Responsible Party/Dept.:	Marshalltown Community School District Director of Business Operations
Partners:	To be identified
Potential Funding Source:	School District General Funds, FEMA HMGP, Life and Fire Safety Grants
Estimated cost:	$10,000 to $99,999
Benefits (loss avoided):	Critical facilities and functions can operate during a power outage
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Goal 2: Protect the health and safety of Marshall County residents and visitors.

Mitigation Action 2.1: Update and review facility safety awareness program (12)

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. The district has a district safety committee and a district police officer who are very active in the process.
Hazards Addressed:	All

Responsible Party/Dept.:	Marshalltown Community School District Director of Equity
Partners:	Engineering Companies, County Engineer, County Sanitarian, others to be identified
Potential Funding Source:	Marshalltown Community School District General Funds, others to be identified
Estimated cost:	Less than $10,000
Benefits (loss avoided):	Problems with the safety and safety procedures of school facilities in town will be identified
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing – as time allows
Target Completion Date:	2017

Mitigation Action 2.2: Build safe room shelters (7)

Plan for implementation and administration:	Nine school locations need infrastructure to assist with securing facilities in the event of an environmental disaster. If a hazard event were to occur, these nine locations currently have no safe place for students.
Hazards Addressed:	Thunderstorms, Lightning, and Hail, Wind Storms, Tornado, Terrorism
Responsible Party/Dept.:	Marshalltown Community School District Director of Equity. Director of Buildings and Grounds, Director of Business Operations
Partners:	To be identified
Potential Funding Source:	School District General Funds, FEMA HMGP, others to be identified
Estimated cost:	$100,000 to $299,999
Benefits (loss avoided):	Life safety of school district students and staff
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Goal 3: Educate Marshall County residents about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Create a hazard/safety information session for students (8)

Plan for implementation and administration:	Create an information session for students to learn proper safety procedures in hazard events
Hazards Addressed:	All
Responsible Party/Dept.:	Marshalltown Community School District Director of Equity
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	Marshalltown Community School District General Funds, others to be identified
Estimated cost:	Less than $10,000
Benefits (loss avoided):	Giving information about hazards and how to proceed in an event
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Mitigation Action 3.2: District-wide training (11)

Plan for implementation and administration:	Hold session to train district employees and staff on hazard identification, proper response and facility safety procedures. The district has EMC insurance, which offers free training videos online. These videos cover a wide range of topics, including hazardous materials, blood-borne pathogens, among others. The school district will work on the logistics of which trainings should be mandatory for which staff.
Hazards Addressed:	All
Responsible Party/Dept.:	Marshalltown Community School District Director of Equity
Partners:	Marshall County Emergency Management, others to be identified
Potential Funding Source:	Marshalltown Community School District General Funds, others to be identified
Estimated cost:	Less than $10,000
Benefits (loss avoided):	Personnel will serve better in events with proper training and instruction
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Mitigation Action 3.3: K-12 education on hazards (11)

Plan for implementation and administration:	Assist with education of youth and future Marshalltown residents.
Hazards Addressed:	All
Responsible Party/Dept.:	Marshalltown Community School District Director of Equity, Director of Buildings and Grounds
Partners:	To be identified
Potential Funding Source:	School District General Funds
Estimated cost:	Less than $10,000
Benefits (loss avoided):	Life safety of school district students and staff
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Goal 4: The continuity of operations will not be significantly disrupted by disasters in Marshall County.

Mitigation Action 4.1: Write an emergency plan for city, emergency response, and schools (10)

Plan for implementation and administration:	Complete a cooperative plan for use between the city, emergency responders, and school
Hazards Addressed:	All
Responsible Party/Dept.:	Marshalltown Community School District Director of Equity, Police Chief
Partners:	Marshall County Emergency Management, local fire, law enforcement, and emergency response personnel

Potential Funding Source:	Marshalltown Community School District General Funds, Marshalltown Police Funds
Estimated cost:	Less than $10,000
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
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Marshalltown Community School District Mitigation Action Prioritization

1. **Mitigation Action 1.1:** Maintain facility standards and safe code compliance (12)
2. **Mitigation Action 2.1:** Update and review facility safety awareness program (12)
3. **Mitigation Action 3.2:** District-wide training (11)
4. **Mitigation Action 3.3:** K-12 education on hazards (11)
5. **Mitigation Action 4.1:** Write an emergency plan for city, emergency response, and schools (10)
6. **Mitigation Action 1.2:** Purchase backup power generators (8)
7. **Mitigation Action 3.1:** Create a hazard/safety information session for students (8)
8. **Mitigation Action 2.2:** Build safe room shelters (7)

West Marshall Community School District

Goal 1: Minimize losses to existing and future school structures within hazard areas. Critical facilities and identified assets are high priority structures.

Mitigation Action 1.1: Perform roof improvements to district buildings (5)

Plan for implementation and administration:	Several district buildings are in need of roof repairs. The High School and Elementary School have spots in the roof with leaks. Many of these leaks have been patched, but more substantial repairs will need to take place in the future. The High School is a larger priority, as it has the most substantial leaking problem.
Hazards Addressed:	Severe Winter Storm, Wind Storm, Thunderstorm/Lightning/Hail
Responsible Party/Dept.:	West Marshall CSD Board
Partners:	To be determined
Potential Funding Source:	One Cent Sales Tax SAVE Fund
Estimated cost:	$10,000 - $99,999
Benefits (loss avoided):	Preventing significant structural damage
Mitigation Measure Category:	Property Protection
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Goal 2: Protect the health and safety of Marshall County residents and visitors.

Mitigation Action 2.1: Install security cameras in buildings and on buses (6)

Plan for implementation and administration:	The district would like to install security cameras in the high school and on district buses to improve building security.
Hazards Addressed:	Transportation Incident, Terrorism
Responsible Party/Dept.:	West Marshall CSD Board, Transportation Manager, Superintendent
Partners:	To be determined
Potential Funding Source:	Grants, School District General Fund
Estimated cost:	Buses - $70,000 to $99,999, Whole Project - $100,000 to $299,999
Benefits (loss avoided):	Protecting the health and safety of students and staff while riding the bus and occupying school buildings
Mitigation Measure Category:	Property Protection
Estimated Start Date:	Ongoing
Target Completion Date:	2017

Mitigation Action 2.2: Plan for emergencies by installing card readers on district buildings (2)

Plan for implementation and administration:	District buildings would be made more secure by installing card readers at building entrances that allow access to the building with a card/FOB system. The current security system is lock and key.
Hazards Addressed:	Terrorism
Responsible Party/Dept.:	West Marshall CSD Board
Partners:	To be determined
Potential Funding Source:	One Cent Sales Tax SAVE Fund, School District General Fund
Estimated cost:	$300,000 or more
Benefits (loss avoided):	Preventing damage or unauthorized access
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	5 years or more from plan adoption
Target Completion Date:	2022

Mitigation Action 2.3: Perform radon testing in pre-school (9)

Plan for implementation and administration:	Radon testing is currently required in the pre-school building. The district is currently using their pre-school funds but would like to find another source to fund this required testing.
Hazards Addressed:	Hazardous Materials Incident
Responsible Party/Dept.:	West Marshall CSD Board
Partners:	To be determined
Potential Funding Source:	One Cent Sales Tax SAVE Fund
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Preventing sickness or injury from radon exposure
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	Every 2 years

Mitigation Action 2.4: Remove asbestos when floors are replaced (8)

Plan for implementation and administration:	The district is required to remove asbestos from facilities if floors in the buildings are replaced. There are two rooms in the high school and one in the elementary school in which the district plans to replace floors in the near future.
Hazards Addressed:	Hazardous Materials Incident
Responsible Party/Dept.:	West Marshall CSD Board
Partners:	To be determined
Potential Funding Source:	School District General Fund
Estimated cost:	$9,999 or less per room
Benefits (loss avoided):	Preventing sickness or injury from asbestos exposure
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	As needed

Mitigation Action 2.5: Address environmental concerns in high school and other district buildings (6)

Plan for implementation and administration:	Environmental concerns were brought up by the public at recent school district board meetings. The City of State Center has hard water, and the water quality is concerning to parents. In addition, the high school is located near a mill which produces a significant amount of dust. The high school does not have air conditioning and therefore cannot close its windows to stop dust from entering the building. The school district would like to explore the possibility of getting a new heating and cooling system for the high school that would allow windows to be shut.
Hazards Addressed:	Hazardous Materials Incident
Responsible Party/Dept.:	West Marshall CSD Board
Partners:	To be determined
Potential Funding Source:	One Cent Sales Tax SAVE Fund
Estimated cost:	$100,000 to $299,999
Benefits (loss avoided):	Preventing sickness or injury
Mitigation Measure Category:	Prevention
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Goal 3: Educate Marshall County residents about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Address safety education during crisis planning and drills (9)

Plan for implementation and administration:	The district will address safety education during its crisis planning and drills. The district will work with public safety, CPR, and ED's to incorporate the appropriate materials into drills and plans.
Hazards Addressed:	All
Responsible Party/Dept.:	West Marshall CSD Board
Partners:	To be determined

Potential Funding Source:	School District General Fund
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Preparedness during a crisis
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Annually

Goal 4: The continuity of operations will not be significantly disrupted by disasters in Marshall County.

Mitigation Action 4.1: Improve communication systems in high school (7)

Plan for implementation and administration:	The high school currently has no phones in the classroom. The building is wired with an intercom system, but this method of communication may not be appropriate during emergency situations. The district would like to get a phone system that serves all classrooms that includes an updated speaker system.
Hazards Addressed:	All
Responsible Party/Dept.:	West Marshall CSD Board, Superintendent
Partners:	To be determined
Potential Funding Source:	Grants, School District General Fund
Estimated cost:	$10,000 - $99,999
Benefits (loss avoided):	Preparedness during a crisis
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2016

Mitigation Action 4.2: Crisis plan review and update (9)

Plan for implementation and administration:	Review crisis plan and update bi-annually.
Hazards Addressed:	All
Responsible Party/Dept.:	West Marshall CSD Board, Superintendent
Partners:	Marshall County Emergency Management, others to be determined
Potential Funding Source:	School District General fund
Estimated cost:	$9,999 or less
Benefits (loss avoided):	Preparedness during a crisis
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Bi-Annually

Mitigation Action 4.3: Improve vehicle access to elementary and pre-school (3)

Plan for implementation and administration:	The district would like to add a parking lot by the elementary school to improve vehicle access to the elementary school and the pre-school. Improved access will be especially important during regular drop-off and pick-up times and during emergencies.

Hazards Addressed:	Transportation Incident
Responsible Party/Dept.:	West Marshall CSD Board
Partners:	To be determined
Potential Funding Source:	Grants, School District General Fund, One Cent Sales Tax SAVE Fund
Estimated cost:	$10,000 - $99,999
Benefits (loss avoided):	Preparedness during a crisis
Mitigation Measure Category:	Prevention
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Mitigation Action 4.4: Purchase generators (4)

Plan for implementation and administration:	Purchase generators for the high school so that the facility can operate during a power loss or other emergency.
Hazards Addressed:	All
Responsible Party/Dept.:	West Marshall CSD Board
Partners:	To be determined
Potential Funding Source:	Grants, School District General Fund
Estimated cost:	$10,000 to $99,999
Benefits (loss avoided):	Preparedness during a crisis
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	5 years or more from plan adoption
Target Completion Date:	2022

West Marshall Community School District Mitigation Action Prioritization

Mitigation Action 2.3: Perform radon testing in pre-school (9)
Mitigation Action 3.1: Address safety education during crisis planning and drills (9)
Mitigation Action 4.2: Crisis plan review and update (9)
Mitigation Action 2.4: Remove asbestos when floors are replaced (8)
Mitigation Action 4.1: Improve communication systems in high school (7)
Mitigation Action 2.1: Install security cameras in buildings and on buses (6)
Mitigation Action 2.5: Address environmental concerns in high school and other district buildings (6)
Mitigation Action 1.1: Perform roof improvements to district buildings (5)
Mitigation Action 4.4: Purchase generators (4)
Mitigation Action 4.3: Improve vehicle access to elementary and pre-school (3)
Mitigation Action 2.2: Plan for emergencies by installing card readers on district buildings (2)

Chapter 6: Plan Maintenance Process

This section of the plan provides an overview of the overall 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 Task Force (members may vary over time) agrees to monitor, evaluate, and maintain the plan. The Task Force 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 Task Force 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 action 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 will be enacted through written changes and submissions, as Marshall County Emergency Management deems appropriate and necessary, and as approved by the Marshall 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 mater 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 mechanism under their authority to consult this plan to ensure minimization of risk to natural and manmade hazards as well as coordination of activities.

The Board of Supervisors or the governing board of the participating jurisdictions involved in the plan update will be responsible for encouraging the integration of the findings actions of the mitigation plan as appropriate. The Board of Supervisors 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 Task Force 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. Task Force 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.

Chapter 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 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.

Appendix A. Meeting Minutes

Marshall County Hazard Mitigation Meeting Minutes

Meeting #1 – Marshall County Sherriff's Office Administrative Building
April 21, 2015 – 11 AM

Meeting attended by: Jeff Bunn, State Center Police Chief; Jim Eckhardt, State Center Fire and EMS Chief; Maren Williams, City of LeGrand City Hall Deputy Clerk; Jodi Abrahams, City of LeGrand Clerk/Treasurer; Dale Thompson, City of Ferguson Mayor; Glenda Thompson, City of Ferguson Council; Susanne Sietmann, City of Laurel City Council; Brian Batterson, Marshalltown Police Captain; Andrew Nickell, Beck's Hybrids Site Manager; David Daters, City of Marshalltown Public Facility Superintendent; Scott Johnson, Marshalltown Fire Department Deputy Chief; David Rierson, Marshalltown Fire Department Fire Chief; Leah Cox, Lennox Industries Health Care Specialist; Steve Sincox, Marshalltown Water Works General Manager; Mike Stagmann, Marshall County Conservation Board Director; Brandon Hilstrom, American Red Cross Disaster Program Manager; Pat Thompson, Marshall County Public Health; Robert Douglas, Central Iowa Health Care; Mark Stephens, IDOT Highway Maintenance Supervisor; Mark Kingery, Hearland Coops LEPC Representative; Kimberly Elder, Marshall County Emergency Management Coordinator; Robert Monroe, Melbourne Fire Department Chief; Deb Mercer, City of Melbourne Deputy Clerk; Hank Penner, City of Liscomb Mayor; Tom McWilliams, Green Mountain Fire Department; Matt Tullis, Marshalltown Community School District Director of Equity/District Safety.

Meeting started at 11:05 AM

The Marshall County Hazard Mitigation Committee met for the first time on April 21, 2015. Julie Whitson and Stacy Lentsch facilitated the meeting on behalf of Region VI. Marty Wymore, Executive Director of Region 6 Planning Commission, explained the purpose of the meeting and mitigation plan, what the mitigation plan was intended to do for the community, and what the planning process would look like.

Next, the committee discussed which hazards could impact Marshall County using a list of 21 hazards and their associated definitions from the State of Iowa 2013 Mitigation Plan. The committee determined that the following hazards would have little to no impact on Marshall County and should be removed from further discussion:

- Expansive soils
- Landslide
- Sinkholes

The committee also determined that the following hazards should be addressed at the county level, as they posed similar levels of risk to each jurisdiction if they were to occur:

- Animal/Plant/Crop Disease
- Drought
- Earthquake
- Extreme Heat
- Radiological
- Severe Winter Storm
- Wind Storms

The committee did not identify any additional hazards that were not included on the list.

The group then conducted a risk assessment for the hazards that were to be addressed at the county level. The group agreed to a score for each county-wide hazard based on historical occurrence, probability of the hazard occurring in the future, vulnerability of people and property, severity of impact, and speed of onset. Individual communities then scored the remaining hazards using the same criteria. The committee decided to hold their next meeting on Tuesday, May 19th at 11:30AM in the same location at the Marshall County Sheriff's Office Administrative Building in Tama County.

Meeting adjourned at 12:15

Marshall County Hazard Mitigation Meeting Minutes

Meeting #2 – Marshall County Sherriff's Office Administrative Building
May 19, 2015 – 11:30 AM

Meeting attended by: Jeff Bunn, State Center Police Chief; Jim Eckhardt, State Center Fire and EMS Chief; Maren Williams, City of LeGrand City Hall Deputy Clerk; Jodi Abrahams, City of LeGrand Clerk/Treasurer; Dale Thompson, City of Ferguson Mayor; Glenda Thompson, City of Ferguson Council; Susanne Sietmann, City of Laurel City Council; David Daters, City of Marshalltown Public Facility Superintendent; David Rierson, Marshalltown Fire Department Fire Chief; Steve Sincox, Marshalltown Water Works General Manager; Mike Stagmann, Marshall County Conservation Board Director; Brandon Hilstrom, American Red Cross Disaster Program Manager; Pat Thompson, Marshall County Public Health; Mark Kingery, Hearland Coops LEPC Representative; Kimberly Elder, Marshall County Emergency Management Coordinator; Robert Monroe, Melbourne Fire Department Chief; Deb Mercer, City of Melbourne Deputy Clerk; Jerry McDonald, City of Liscomb City Council; Gale Klosterman, City of Rhodes Clerk; Keith Balvanz, City of Albion Representative; Rick Simpson, Marshalltown Community School District Buildings and Grounds Supervisor; Robb Gage, East Marshall Community School District Buildings and Grounds Director.

Meeting started at 11:30 AM

Julie Whitson and Stacy Lentsch facilitated the meeting on behalf of Region VI. Facilitators led the meeting participants through the following steps:

- Reviewed the risk assessment results and supporting information about hazards that they provided at the previous meeting. Communities were given the opportunity to make changes to scores and information as needed.
- Guided communities who hadn't yet completed the risk assessment through the process
- Updated critical facilities maps and community assets narrative from previous plan
- Drew on map to indicate location of areas prone to flash flooding
- Completed community capabilities worksheets that indicated each city's current staffing, plans, regulations, and programs in which each community participates.
- Reviewed goals from the previous plan and agreed that communities wanted to keep the goals from the previous plan
- Began a preliminary list of new mitigation actions for each community
- Began an update of the status of existing actions from the previous plan

- Set the meeting date for the third and final meeting on Tuesday, June 16th at 11:30 AM in the same location (Marshall County Sherriff's Office Administrative Building)

Meeting adjourned at 12:30 PM.

Note that some communities took meeting items back to their city councils and other city staff to confer with others and gather additional information. Communities will return these items to planners electronically before Meeting #3.

Marshall County Hazard Mitigation Meeting Minutes

Meeting #3 – Marshall County Sherriff's Office Administrative Building
June 16, 2015 – 11:30 AM

Meeting attended by:

Meeting attended by: Jeff Bunn, State Center Police Chief; Jim Eckhardt, State Center Fire and EMS Chief; Jodi Abrahams, City of LeGrand Clerk/Treasurer; Dale Thompson, City of Ferguson Mayor; Glenda Thompson, City of Ferguson Council; David Daters, City of Marshalltown Public Facility Superintendent; Brian Bateson, Marshalltown Police Captain; Pat Thompson, Marshall County Public Health; Kimberly Elder, Marshall County Emergency Management Coordinator; Robb Gage, East Marshall Community School District Buildings and Grounds Director; Randy Denham, East Marshall Community School District Business Manager; Mark Polich, GMG Community School District Principal.

Meeting started at 11:30 AM

Julie Whitson and Stacy Lentsch facilitated the meeting on behalf of Region VI. Meeting materials were prepared ahead of time according to mitigation actions that communities had indicated they wanted to carry over from the previous plan or add as new actions to the plan update. Facilitators led the meeting participants through the following steps:

- STAPLEE evaluation – Participants completed the economic portion of the STAPLEE evaluation for each mitigation action.
- Action plan – Participants completed an action plan for each mitigation action, including the hazards that each action addressed, the party or department that would be responsible for implementing the action, the estimated cost, funding source, mitigation measure category, estimated start date, and target completion date of the action.
- Prioritization – Participants viewed how their actions were prioritized based four criteria that considered the risk assessment score of the hazard (s) addressed with each action, start date of the project, total score of the STAPLEE economic evaluation, and a local preference "bonus" point for up to three actions that participants wished to give the actions that they hoped to accomplish if money were not an issue.

Participants were notified that they may be contacted for follow-up information.

Meeting ended at 12:30 PM.

Appendix B: Action Updates

The following 17 jurisdictions in Marshall County participated in the previous Multi-Jurisdictional Hazard Mitigation Plan that was approved in 2012:

- City of Albion
- City of Clemons
- City of Ferguson
- City of Gilman
- City of Haverhill
- City of Laurel
- City of LeGrand
- City of Liscomb
- City of Marshalltown
- City of Melbourne
- City of Rhodes
- City of Vining
- City of State Center
- Marshall County (Unincorporated)
- East Marshall Community School District
- Marshalltown Community School District

Below is a table of the mitigation actions that were included in the previous plan. **Only the actions that were included in the previous plan are listed in this section**. For details about actions that communities have included in the plan update, including actions that were carried over from the previous plan, see the Mitigation Strategy Section of this plan. Each activity has been given a "status" that explains whether a community has made progress on an action and whether the action has been included in the plan update. Activity status descriptions are as follows:

- **Completed**: Activities have already been completed and will not be carried over to the next hazard mitigation plan
- **Deleted**: Activities were not completed and are no longer a priority to pursue for the jurisdiction. Additional information about why the activity was deleted is included at the bottom of each table.
- **Carried Over**: Activities were not completed, but the jurisdiction wishes to pursue these actions in the next hazard mitigation plan. Information about progress towards an action is included at the bottom of each table when applicable.
- **Completed and Carried Over**: Activities are ongoing. Progress has already been made to implement and complete the action, and work on the action will continue as specified in the updated plan.

It is important to note that many communities listed the action "Maintain Participation in Code Red," which is an alert system that many communities use to warn residents about hazard events. The Code Red system has been replaced by the "Alert Iowa" system. This change is reflected in the wording of actions throughout this plan. At the bottom of each table, additional details are included regarding activity statuses. When available, details may include how and when an action was completed, the extent of progress made on an action even if it is not completed, or why an action was deleted. Action updates are listed on the following pages in alphabetical order by jurisdiction. Participating school districts are listed at the end of this chapter.

Action Updates by Jurisdiction

Jurisdiction	Mitigation Action	Status
Albion	Bigger rural water line for backup water	Carried over
	Water well improvements	Completed and Carried over
	Construct a safe room that doubles as communications storage and backup	Carried over
	Purchase of emergency equipment for water rescue	Deleted
	Purchase generators	Completed
	Purchase warning siren with backup power and remote triggering	Completed and Carried over
	Elevate roads	Deleted
Additional Details: The rural water line has not yet been completed due to the cost of the project. This project would easily be over $300,000 because it requires the old line to be removed and a new, bigger water line to be installed. ● The water well improvements are currently in progress and should be completed by the fall of 2015 or winter of 2016. Prior to the project, 2 of 3 of the wells were not working. ● The city would still like to pursue a safe room, but it is not a high priority. Most people in the community have basements. There is one mobile home park in Albion, but it currently does not have any homes located within it. The city may use it as a place to house temporary workers who are working in the area. If this occurred, these people would need a safe shelter. The room should be able to accommodate 10-15 people. ● Water rescue equipment does not need to be purchased by the City and was removed from the plan. If a water rescue needed to occur, it likely would not affect the City (it would be in an area outside of the city). Marshalltown or Marshall County Sheriff would be the entities responsible for any water rescue. ● The city purchased generators for their fire station and their water treatment facility. There is no need for additional generators, and the action is completed. ● The city does not wish to purchase a new warning siren, but it does want to work with Marshall County EMA in the future to set up remote access. As of now, the siren has backup power through the generator that powers the Fire Station, and it has more than 20 people who are able to activate the siren if an alert is issued. ● Elevating roads in the city limits was removed from the plan because there is no need. Albion sits on a large hill and is not affected by river flooding from the Iowa River. Roads outside of the city limits do flood (several miles away), but these roads are in the county/state jurisdiction.		

Jurisdiction	Mitigation Action	Status
Clemons	Maintain existing culverts and add new culverts	Completed and Carried over
	Add lift station	Carried over
	New emergency siren	Deleted
	Purchase generators	Completed
	Remove junk cars and farm machinery	Competed and Carried over
Additional Details: **Maintain and add new culverts** – There are two areas in the city where new culverts need to be added. The city has estimated the cost of installing new culverts to be $1,600 and $36,000. The		

location of the more expensive culvert is near the NW corner of town, at the bottom of the hill, on and near Market Avenue. Flooding in this area currently occurs and affects one house. It washes out their entire driveway and affects the road. The road is used by farmers who need to get their product to the elevator and by other members of the community. This area is right along the boundaries of where county maintenance ends and city maintenance begins. ● **Lift station** – the lift station was built in the late 70s. It is expensive to operate and is capable of failing. During heavy rains, the city has to watch the facility and make sure it doesn't fail. The city of working with Region 6 on this matter currently**.** ● **New emergency siren** – Deleted because the cost of a new siren ($17,000+) is prohibitive. The city has instead added an action in which they will ensure that people in the community have access to weather updates. ● **Purchase generators** – Completed, purchased 3 at sewer

Jurisdiction	Mitigation Action	Status
Ferguson	Upgrade and purchase new emergency siren	Completed and Carried over
	Purchase generator for community center	Completed and Carried over
	Purchase generators	Deleted
	Create a public information session and conservation (water) program for Ferguson	Deleted
	Establish cooling center	Completed
	Update general water system	Deleted
	Add hazard information inserts to water bills and city newsletter	Completed and Carried over
	Public education on open burning	Completed and Carried over
	Further emergency education and training opportunities between jurisdictions	Completed and Carried over

Additional Details: Central Iowa Water Association took control of Ferguson's water and sewer systems December 2013. Because of this change, the deleted actions related to the water infrastructure (purchase generators and create a public information session) are no longer Ferguson's responsibility. The city is ready to move on upgrading the emergency siren and purchasing a generator for the community center. These actions will still require funding. Ferguson completed the action "Establish cooling center" by establishing air conditioning at the Ferguson Church and in the kitchen at the community center. These areas can be used as cooling centers.

Jurisdiction	Mitigation Action	Status
Gilman	Update fire rescue equipment	Completed and Carried over
	Establish warming/cooling shelter at Fire Station	Completed
	Remove debris from abandoned properties	Completed and Carried over
	Public education sessions on warning siren	Completed and Carried over

Additional Details: The city has no major city problems that need to be addressed with mitigation actions. The city has 2 generators: one at city hall and the other at the sewer station. The city has 2 sirens with

backup power. There are no trailer park or campgrounds are located in the city, therefore there is no need for a safe room. The sewer system has experience and handful of backups or bypasses during the heaviest rains, but it's not a significant problem. The Fire Station and City Hall are still in good condition and meet the city's needs.

The city purchases fire rescue equipment as needed. The city purchased a new fire truck 2 to 3 years ago and is still looking for additional equipment. The city is working with landowners to remove blight from private property; at this time, the city is responsible for maintaining and mowing the lawns of these properties. Public education on the warning sirens is achieved by including information about the sirens in a yearly newsletter that goes out to city residents.

Jurisdiction	Mitigation Action	Status
Haverhill	New emergency siren	Deleted
	Purchase new fire truck	Deleted
	Purchase generators for Haverhill critical facilities and citizens	Completed
	Create community water/supply station	Deleted
	Pave a second road to town	Deleted
	Establish warming/cooling shelters	Completed
	Emergency equipment upgrades for first responders	Carried over
	Install sump pumps for city buildings and citizens	Deleted
	Improve roads	Carried over
	Construct a safe room with backup generator	Completed
	Public education sessions on hazard procedures	Carried over
	Create a sandbag committee	Deleted
	Mutual aid for disaster clean up	Completed and Carried over
	Purchase debris removal equipment	Deleted

Additional Details: **New emergency siren** – Deleted, not a city priority. Outdoor siren taken out 30 years ago. Many homes have emergency weather radios, many people have smart phones and/or personal computers where they can get weather updates. Town currently has no working siren, but it is not a priority for the city since it is so small and financially limited. ● **Purchase new fire truck** – Deleted. Not city's responsibility. Township's responsibility. The city is just responsible for the fire station. ● **Purchase generators** – Completed during the building of the new fire station. It is stationary and purchased through a grant. The city does not need any additional generators. ● **Create community water/supply station** – Deleted. This is not a priority for the city. The city is with Central Iowa Water and does not have any additional funding to pursue a new water supply tank or area. ● **Pave a second road to town** – Deleted. City does not have issues accessing town after or during flood events. ● **Establish warming/cooling shelters** - Shelter house (community building) has AC and people can go there during events of extreme heat. City owns building, state owns ground. City controls ground. Heating: generator in fire station in the event of power loss in town during winter weather/storm. ● **Emergency equipment** – Carried over. Haven't done in last 5 years, could need it in the future. ● **Install sump pumps for city buildings and citizens** – Deleted. This action is not needed. No flood problems in city facilities. Brand new fire station, no flooding issues. ● **Improve roads** – Carried over, regular maintenance.

Jurisdiction	Mitigation Action	Status
Laurel	New emergency siren	Carried over
	Distribute NOAA All-Hazard Radios to all Laurel residents	Deleted
	Purchase generators	Carried over
Additional Details: Distribute NOAA All-Hazard Radios to all Laurel residents - this action was deleted due to changing city priorities. Most residents have access to weather updates through their smart phones, personal computers, or a TV weather station. ● The purchase of generators and the new emergency siren were not completed during the previous planning process due to lack of funding. These actions are both being carried over to be completed in the next planning process.		

Jurisdiction		
Le Grand	Improve and update all city buildings	Carried over
	Purchase generators for all critical facilities	Carried over
	Install alternate communication devices in all critical facilities	Carried over
	Identify each critical facility's function in a hazard event	Carried over
	Create a sandbag committee	Deleted
	Construct safe room	Carried over
	Lagoon improvements	Completed and Carried over
	Hydrant improvements	Carried over
	New emergency siren	Deleted
	Public education program	Carried over
	Create online forms of hazard information	Carried over
	Create an emergency phone tree	Carried over
	Continued water tower updates and maintenance	Completed and Carried over
	Ensure online emergency system is working	Completed and Carried over
	Mutual aid for disaster relief	Completed and Carried over
Additional Details: **Improve and update all city buildings** – all city buildings need improvements. Lack of funding kept this action from being completed. ● **Purchase generators for all critical facilities** – Fire station has a generator, sewer lift station generator was purchased in 2014. There is no funding for the remaining city facilities, but city will still attempt to pursue this action in the coming years. ● **Install alternate communication devices in all critical facilities** – City will need to pursue funding elsewhere. ● **Identify critical facility functions** – The city intends to do this soon. ● **Sandbag committee** – there is no need for this committee because the city does not have a substantial water body nearby that causes flooding and/or threatens buildings. This action was deleted. ● **Construct a safe room** – The city will have to pursue funding for this action. ● **Lagoon improvements** – Facility plan will begin June 2015. Project will take 3 years to complete. ● **Emergency siren** – The current emergency siren is smaller and cannot be heard by everyone indoors. However, this siren is meant to be an outdoor warning siren – it is not meant to inform people who are inside of a house or building. It is designed for people outdoors who may be unaware of impending storms. The city has verified that the siren can be heard in all open areas of the city, especially where children may be located. The siren can be heard in open areas, the city park, the high school, high		

school softball diamonds, high school football field, and the Little League Diamond (which is next door to where the siren is located). Therefore, the siren's purpose is being served and does not need to be replaced. The siren does still need a backup power source. A new action has been added to the plan to research what kinds of backup power sources might be compatible with the siren. Ideally, if the city was able to fund a generator for its critical facilities, the city would also use the generator as a backup power source for the siren. If this power source is not compatible, the city will pursue grant funding for a backup battery. ● **Public education program** – will begin in 2015 ● **Create online forms of hazard information** – will begin in 2015 ● **Phone tree** - – will begin in 2015 ● **Water tower** – the city does not own the water tower. The city will continue to maintain the water distribution lines.

Jurisdiction		
Liscomb	New automatic emergency siren	Carried over
	Purchase generator for City	Completed
	Develop an alternate water supply	Deleted

Additional Details: A new automatic siren was purchased with local funds and is wired to the fire house. This unit must be manually started and has suffered occasional failures due to operational complexity and lack of experienced operators. The city plans to get remote activation for the siren soon. The city purchased a generator during the last plan period. The city chose to delete developing an alternative water supply. An alternative water supply is already available and the city did not see the need to purchase additional storage tanks.

Jurisdiction		
Marshalltown	Flood protection and repairs for sewer lift station and levees	Completed and Carried over
	Structural inspections of levee	Completed and Carried over
	Inspections of medical and care facilities in town	Deleted
	Flood protection and repairs for medical and care facilities in town	Deleted
	Public education program	Carried over
	Further education and training opportunities between jurisdictions	Carried over

Additional Details: Flood protection and repairs for sewer lift station and levees –
the levee has been inspected. There are plans to raise the levee in 2016 roughly one mile east of highway 14 to highway 14. There are no problems with the levee East of this location. ● Inspections of medical and care facilities in town – this is no longer a priority for the city. Task Force members are not aware of any significant problems related to the structural and sanitary status of the care facilities. ● Flood protection and repairs for medical and care facilities in town – this is no longer a priority for the city ● Structural inspections of levee – are regularly completed ● Public education program, Further education and training opportunities between jurisdictions – city has plans to complete these actions in the upcoming planning cycle

Jurisdiction		
Melbourne	New emergency siren	Deleted
	Sewer improvements	Completed and Carried over

	Demolish hazardous buildings in town	Completed and Carried over
	Add hazard information articles to quarterly newsletter	Completed and Carried over
	Back up computer system off-site	Completed

Additional Details: **New emergency siren** – removed. This action is not necessary. New technology makes a siren update less important. Cell phone alerts and Alert Iowa help to inform residents of severe weather and hazards. The city has a functioning emergency siren and cannot justify the cost of updating the siren. ● **Sewer improvements** – a large section of the system (the force main) was lined in 2013-2014. The project is ongoing. The rest of the project does not qualify for grant monies and there is no local funding available at this time. ● **Demolish hazardous buildings** – the city is working with the building owner who owns the old school. Owner removed asbestos in 2014 but no additional action has been taken. The city will continue to work with the building owner as the relationship allows. The council approved moving forward with the demolition at the recommendation of the city attorney. ● **Information in newsletter** – City includes information about hazards quarterly in the newsletter and will continue to do so. ● **Computer backup** – computer is backed up M-F every night and will continue to be backed up. The city no longer needs this action as a mitigation action although the work will continue.

Jurisdiction		
Rhodes	Demolition of building on Main Street	Completed
	New emergency siren	Completed
	Inform residents of shelter areas in town	Completed and Carried over

Additional Details: Demolition of building on Main Street – General funds used ● New emergency siren – Donations and general funds used ● City is already planning how to implement a plan to inform residents about the shelter areas in town

Jurisdiction	**Mitigation Action**	
St. Anthony	Construct a safe room	Deleted
	Backup power for shelter and critical facilities	Ongoing
	Recruiting emergency responders	Ongoing
	Public education sessions on warning siren	Deleted

Additional Details: **Construct a safe room** – Deleted because most homes have basements. A safe room is no longer a priority for the city. ● **Public education sessions on warning siren** – Deleted because this is no longer a priority for the city. The city does not have an emergency siren. ● Other actions are ongoing for the city as funding at time allows.

Jurisdiction	**Mitigation Action**	
State Center	New warning siren	Carried over
	Backup power for critical facilities	Completed and Carried over

	Purchase new grass fire vehicle	Completed
	Construct a safe room	Carried over
	Coordinate city public awareness	Carried over

Additional Details: Grass fire vehicles – 2 pickup trucks purchased during the last planning period and in use. Main pumper refurbished with pump, recertified ● Backup power for critical facilities – Generators were purchased for some critical facilities, but not others. City would still like to purchase 1 or 2 generators. They would need to be very small generators that would be used to run the station (critical computers, etc.) in the event of a power loss. ● Other items that were carried over were not completed due to lack of funds.

Jurisdiction	Mitigation Action	
Marshall County	Reinforce levee and surrounding land	Carried over
	Construct safe rooms in vulnerable areas of the county	Completed and Carried over
	Acquisition and elevation of structures	Completed and Carried over
	Laminated glass for use during hailstorms	Carried over
	Plant windbreaks	Carried over
	Ground water protection	Completed and Carried over
	Coordinate public awareness	Completed and Carried over
	Courthouse security	Carried over
	Create a public information session and conservation (water) program	Completed and Carried over
	Install radiology monitors in all county vehicles	Carried over
	Public education program	Completed and Carried over
	CERT responder training	Completed and Carried over
	Animal/Crop/Plant and Human Disease Epidemic planning and training	Completed and Carried over
	Train fire departments for grass fires and maintain needed equipment	Completed and Carried over
	Public warnings of dam failures	Deleted
	Create hazardous materials removal plan	Completed
	Purchase generators for critical facilities	Carried over
	Elevate roads	Carried over
	Improve communication systems	Carried over
	Purchase/update snow removal equipment	Carried over
	Maintain quality of courthouse's technological equipment with temperature regulation	Carried over

Additional Details: The county has made progress on many of their mitigation actions, including constructing safe rooms, acquiring and elevating structures, ground water protection, coordinating public awareness, creating a public information session and water conservation program, public education programs, CERT responder training, disease training, and fire department training. Many of these action

items are actions that the county has looked into how the action can be completed and has started reaching out to partners and other entities that can assist in completing the task. Other actions are ongoing in nature and will continue throughout the foreseeable future; these actions include the CERT responder training, improving communications systems, and the public information program. Plan procedures are included in emergency support functions and the hazardous materials plan. The actions "reinforce levees" and "elevate roads" were not completed due to lack of funding.

During the last planning process, the county completed a hazardous materials removal plan.

Public warning of dam failures is the only action item that was deleted. This action was deleted because dam failures in the county would be relatively rare, and county priorities have shifted to other, more pressing mitigation actions. If a dam failure were to occur for either of the two Moderate classification dams, residents would not likely be affected. Green Castle Dam would dump into a quarry that is already full of water. Southridge Road Detention Basin would go under a creek, wouldn't go over road. This area contains a deep valley with no structures downstream that would be affected.

East Marshall Community School District	Reinforce school buildings	Completed and Carried over
	Complete required hazard drills every year	Completed and Carried over
	Purchase/update snow removal equipment	Completed and Carried over
	Create debris removal plan	Completed and Carried over
	Ensure proper grounding of facilities during hazard events	Completed and Carried over
	Retrofit school buildings as shelters	Carried over
	Public education sessions on safe room procedures	Completed and Carried over
	Coordinate city public awareness and emergency plan	Completed and Carried over

Additional Details: Almost all items on the District's hazard mitigation plan are ongoing. Most of the items are things that are ongoing and looked at continuously through the year. The district looks at the item and prioritizes those items with other items in the District to work into our budget. The district recently put together a safety team to put more emphasis on overall safety within the district. The safety team will look into incorporating the hazard mitigation actions into the district's master safety plan.

Marshalltown Community School District	Maintain facility standards and safe code compliance	Completed and Carried over
	Update and review facility safety awareness program	Completed and Carried over
	Create a hazard/safety information session for students	Completed
	District-wide training	Completed and Carried over
	Write an emergency plan for city, emergency response, and schools	Completed and Carried over

Additional Details: **Maintain facility standards** – upgrades are ongoing as needed and as funding allows ● **Update and review facility safety awareness program** – Ongoing and reviewed at least on an annual basis ● **Create a hazard safety information session for students** – this session is now part of the facility training for the district ● **District-wide training** – while this training exists, it needs improvement. The school district will work to incorporate more hazard-related topics into this training so that the district will be prepared for any event. ● **Write an emergency plan** – this plan is in progress.

Appendix C. Public Notification

From The Marshalltown Times Republican
4-17-15 (left), 5-6-15 (center), and 6-2-15 (right)



PUBLIC NOTICE
NOTICE OF PUBLIC MEETING

Marshall County has begun work on a county-wide Hazard Mitigation Plan. The plan will assess the county's risk to hazards and will identify actions to reduce vulnerability to such risks. This is the first of three county-wide meetings that will be held to assess risk, set goals for the county, and identify actions that communities will take in the coming years to mitigate the risk of certain hazards.

The overall outcome of these meetings is the creation of a FEMA-approved Hazard Mitigation Plan, which will detail the strategies and actions that communities plan to take to improve quality of life and keep residents and visitors safe from hazards. Completion of this plan will also allow communities to qualify for certain types of grant funding.

The meeting will take place on April 21, 2015 at the Marshall County Sherriff's Office Administrative Building (Floor 3) at 11:00 AM. We would like to invite the public to provide input on setting goals and identifying mitigation strategies for the county.

If you have any questions or would like to RSVP, please contact Marty Wymore, Region 6 Planning Commission, by phone or email at
641-752-6202 ext. 107
or
mwymore@region6planning.org.

18910



Legals
PUBLIC NOTICE
NOTICE OF PUBLIC MEETING

Marshall County will continue work on a county-wide Hazard Mitigation Plan with a second county-wide hazard mitigation meeting. This is the second of three county-wide meetings that will be held to assess risk, set goals for the county, and identify mitigation actions that communities in Marshall County will pursue in the next five years.

The overall outcome of these meetings is the creation of a FEMA-approved Hazard Mitigation Plan. Completion of this plan will also allow communities to qualify for certain types of grant funding.

The meeting will take place on May 19, 2015 at the Marshall County Sherriff's Office Administrative Building (Floor 3) at 11:30 AM. We would like to invite the public to provide input on setting goals and identifying mitigation strategies for the county.

If you have any questions or would like to RSVP, please contact Marty Wymore, Region 6 Planning Commission, by phone or email at
641-752-6202 ext. 107 or
mwymore@region6planning.org.

19009



PUBLIC NOTICE
NOTICE OF PUBLIC MEETING

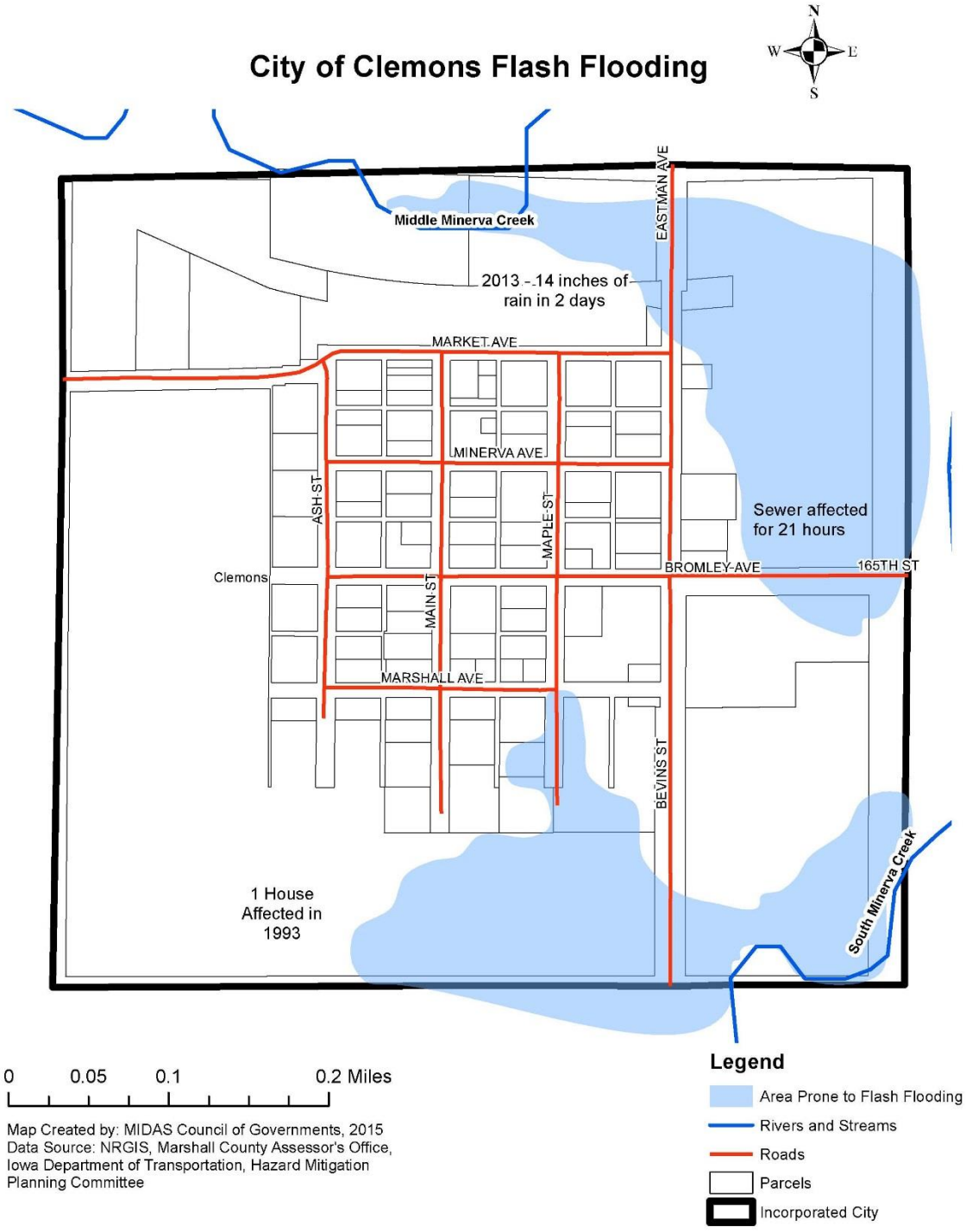
Marshall County will continue work on a county-wide Hazard Mitigation Plan with the last of three county-wide hazard mitigation meeting. These meetings brought together community leaders to assess risk, set goals for the county, and identify mitigation actions that communities in Marshall County will pursue in the next five years. The overall outcome of these meetings is the creation of a FEMA-approved Hazard Mitigation Plan. Completion of this plan will also allow communities to qualify for certain types of grant funding.

The meeting will take place on June 16, 2015 at the Marshall County Sherriff's Office Administrative Building (Floor 3) at 11:30 AM. We would like to invite the public to provide input on setting goals and identifying mitigation strategies for the county.

If you have any questions or would like to RSVP, please contact Marty Wymore, Region 6 Planning Commission, by phone or email at 641-752-6202 ext. 107 or mwymore@region6planning.org.

19175

Appendix D. Flash Flood Maps



City of Liscomb Flash Flooding



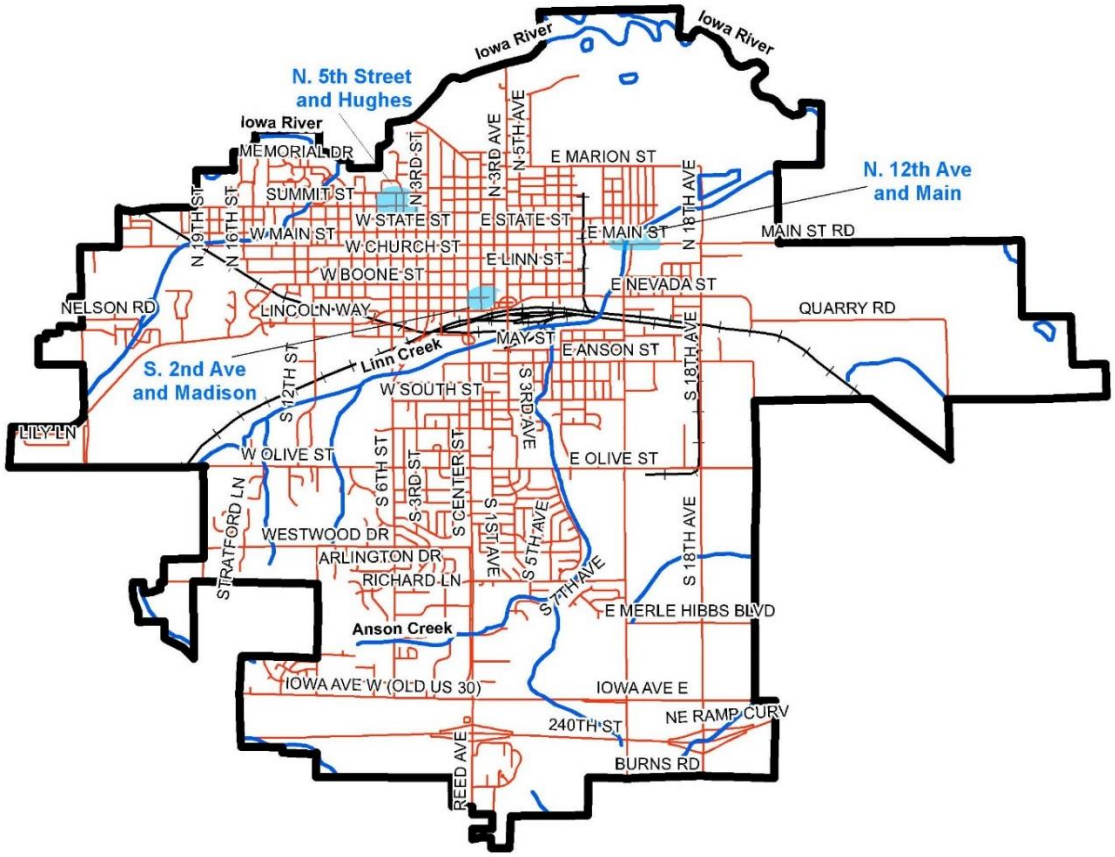
0 0.125 0.25 0.5 Miles

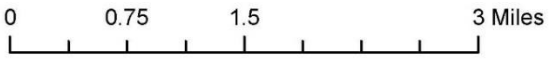
Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Transportation, Hazard Mitigation Planning Committee

Legend

- Areas Prone to Flash Flooding
- Rivers and Streams
- Roads
- Railroads
- Parcels
- Incorporated City

City of Marshalltown Flash Flooding



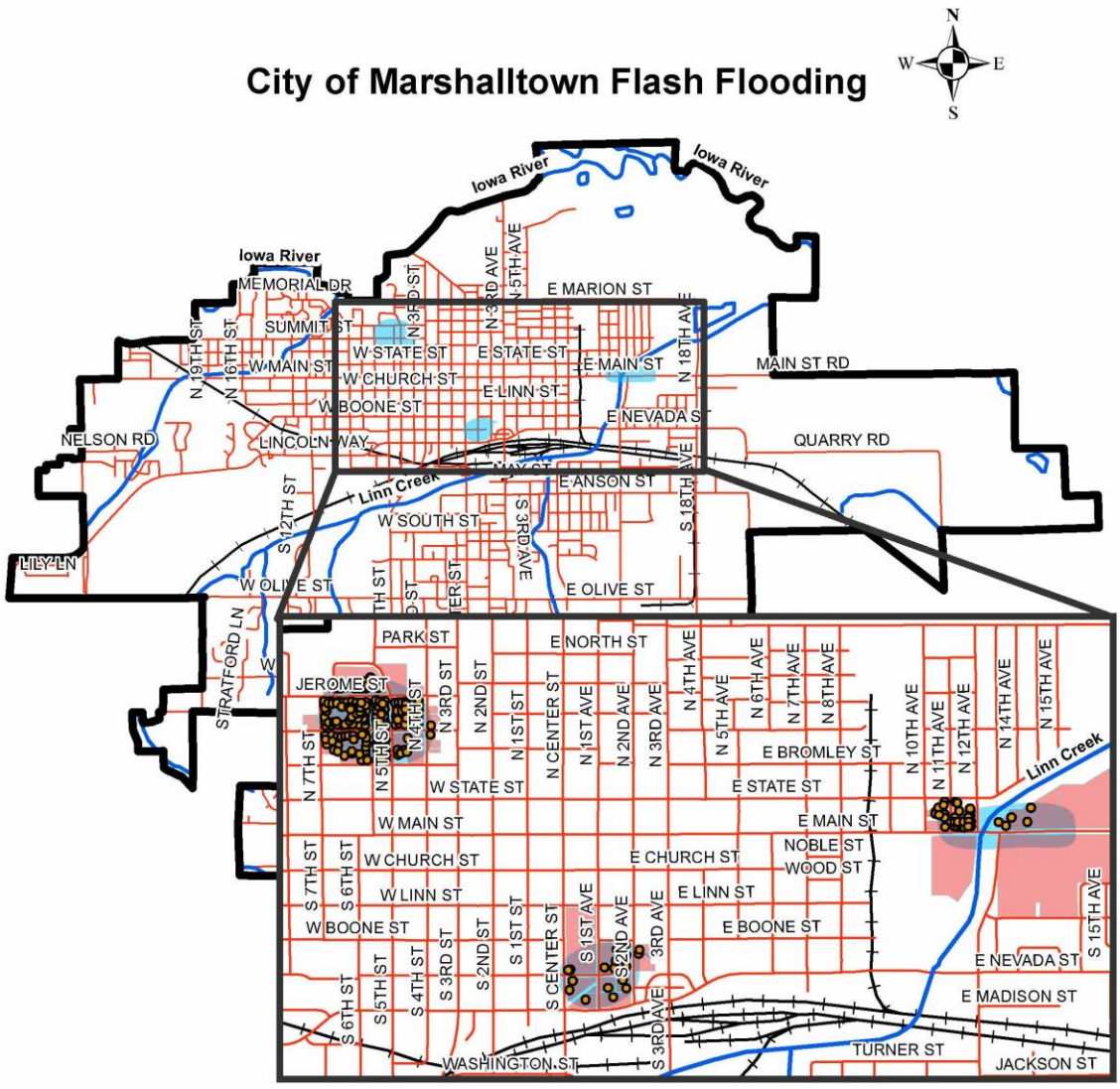


Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Transportation, Hazard Mitigation Planning Committee

Legend

- Areas Prone to Flash Flooding
- Rivers and Streams
- Roads
- Railroads
- Parcels
- Incorporated City

City of Marshalltown Flash Flooding



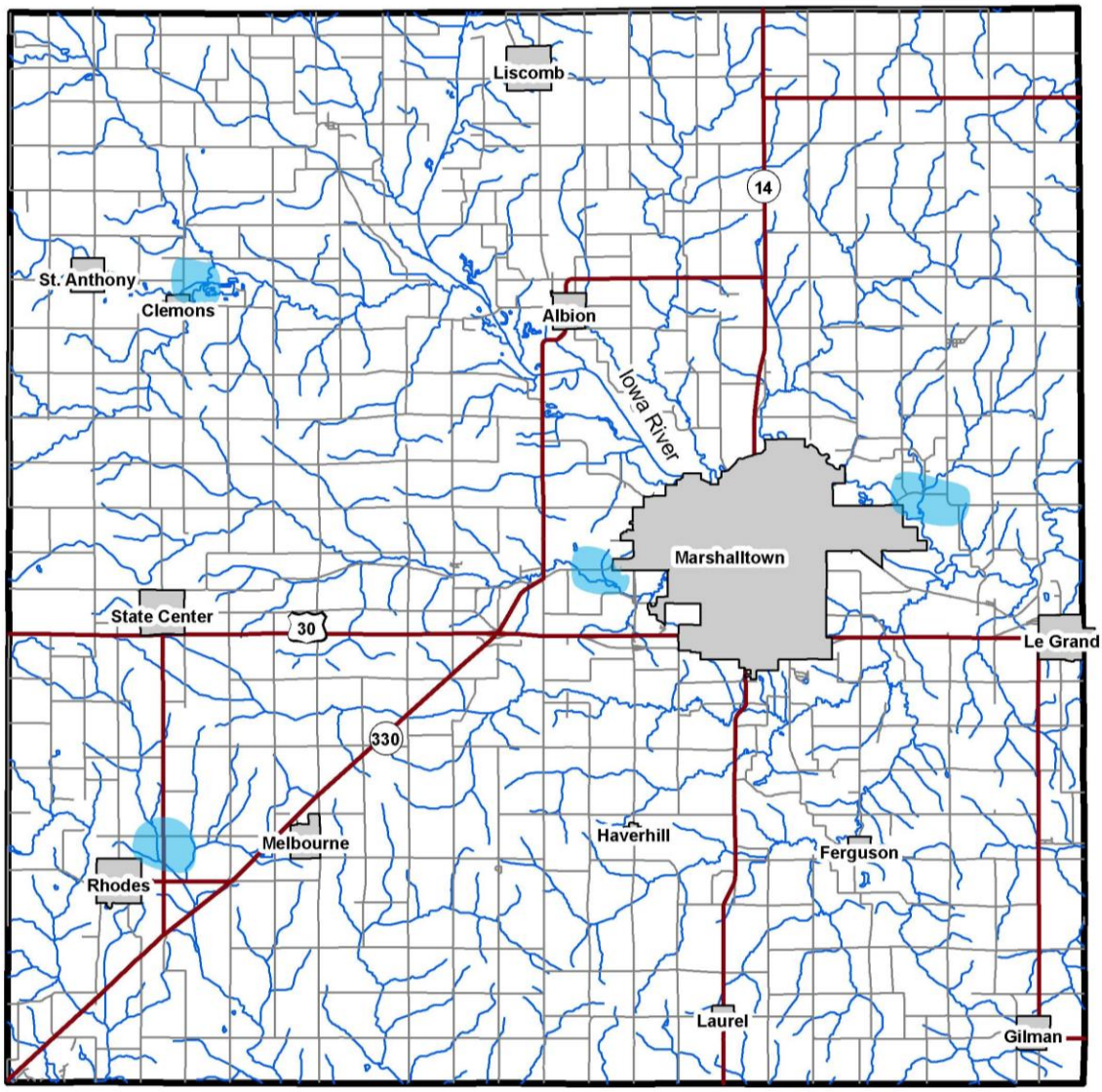
0 0.75 1.5 3 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Transportation, Hazard Mitigation Planning Committee

Legend

- Marshalltown Structures in Hazard Area
- Areas Prone to Flash Flooding
- Parcels With Value in Hazard Area
- Parcels
- Rivers and Streams
- Roads
- Railroads
- Incorporated City

Marshall County Flash Flooding



0 3 6 12 Miles

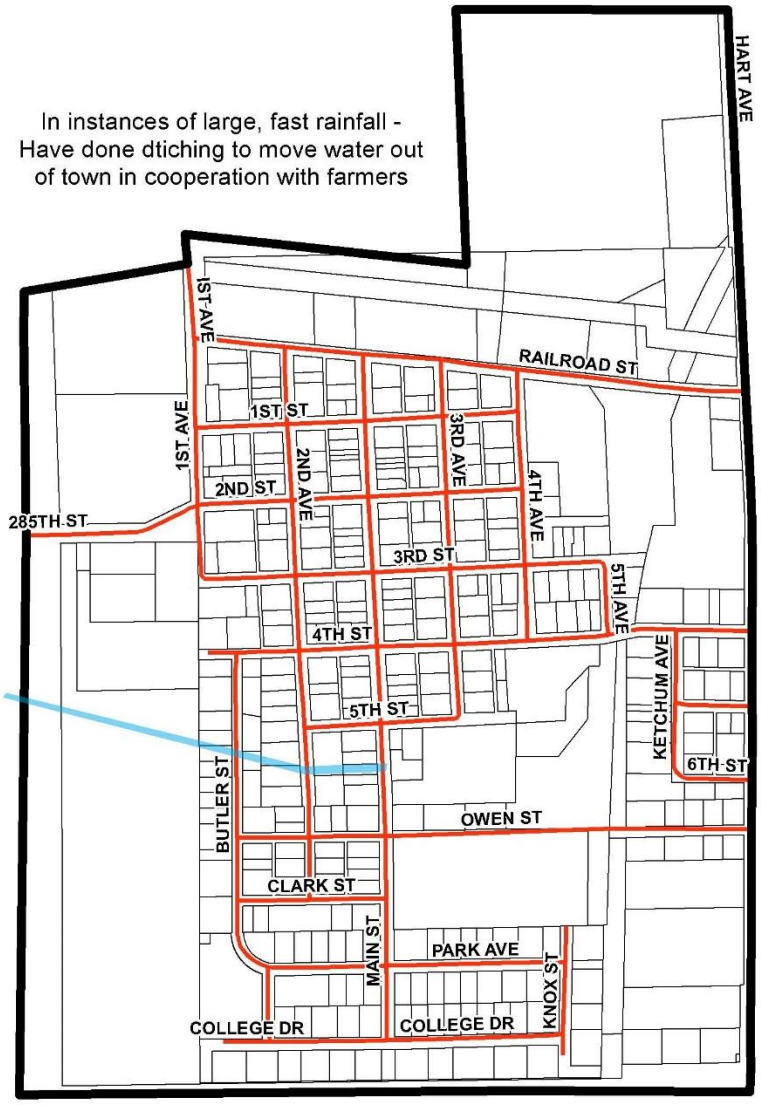
Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Transportation, Hazard Mitigation Planning Committee

Legend

- Areas Prone to Flash Flooding
- Highways
- Roads
- Rivers and Streams
- Railroads
- Incorporated City
- County Boundary

City of Melbourne Flash Flooding





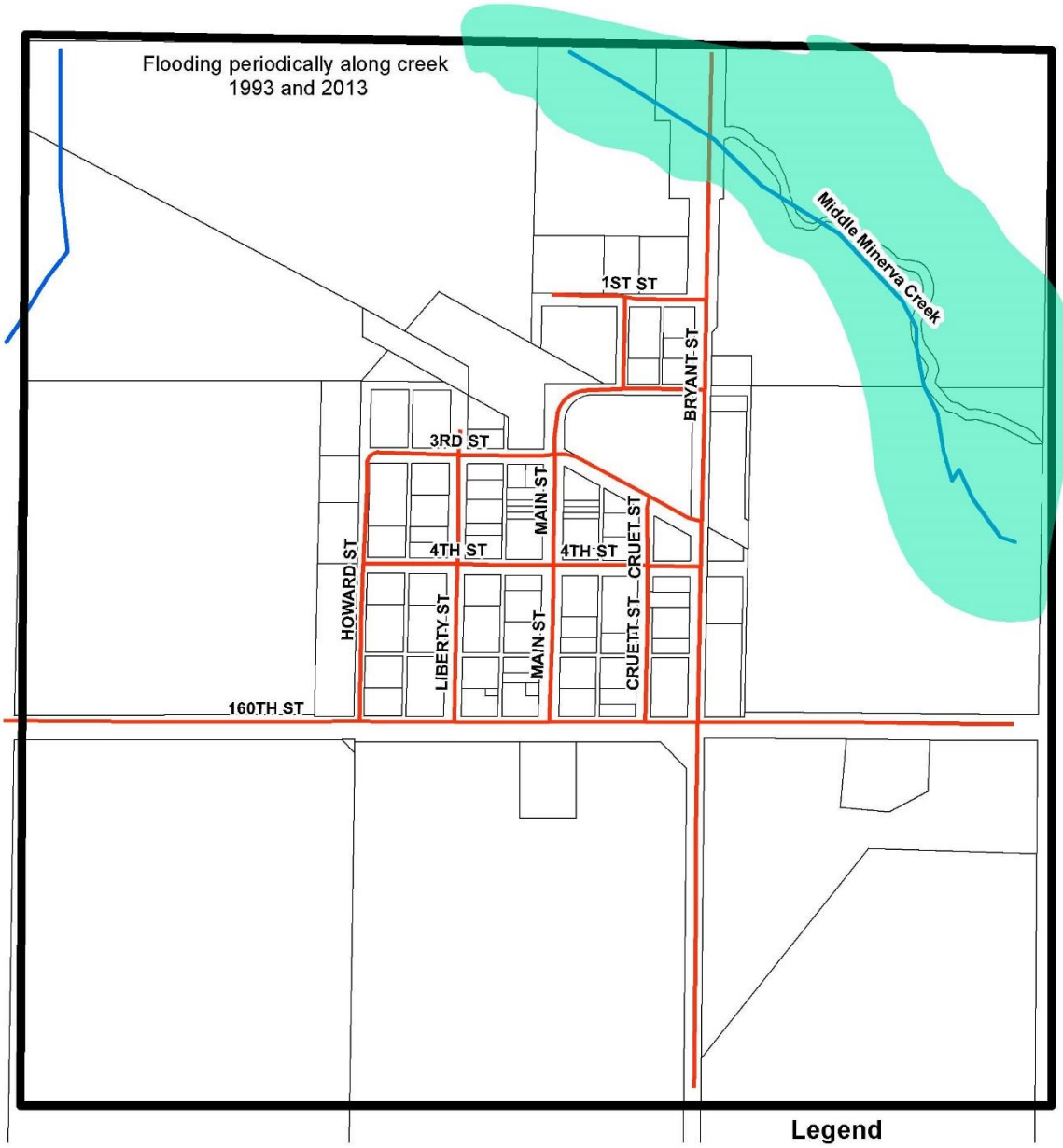
0 0.125 0.25 0.5 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Transportation, Hazard Mitigation Planning Committee

Legend

- Areas Prone to Flash Flooding
- Rivers and Streams
- Roads
- Railroads
- Parcels
- Incorporated City

City of St. Anthony Flash Flooding



0 0.1 0.2 0.4 Miles

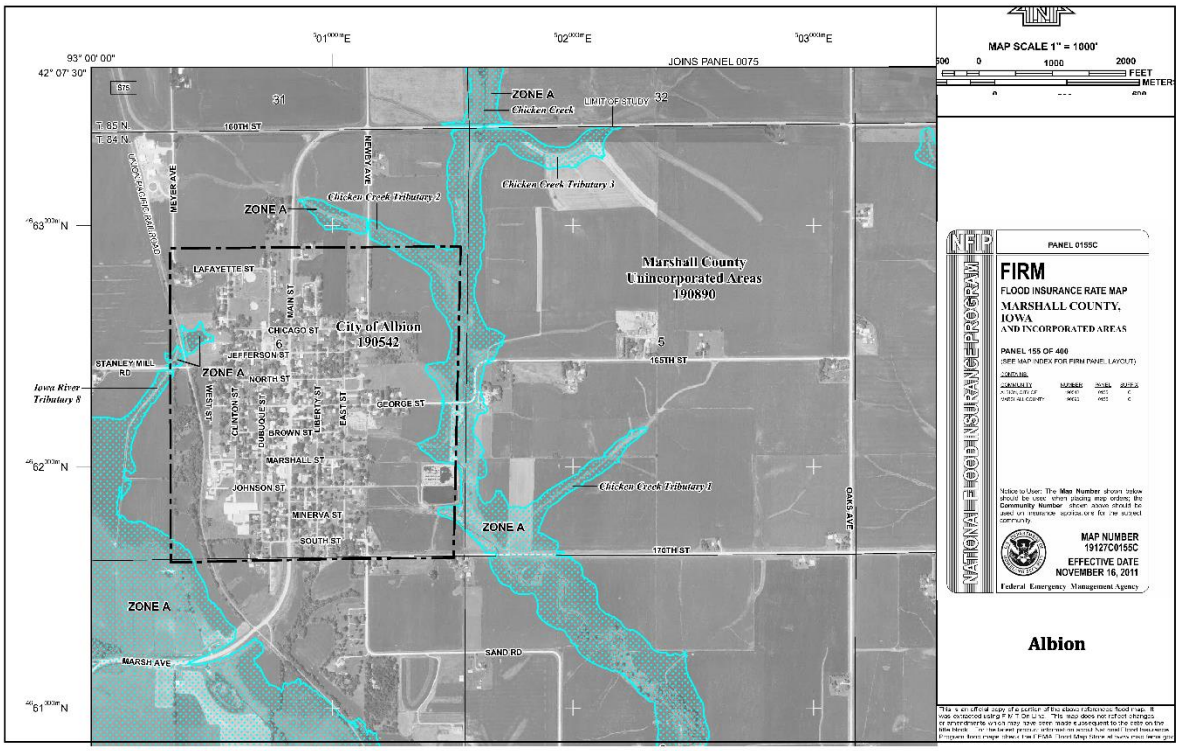
Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Transportation, Hazard Mitigation Planning Committee

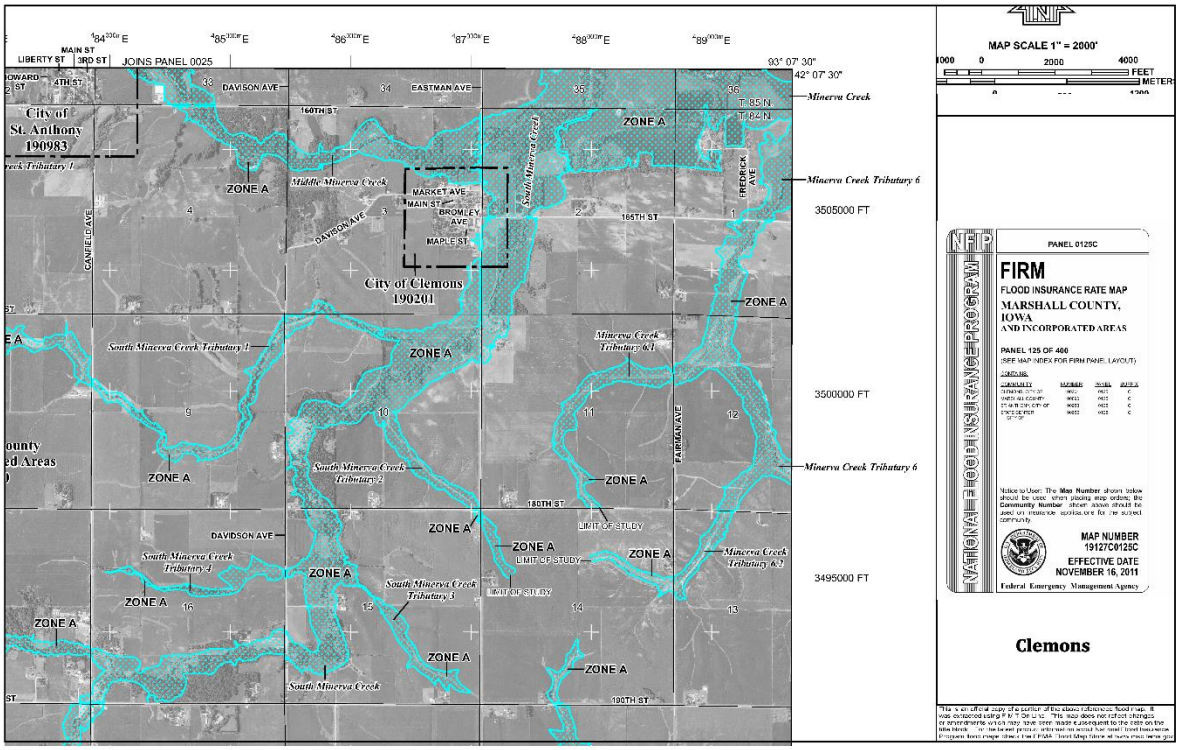
Legend

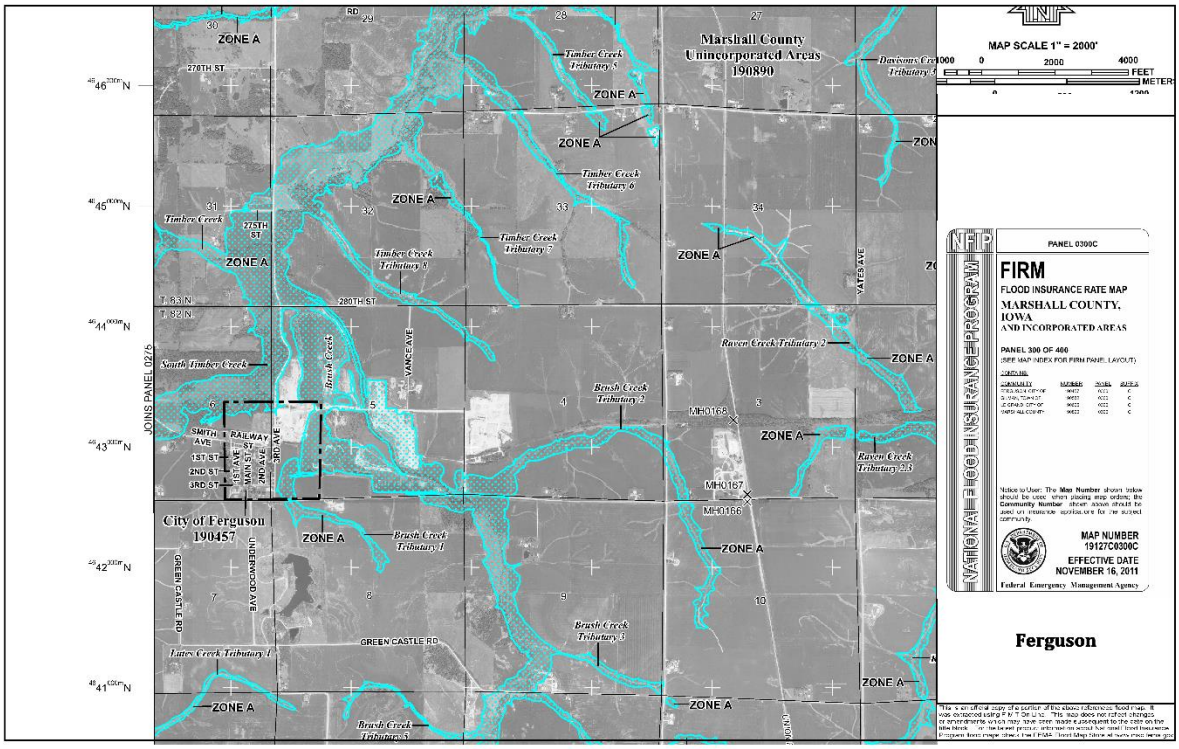
- Areas Prone to Flash Flooding
- Rivers and Streams
- Roads
- Railroads
- Parcels
- Incorporated City

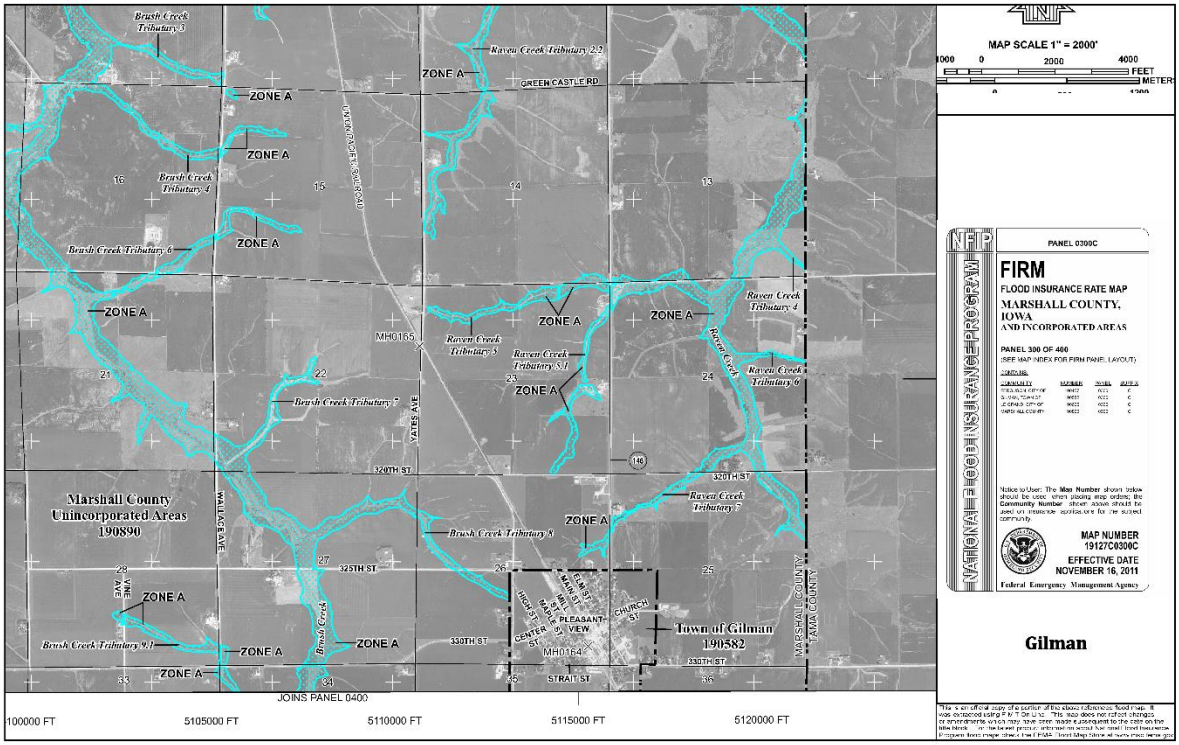
Appendix E. Marshall County Floodplain Maps

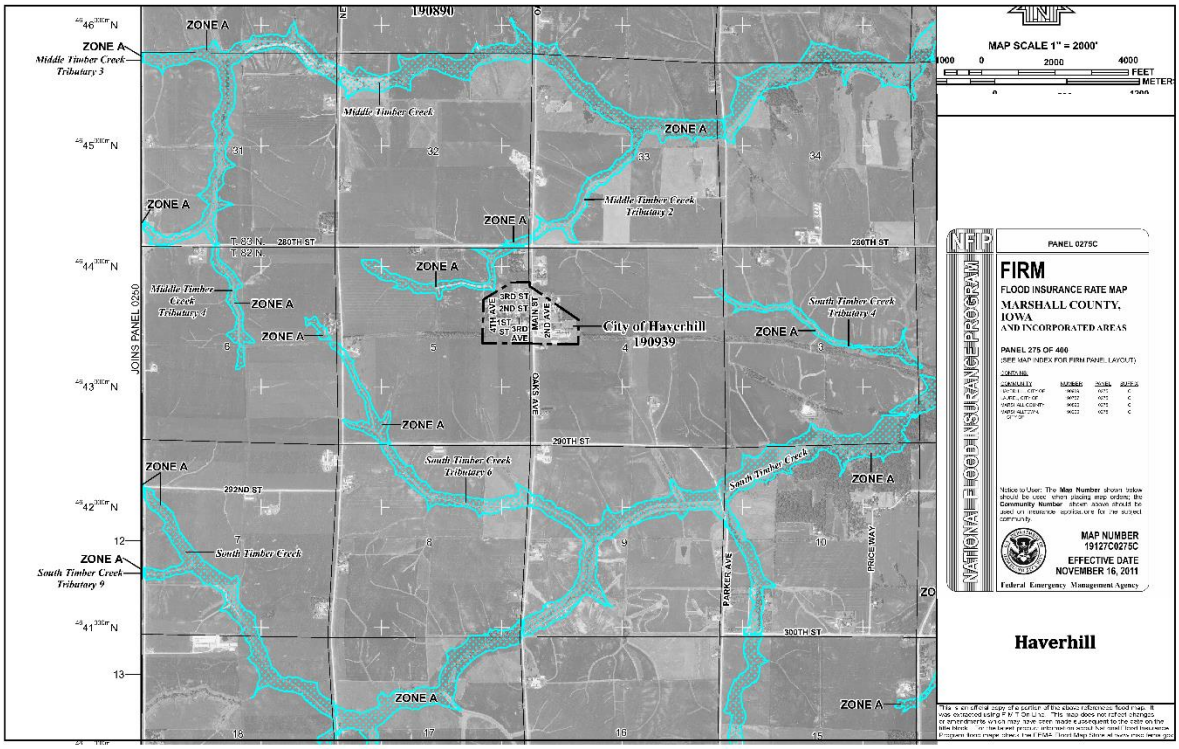
The following maps are FIRMettes of each incorporated area in Marshall County. The floodplains of some incorporated areas require multiple FIRMettes and/or map panels to capture. Incorporated areas are listed in alphabetical order.

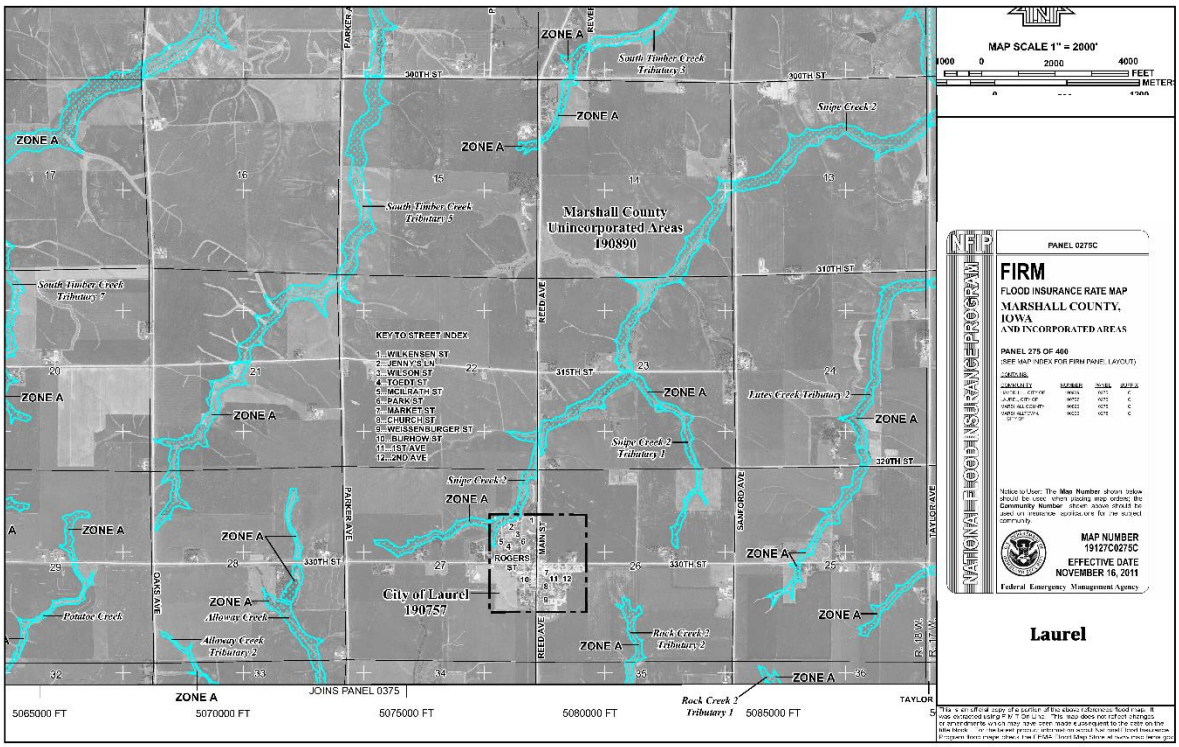


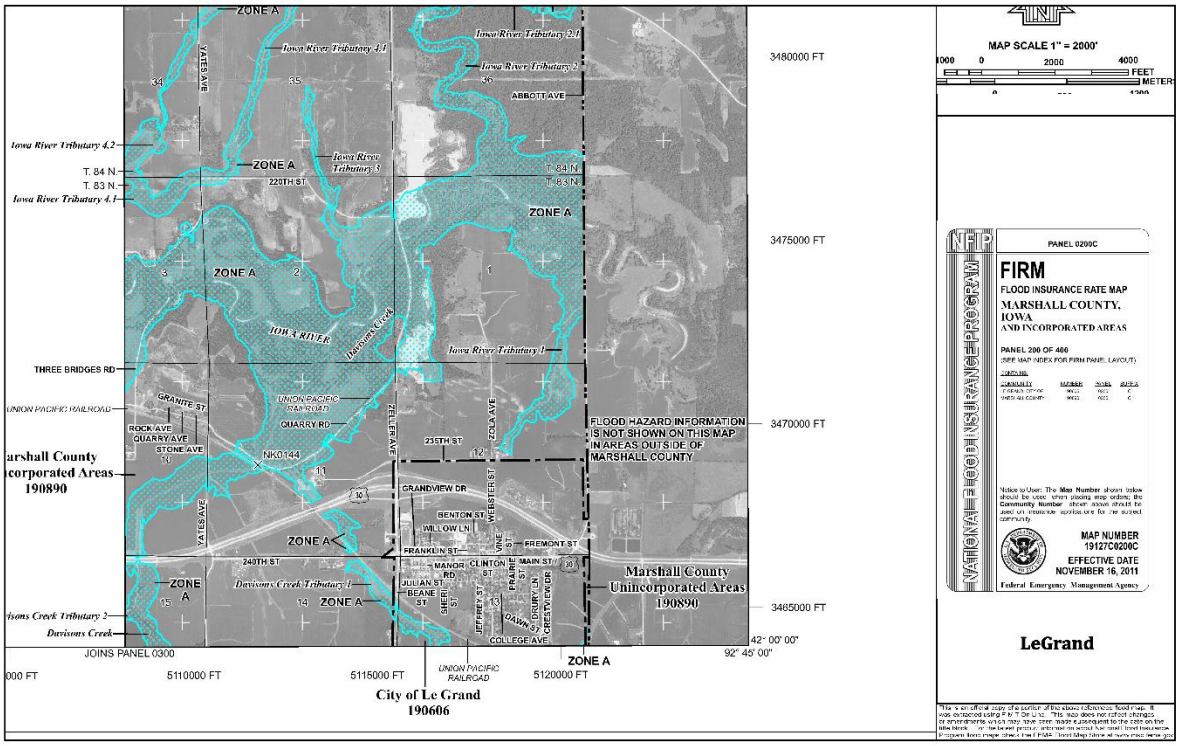

MAP SCALE 1" = 2000'
1000 0 2000 4000
FEET
METERS
PANEL 0125C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 125 OF 460
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
MAP NUMBER
19127C0125C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
Clemons
City of St. Anthony 190983
City of Clemons 190201
JOINS PANEL 0025
ZONE A
Middle Minerva Creek
South Minerva Creek Tributary 1
South Minerva Creek Tributary 2
South Minerva Creek Tributary 3
South Minerva Creek Tributary 4
South Minerva Creek
Minerva Creek Tributary 6
Minerva Creek Tributary 6.1
Minerva Creek Tributary 6.2
Minerva Creek Tributary 6.3
Minerva Creek
LIMIT OF STUDY
DAVISON AVE
MAIN ST
MARKET AVE
BROMLEY AVE
MAPLE ST
160TH ST
165TH ST
180TH ST
190TH ST
CANFIELD AVE
EASTMAN AVE
FAIRMAN AVE
DRONICK AVE
3505000 FT
3500000 FT
3495000 FT

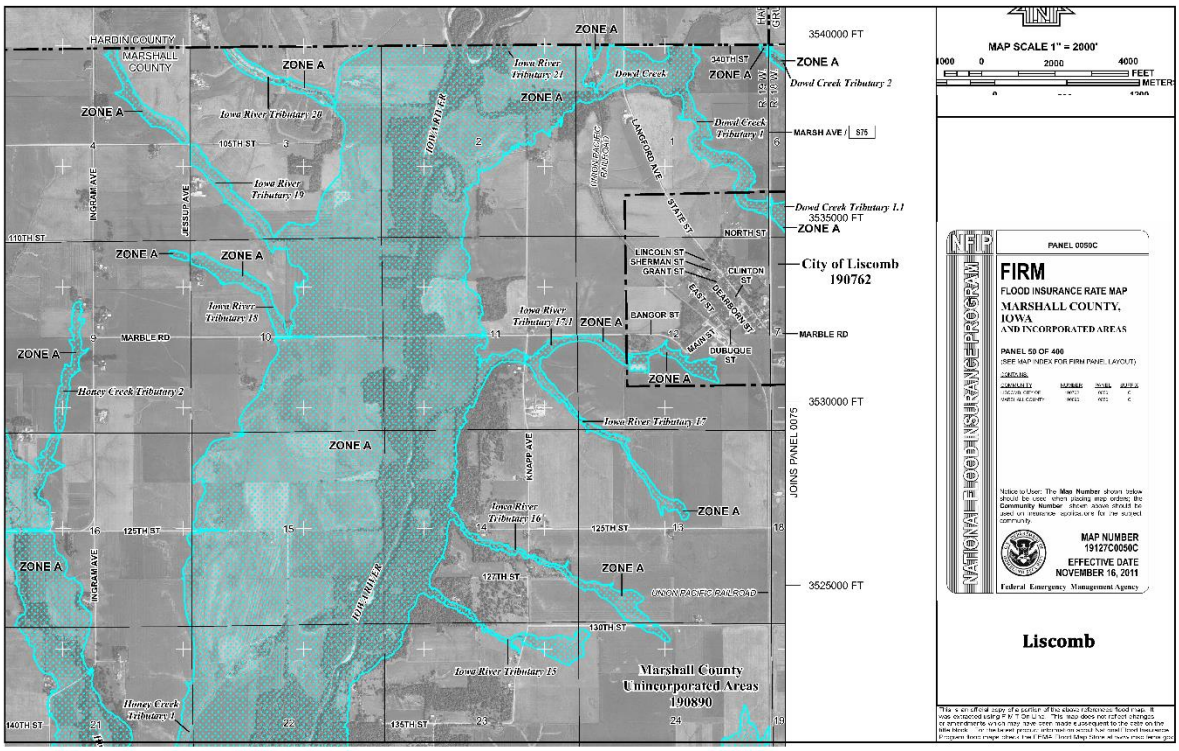

MAP SCALE 1" = 2000'
1000 0 2000 4000
FEET
METERS
PANEL 0300C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 300 OF 460
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
MAP NUMBER
19127C0300C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
Ferguson
Marshall County Unincorporated Areas 190890
City of Ferguson 190457
JOINS PANEL 0275
ZONE A
Timber Creek Tributary 1
Timber Creek Tributary 6
Timber Creek Tributary 7
Timber Creek Tributary 8
Timber Creek
South Timber Creek
Brush Creek Tributary 1
Brush Creek Tributary 2
Brush Creek Tributary 3
Brush Creek
Raven Creek Tributary 2
Raven Creek Tributary 2.1
Raven Creek
Otter Creek Tributary 1
MH0166
MH0167
MH0168
270TH ST
275TH ST
280TH ST
VANCE AVE
YATES AVE
GREEN CASTLE RD
UNDERWOOD BAY
SMITH & RAILWAY AVE
1ST ST
2ND ST
3RD ST
MAIN ST
1ST AVE
2ND AVE
3RD AVE

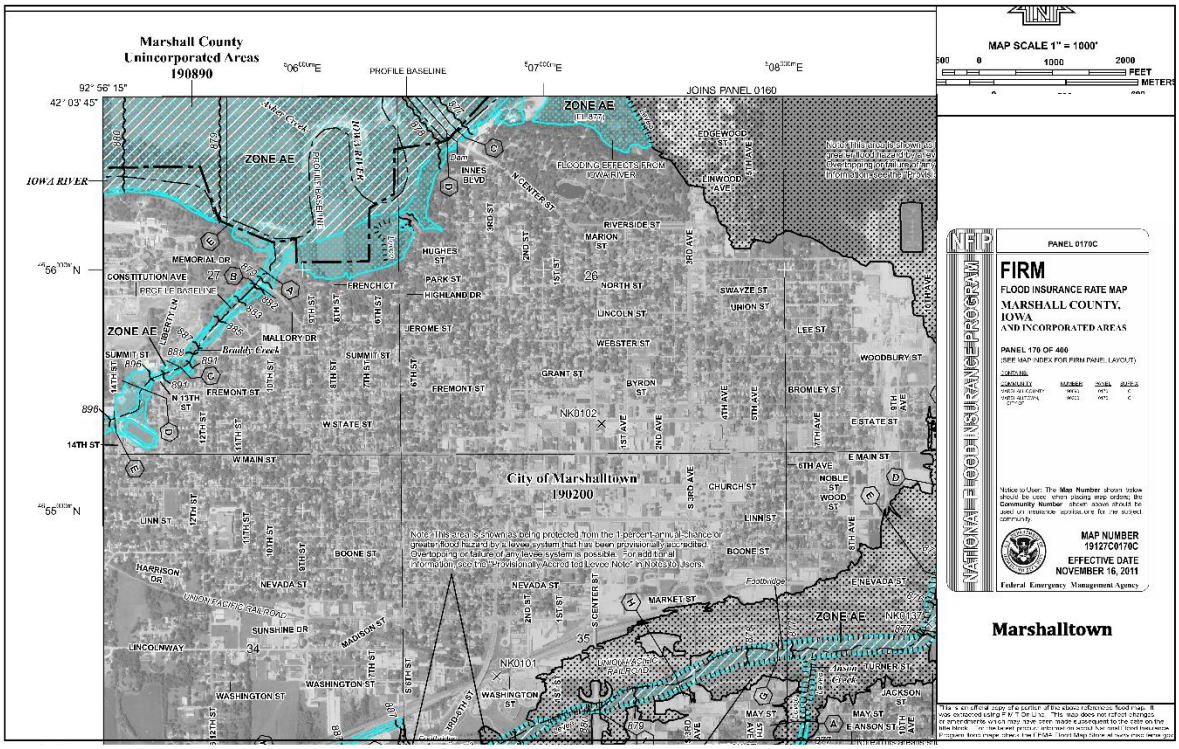

MAP SCALE 1" = 2000'
1000 0 2000 4000
FEET
METER
PANEL 0300C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 300 OF 460
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
19127C0300C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM
Gilman
Marshall County Unincorporated Areas 190890
Town of Gilman 190582
ZONE A
Brush Creek Tributary 3
Brush Creek Tributary 4
Brush Creek Tributary 6
Brush Creek Tributary 7
Brush Creek Tributary 8
Brush Creek Tributary 9.1
Raven Creek Tributary 2.2
Raven Creek Tributary 3
Raven Creek Tributary 4
Raven Creek Tributary 5
Raven Creek Tributary 5.1
Raven Creek Tributary 6
Raven Creek Tributary 7
Raven Creek
Brush Creek
GREEN CASTLE RD
320TH ST
325TH ST
330TH ST
STRAIT ST
WALLACE AVE
YATES AVE
MAPLE AVE
CENTER ST
HIGHLAND ST
MAIN ST
ELM ST
MILL ST
PLEASANT VIEW
CHURCH ST
MARSHALL COUNTY IOWA COUNTY
MH0165
MH0164
JOINS PANEL 0400
100000 FT
5105000 FT
5110000 FT
5115000 FT
5120000 FT

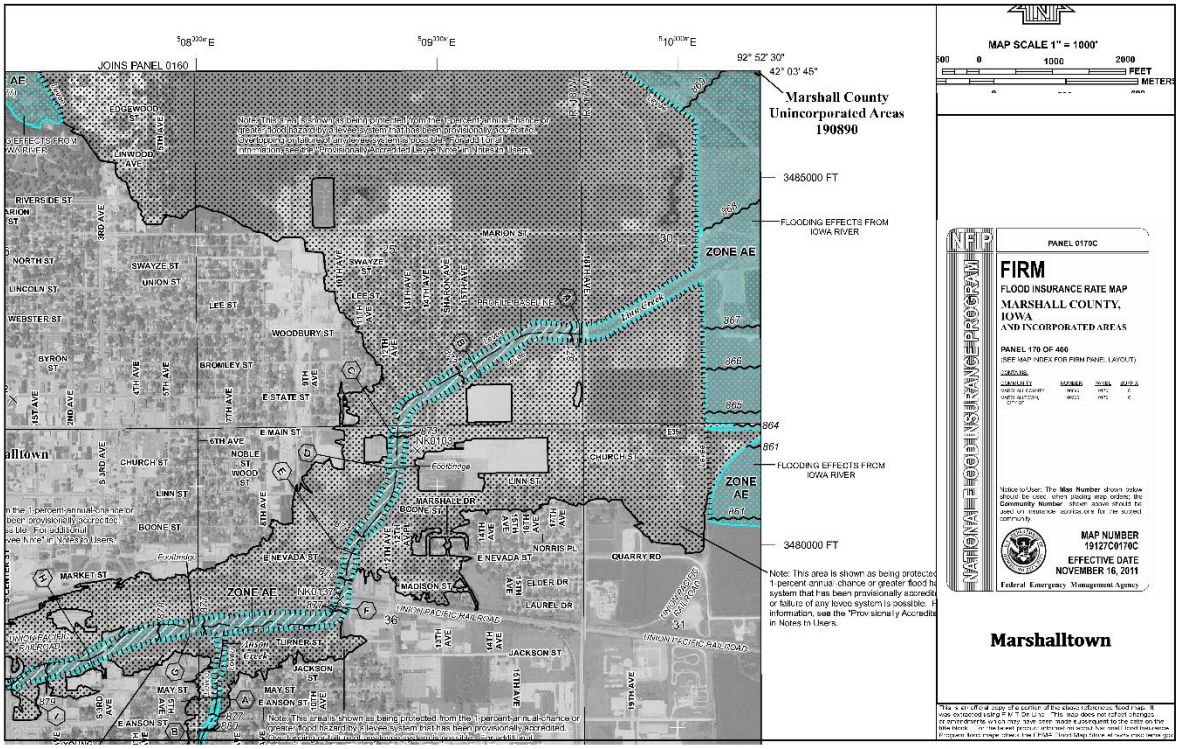

MAP SCALE 1" = 2000'
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FEET
METER
PANEL 0275C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 275 OF 460
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
19127C0275C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM
Haverhill
City of Haverhill 190939
ZONE A
Middle Timber Creek Tributary 3
Middle Timber Creek
Middle Timber Creek Tributary 4
Middle Timber Creek Tributary 5
Middle Timber Creek Tributary 6
South Timber Creek
South Timber Creek Tributary 4
South Timber Creek Tributary 6
South Timber Creek Tributary 9
280TH ST
290TH ST
292ND ST
300TH ST
OAKS AVE
PARKER AVE
PRICE WAY
MAIN AVE
1ST AVE
2ND AVE
3RD AVE
JOINS PANEL 0250
T 83 N
T 82 N
41°45'00"N
41°42'30"N
41°41'30"N

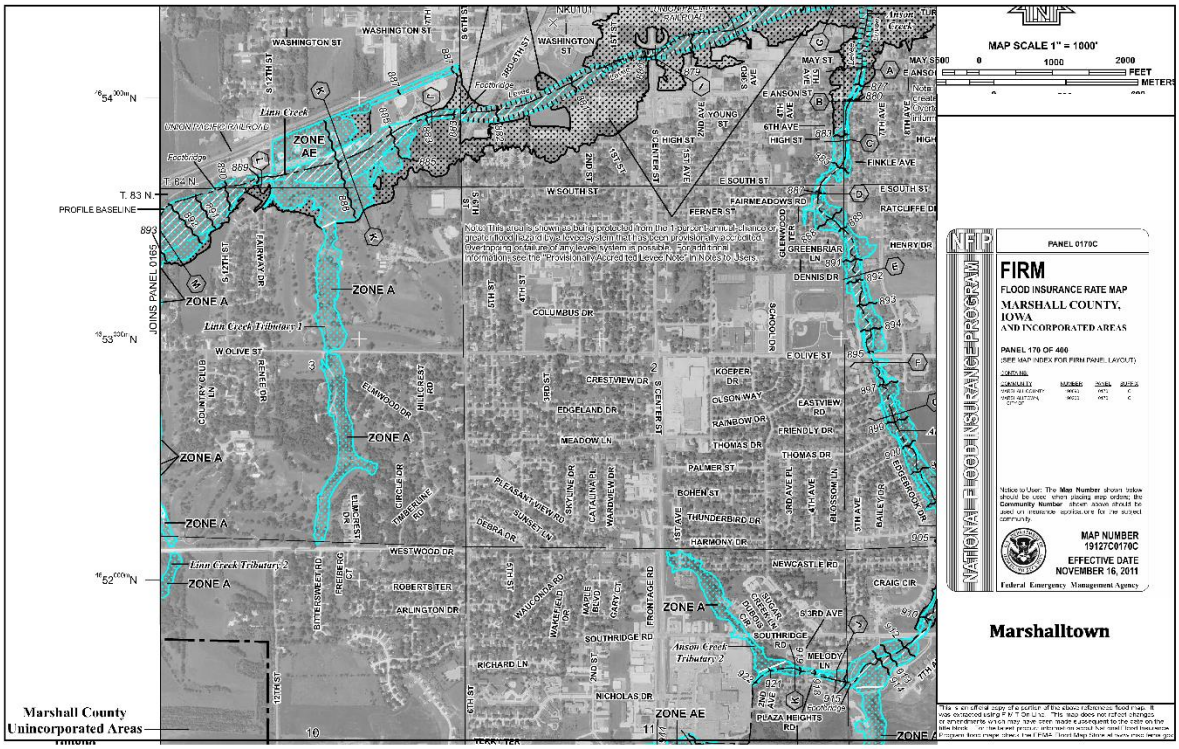

MAP SCALE 1" = 2000'
1000 0 2000 4000
FEET
METER
PANEL 0275C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 275 OF 400
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
19127C0275C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
Laurel
ZONE A
Marshall County Unincorporated Areas 190890
City of Laurel 190757
KEY TO STREET INDEX
1 WILKENSEN ST
2 JENNY LN
3 WILSON ST
4 TOEDT ST
5 MCILRATH ST
6 PARK ST
7 MARKET ST
8 CHURCH ST
9 WEISSENBURGER ST
10 BURHOW ST
11 1ST AVE
12 2ND AVE
South Timber Creek Tributary 3
South Timber Creek Tributary 5
South Timber Creek Tributary 7
Snipe Creek 2
Snipe Creek 2 Tributary 1
Potatoe Creek
Alloway Creek
Alloway Creek Tributary 2
Yates Creek Tributary 2
Rock Creek 2 Tributary 1
Rock Creek 2 Tributary 2
300TH ST
310TH ST
315TH ST
320TH ST
330TH ST
REED AVE
PARKER AVE
OAKS AVE
MAIN ST
ROGERS ST
SAMFORD AVE
TAYLOR AVE
JOINS PANEL 0375
5065000 FT
5070000 FT
5075000 FT
5080000 FT
5085000 FT

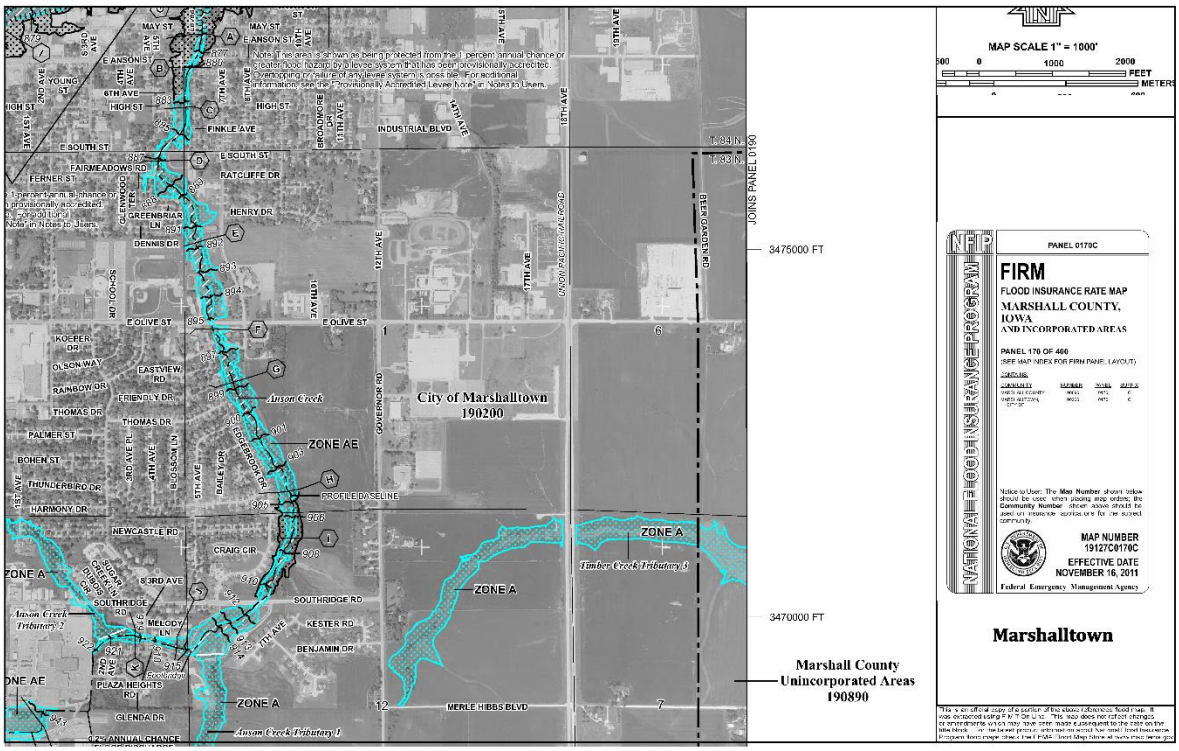

MAP SCALE 1" = 2000'
1000 0 2000 4000
FEET
METER
PANEL 0200C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 200 OF 400
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
19127C0200C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
LeGrand
ZONE A
Marshall County Unincorporated Areas 190890
City of Le Grand 190606
FLOOD HAZARD INFORMATION IS NOT SHOWN ON THIS MAP IN AREAS OUTSIDE OF MARSHALL COUNTY
Iowa River Tributary 4.2
Iowa River Tributary 4.1
Iowa River Tributary 2.1
Iowa River Tributary 2
Iowa River Tributary 3
Iowa River Tributary 1
Lawsons Creek
Davisons Creek Tributary 1
Davisons Creek
Isons Creek Tributary 2
T. 84 N.
T. 83 N.
220TH ST
240TH ST
ABBOTT AVE
YATES AVE
ZEALE AVE
ZOLA AVE
WEBSTER ST
VINE ST
PRAIRIE ST
THREE BRIDGES RD
UNION PACIFIC RAILROAD
GRANITE ST
ROCK AVE
QUARRY RD
QUARRY AVE
STONE AVE
NK0144
25TH ST
GRANDVIEW DR
BENTON ST
WILLOW LN
FRANKLIN ST
FREMONT ST
MANOR RD
CLINTON ST
MAIN ST
JULIAN ST
BEANE ST
SHERI ST
JEFFREY ST
DRURY LN
CRESTVIEW DR
DAWN ST
COLLEGE AVE
JOINS PANEL 0300
3480000 FT
3475000 FT
3470000 FT
3465000 FT
42° 00' 00"
92° 45' 00"
5110000 FT
5115000 FT
5120000 FT

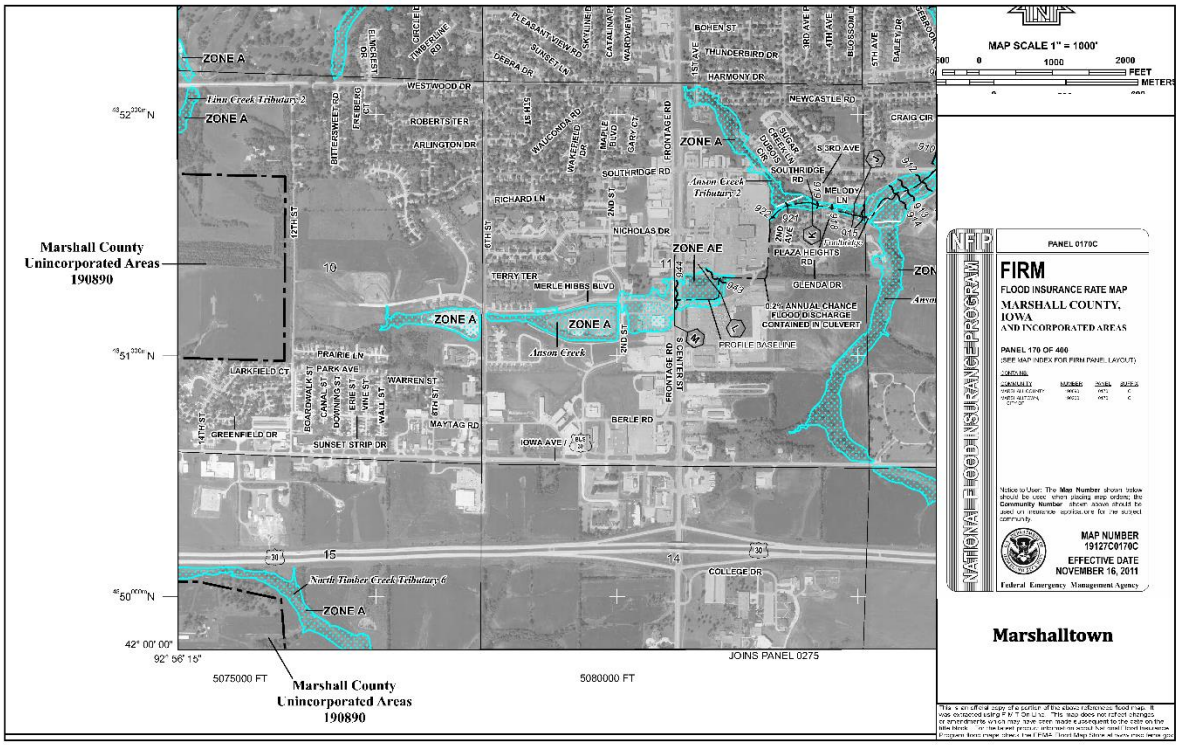

MAP SCALE 1" = 2000'
1000 0 2000 4000
FEET
METER
PANEL 0050C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 50 OF 400
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
19127C0050C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
Liscomb
ZONE A
City of Liscomb
190762
Marshall County
Unincorporated Areas
190890
JOINS PANEL 0075
3540000 FT
3535000 FT
3530000 FT
3525000 FT
MARSH AVE
MARBLE RD
NORTH ST
LINCOLN ST
SHERMAN ST
GRANT ST
CLINTON ST
EASTERN AVE
DUBUQUE ST
BANGOR ST
MAIN ST
125TH ST
127TH ST
130TH ST
135TH ST
140TH ST
INGRAM AVE
JESSUP AVE
KNAPP AVE
IOWA RIVER
STATE ST
LANGFORD AVE
UNION PACIFIC RAILROAD
Iowa River Tributary 21
Dowd Creek
Dowd Creek Tributary 2
Iowa River Tributary 20
Dowd Creek Tributary 1
Iowa River Tributary 19
Dowd Creek Tributary 1.1
Iowa River Tributary 18
Iowa River Tributary 17.1
Honey Creek Tributary 2
Iowa River Tributary 17
Iowa River Tributary 16
Iowa River Tributary 15
Honey Creek Tributary 1

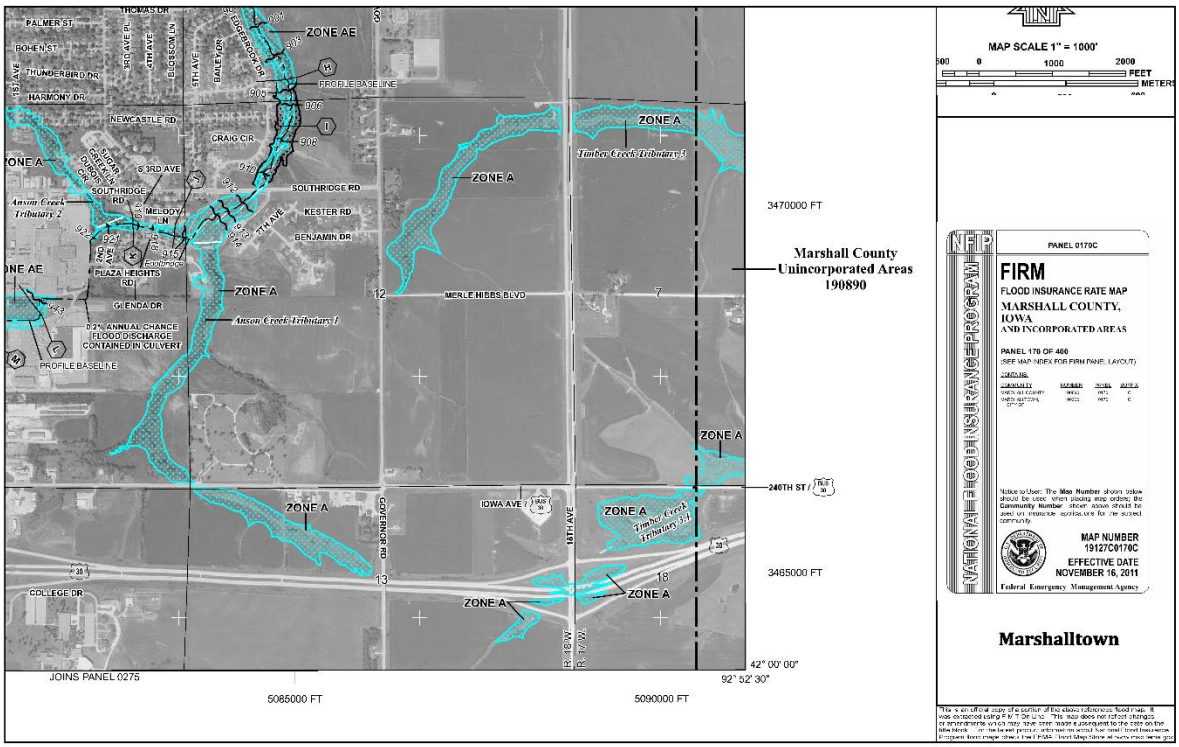

MAP SCALE 1" = 1000'
500 0 1000 2000
FEET
METER
PANEL 0170C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 170 OF 400
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
19127C0170C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
Marshalltown
Marshall County
Unincorporated Areas
190890
City of Marshalltown
190200
JOINS PANEL 0160
PROFILE BASELINE
92° 56' 15"
42° 03' 45"
IOWA RIVER
ZONE AE
ZONE A
FLOODING EFFECTS FROM IOWA RIVER
Note: This area is shown as being protected from the 1-percent-annual-chance or greater flood hazard by a levee system that has been provisionally accredited. Overtopping or failure of any levee system is possible. For additional information, see the Provisionally Accredited Levee Notice in Notes to Users.
Note: This area is shown as being protected from the 1-percent-annual-chance or greater flood hazard by a levee system that has been provisionally accredited. Overtopping or failure of any levee system is possible.
Beaver Creek
Bruddy Creek
NK0102
NK0101
NK0137
EDGEWOOD ST
LINWOOD AVE
RIVERSIDE ST
MARION ST
NORTH ST
SWAYZE ST
UNION ST
LEE ST
WOODBURY ST
BROMLEY ST
E ESTATE ST
E MAIN ST
W MAIN ST
W STATE ST
FREMONT ST
GRANT ST
BYRON ST
WEBSTER ST
LINCOLN ST
JEROME ST
MALLORY DR
FRENCH CT
HIGHLAND DR
PARK ST
HUGHES ST
INNES BLVD
N CENTER ST
MEMORIAL DR
CONSTITUTION AVE
SUMMIT ST
LIBERTY LN
CHURCH ST
LINN ST
BOONE ST
NEVADA ST
E NEVADA ST
MARKET ST
HARRISON DR
SUNSHINE DR
LINCOLNWAY
MADISON ST
WASHINGTON ST
JACKSON ST
MAY ST
E ANSON ST
IRVING TURNER ST
NOBLE ST
WOOD ST
UNION PACIFIC RAILROAD
CHICAGO, ROCK ISLAND & PACIFIC RAILROAD

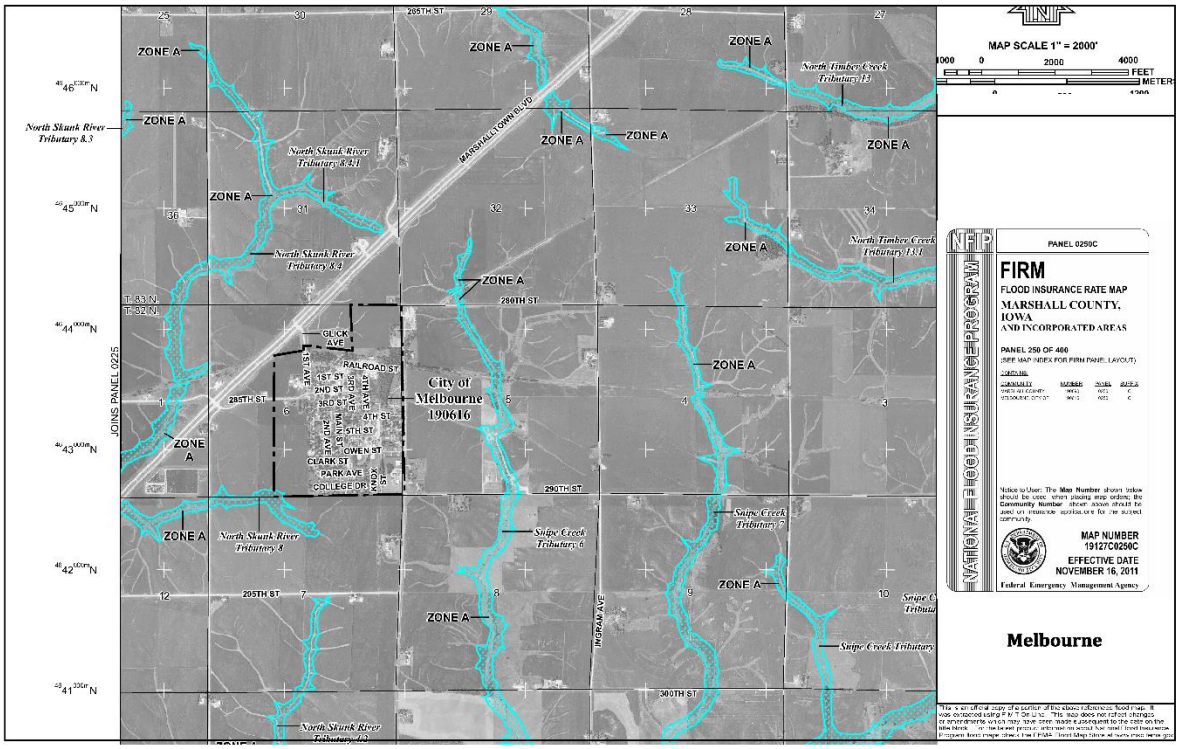

MAP SCALE 1" = 1000'
PANEL 0170C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 170 OF 460
MAP NUMBER 19127C0170C
EFFECTIVE DATE NOVEMBER 16, 2011
Federal Emergency Management Agency
Marshalltown
Marshall County Unincorporated Areas 190890
JOINS PANEL 0160
ZONE AE
ZONE A
FLOODING EFFECTS FROM IOWA RIVER
PROFILE BASELINE
3485000 FT
3480000 FT
Iowa River
Linn Creek
Footbridge
MARSHALL DR
BOONE ST
E NEVADA ST
QUARRY RD
MADISON ST
LAUREL DR
ELDER DR
NORRIS PL
JACKSON ST
MAY ST
E ANSON ST
E MAIN ST
CHURCH ST
LINN ST
MARKET ST
TURNER ST
WOODSBURY ST
MARION ST
SWAZYE ST
UNION ST
LINCOLN ST
WEBSTER ST
LEE ST
BROMLEY ST
E STATE ST
NORTH ST
RIVERSIDE ST
LINWOOD AVE
EDGEWOOD ST
BYRON ST
NOBLE ST
WOOD ST
UNION PACIFIC RAILROAD
UNION PACIFIC RAILROAD

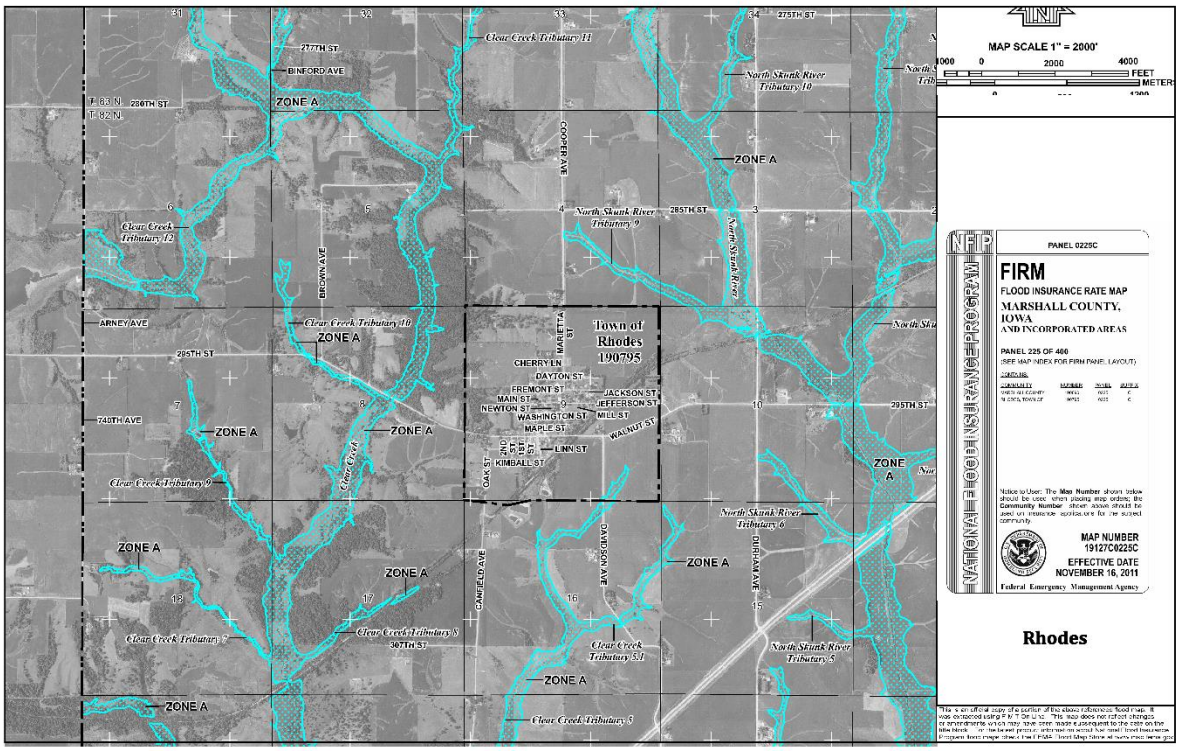

MAP SCALE 1" = 1000'
PANEL 0170C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 170 OF 460
MAP NUMBER 19127C0170C
EFFECTIVE DATE NOVEMBER 16, 2011
Federal Emergency Management Agency
Marshalltown
Marshall County Unincorporated Areas
JOINS PANEL 0165
ZONE A
ZONE AE
T. 83 N.
T. 84 N.
PROFILE BASELINE
Linn Creek
Linn Creek Tributary 1
Linn Creek Tributary 2
Anson Creek Tributary 2
WASHINGTON ST
W SOUTH ST
E SOUTH ST
W OLIVE ST
E OLIVE ST
HIGH ST
FINKLE AVE
FERNER ST
FAIRMEADOWS RD
RATCLIFFE DR
HENRY DR
GREENBRIAR LN
DENNIS DR
COLUMBUS DR
CREST VIEW DR
EDGELAND DR
MEADOW LN
RAINBOW DR
FRIENDLY DR
EASTVIEW RD
OLSON WAY
KOEPER DR
THOMAS DR
PALMER ST
BOHEN ST
THUNDERBIRD DR
HARMONY DR
WESTWOOD DR
ROBERTS TER
ARLINGTON DR
NEWCASTLE RD
CRAIG CIR
SOUTHRIDGE RD
MELODY LN
RICHARD LN
NICHOLAS DR
PLAZA HEIGHTS RD
FAIRWAY DR
COUNTRY CLUB LN
PLEASANT VIEW RD
SUNSET LN
DEBRA DR
CATALINA PL
SKYLINE DR
WARDVIEW DR
BAILEY DR
BRIDGEBROOK DR
BLOSSOM LN
FRONTAGE RD
MARBLE BLVD
GARY CT
MARBLEHEAD DR
BITTERSWEET RD
PREBEL RD
CIRCLE DR
TIMBERLINE RD
LANCASTER DR
ELMWOOD DR
HILLCREST RD
UNION PACIFIC RAILROAD

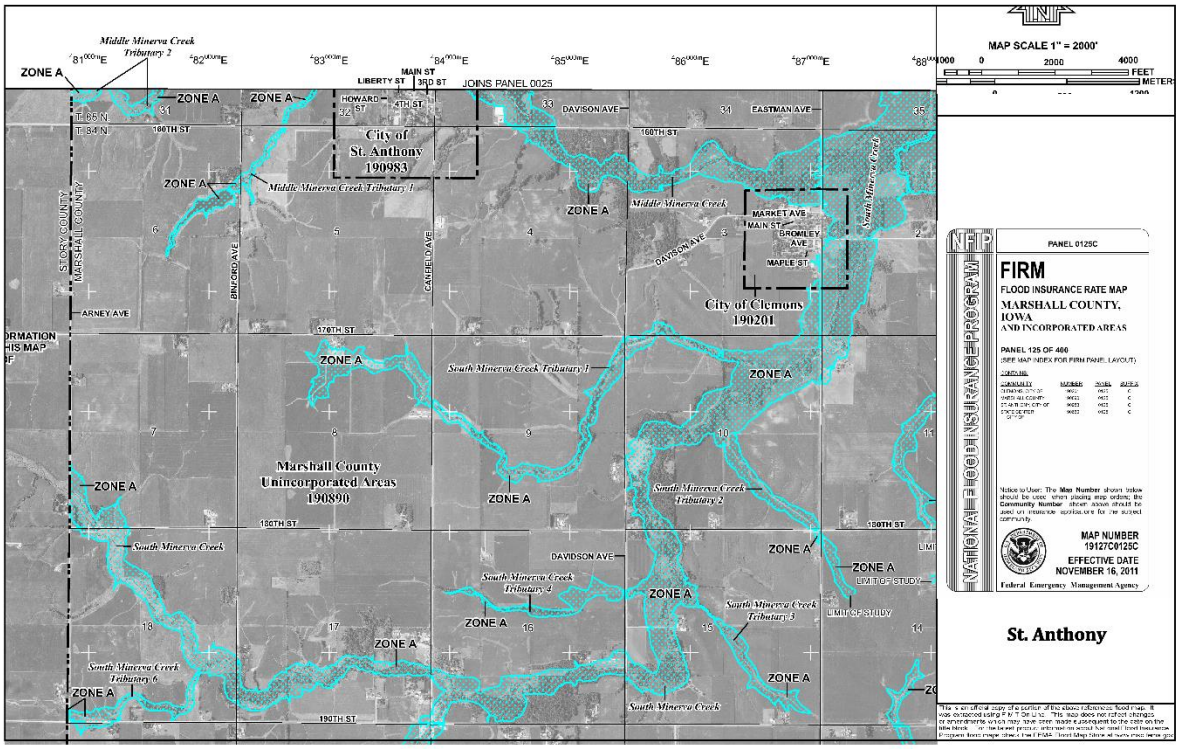

MAP SCALE 1" = 1000'
500 0 1000 2000
FEET
METERS
PANEL 0170C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 170 OF 460
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
19127C0170C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
Marshalltown
City of Marshalltown
190200
Marshall County
Unincorporated Areas
190890
ZONE AE
ZONE A
Timber Creek Tributary 1
Anson Creek
Anson Creek Tributary 2
Anson Creek Tributary 1
PROFILE BASELINE
0.2% ANNUAL CHANCE
JOINS PANEL 0190
3475000 FT
3470000 FT
T 84 N

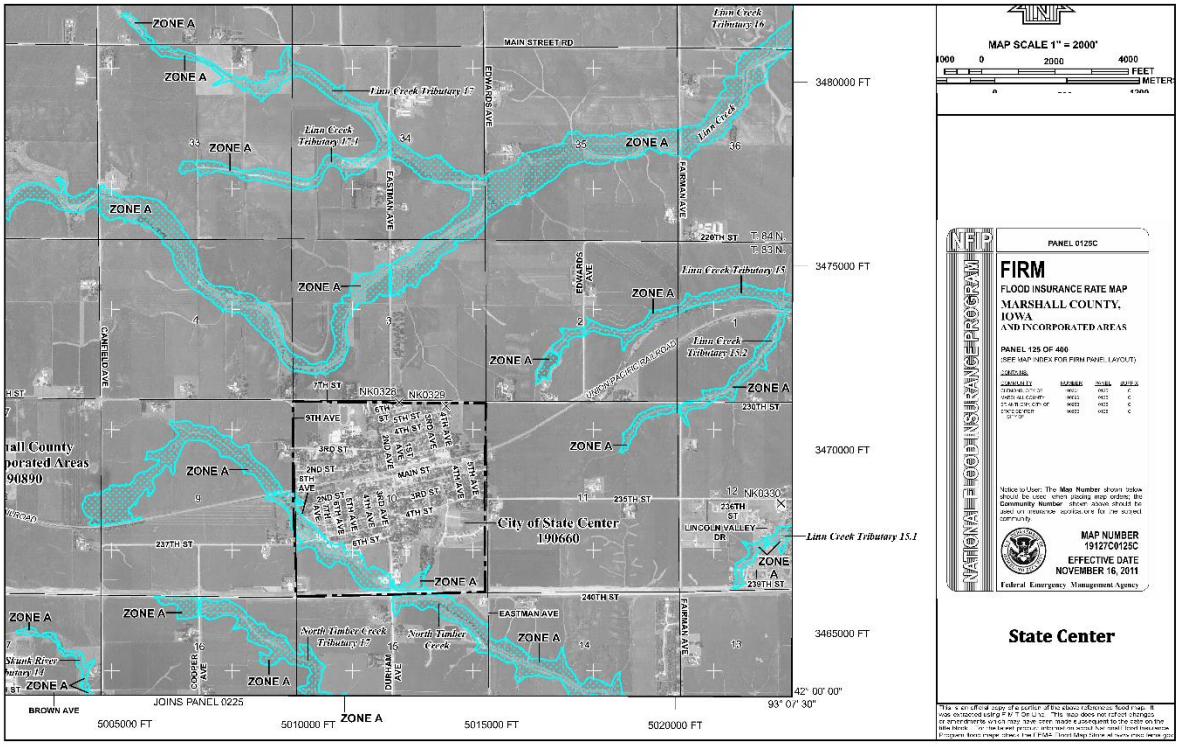

MAP SCALE 1" = 1000'
500 0 1000 2000
FEET
METERS
PANEL 0170C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 170 OF 460
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
19127C0170C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
Marshalltown
Marshall County
Unincorporated Areas
190890
ZONE AE
ZONE A
Timber Creek Tributary 2
Anson Creek
Anson Creek Tributary 2
North Timber Creek Tributary 6
PROFILE BASE LINE
0.2% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT
JOINS PANEL 0275
5075000 FT
5080000 FT
42° 00' 00"
92° 56' 15"


MAP SCALE 1" = 1000'
500 0 1000 2000
FEET
METERS
PANEL 0170C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 170 OF 460
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
MARSHALL COUNTY 190890 0170 C
MARSHALLTOWN 190616 0170 C
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the suited community.
MAP NUMBER
19127C0170C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM
Marshalltown
Marshall County Unincorporated Areas 190890
ZONE AE
ZONE A
PROFILE BASELINE
0.2% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT
Timber Creek Tributary 1
Timber Creek Tributary 1A
Anson Creek Tributary 1
Anson Creek Tributary 2
Swan Creek Tributary
MERLE HIBBS BLVD
240TH ST
IOWA AVE
COLLEGE DR
GOVERNOR RD
16TH AVE
SOUTHRIDGE RD
KESTER RD
BENJAMIN DR
PLAZA HEIGHTS RD
GLENDA DR
CRAIG CIR
MELODY LN
HARMONY DR
NEWCASTLE RD
THUNDERBIRD DR
BOHEN ST
PALMER ST
THOMAS DR
3470000 FT
3465000 FT
42° 00' 00"
92° 52' 30"
5085000 FT
5090000 FT
JOINS PANEL 0275


MAP SCALE 1" = 2000'
1000 0 2000 4000
FEET
METERS
PANEL 0250C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 250 OF 460
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
MARSHALL COUNTY 190890 0250 C
MELBOURNE 190616 0250 C
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the suited community.
MAP NUMBER
19127C0250C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM
Melbourne
City of Melbourne 190616
ZONE A
North Skunk River Tributary 8.3
North Skunk River Tributary 8.3A
North Skunk River Tributary 8.4
North Timber Creek Tributary 13
North Timber Creek Tributary 13A
Snipe Creek Tributary 6
Snipe Creek Tributary 7
MARSHALLTOWN BLVD
INGRAM AVE
285TH ST
290TH ST
300TH ST
205TH ST
GLICK AVE
RAILROAD ST
1ST ST
2ND ST
3RD ST
4TH ST
5TH ST
OWEN ST
CLARK ST
PARK AVE
COLLEGE DR
T. 83 N.
T. 82 N.
JOINS PANEL 0225


MAP SCALE 1" = 2000'
1000 0 2000 4000
FEET
METER
PANEL 0225C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 225 OF 400
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
19127C0225C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM
Rhodes
Town of Rhodes 190795
ZONE A
Clear Creek Tributary 11
North Skunk River Tributary 10
North Skunk River Tributary 9
Clear Creek Tributary 12
Clear Creek Tributary 10
Clear Creek Tributary 9
Clear Creek Tributary 7
Clear Creek Tributary 5
Clear Creek Tributary 5A
Clear Creek Tributary 3
North Skunk River Tributary 6
North Skunk River Tributary 5
BINFORD AVE
BROWN AVE
COOPER AVE
CAMFIELD AVE
DAVISON AVE
DUCHAW AVE
MARIETTA AVE
CHERRY LN
DAYTON ST
FREMONT ST
MAIN ST
NEWTON ST
WASHINGTON ST
MAPLE ST
JACKSON ST
JEFFERSON ST
MILL ST
WALNUT ST
LINN ST
KIMBALL ST
OAK ST
2ND ST
1ST ST
ARNEY AVE
295TH ST
285TH ST
275TH ST
277TH ST
286TH ST
T 83 N
T 82 N
749TH AVE


MAP SCALE 1" = 2000'
1000 0 2000 4000
FEET
METER
PANEL 0125C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 125 OF 400
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
19127C0125C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM
St. Anthony
City of St. Anthony 190983
City of Clemons 190201
Marshall County Unincorporated Areas 190890
ZONE A
Middle Minerva Creek Tributary 2
Middle Minerva Creek Tributary 1
Middle Minerva Creek
South Minerva Creek Tributary 1
South Minerva Creek Tributary 2
South Minerva Creek Tributary 3
South Minerva Creek Tributary 4
South Minerva Creek Tributary 6
South Minerva Creek
JOINS PANEL 0025
MAIN ST
LIBERTY ST
3RD ST
4TH ST
HOWARD ST
DAVISON AVE
EASTMAN AVE
MARKET AVE
BROMLEY AVE
MAPLE ST
DAWSON AVE
BINFORD AVE
CAMFIELD AVE
ARNEY AVE
DAVIDSON AVE
LIMIT OF STUDY
STORY COUNTY
MARSHALL COUNTY
T 85 N
T 84 N
160TH ST
176TH ST
180TH ST
190TH ST


ZONE A
MAIN STREET RD
Linn Creek Tributary 16
Linn Creek Tributary 17
Linn Creek Tributary 17.1
Linn Creek
EDWARDS AVE
EASTMAN AVE
FAIRMAN AVE
CAMELBACK AVE
226TH ST
T 84 N
T 83 N
3480000 FT
3475000 FT
Linn Creek Tributary 15
Linn Creek Tributary 15.2
UNION PACIFIC RAILROAD
NK0328
NK0329
NK0330
7TH ST
5TH AVE
4TH AVE
3RD AVE
2ND AVE
1ST AVE
MAIN ST
1ST ST
2ND ST
3RD ST
4TH ST
5TH ST
City of State Center
190660
231ST ST
235TH ST
236TH ST
LINCOLN VALLEY DR
Linn Creek Tributary 15.1
3470000 FT
237TH ST
240TH ST
EASTMAN AVE
North Timber Creek Tributary 16
North Timber Creek
3465000 FT
Skunk River Tributary 17
COOPER AVE
DURHAM AVE
BROWN AVE
JOINS PANEL 0225
5005000 FT
5010000 FT
5015000 FT
5020000 FT
42° 00' 00"
93° 07' 30"
MAP SCALE 1" = 2000'
1000 0 2000 4000
FEET
METERS
PANEL 0125C
FIRM
FLOOD INSURANCE RATE MAP
MARSHALL COUNTY, IOWA
AND INCORPORATED AREAS
PANEL 125 OF 400
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY
NUMBER
PANEL
SUFFIX
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER
19127C0125C
EFFECTIVE DATE
NOVEMBER 16, 2011
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM
State Center

Appendix F. Marshall County, Iowa Historic River Flooding News Articles

The following article documents river flooding events in Marshall County, Iowa in 2013. The purpose of including this article in the plan is to demonstrate that when the Iowa River basin floods, communities along the Iowa River in Marshall County are affected. These effects are not always documented in the available NCDC data. Iowa River communities are impacted by flood events which result in closed roads, flooding of agricultural lands, and sometimes flooding that affects infrastructure and buildings. Plain text of the news article and associated pictures have been collected. For the article as it appears at the source, follow the link provided.

As a point of reference to spatially show the communities affected by flooding in this article, a map displaying the Special Flood Hazard Areas for Marshall County has been included at the end of this section.

Source name: Times Republican
Flood date: References flooding in 2013
Link: http://timesrepublican.com/page/content.detail/id/560627/Flooding-makes-for-dicey-travel-in-Marshalltown-area.html

Flooding makes for dicey travel in Marshalltown area

May 31, 2013

By ANDREW POTTER - Staff Writer (apotter@timesrepublican.com), Times-Republican

At the Marshall County board of supervisors meeting Tuesday morning, Marshall County Engineer Paul Geilenfeldt said those looking to get to Marshalltown from the north can use Marble Road (E-18) west of Liscomb or 148th Street northwest of Albion to cross the river. There is also access to from Bangor to e-29 to Highway 330 to East Main Street.

Kim Elder, director of Marshall County Emergency Management, estimated that between 70 and 80 percent of basements in the area saw flooding. She said the Iowa River failed to hit its record 22 feet, and its level was falling Tuesday morning.

The board of supervisors signed a disaster declaration Tuesday, making the county available for state and federal assistance. A representative with the office of U.S. Rep. Bruce Braley, D-Iowa, is coming to Marshalltown Tuesday morning to meet with local officials.

In case of an emergency north of the river, the Marshalltown Area Paramedic Service has stationed an ambulance north of the Iowa River in Albion to serve the northern portions of the county. Supervisor Denny Grabenbauer urged area residents to continue to use caution and not drive through water.

"This is a dangerous situation," Grabenbauer said.
The NWS is also predicting severe weather, including possibly tornados, for all of Iowa Tuesday and select areas west of I-35 Wednesday.

The Iowa Department of Transportation and Marshall County Secondary Road Department announced the following road closures:

- Iowa Highway 14 between US Highway 30 and Iowa Highway 330, Marshalltown.
- Iowa Highway 330 between County Road E29 and County Road S75, near Albion.
- Zeller Avenue from 2200 mile to 2300 mile is closed.
- East Main Street Road in Marshalltown is closed from 2900 to 3100 block due to water over the road.
- US Highway 63 between County Road E64 and US Highway 30, near Tama.
- US 30 eastbound: Left lane closed between County Road T47 and Exit 202: US 63, two miles east of the Montour area. The left lane is closed because of flooding.
- US 30 westbound: Right lane closed between County Road T47 and Exit 202: US 63, near Montour. The right lane is closed because of flooding.
- Stanley Mill Road from 2000 to 2100 mile is closed due to water over the road from east of Knapp Avenue to Lafayette Avenue.
- Garwin Road from 2600 to 2700 mile is closed due to water at the intersection of Highway 14 and Garwin Road, right of Wiesegarden intersection.
- North Center Street Road from 1900 to 2100 mile is closed due to water over the road south of KDAO through the Marshalltown Water Works.

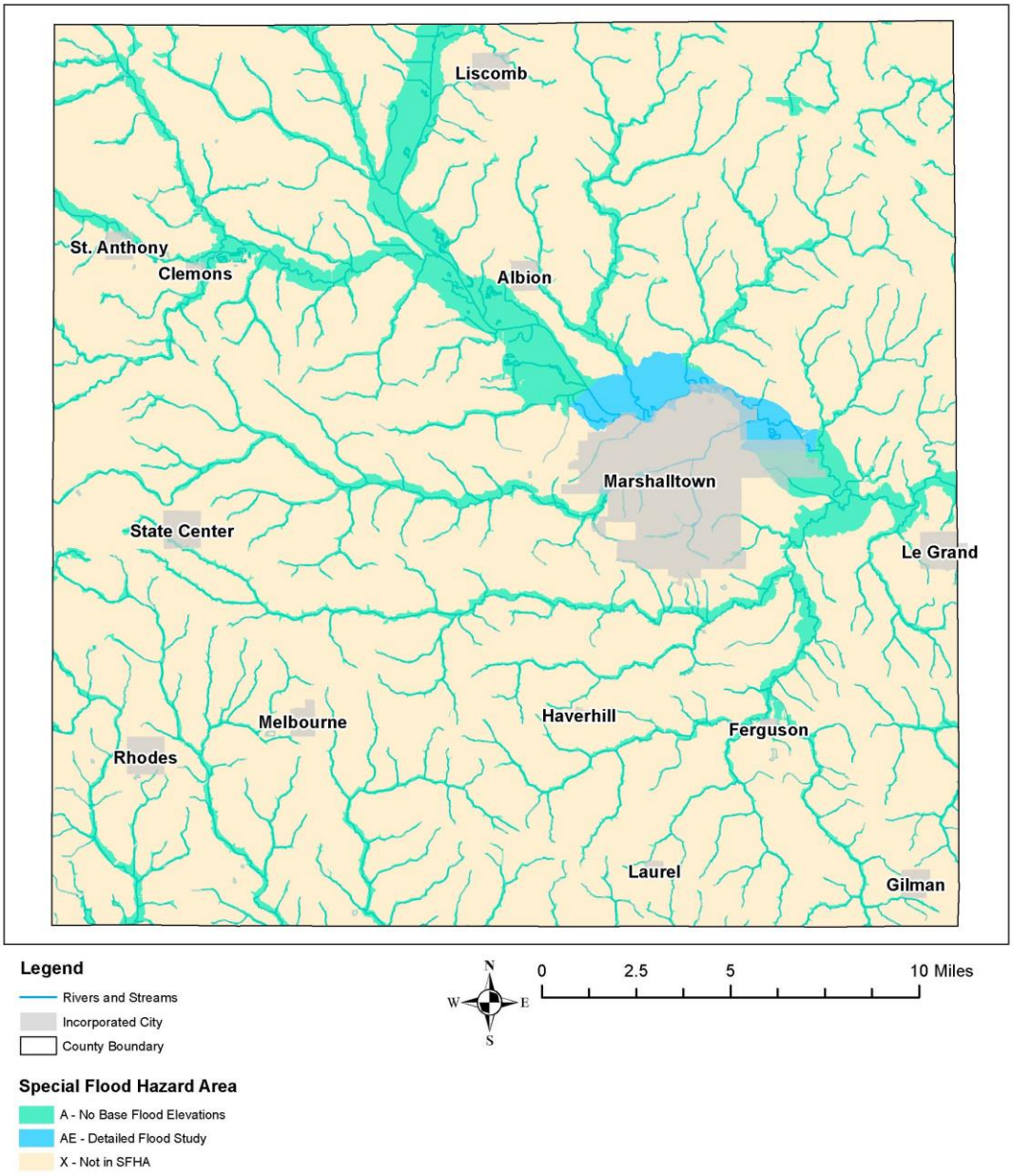
Article Photos



T-R PHOTO BY GARRY BRANDENBURG
This rural Marshall County bridge has its south approach washed away from flood waters of Honey Creek, a tributary to the Iowa River. The bridge is on Ingram Avenue about three-fourths of a mile north of 148th Street, not too far from the Royal Ranch.

The following map shows the Special Flood Hazard Areas of Marshall County. According to the news article, roads in and around the cities of Marshalltown and Albion were affected by flooding in 2013. Closed roads in Marshall and Tama County required all travelers to use alternate routes.

Special Flood Hazard Areas of Marshall County



Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS

Appendix G. Marshall County Historic Weather and Hazardous Materials Data

Historic Weather Data

Data from the earliest available records through December 2014 was obtained from the National Climatic Data Center (NCDC) Storm Event Database at http://www.ncdc.noaa.gov/stormevents/. The cutoff date of December 2014 was chosen in order to present a complete year of data. Data collection for the planning process began in Winter of 2015 in order to prepare for the first meeting in Spring of 2015. This is not a comprehensive list of all storms or events that may have affected Marshall County as all damage or storms may not have been recorded. Many of the events include a hyperlink to the NCDC website which provides a more detailed description of events (applied to digital copies of this plan only). This information can be accessed by clicking the hyperlinks in the "Location" column of the tables.

The following tables are organized alphabetically by hazard.

Mag = Magnitude Dth = Death Inj = Injury PrD = Property Damage CrD = Crop Damage

DROUGHT								
Location	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
MARSHALL (ZONE)	8/14/2000	0:00	Drought	N/A	0	0	0.00K	4.690M
MARSHALL (ZONE)	9/1/2000	0:00	Drought		0	0	0.00K	5.030M
MARSHALL (ZONE)	8/1/2001	0:00	Drought		0	0	0.00K	11.350M
MARSHALL (ZONE)	8/1/2003	0:00	Drought		0	0	12.650M	0.00K
MARSHALL (ZONE)	7/1/2012	0:00	Drought		0	0	0.00K	90.000M
MARSHALL (ZONE)	8/1/2012	0:00	Drought		0	0	0.00K	6.000M
MARSHALL (ZONE)	9/1/2012	0:00	Drought		0	0	0.00K	0.00K
MARSHALL (ZONE)	10/1/2012	0:00	Drought		0	0	0.00K	0.00K
MARSHALL (ZONE)	8/1/2013	0:00	Drought		0	0	0.00K	21.000M

FLASH FLOODING								
Location	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
CLEMONS	5/26/2013	14:35	Flash Flood	N/A	0	0	25.00K	0.00K
COUNTYWIDE	6/18/2002	2:00	Flash Flood		0	0	75.00K	50.00K
COUNTYWIDE	5/22/2004	20:30	Flash Flood		0	0	250.00K	50.00K
HAVERHILL	5/26/2013	17:10	Flash Flood		0	0	100.00K	0.00K
LURAY	6/11/2008	23:42	Flash Flood		0	0	50.00K	5.00K
LURAY	5/26/2013	15:30	Flash Flood		0	0	250.00K	0.00K
LURAY	5/29/2013	15:22	Flash Flood		0	0	200.00K	0.00K
MARIETTA	3/14/2008	4:00	Flash Flood		0	0	15.00K	0.00K
MARSHALLTOWN	6/22/2007	17:15	Flash Flood		0	0	150.00K	250.00K
MARSHALLTOWN	6/8/2008	18:00	Flash Flood		0	0	50.00K	0.00K

MARSHALLTOWN	4/26/2009	17:42	Flash Flood		0	0	15.00K	0.00K
MARSHALLTOWN	4/26/2009	19:03	Flash Flood		0	0	10.00K	0.00K
MARSHALLTOWN	4/26/2009	19:03	Flash Flood		0	0	10.00K	0.00K
MARSHALLTOWN ARPT	4/26/2009	17:42	Flash Flood		0	0	10.00K	0.00K
MARSHALLTOWN ARPT	5/26/2013	10:00	Flash Flood		0	0	20.00K	0.00K
QUARRY	6/30/2014	17:14	Flash Flood		0	0	50.00K	0.00K
RHODES	5/25/2013	9:01	Flash Flood		0	0	5.00K	0.00K
ST ANTHONY	5/26/2013	10:25	Flash Flood		0	0	25.00K	0.00K
STATE CENTER	3/2/2008	16:00	Flash Flood		0	0	25.00K	0.00K
STATE CENTER	3/2/2008	18:22	Flash Flood		0	0	25.00K	0.00K

RIVER FLOODING								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
MARSHALL (ZONE)	2/9/1996	6:00	Flood	N/A	0	0	0.00K	0.00K
MARSHALL (ZONE)	6/17/1996	3:00	Flood		0	0	0.00K	0.00K
MARSHALL (ZONE)	2/18/1997	18:00	Flood		0	0	0.00K	0.00K
MARSHALL (ZONE)	3/9/1997	6:00	Flood		0	0	0.00K	0.00K
MARSHALL (ZONE)	3/19/1997	12:00	Flood		0	0	0.00K	0.00K
MARSHALL (ZONE)	5/1/1997	0:00	Flood		0	0	5.00K	0.00K
MARSHALL (ZONE)	6/21/1997	15:00	Flood		0	0	0.00K	0.00K
MARSHALL (ZONE)	6/8/1998	18:00	Flood		0	0	50.00K	10.00K
MARSHALL (ZONE)	6/14/1998	9:00	Flood		0	0	100.00K	20.00K
MARSHALL (ZONE)	6/18/1998	2:00	Flood		0	0	100.00K	20.00K
MARSHALL (ZONE)	6/21/1998	6:00	Flood		0	0	100.00K	20.00K
MARSHALL (ZONE)	6/24/1998	3:00	Flood		0	0	75.00K	20.00K
MARSHALL (ZONE)	6/28/1998	6:00	Flood		0	0	75.00K	20.00K
MARSHALL (ZONE)	7/6/1998	3:00	Flood		0	0	50.00K	100.00K
MARSHALL (ZONE)	4/6/1999	18:00	Flood		0	0	7.00K	0.00K
MARSHALL (ZONE)	4/22/1999	6:00	Flood		0	0	10.00K	0.00K
MARSHALL (ZONE)	5/16/1999	21:00	Flood		0	0	200.00K	25.00K
MARSHALL (ZONE)	5/21/1999	15:00	Flood		0	0	50.00K	10.00K
MARSHALL (ZONE)	6/9/1999	6:00	Flood		0	0	50.00K	75.00K
MARSHALL (ZONE)	6/9/2000	18:00	Flood		0	0	25.00K	25.00K
MARSHALL (ZONE)	6/13/2000	15:00	Flood		0	0	20.00K	50.00K
MARSHALL (ZONE)	7/10/2000	6:00	Flood		0	0	50.00K	25.00K
MARSHALL (ZONE)	3/15/2001	15:00	Flood		0	0	5.00K	0.00K
MARSHALL (ZONE)	3/23/2001	18:00	Flood		0	0	7.50K	0.00K
MARSHALL (ZONE)	4/7/2001	21:00	Flood		0	0	150.00K	0.00K
MARSHALL (ZONE)	5/1/2001	0:00	Flood		0	0	75.00K	0.00K

MARSHALL (ZONE)	6/12/2001	15:00	Flood		0	0	25.00K	50.00K
MARSHALL (ZONE)	5/4/2003	12:00	Flood		0	0	5.00K	0.00K
MARSHALL (ZONE)	5/9/2003	6:00	Flood		0	0	5.00K	0.00K
MARSHALL (ZONE)	7/5/2003	12:00	Flood		0	0	10.00K	25.00K
MARSHALL (ZONE)	5/22/2004	18:00	Flood		0	0	100.00K	298.04K
MARSHALL (ZONE)	6/26/2005	0:00	Flood		0	0	74.07K	50.00K
MARSHALL (ZONE)	7/26/2005	21:00	Flood		0	0	10.00K	30.00K
MARSHALLTOWN	6/14/1998	11:00	Flood		0	0	100.00K	75.00K
MARSHALLTOWN	6/24/1998	1:00	Flood		0	0	30.00K	3.00K
MARSHALLTOWN	6/29/1998	13:00	Flood		0	0	50.00K	10.00K
MARSHALLTOWN	3/12/2007	2:15	Flood		0	0	50.00K	0.00K
MARSHALLTOWN	4/25/2007	14:45	Flood		0	0	100.00K	0.00K
MARSHALLTOWN	5/8/2007	0:15	Flood		0	0	25.00K	0.00K
MARSHALLTOWN	5/24/2007	13:45	Flood		0	0	25.00K	25.00K
MARSHALLTOWN	6/1/2007	0:00	Flood		0	0	0.00K	10.00K
MARSHALLTOWN	6/22/2007	16:45	Flood		0	0	0.00K	25.00K
MINERVA	3/14/2008	17:00	Flood		0	0	20.00K	0.00K
MINERVA	4/25/2008	17:30	Flood		0	0	20.00K	0.00K
MINERVA	5/30/2008	8:05	Flood		0	0	5.00K	25.00K
MINERVA	6/1/2008	0:00	Flood		0	0	100.00K	250.000M
MINERVA	6/6/2008	11:07	Flood		0	0	100.00K	500.00K
MINERVA	4/27/2009	5:50	Flood		0	0	5.00K	0.00K
MINERVA	3/11/2010	12:16	Flood		0	0	50.00K	0.00K
MINERVA	6/27/2010	10:30	Flood		0	0	250.00K	2.000M
MINERVA	7/1/2010	0:00	Flood		0	0	10.00K	25.00K
MINERVA	8/11/2010	23:30	Flood		0	0	25.00K	10.00K
MINERVA	5/26/2013	15:00	Flood		0	0	250.00K	0.00K
MINERVA	6/1/2013	0:00	Flood		0	0	0.00K	0.00K
ST ANTHONY	6/12/2010	12:00	Flood		0	0	0.00K	20.000M

SEVERE WINTER STORMS								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
MARSHALL (ZONE)	1/18/1996	9:00	Blizzard	N/A	0	0	0.00K	0.00K
MARSHALL (ZONE)	1/26/1996	12:00	Blizzard		0	0	0.00K	0.00K
MARSHALL (ZONE)	1/26/1996	0:00	Heavy Snow		0	0	0.00K	0.00K
MARSHALL (ZONE)	1/28/1996	20:00	Blizzard		0	0	0.00K	0.00K
MARSHALL (ZONE)	3/24/1996	22:00	Blizzard		0	0	0.00K	0.00K
MARSHALL (ZONE)	11/14/1996	16:00	Ice Storm		0	0	0.00K	0.00K
MARSHALL (ZONE)	2/3/1997	14:00	Heavy Snow		0	0	0.00K	0.00K
MARSHALL (ZONE)	10/26/1997	3:00	Heavy Snow		0	0	640.00K	2.600M
MARSHALL (ZONE)	12/21/1997	14:00	Ice Storm		0	0	2.05K	0.00K

MARSHALL (ZONE)	1/4/1998	6:30	Ice Storm		0	0	20.40K	0.00K
MARSHALL (ZONE)	1/20/1998	18:00	Heavy Snow		0	0	10.45K	0.00K
MARSHALL (ZONE)	3/7/1998	21:00	Heavy Snow		0	0	50.00K	0.00K
MARSHALL (ZONE)	3/17/1998	2:00	Ice Storm		0	0	5.88K	0.00K
MARSHALL (ZONE)	1/1/1999	15:00	Winter Storm		0	0	10.00K	0.00K
MARSHALL (ZONE)	2/11/1999	9:00	Ice Storm		0	0	5.00K	0.00K
MARSHALL (ZONE)	3/8/1999	0:00	Winter Storm		0	0	10.00K	0.00K
MARSHALL (ZONE)	1/19/2000	7:00	Winter Storm		0	0	1.00K	0.00K
MARSHALL (ZONE)	2/17/2000	23:00	Winter Storm		0	0	10.00K	0.00K
MARSHALL (ZONE)	12/10/2000	21:00	Winter Storm		0	0	24.90K	0.00K
MARSHALL (ZONE)	12/18/2000	9:00	Blizzard		0	0	25.00K	0.00K
MARSHALL (ZONE)	12/21/2000	12:00	Blizzard		0	0	20.00K	0.00K
MARSHALL (ZONE)	2/8/2001	16:00	Ice Storm		0	0	75.00K	0.00K
MARSHALL (ZONE)	2/8/2001	23:00	Winter Storm		0	0	50.00K	0.00K
MARSHALL (ZONE)	3/1/2002	17:00	Heavy Snow		0	0	5.00K	0.00K
MARSHALL (ZONE)	1/28/2003	5:00	Winter Weather		0	0	0.00K	0.00K
MARSHALL (ZONE)	2/14/2003	11:00	Winter Storm		0	0	5.00K	0.00K
MARSHALL (ZONE)	3/15/2004	7:00	Heavy Snow		0	0	10.00K	0.00K
MARSHALL (ZONE)	1/4/2005	17:00	Heavy Snow		0	0	10.00K	0.00K
MARSHALL (ZONE)	1/22/2005	1:00	Blizzard		0	0	5.00K	0.00K
MARSHALL (ZONE)	1/20/2007	23:00	Heavy Snow		0	0	0.00K	0.00K
MARSHALL (ZONE)	2/24/2007	3:00	Winter Storm		0	0	1.000M	0.00K
MARSHALL (ZONE)	12/1/2007	7:00	Ice Storm		0	0	10.00K	0.00K
MARSHALL (ZONE)	12/11/2007	1:00	Ice Storm		0	0	75.00K	0.00K
MARSHALL (ZONE)	2/5/2008	12:00	Winter Storm		0	0	10.00K	0.00K
MARSHALL (ZONE)	12/18/2008	20:00	Winter Storm		0	0	5.00K	0.00K
MARSHALL (ZONE)	12/27/2008	6:00	Ice Storm		0	0	5.00K	0.00K
MARSHALL (ZONE)	1/9/2009	17:00	Heavy Snow		0	0	0.00K	0.00K
MARSHALL (ZONE)	4/5/2009	9:00	Winter Storm		0	0	10.00K	0.00K
MARSHALL (ZONE)	12/8/2009	2:00	Heavy Snow		0	0	10.00K	0.00K
MARSHALL (ZONE)	12/9/2009	3:00	Blizzard		0	0	50.00K	0.00K

MARSHALL (ZONE)	1/6/2010	16:00	Winter Storm		0	0	25.00K	0.00K
MARSHALL (ZONE)	1/20/2010	6:00	Ice Storm		0	0	100.00K	0.00K
MARSHALL (ZONE)	1/25/2010	14:00	Blizzard		0	0	75.00K	0.00K
MARSHALL (ZONE)	12/11/2010	19:00	Blizzard		0	0	75.00K	0.00K
MARSHALL (ZONE)	2/1/2011	19:00	Blizzard		0	0	25.00K	0.00K
MARSHALL (ZONE)	12/19/2012	19:00	Winter Storm		0	0	25.00K	0.00K
MARSHALL (ZONE)	12/20/2012	2:00	Blizzard		0	0	100.00K	0.00K
MARSHALL (ZONE)	1/27/2013	6:00	Ice Storm		0	0	25.00K	0.00K
MARSHALL (ZONE)	1/30/2013	0:00	Winter Storm		0	0	25.00K	0.00K
MARSHALL (ZONE)	2/26/2013	8:00	Heavy Snow		0	0	5.00K	0.00K
MARSHALL (ZONE)	5/2/2013	17:00	Heavy Snow		0	0	100.00K	0.00K
MARSHALL (ZONE)	12/22/2013	0:00	Heavy Snow		0	0	0.00K	0.00K
MARSHALL (ZONE)	2/4/2014	16:00	Winter Storm		0	0	0.00K	0.00K

THUNDERSTORMS, LIGHTNING, AND HAIL								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
ALBION	5/18/2000	9:35	Hail	1.25 in.	0	0	5.00K	5.00K
ALBION	6/18/2001	21:38	Hail	0.88 in.	0	0	2.00K	5.00K
ALBION	7/18/2003	3:50	Hail	1.00 in.	0	0	5.00K	10.00K
ALBION	3/21/2007	10:49	Hail	0.75 in.	0	0	0.00K	0.00K
ALBION	8/3/2004	16:30	Tstorm Wind	52 kts. EG	0	0	10.00K	0.00K
ALBION	8/3/2004	16:40	Tstorm Wind	61 kts. EG	0	0	25.00K	5.00K
ALBION	7/11/2011	3:23	Tstorm Wind	75 kts. EG	0	0	50.00K	100.00K
ALBION	7/22/2013	18:52	Tstorm Wind	56 kts. EG	0	0	10.00K	0.00K
BANGOR	5/20/2013	19:11	Tstorm Wind	52 kts. EG	0	0	3.00K	0.00K
BEAMAN	4/26/2009	17:13	Tstorm Wind	56 kts. EG	0	0	25.00K	0.00K
Bolton	7/4/1995	17:55	Tstorm Wind	50 kts.	0	0	1.00K	0.00K
CLEMONS	8/25/2003	18:35	Tstorm Wind	52 kts. EG	0	0	2.00K	0.00K

CLEMONS	3/30/2006	19:10	Tstorm Wind	57 kts. EG	0	0	5.00K	0.00K
CLEMONS	8/25/2003	18:45	Hail	1.50 in.	0	0	5.00K	20.00K
CLEMONS	8/16/2004	21:44	Hail	1.00 in.	0	0	3.00K	5.00K
DILLON	5/19/2013	19:36	Tstorm Wind	55 kts. EG	0	0	2.00K	0.00K
Dunbar	4/8/1995	21:50	Hail	1.00 in.	0	0	2.00K	0.00K
DUNBAR	5/29/2013	15:30	Hail	1.00 in.	0	0	0.00K	5.00K
FERGUSON	3/9/2002	0:30	Tstorm Wind	56 kts. E	0	0	5.00K	0.00K
FERGUSON	8/26/2004	20:52	Tstorm Wind	52 kts. EG	0	0	2.00K	0.00K
FERGUSON	6/5/1997	13:48	Hail	0.75 in.	0	0	1.00K	5.00K
FERGUSON	6/24/2006	15:45	Hail	0.75 in.	0	0	0.00K	5.00K
GILMAN	4/20/2005	2:00	Lightning		0	0	3.00K	0.00K
GILMAN	7/24/2009	19:41	Hail	1.00 in.	0	0	2.00K	10.00K
GILMAN	5/29/2013	15:03	Hail	1.25 in.	0	0	5.00K	25.00K
GILMAN	5/29/2013	15:50	Hail	1.00 in.	0	0	0.00K	5.00K
GILMAN	6/25/2013	6:00	Heavy Rain		0	0	0.00K	0.00K
GILMAN	6/12/2001	4:20	Tstorm Wind	52 kts. E	0	0	5.00K	0.00K
GILMAN	8/26/2004	20:02	Tstorm Wind	50 kts. EG	0	0	1.00K	0.00K
GILMAN	8/26/2004	20:30	Tstorm Wind	57 kts. EG	0	0	5.00K	0.00K
GILMAN	6/6/2008	0:05	Tstorm Wind	61 kts. EG	0	0	15.00K	0.00K
GILMAN	5/29/2013	15:03	Tstorm Wind	52 kts. EG	0	0	0.00K	0.00K
GILMAN ARPT	5/29/2013	15:00	Hail	1.00 in.	0	0	0.00K	5.00K
GREEN MTN	7/26/2000	8:30	Hail	1.75 in.	0	0	10.00K	10.00K
GREEN MTN	5/10/2001	16:04	Hail	2.00 in.	0	0	10.00K	0.00K
GREEN MTN	8/2/2001	11:32	Hail	0.88 in.	0	0	1.00K	5.00K
GREEN MTN	6/14/2008	13:38	Hail	0.88 in.	0	0	1.00K	5.00K
HAVERHILL	5/19/1998	16:47	Hail	1.00 in.	0	0	1.00K	5.00K
HAVERHILL	10/14/1998	15:20	Hail	0.75 in.	0	0	0.00K	20.00K
Haverhill	7/4/1995	17:45	Tstorm Wind	50 kts.	0	0	3.00K	1.00K
HAVERHILL	4/5/1997	14:20	Tstorm Wind	55 kts.	0	0	50.00K	0.00K
HAVERHILL	7/25/2012	19:37	Tstorm Wind	56 kts. MG	0	0	5.00K	10.00K
LA MOILLE	5/24/2011	15:14	Tstorm Wind	52 kts. EG	0	0	0.00K	0.00K
LA MOILLE	7/11/2011	3:04	Tstorm Wind	70 kts. EG	0	0	50.00K	50.00K

LAUREL	6/4/2005	21:13	Tstorm Wind	52 kts. EG	0	0	5.00K	0.00K
LAUREL	6/29/2005	21:36	Tstorm Wind	57 kts. EG	0	0	5.00K	0.00K
LAUREL	9/7/2012	1:00	Tstorm Wind	52 kts. EG	0	0	10.00K	0.00K
LAUREL	6/12/2001	8:55	Hail	1.75 in.	0	0	25.00K	10.00K
LAUREL	3/8/2006	17:20	Hail	0.75 in.	0	0	0.00K	0.00K
LAUREL	6/8/2011	18:48	Hail	1.75 in.	0	0	5.00K	10.00K
LAUREL	6/8/2011	18:50	Hail	0.75 in.	0	0	0.00K	20.00K
LE GRAND	3/9/2002	0:35	Tstorm Wind	70 kts. E	0	0	50.00K	0.00K
LE GRAND	5/22/2004	20:35	Tstorm Wind	61 kts. EG	0	0	10.00K	0.00K
LE GRAND	10/14/1998	16:02	Hail	0.88 in.	0	0	0.50K	3.00K
LE GRAND	8/16/1987	15:00	Hail	2.00 in.	0	0	0.00K	0.00K
LISCOMB	5/9/2001	21:29	Hail	1.00 in.	0	0	5.00K	0.00K
LISCOMB	4/18/2002	18:10	Hail	0.75 in.	0	0	0.00K	0.00K
LISCOMB	8/25/2003	19:07	Hail	0.88 in.	0	0	2.00K	5.00K
LISCOMB	4/13/2006	18:00	Hail	0.88 in.	0	0	3.00K	0.00K
LISCOMB	8/3/2004	16:30	Tstorm Wind	57 kts. EG	0	0	25.00K	5.00K
LISCOMB	6/17/2009	23:45	Tstorm Wind	57 kts. EG	0	0	15.00K	0.00K
LISCOMB	6/30/2014	12:20	Tstorm Wind	65 kts. EG	0	0	100.00K	5.00K
LURAY	5/8/2009	16:08	Tstorm Wind	56 kts. MG	0	0	0.00K	0.00K
LURAY	6/19/2009	5:30	Tstorm Wind	52 kts. EG	0	0	3.00K	0.00K
LURAY	6/19/2009	5:30	Tstorm Wind	52 kts. EG	0	0	3.00K	0.00K
LURAY	7/11/2011	3:05	Tstorm Wind	75 kts. EG	0	0	150.00K	250.00K
LURAY	5/20/2013	20:23	Tstorm Wind	61 kts. MG	0	0	2.00K	0.00K
MARSHALL CO.	4/16/1960	14:00	Hail	0.75 in.	0	0	0.00K	0.00K
MARSHALL CO.	4/23/1961	10:15	Tstorm Wind	87 kts.	0	0	0.00K	0.00K
MARSHALL CO.	5/11/1962	14:00	Hail	2.00 in.	0	0	0.00K	0.00K
MARSHALL CO.	4/30/1967	16:30	Hail	2.50 in.	0	0	0.00K	0.00K
MARSHALL CO.	6/11/1969	20:20	Hail	2.00 in.	0	0	0.00K	0.00K
MARSHALL CO.	7/8/1971	2:00	Tstorm Wind	69 kts.	0	0	0.00K	0.00K

MARSHALL CO.	6/19/1974	23:35	Hail	1.75 in.	0	0	0.00K	0.00K
MARSHALL CO.	4/14/1976	20:50	Hail	1.75 in.	0	0	0.00K	0.00K
MARSHALL CO.	8/15/1977	17:20	Hail	1.75 in.	0	0	0.00K	0.00K
MARSHALL CO.	6/14/1985	23:25	Hail	0.88 in.	0	0	0.00K	0.00K
MARSHALL CO.	8/6/1985	17:40	Hail	1.00 in.	0	0	0.00K	0.00K
MARSHALL CO.	4/29/1986	16:09	Hail	1.75 in.	0	0	0.00K	0.00K
MARSHALL CO.	5/8/1986	16:25	Tstorm Wind	52 kts.	0	0	0.00K	0.00K
MARSHALL CO.	7/24/1986	22:15	Tstorm Wind	50 kts.	0	0	0.00K	0.00K
MARSHALL CO.	7/28/1986	22:00	Tstorm Wind	52 kts.	0	0	0.00K	0.00K
MARSHALL CO.	5/8/1988	11:55	Tstorm Wind	50 kts.	0	0	0.00K	0.00K
MARSHALL CO.	7/10/1989	19:10	Tstorm Wind	50 kts.	0	0	0.00K	0.00K
MARSHALL CO.	8/5/1989	8:55	Tstorm Wind	50 kts.	0	0	0.00K	0.00K
MARSHALL CO.	8/5/1989	9:15	Tstorm Wind	61 kts.	0	0	0.00K	0.00K
MARSHALL CO.	6/2/1990	11:10	Tstorm Wind	60 kts.	0	0	0.00K	0.00K
MARSHALL CO.	6/12/1990	16:12	Tstorm Wind	50 kts.	0	0	0.00K	0.00K
MARSHALL CO.	6/19/1990	5:15	Tstorm Wind	50 kts.	0	0	0.00K	0.00K
MARSHALL CO.	5/14/1991	9:38	Hail	1.50 in.	0	0	0.00K	0.00K
MARSHALL CO.	7/6/1991	4:46	Tstorm Wind	50 kts.	0	0	0.00K	0.00K
MARSHALL CO.	9/12/1991	14:47	Tstorm Wind	50 kts.	0	0	0.00K	0.00K
MARSHALL CO.	5/16/1992	23:10	Tstorm Wind	70 kts.	0	0	0.00K	0.00K
MARSHALL CO.	6/17/1992	2:36	Tstorm Wind	50 kts.	0	0	0.00K	0.00K
MARSHALLTOWN	7/10/1989	18:47	Hail	1.00 in.	0	0	0.00K	0.00K
MARSHALLTOWN	3/22/1991	17:00	Hail	1.75 in.	0	0	0.00K	0.00K
MARSHALLTOWN	3/27/1991	0:08	Hail	1.75 in.	0	0	0.00K	0.00K
Marshalltown	4/14/1994	20:25	Hail	1.75 in.	0	0	50.00K	0.00K
Marshalltown	6/6/1994	20:12	Tstorm Wind	50 kts.	0	0	5.00K	0.00K
Marshalltown	7/4/1995	17:56	Tstorm Wind	50 kts.	0	0	10.00K	1.00K
MARSHALLTOWN	4/18/1996	12:10	Hail	0.75 in.	0	0	10.00K	0.00K
MARSHALLTOWN	6/5/1997	13:38	Hail	0.75 in.	0	0	1.00K	5.00K
MARSHALLTOWN	6/5/1997	13:40	Hail	1.75 in.	0	0	25.00K	10.00K

MARSHALLTOWN	6/11/1998	13:10	Tstorm Wind	50 kts.	0	0	5.00K	0.00K
MARSHALLTOWN	6/29/1998	12:35	Tstorm Wind	56 kts.	0	0	20.00K	1.00K
MARSHALLTOWN	6/29/1998	12:45	Tstorm Wind	69 kts.	0	0	75.00K	10.00K
MARSHALLTOWN	6/29/1998	12:53	Tstorm Wind	61 kts.	0	0	50.00K	1.00K
MARSHALLTOWN	5/16/1999	20:30	Tstorm Wind	56 kts.	0	0	10.00K	0.00K
MARSHALLTOWN	6/4/1999	10:45	Hail	0.88 in.	0	0	1.00K	5.00K
MARSHALLTOWN	6/8/1999	20:00	Hail	0.88 in.	0	0	2.00K	3.00K
MARSHALLTOWN	6/13/2000	13:05	Tstorm Wind	56 kts. E	0	0	25.00K	1.00K
MARSHALLTOWN	7/26/2000	8:20	Hail	1.75 in.	0	0	25.00K	10.00K
MARSHALLTOWN	7/26/2000	8:30	Hail	1.25 in.	0	0	10.00K	5.00K
MARSHALLTOWN	9/14/2000	1:00	Tstorm Wind	69 kts. E	0	0	100.00K	75.00K
MARSHALLTOWN	4/8/2001	20:27	Hail	0.88 in.	0	0	1.00K	0.00K
MARSHALLTOWN	6/12/2001	4:34	Hail	0.75 in.	0	0	0.00K	5.00K
MARSHALLTOWN	6/12/2001	4:55	Hail	0.75 in.	0	0	0.00K	2.00K
MARSHALLTOWN	7/8/2001	9:35	Tstorm Wind	61 kts. E	0	0	10.00K	3.00K
MARSHALLTOWN	7/8/2001	9:40	Tstorm Wind	65 kts. E	0	0	15.00K	5.00K
MARSHALLTOWN	9/7/2001	14:15	Tstorm Wind	52 kts. E	0	0	5.00K	0.00K
MARSHALLTOWN	3/9/2002	0:26	Tstorm Wind	61 kts. E	0	0	30.00K	0.00K
MARSHALLTOWN	6/17/2002	22:52	Hail	1.00 in.	0	0	5.00K	5.00K
MARSHALLTOWN	6/25/2003	11:30	Tstorm Wind	50 kts. EG	0	0	3.00K	0.00K
MARSHALLTOWN	8/17/2002	3:55	Tstorm Wind	54 kts. E	0	0	10.00K	5.00K
MARSHALLTOWN	5/14/2003	13:44	Hail	1.00 in.	0	0	5.00K	0.00K
MARSHALLTOWN	7/18/2003	3:45	Hail	3.00 in.	0	0	50.00K	25.00K
MARSHALLTOWN	3/24/2004	3:50	Hail	0.75 in.	0	0	0.00K	0.00K
MARSHALLTOWN	8/3/2004	16:27	Tstorm Wind	57 kts. EG	0	0	50.00K	5.00K
MARSHALLTOWN	8/3/2004	16:30	Tstorm Wind	57 kts. EG	0	0	100.00K	5.00K
MARSHALLTOWN	8/26/2004	20:06	Tstorm Wind	50 kts. EG	0	0	1.00K	0.00K
MARSHALLTOWN	8/26/2004	20:10	Tstorm Wind	65 kts. EG	0	0	20.00K	3.00K
MARSHALLTOWN	9/8/2005	12:10	Tstorm Wind	52 kts. EG	0	0	10.00K	0.00K

MARSHALLTOWN	3/8/2006	17:34	Hail	0.88 in.	0	0	2.00K	0.00K
MARSHALLTOWN	3/8/2006	17:35	Hail	0.88 in.	0	0	3.00K	0.00K
MARSHALLTOWN	3/13/2006	0:10	Hail	1.25 in.	0	0	5.00K	0.00K
MARSHALLTOWN	3/21/2007	10:31	Hail	0.75 in.	0	0	0.00K	0.00K
MARSHALLTOWN	3/31/2007	14:45	Tstorm Wind	55 kts. EG	0	0	3.00K	0.00K
MARSHALLTOWN	7/18/2007	17:07	Tstorm Wind	52 kts. EG	0	0	10.00K	0.00K
MARSHALLTOWN	7/18/2007	17:18	Tstorm Wind	52 kts. MG	0	0	3.00K	50.00K
MARSHALLTOWN	7/18/2007	21:05	Hail	0.75 in.	0	0	0.00K	10.00K
MARSHALLTOWN	8/19/2007	19:29	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN	8/21/2007	23:08	Tstorm Wind	51 kts. MG	0	0	2.00K	0.00K
MARSHALLTOWN	6/5/2008	0:48	Tstorm Wind	59 kts. MG	0	0	2.00K	0.00K
MARSHALLTOWN	6/5/2008	0:51	Tstorm Wind	67 kts. EG	0	0	20.00K	0.00K
MARSHALLTOWN	6/14/2008	13:31	Tstorm Wind	51 kts. MG	0	0	0.00K	0.00K
MARSHALLTOWN	4/26/2009	6:00	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN	4/26/2009	6:00	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN	6/7/2009	19:28	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN	6/19/2009	5:35	Tstorm Wind	82 kts. MG	0	0	25.00K	100.00K
MARSHALLTOWN	6/23/2009	15:10	Tstorm Wind	52 kts. EG	0	0	2.00K	0.00K
MARSHALLTOWN	8/9/2009	17:44	Tstorm Wind	65 kts. MG	0	0	10.00K	25.00K
MARSHALLTOWN	8/8/2010	21:38	Tstorm Wind	52 kts. EG	0	0	2.00K	0.00K
MARSHALLTOWN	8/8/2010	21:49	Tstorm Wind	56 kts. EG	0	0	25.00K	0.00K
MARSHALLTOWN	3/22/2011	18:55	Hail	0.88 in.	0	0	0.00K	0.00K
MARSHALLTOWN	7/11/2011	3:09	Tstorm Wind	85 kts. EG	0	0	500.00K	50.00K
MARSHALLTOWN	7/11/2011	3:20	Tstorm Wind	70 kts. MG	0	0	50.00K	50.00K
MARSHALLTOWN	10/12/2011	15:05	Lightning		0	0	10.00K	0.00K
MARSHALLTOWN	4/15/2012	6:00	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN	6/29/2012	7:09	Hail	0.88 in.	0	0	0.00K	5.00K
MARSHALLTOWN	7/14/2012	13:23	Hail	1.00 in.	0	0	0.00K	5.00K
MARSHALLTOWN	7/14/2012	13:27	Hail	0.88 in.	0	0	0.00K	3.00K
MARSHALLTOWN	7/25/2012	19:43	Tstorm Wind	55 kts. MG	0	0	0.00K	0.00K
MARSHALLTOWN	5/26/2013	6:00	Heavy Rain		0	0	0.00K	0.00K

MARSHALLTOWN	5/29/2013	14:53	Tstorm Wind	59 kts. MG	0	0	5.00K	0.00K
MARSHALLTOWN	6/25/2013	6:00	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN	7/22/2013	18:45	Tstorm Wind	56 kts. EG	0	0	15.00K	0.00K
MARSHALLTOWN	4/3/2014	18:14	Hail	0.88 in.	0	0	0.00K	0.00K
MARSHALLTOWN	4/3/2014	18:15	Hail	1.00 in.	0	0	0.00K	0.00K
MARSHALLTOWN	4/12/2014	6:00	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN	6/27/2014	12:15	Tstorm Wind	65 kts. EG	0	0	200.00K	0.00K
MARSHALLTOWN	8/23/2014	4:42	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN	8/23/2014	5:17	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN	8/23/2014	6:00	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN	8/23/2014	6:00	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN	9/1/2014	6:00	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN	9/1/2014	7:00	Heavy Rain		0	0	0.00K	0.00K
MARSHALLTOWN ARPT	6/15/1997	16:46	Tstorm Wind	55 kts.	0	0	10.00K	0.00K
MARSHALLTOWN ARPT	6/29/1998	12:33	Tstorm Wind	57 kts.	0	0	10.00K	1.00K
MARSHALLTOWN ARPT	7/11/2004	9:53	Tstorm Wind	50 kts. MG	0	0	0.00K	0.00K
MARSHALLTOWN ARPT	8/26/2004	20:06	Tstorm Wind	54 kts. MG	0	0	1.00K	0.00K
MARSHALLTOWN ARPT	6/14/2008	13:30	Tstorm Wind	51 kts. MG	0	0	0.00K	0.00K
MARSHALLTOWN ARPT	7/12/2008	0:29	Tstorm Wind	52 kts. MG	0	0	1.00K	0.00K
MARSHALLTOWN ARPT	6/23/2009	15:12	Tstorm Wind	50 kts. MG	0	0	2.00K	0.00K
MARSHALLTOWN ARPT	5/2/2010	14:08	Tstorm Wind	62 kts. MG	0	0	5.00K	0.00K
MARSHALLTOWN ARPT	5/19/2013	19:12	Tstorm Wind	52 kts. MG	0	0	0.00K	0.00K
MARSHALLTOWN ARPT	6/24/2013	12:11	Tstorm Wind	55 kts. MG	0	0	5.00K	0.00K
MARSHALLTOWN ARPT	5/19/1998	16:50	Hail	1.50 in.	0	0	10.00K	5.00K
MARSHALLTOWN ARPT	6/14/2008	13:25	Hail	0.75 in.	0	0	0.00K	5.00K
MARSHALLTOWN ARPT	5/12/2010	17:52	Hail	1.00 in.	0	0	3.00K	0.00K
MARSHALLTOWN ARPT	5/12/2010	17:55	Hail	0.88 in.	0	0	1.00K	0.00K
MARSHALLTOWN ARPT	6/25/2013	6:00	Heavy Rain		0	0	0.00K	0.00K
MELBOURNE	10/14/1998	15:30	Hail	1.00 in.	0	0	10.00K	100.00K

MELBOURNE	4/8/1999	11:54	Hail	0.88 in.	0	0	2.00K	0.00K
MELBOURNE	4/8/1999	12:02	Hail	0.88 in.	0	0	4.00K	0.00K
MELBOURNE	7/26/2000	5:40	Hail	0.75 in.	0	0	2.00K	10.00K
MELBOURNE	5/10/2001	17:32	Hail	0.88 in.	0	0	3.00K	0.00K
MELBOURNE	5/10/2001	17:36	Hail	0.88 in.	0	0	3.00K	0.00K
MELBOURNE	6/8/2011	17:45	Hail	1.00 in.	0	0	2.00K	10.00K
Melborne	7/4/1995	17:09	Tstorm Wind	52 kts.	0	0	5.00K	1.00K
Melbourne	4/14/1994	22:21	Tstorm Wind	61 kts.	0	0	50.00K	0.00K
MELBOURNE	5/22/2004	19:15	Tstorm Wind	80 kts. EG	0	0	25.00K	0.00K
MELBOURNE	4/18/2006	21:00	Tstorm Wind	52 kts. EG	0	0	2.00K	0.00K
MELBOURNE	6/5/2008	0:23	Tstorm Wind	57 kts. EG	0	0	15.00K	0.00K
QUARRY	7/11/2011	3:13	Tstorm Wind	65 kts. EG	0	0	40.00K	50.00K
RHODES	5/22/2004	19:19	Tstorm Wind	69 kts. EG	0	0	10.00K	0.00K
RHODES	6/26/2011	21:15	Tstorm Wind	52 kts. EG	0	0	5.00K	0.00K
RHODES	10/14/1998	14:45	Hail	0.75 in.	0	0	0.00K	20.00K
RHODES	5/10/2001	17:15	Hail	1.75 in.	0	0	15.00K	0.00K
RHODES	5/10/2001	17:28	Hail	1.50 in.	0	0	15.00K	0.00K
RHODES	8/16/2004	22:49	Hail	0.75 in.	0	0	0.00K	2.00K
ST ANTHONY	5/14/1991	8:53	Hail	0.88 in.	0	0	0.00K	0.00K
ST ANTHONY	5/18/2000	9:33	Hail	1.00 in.	0	0	3.00K	5.00K
ST ANTHONY	8/25/2003	18:52	Hail	0.88 in.	0	0	2.00K	5.00K
ST ANTHONY	8/25/2003	18:54	Hail	1.00 in.	0	0	5.00K	5.00K
ST ANTHONY	8/25/2003	18:57	Hail	1.25 in.	0	0	5.00K	5.00K
ST ANTHONY	6/22/2007	5:30	Lightning		0	0	350.00K	0.00K
ST ANTHONY	6/25/2008	18:33	Hail	1.75 in.	0	0	5.00K	10.00K
STATE CENTER	4/29/1986	16:02	Hail	1.75 in.	0	0	0.00K	0.00K
State Center	4/14/1994	22:25	Hail	1.75 in.	0	0	50.00K	0.00K
STATE CENTER	4/18/1996	12:03	Hail	0.75 in.	0	0	5.00K	0.00K
STATE CENTER	5/30/1998	13:25	Hail	1.75 in.	0	0	10.00K	10.00K
STATE CENTER	5/30/1998	13:35	Hail	2.75 in.	0	0	100.00K	5.00K
STATE CENTER	5/30/1998	13:38	Hail	1.75 in.	0	0	10.00K	10.00K
STATE CENTER	5/30/1998	13:39	Hail	2.75 in.	0	0	50.00K	5.00K
STATE CENTER	6/13/2000	12:35	Hail	1.00 in.	0	0	5.00K	5.00K
STATE CENTER	5/10/2001	17:12	Hail	2.75 in.	0	0	30.00K	0.00K
STATE CENTER	6/12/2001	9:35	Hail	0.75 in.	0	0	0.00K	5.00K
STATE CENTER	6/12/2001	9:52	Hail	1.75 in.	0	0	10.00K	10.00K

STATE CENTER	7/7/2003	18:43	Hail	1.00 in.	0	0	5.00K	10.00K
STATE CENTER	7/7/2003	18:55	Hail	0.88 in.	0	0	3.00K	5.00K
STATE CENTER	3/6/2005	22:04	Hail	0.88 in.	0	0	1.00K	0.00K
STATE CENTER	7/12/2008	0:13	Hail	0.88 in.	0	0	1.00K	10.00K
STATE CENTER	4/2/2010	10:50	Hail	0.88 in.	0	0	0.00K	0.00K
STATE CENTER	4/2/2010	10:55	Hail	0.88 in.	0	0	0.00K	0.00K
STATE CENTER	5/12/2010	13:15	Hail	1.25 in.	0	0	10.00K	0.00K
STATE CENTER	6/8/2011	17:19	Hail	0.88 in.	0	0	0.00K	0.00K
STATE CENTER	6/9/2011	20:10	Hail	1.75 in.	0	0	15.00K	0.00K
STATE CENTER	6/9/2011	20:11	Hail	1.75 in.	0	0	15.00K	0.00K
STATE CENTER	5/25/2013	11:07	Heavy Rain		0	0	0.00K	0.00K
STATE CENTER	5/25/2013	11:46	Heavy Rain		0	0	0.00K	0.00K
STATE CENTER	4/12/2014	20:17	Hail	1.00 in.	0	0	2.00K	0.00K
State Center	8/14/1993	14:25	Tstorm Wind	50 kts.	0	0	5.00K	0.50K
State Center	4/14/1994	22:15	Tstorm Wind	60 kts.	0	0	50.00K	0.00K
STATE CENTER	5/19/1996	17:16	Tstorm Wind	52 kts.	0	0	2.00K	0.00K
STATE CENTER	6/18/1998	13:45	Tstorm Wind	56 kts.	0	0	20.00K	3.00K
STATE CENTER	6/27/1998	22:45	Tstorm Wind	56 kts.	0	0	5.00K	0.50K
STATE CENTER	6/27/1998	22:45	Tstorm Wind	56 kts.	0	0	3.00K	0.00K
STATE CENTER	6/13/2000	17:55	Tstorm Wind	69 kts. E	0	0	75.00K	5.00K
STATE CENTER	4/11/2001	14:53	Tstorm Wind	53 kts. M	0	0	2.00K	0.00K
STATE CENTER	4/11/2001	14:53	Tstorm Wind	53 kts. E	0	0	5.00K	0.00K
STATE CENTER	7/8/2001	9:15	Tstorm Wind	61 kts. E	0	0	10.00K	2.00K
STATE CENTER	7/8/2001	9:25	Tstorm Wind	61 kts. E	0	0	10.00K	2.00K
STATE CENTER	9/7/2001	20:33	Tstorm Wind	57 kts. E	0	0	10.00K	3.00K
STATE CENTER	8/3/2004	16:05	Tstorm Wind	54 kts. EG	0	0	5.00K	0.00K
STATE CENTER	6/20/2005	19:00	Tstorm Wind	52 kts. EG	0	0	3.00K	0.00K
STATE CENTER	6/20/2005	19:10	Tstorm Wind	61 kts. EG	0	0	25.00K	0.00K
STATE CENTER	3/31/2007	14:30	Tstorm Wind	56 kts. EG	0	0	10.00K	0.00K

STATE CENTER	3/31/2007	14:33	Tstorm Wind	56 kts. EG	0	0	10.00K	0.00K
STATE CENTER	7/18/2007	17:06	Tstorm Wind	65 kts. EG	0	0	30.00K	50.00K
STATE CENTER	5/2/2012	1:19	Tstorm Wind	61 kts. EG	0	0	15.00K	0.00K
STATE CENTER	6/20/2012	19:57	Tstorm Wind	61 kts. EG	0	0	15.00K	0.00K
STATE CENTER	5/19/2013	19:18	Tstorm Wind	52 kts. EG	0	0	3.00K	0.00K
STATE CENTER	5/20/2013	19:15	Tstorm Wind	52 kts. EG	0	0	5.00K	0.00K
STATE CENTER	7/22/2013	18:30	Tstorm Wind	52 kts. EG	0	0	5.00K	0.00K
VAN CLEVE	5/20/2014	19:42	Hail	0.88 in.	0	0	0.00K	0.00K

TORNADO								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
ALBION	8/3/2004	16:20	Tornado	F1	0	0	100.00K	10.00K
BANGOR	06/30/2014	12:15	Tornado	EF0	0	0	50.00K	5.00K
FERGUSON	5/22/2004	19:19	Tornado	F0	0	0	0.00K	1.00K
GILMAN	6/6/1969	22:50	Tornado	F1	0	0	25.00K	0.00K
LE GRAND	5/19/1996	17:30	Tornado	F0	0	0	0.00K	0.00K
MARSHALL CO.	6/1/1951	21:15	Tornado	F3	0	7	0.00K	0.00K
MARSHALL CO.	5/28/1962	21:00	Tornado	F2	0	5	250.00K	0.00K
MARSHALL CO.	6/11/1966	19:45	Tornado	F1	0	0	0.00K	0.00K
MARSHALL CO.	6/11/1969	20:15	Tornado	F2	0	0	25.00K	0.00K
MARSHALL CO.	9/16/1978	19:25	Tornado	F3	0	0	0.00K	0.00K
MARSHALL CO.	4/10/1981	17:55	Tornado	F2	0	9	2.500M	0.00K
MARSHALL CO.	7/11/1987	22:46	Tornado	F0	0	0	2.50K	0.00K
MARSHALL CO.	5/24/1989	18:42	Tornado	F4	0	0	25.000M	0.00K
MARSHALL CO.	5/24/1989	19:40	Tornado	F0	0	0	2.50K	0.00K
MARSHALLTOWN	4/23/1961	10:15	Tornado	F3	0	6	2.500M	0.00K
MARSHALLTOWN	6/6/1969	18:30	Tornado	F2	0	0	25.00K	0.00K
MARSHALLTOWN	6/22/1969	16:25	Tornado	F0	0	0	25.00K	0.00K
MARSHALLTOWN	6/18/1974	20:01	Tornado	F0	0	0	2.50K	0.00K
MARSHALLTOWN	9/12/1991	14:30	Tornado	F1	0	0	25.00K	0.00K
MARSHALLTOWN	6/29/1998	12:50	Tornado	F1	0	0	20.00K	5.00K
MARSHALLTOWN	7/19/2008	19:10	Tornado	EF0	0	0	0.00K	0.00K
MELBOURNE	5/22/2004	19:40	Tornado	F1	0	0	10.00K	5.00K
MELBOURNE	8/26/2004	19:40	Tornado	F1	0	0	50.00K	10.00K

PICKERING	6/8/2008	15:10	Tornado	EF1	0	0	30.00K	2.00K
RHODES	5/30/1998	13:30	Tornado	F1	0	0	2.00K	0.50K
RHODES	4/11/2001	14:51	Tornado	F0	0	0	1.00K	0.00K
ST ANTHONY	06/30/2014	12:05	Tornado	EF1	0	0	150.00K	20.00K
State Center	4/14/1994	22:21	Tornado	F1	0	0	500.00K	0.00K
STATE CENTER	6/13/2000	17:44	Tornado	F1	0	0	150.00K	5.00K
STATE CENTER	9/5/2004	20:17	Tornado	F1	0	0	10.00K	2.00K
STATE CENTER	9/5/2004	20:17	Tornado	F0	0	0	20.00K	5.00K

WINDSTORM								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
MARSHALL (ZONE)	1/17/1996	21:00	High Wind	55 kts.	0	0	0.00K	0.00K
MARSHALL (ZONE)	2/10/1996	12:00	High Wind	56 kts.	0	0	0.00K	0.00K
MARSHALL (ZONE)	3/24/1996	17:00	High Wind	54 kts.	0	0	0.00K	0.00K
MARSHALL (ZONE)	4/25/1996	9:30	High Wind	52 kts.	0	0	0.00K	0.00K
MARSHALL (ZONE)	10/29/1996	11:00	High Wind	57 kts.	0	0	0.00K	0.00K
MARSHALL (ZONE)	4/6/1997	9:00	High Wind	55 kts.	0	0	0.00K	0.00K
MARSHALL (ZONE)	4/30/1997	12:00	High Wind	52 kts.	0	0	0.00K	0.00K
MARSHALL (ZONE)	5/5/1997	12:30	High Wind	52 kts.	0	0	0.00K	0.00K
MARSHALL (ZONE)	11/10/1998	2:00	High Wind	61 kts.	0	0	300.00K	5.10K
MARSHALL (ZONE)	3/17/1999	12:00	High Wind	50 kts.	0	0	30.00K	0.00K
MARSHALL (ZONE)	5/10/1999	17:00	High Wind	50 kts.	0	0	25.00K	0.00K
MARSHALL (ZONE)	3/8/2000	11:00	High Wind	50 kts. E	0	0	10.00K	0.00K
MARSHALL (ZONE)	4/7/2001	4:00	High Wind	50 kts. M	0	0	50.00K	0.00K
MARSHALL (ZONE)	11/12/2003	9:00	High Wind	50 kts. EG	0	0	50.00K	0.00K
MARSHALL (ZONE)	1/22/2005	0:15	High Wind	52 kts. MG	0	0	10.00K	0.00K
MARSHALL (ZONE)	5/12/2005	9:30	High Wind	62 kts. MG	0	0	10.00K	0.00K
MARSHALL (ZONE)	6/8/2005	9:00	High Wind	50 kts. EG	0	0	20.00K	0.00K
MARSHALL (ZONE)	1/24/2006	9:30	High Wind	54 kts. MG	0	0	10.00K	0.00K
MARSHALL (ZONE)	5/27/2006	11:30	High Wind	70 kts. EG	0	0	50.00K	0.00K
MARSHALL (ZONE)	10/26/2008	10:30	High Wind	54 kts. MG	0	0	25.00K	25.00K
MARSHALL (ZONE)	10/27/2010	9:00	High Wind	51 kts. MG	0	0	25.00K	0.00K
MARSHALL (ZONE)	1/1/2012	3:00	High Wind	51 kts. MG	0	0	25.00K	0.00K
MARSHALL (ZONE)	3/29/2012	23:30	High Wind	50 kts. MG	0	0	0.00K	0.00K
MARSHALL (ZONE)	5/27/2013	7:30	High Wind	52 kts. MG	0	0	5.00K	0.00K
MARSHALL (ZONE)	1/26/2014	15:00	High Wind	53 kts. MG	0	0	25.00K	0.00K

Extreme Heat Data

Extreme Heat data was obtained from the NCDC Climate Data Online Search at http://www.ncdc.noaa.gov/cdo-web/search. Data was obtained from 1980 to December of 2013. Data collection stopped at 1993 because 21 years of data gives us adequate information on the occurrence of extreme heat events in Marshall County.

EXTREME HEAT				
Location	**Type**	**Year**	**# of Occurrences**	**Dates**
MARSHALL	Extreme Heat	1993	0	None
MARSHALL	Extreme Heat	1994	0	None
MARSHALL	Extreme Heat	1995	5	6/20 – 6/23, 7/10 – 7/15, 7/27 – 7/30, 8/11 – 8/13, 8/26 – 8/30
MARSHALL	Extreme Heat	1996	1	6/27 – 6/29
MARSHALL	Extreme Heat	1997	2	6/20 – 6/23, 7/15 – 7/20
MARSHALL	Extreme Heat	1998	2	6/25 – 6/28, 7/19 – 7/21
MARSHALL	Extreme Heat	1999	3	7/4 – 7/6, 7/19 – 7/26, 7/29 – 7/31
MARSHALL	Extreme Heat	2000	0	None
MARSHALL	Extreme Heat	2001	2	7/31 – 8/3, 8/5 – 8/10
MARSHALL	Extreme Heat	2002	3	6/30 – 7/2, 7/18 – 7/22, 9/8 – 9/10
MARSHALL	Extreme Heat	2003	2	8/16 – 8/19, 8/25 – 8/28
MARSHALL	Extreme Heat	2004	0	None
MARSHALL	Extreme Heat	2005	3	6/23 – 6/25, 7/15 – 7/18, 7/23 – 7/26
MARSHALL	Extreme Heat	2006	2	7/16 – 7/18, 7/29 – 8/2
MARSHALL	Extreme Heat	2007	0	None
MARSHALL	Extreme Heat	2008	0	None
MARSHALL	Extreme Heat	2009	0	None
MARSHALL	Extreme Heat	2010	1	8/11 – 8/13
MARSHALL	Extreme Heat	2011	3	6/7 – 6/9, 7/17 – 7/21, 8/1 – 8/3
MARSHALL	Extreme Heat	2012	8	6/19 – 6/21, 7/1 – 7/8, 7/16 – 7/19, 7/23, 7/24, 7/26, 8/2 – 8/4, 8/30 – 9/1
MARSHALL	Extreme Heat	2013	2	7/17 – 7/20, 8/26 – 8/31
MARSHALL	Extreme Heat	2014	0	None

Hazardous Materials Data

Data on hazardous materials spills was collected from the Iowa DNR's Hazardous Spills Summary Report database at https://programs.iowadnr.gov/hazardousspills/Reports/SpillSummary.aspx. Data from the earliest available records (1995) through December 2013 was obtained.

Hazardous Materials

Iowa Department Of Natural Resources
Hazardous Spill Summary Report

Spill Number	Reported Date	County	Responsible Party	Mode	Type	Land	Air	Ground water	Srfc Water	Material Name	Amount	Unit
010795-KL-1221	1/7/1995 12:21	Marshall	TRANSPORTATION CO.,C.N.W.	Railroad	Petroleum	×	-	-	-	Diesel Fuel		Unknown
032295-KL-1410	3/22/1995 14:10	Marshall	UTILITIES,IES	Handling Storage Process	Acids/Bases	-	-	-	-	SULFURICC ACID		Unknown
041895-SG-1205	4/18/1995 00:00	Marshall	IES,	Motor Carrier	Acids/Bases	×	-	-	-	ETHELENE GLYCOL		Unknown
050795-SM-2005	5/7/1995 20:05	Marshall	CO. R.E.C.,GRUNDY	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil		Unknown
051695-KL-1645	5/16/1995 16:45	Marshall	TRANSPORTATION,RUAN	Motor Carrier	Acids/Bases	×	-	-	-	MAGNESIUM BISULFITE		Unknown
060895-KL-2255	6/8/1995 20:55	Marshall	RIVER FS,IOWA	Motor Carrier	Acids/Bases	×	-	-	-	SENCOR; GRAMOXONE		Unknown
061895-SM-2334	6/18/1995 23:34	Marshall	UTILITIES,IES	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil		Unknown
070795-RK-1453	7/7/1995 14:53	Marshall	BACCAM,QUINN	Motor Carrier	Petroleum	-	-	×	-	Waste Oil		Unknown
071495-KL-1547	7/14/1995 15:47	Marshall	UTILITIES,IES	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil		Unknown
082095-SM-2125	8/20/1995 21:25	Marshall	RIVER FS,IOWA	Handling Storage Process	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia		Unknown
082495-KL-1545	8/24/1995 15:45	Marshall	UTILITIES,IES	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil		Unknown
082895-RK-1610	8/28/1995 16:10	Marshall	UTILITIES,IES	Transformer	Acids/Bases	×	-	-	-	TRANSFORMER		Unknown
082995-SM-0841	8/29/1995 08:41	Marshall	RIVER FS,IOWA	Handling Storage Process	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia		Unknown
082995-KL-1235	8/29/1995 12:35	Marshall	UNKNOWN,	Motor Carrier	Acids/Bases	×	-	-	-	UNKNOWN - POSSIBLE DRIED ASPHALT		Unknown

090595-KL-0935	9/5/1995 09:35	Marshall	RIVER F.S.,IOWA	Handling Storage Process	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia		Unknown
101295-SM-1158	10/12/1995 11:58	Marshall	UTILITIES,IES	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil		Unknown
121395-KL-0630	12/13/1995 06:30	Marshall	PACKING - STEVE STODDEN (EXT 292),SWIFT	Handling Storage Process	Acids/Bases	×	×	-	-	ANHYDROUS AMMONIA; OIL		Unknown
122095-SM-1010	12/20/1995 10:10	Marshall	& GO,KUM	Handling Storage Process	Petroleum	×	-	-	-	Gasoline		Unknown
122895-JC-1130	12/28/1995 11:30	Marshall	& GO,KUM	Handling Storage Process	Petroleum	×	-	-	-	Diesel Fuel		Unknown
020596-SM-0217	2/5/1996 02:17	Marshall	SWIFT,	Handling Storage Process	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia		Unknown
022096-SM-1218	2/20/1996 12:18	Marshall	Unknown	Motor Carrier	Petroleum	×	-	-	-	Diesel Fuel		Unknown
022696-SM-0815	2/26/1996 08:15	Marshall	RIVER FS,IOWA	Handling Storage Process	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia		Unknown
042696-RK-2055	4/26/1996 20:55	Marshall	REIMERS,JOHN	Handling Storage Process	Acids/Bases	×	-	-	-	Concrete sealer		Unknown
053196-KL-1427	5/31/1996 14:27	Marshall	CONTROLS,FISCHER	Handling Storage Process	Petroleum	×	-	-	-	#2 Fuel Oil		Unknown
061496-KL-2222	6/14/1996 22:22	Marshall	UTILITIES,IES	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil		Unknown
071996-SM-1025	7/19/1996 10:25	Marshall	RIVER FS,IOWA	Motor Carrier	Petroleum	×	-	-	-	Diesel Fuel		Unknown
012397-RK-1000	1/23/1997 10:00	Marshall	MENARDS,	Handling Storage Process	Acids/Bases	×	-	-	-	ORTHO WEED-B-GONE		Unknown
051397-KL-1800	5/13/1997 18:00	Marshall	CENTURY FS,NEW	Motor Carrier	Acids/Bases	×	-	-	-	PROWL - CONCENTRATED		Unknown
071797-KL-1520	7/17/1997 15:20	Marshall	UTILITIES,IES	Handling Storage Process	Petroleum	×	-	-	-	Diesel Fuel		Unknown
072697-RK-0932	7/26/1997 09:32	Marshall	PACIFIC RAILROAD,UNION	Railroad	Petroleum	×	-	-	-	Diesel Fuel		Unknown
072897-SD-0955	7/28/1997 09:55	Marshall	VETERANS HOSPITAL,IOWA	Handling Storage Process	Acids/Bases	×	-	-	-	HYDROCHLORIC ACID, 20% SOLUTION		Unknown
100297-SD-1157	10/2/1997 11:57	Marshall	CHEMLAWN,TRUGREEN	Motor Carrier	Acids/Bases	×	-	-	-	DILUTED FERTILIZER & BROADLEAF WEED CONTROL		Unknown
101697-KL-1731	10/16/1997 17:31	Marshall	COOP,GILMAN	Handling Storage Process	Petroleum	-	-	-	-	Heating Oil		Unknown

111497-RK-0900	11/14/1997 09:00	Marshall	MART,COASTAL	Handling Storage Process	Petroleum	×	-	-	-	Gasoline		Unknown
120597-RK-1115	12/5/1997 11:15	Marshall	PACIFIC,UNION	Railroad	Acids/Bases	×	-	-	-	AMMONIUM NITRATE PELLETS		Unknown
012798-RK-1630	1/27/1998 16:30	Marshall	UTILITIES,IES	Handling Storage Process	Acids/Bases	×	-	-	-	#1 AND FUEL OIL (WASTE OIL)		Unknown
022598-SD-0910	2/25/1998 09:10	Marshall	YOUNG,ROYAL	Handling Storage Process	Petroleum	×	-	-	-	Diesel Fuel		Unknown
062998-RK-1751	6/29/1998 17:51	Marshall	ALLIANT,	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil		Unknown
071098-KL-1552	7/10/1998 15:52	Marshall	Unknown	Handling Storage Process	Other Chemical	-	×	-	-	Nox		Unknown
102198-KL-0830	10/21/1998 08:30	Marshall	SYSTEMS,NUTRI-JECT	Motor Carrier	Animal/Vegetable Product	×	-	×	-	Biosolids		Unknown
102498-KL-1924	10/24/1998 19:24	Marshall	HAULING,SPECIALIZED	Motor Carrier	Acids/Bases	×	-	-	-	RENDERING PARTS		Unknown
102898-KL-1346	10/28/1998 13:46	Marshall	INDUSTRIES,LENNOX	Handling Storage Process	Other Chemical	×	×	-	-	Nox		Unknown
111398-KL-1340	11/13/1998 13:40	Marshall	G & E,ALLIANT	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil		Unknown
112298-RK-0933	11/22/1998 09:33	Marshall	UNKNOWN,	Motor Carrier	Acids/Bases	×	-	×	-	GASOLINE AND HYDRAULIC OIL		Unknown
041500-CWO-1318	4/15/2000 13:18	Marshall	Cenex	Handling And Storage	Inorganic Chemical	-	-	×	-	Ammonium lignosulphonate	5000	gal
052200-DLP-2137	5/22/2000 21:37	Marshall	Alliant Energy	Transformer	Acids/Bases	×	-	-	-	Transformer oil PCB	10	gal
101000-CWO-0845	10/10/2000 08:45	Marshall	Presto-X	Handling And Storage	Inorganic Chemical	-	×	×	-	Aluminum phosphide	1	unk
112100-DLP-0840	11/21/2000 08:40	Marshall	Unknown	Transformer	Petroleum	×	-	-	-	Hydraulic Oil	1	gal
123000-KAL-1326	12/30/2000 13:26	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer mineral oil	1	gal
011201-CWO-1105	1/12/2001 11:05	Marshall	Central Counties Cooperative	Theft	Fertilizer/ Pesticide	×	×	-	-	Ammonia (anhydrous) - Agricultural	2500	lbs
020701-CWO-2210	2/7/2001 22:10	Marshall	Union Pacific Railroad	RR Incident	Petroleum	×	-	-	-	Diesel Fuel	100	gal
022801-KAL-0825	2/28/2001 08:25	Marshall	Unknown	Handling And Storage	Petroleum	×	-	-	-	Diesel Fuel	100	gal
033001-DLP-0755	3/30/2001 07:55	Marshall	Unknown	Handling And Storage	Animal/Vegetable Product	×	-	-	-	Emulsion Oil	100	gal
040301-DLP-1105	4/3/2001 11:05	Marshall	Koch Fertilizer Storage and Terminal	Handling And Storage	Fertilizer/ Pesticide	-	×	-	-	Ammonia (anhydrous) - Agricultural	5770	lbs
042101-DLP-1758	4/21/2001 17:58	Marshall	Richard Roston	Transportation	Fertilizer/ Pesticide	-	×	-	-	Ammonia (anhydrous) - Agricultural	2000	lbs

062101-DLP-1330	6/21/2001 13:30	Marshall	Allamakee County	Handling And Storage	Fertilizer Pesticide	-	×	-	-	Tetramethrin	1	lbs
071001-WCG-1420	7/10/2001 14:20	Marshall	Unknown	Transportation	Transformer oil/PCB	×	-	-	-	Non-PCB Transformer Oil	1	gal
072701-KAL-1259	7/27/2001 12:59	Marshall	Unknown	Transformer	Acids/Bases	×	-	-	-	Transformer oil PCB	1	gal
090501-KAL-0935	9/5/2001 09:35	Marshall	Unknown	Handling And Storage	Fertilizer/ Pesticide	×	-	-	-	Tri-Power	1	gal
122401-DLP-1030	12/24/2001 10:30	Marshall	Bee Rite Tire Service	Fire	Inorganic Chemical	-	×	-	-	Tires	1000	Unknown
011602-KAL-1019	1/16/2002 10:19	Marshall	New Century FS	Handling And Storage	Petroleum	×	-	-	-	Unleaded gasoline	1	unk
030402-DLP-1933	3/4/2002 19:33	Marshall	Union Pacific Railroad	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil	4	gal
032602-DLP-2029	3/26/2002 20:29	Marshall	Central Counties Cooperative	Handling And Storage	Fertilizer/ Pesticide	-	×	-	-	Ammonia (anhydrous) - Agricultural	55	lbs
032702-WCG-1340	3/27/2002 13:40	Marshall	Customer Coop	Handling And Storage	Petroleum	×	-	-	-	Diesel Fuel	3	gal
040102-DLP-0855	4/1/2002 08:55	Marshall	Martin Brothers Distributing	Transportation	Petroleum	×	-	-	-	Diesel Fuel	50	gal
041002-DLP-1200	4/10/2002 12:00	Marshall	Unknown	Handling And Storage	Fertilizer Pesticide	×	-	-	-	MCPA Ester		unk
										Pendimethalin		unk
					Fertilizer/ Pesticide					Fertilizer-NPK	1	qt
										Tri-Power	1	unk
052802-DLP-1225	5/28/2002 12:25	Marshall	Unknown	Handling And Storage	Petroleum	×	-	-	-	Mineral oil	1	pt
062802-CWO-1145	6/28/2002 11:45	Marshall	Bill Smith	Transportation	Petroleum	×	-	-	-	Diesel Fuel	50	gal
071402-KAL-1035	7/14/2002 10:35	Marshall	Janet Hopkins Residence	Handling And Storage	Petroleum	×	-	-	-	Heating Oil	1	unk
071502-CWO-0910	7/15/2002 09:10	Marshall	Alliant Energy	Transformer	Acids/Bases	×	-	-	-	Transformer oil PCB	7	gal
082102-CWO-1450	8/21/2002 14:50	Marshall	JMT Trucking	Transportation	Petroleum	×	-	-	-	Diesel Fuel	20	gal
082502-CWO-1418	8/25/2002 14:18	Marshall	Unknown	Transformer	Acids/Bases	×	-	-	-	Transformer oil PCB	5	gal
090202-KAL-2051	9/2/2002 20:51	Marshall	Unknown	Transportation	Petroleum	×	-	-	-	Diesel Fuel	1200	gal
102902-DLP-1430	10/29/2002 14:30	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil	1	gal
022503-JS1-1740	2/25/2003 17:40	Marshall	Lennox Industries	Other	Propane/ LPG/Natural Gas	×	×	-	-	Liquid Propane	1	unk
022703-DLP-1802	2/27/2003 18:02	Marshall	Lennox Industries	Handling And Storage	Propane/ LPG/Natural Gas	-	×	-	-	Propane	1	lbs
062603-AHB-1147	6/26/2003 11:47	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil	17	gal
082603-RLT-1440	8/26/2003 14:40	Marshall	Casey's General Stores, Inc.	Transportation	Petroleum	×	-	-	-	Gasoline	8500	gal

091503-RLT-1037	9/15/2003 10:37	Marshall	Sheets Excavating	Transportation	Petroleum	×	-	-	-	Diesel Fuel	30	gal
111403-AHB-0950	11/14/2003 09:50	Marshall	Lieboeich/PDM Steel & Aluminum	Transportation	Petroleum	×	-	-	-	Diesel Fuel	70	gal
031804-AHB-1102	3/18/2004 11:02	Marshall	Mann Trucking Co	Transportation	Petroleum	×	-	-	-	Motor oil	5	qt
										Soybeans	0	unk
040604-AHB-0847	4/6/2004 08:47	Marshall	New Century FS	Transportation	Ammonia (anhydrous)	×	×	-	-	Anhydrous ammonia	4000	lbs
072404-DJA-1743	7/24/2004 17:43	Marshall	Alliant Energy	Handling And Storage	Transformer oil/PCB	×	-	-	-	Transformer oil - PCB	10	gal
080304-JEL-1940	8/3/2004 19:40	Marshall	Koch Nitrogen Company	Handling And Storage	Ammonia /Ag-related	×	-	-	-	Ammonia	0	Unknown
080604-DLP-1830	8/6/2004 18:30	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil	10	gal
091304-AHB-0803	9/13/2004 08:03	Marshall	Mid-Iowa Cooperative	Theft	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	875	lbs
100704-RLT-1028	10/7/2004 10:28	Marshall	Tru-Green (formerly Tru-Green Chemlawn)	Handling And Storage	Fertilizer/ Pesticide	×	-	-	-	Fertilizer Solution	10	gal
100704-AHB-1221	10/7/2004 12:21	Marshall	Lennox Industries	Handling And Storage	Propane/ LPG/Natural Gas	×	-	-	-	Liquid Propane	1	unk
102804-RLT-1700	10/28/2004 17:00	Marshall	Koch Nitrogen Company	Pipeline	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	1550	lbs
013105-AHB-1616	1/31/2005 16:16	Marshall	Mid-Iowa Cooperative	Theft	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	100	lbs
020705-DLP-0415	2/7/2005 04:15	Marshall	Union Pacific Railroad			-	-	-	-			
022205-RLT-0840	2/22/2005 08:40	Marshall	Central Counties Cooperative	Theft	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	100	lbs
040705-AHB-0805	4/7/2005 08:05	Marshall	New Century Coop	Handling And Storage	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	99	lbs
040705-DLP-2241	4/7/2005 22:41	Marshall	New Century Farms	Handling And Storage	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	1	lbs
041405-WCG-0740	4/14/2005 07:40	Marshall	New Century Coop	Theft	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia vapor	1	unk
041405-AHB-1031	4/14/2005 10:31	Marshall	K & R Express	Transportation	Petroleum	×	-	-	-	Motor oil	44	qt
051305-CEC-1653	5/13/2005 16:53	Marshall	Des Moines HazMat	Other	Inorganic Chemical	-	×	-	-	Lithium metal	1	lbs
052605-AHB-0910	5/26/2005 09:10	Marshall	A & K Enterprises	Transportation	Petroleum	×	-	-	-	Diesel Fuel	90	gal
072405-DLP-1852	7/24/2005 18:52	Marshall	Koch Nitrogen Company	Handling And Storage	Ammonia /Ag-related	-	×	-	-	Ammonia	1	lbs
080605-DJA-1937	8/6/2005 19:37	Marshall	Dusty's Spraying Service	Transportation	Fertilizer Pesticide	×	-	-	-	Lorsban	2	gal
082205-TAP-1300	8/22/2005 13:00	Marshall	Git-N-Go	Handling And Storage	Petroleum	×	-	-	-	#2 Diesel Fuel	30	gal
092105-DJA-1240	9/21/2005 12:40	Marshall	Alliant Energy	Handling And Storage	Petroleum	×	-	-	-	#2 Diesel Fuel	0	gal

092205-DJA-0247	9/22/2005 02:47	Marshall	Alliant Energy	Handling And Storage	Transformer oil/PCB	×	-	-	-	tranformer oil-low PCB (< 2 ppm)	1	gal
110305-JAT-1210	11/3/2005 12:10	Marshall	Ruan Leasing Co.	Handling And Storage	Animal/Vegetable Product	×	-	-	-	Liquid egg	53000	lbs
110905-AHB-0916	11/9/2005 09:16	Marshall	Koch Nitrogen Company	Handling And Storage	Ammonia /Ag-related	-	×	-	-	Ammonia	20	lbs
013106-DLP-0631	1/31/2006 06:31	Marshall	Mace Trucking	Transportation	Petroleum	×	-	-	-	Diesel Fuel	75	gal
020906-RLT-1445	2/9/2006 14:45	Marshall	Ruan Transportation	Handling And Storage	Petroleum	×	-	-	-	Diesel Fuel	30	gal
042706-JAT-1830	4/27/2006 18:30	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	PCB oil	30	gal
081006-AHB-0838	8/10/2006 08:38	Marshall	Koch Nitrogen Company	Handling And Storage	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	1	unk
081006-WCG-0910	8/10/2006 09:10	Marshall	Koch Pipeline Company	Pipeline	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	30	lbs
081506-AHB-1359	8/15/2006 13:59	Marshall	Eggers Farms	Manure	Manure	×	-	-	-	Liquid hog manure	6000	gal
082206-CWF-1650	8/22/2006 16:50	Marshall	Martin Marietta Aggregates	Fire	Petroleum	×	-	-	-	Engine oil	9	gal
091806-RLT-0932	9/18/2006 09:32	Marshall	JBS (Swift & Co.)	Transportation	Petroleum	×	-	-	-	Diesel Fuel	3	gal
102706-RLT-1224	10/27/2006 12:24	Marshall	Koch Nitrogen Company	Handling And Storage	Ammonia /Ag-related	-	×	-	-	Ammonia	1	unk
103006-AHB-1139	10/30/2006 11:39	Marshall	Koch Nitrogen Company	Handling And Storage	Ammonia /Ag-related	-	×	-	-	Ammonia	118	lbs
					Inorganic Chemical					NO x	32	lbs
110706-TAP-2323	11/7/2006 23:23	Marshall	Koch Nitrogen Company	Handling And Storage	Ammonia /Ag-related	-	×	-	-	Ammonia	0	Unknown
022407-WCG-1435	2/24/2007 14:35	Marshall	Koch Nitrogen Company	Handling And Storage	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	0	Unknown
022507-WCG-0235	2/25/2007 02:35	Marshall	Koch Nitrogen Company			-	-	-	-			
032607-RLT-0906	3/26/2007 09:06	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	tranformer oil-low PCB (< 2 ppm)	1	unk
043007-KAL-1018	4/30/2007 10:18	Marshall	Consumers Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil	1	gal
043007-TAP-1715	4/30/2007 17:15	Marshall	Koch Nitrogen Company	Handling And Storage	Fertilizer/ Pesticide	-	×	-	-	Ammonia (anhydrous) - Agricultural	0	Unknown
050807-RLT-1018	5/8/2007 10:18	Marshall	Koch Nitrogen Company	Handling And Storage	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	900	lbs
051607-AHB-1256	5/16/2007 12:56	Marshall	Consumers Energy	Transformer	Transformer oil/PCB	×	-	-	-	transformer non PCB	62	gal
053007-RLT-1238	5/30/2007 12:38	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil	25	gal
053107-RLT-1317	5/31/2007 13:17	Marshall	Corkery, inc.	Transportation	Petroleum	×	-	-	-	Hydraulic Fluid	30	gal
060107-JS1-0029	6/1/2007 00:29	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil	1	unk

073007-AHB-0913	7/30/2007 09:13	Marshall	Martin Marietta Aggregates	Handling And Storage	Petroleum	-	-	×	-	Gear oil	25	gal
073007-RLT-1331	7/30/2007 13:31	Marshall	Martin Marietta Aggregates	Other	Petroleum	-	-	×	-	Gear oil	55	gal
081807-WCG-0910	8/18/2007 09:10	Marshall	Koch Nitrogen Company	Pipeline	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	1	unk
120507-DJA-0422	12/5/2007 04:22	Marshall	Koch Nitrogen Company	Handling And Storage	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia vapor	0	lbs
011608-KAL-1123	1/16/2008 11:23	Marshall	John Lint Property	Handling And Storage	Petroleum	×	-	×	-	Diesel Fuel	4000	gal
020308-WCG-1417	2/3/2008 14:17	Marshall	Koch Nitrogen Company	Handling And Storage	Ammonia /Ag-related	-	×	-	-	Ammonia	143	lbs
021808-KAL-0914	2/18/2008 09:14	Marshall	JBS (Swift & Co.)	Transportation	Petroleum	×	-	-	-	Diesel Fuel	35	gal
021908-TAP-1109	2/19/2008 11:09	Marshall	Coca-Cola	Transportation	Petroleum	×	-	-	-	Diesel Fuel	15	gal
021908-DJA-1420	2/19/2008 14:20	Marshall	Unknown	Unknown	Petroleum	×	-	-	-	petroleum-like substance	0	gal
032608-AHB-1127	3/26/2008 11:27	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil	4	gal
032608-AHB-1607	3/26/2008 16:07	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil - Non PCB Oil	2	gal
041608-AHB-1221	4/16/2008 12:21	Marshall	Consumers Energy	Handling And Storage	Petroleum	×	-	-	-	Hydraulic Oil	4	gal
041708-AHB-1232	4/17/2008 12:32	Marshall	Mid-Iowa Cooperative	Handling And Storage	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	1500	lbs
060708-TAP-1130	6/7/2008 11:30	Marshall	Alliant Energy	Handling And Storage	Acids/Bases	×	-	-	-	Sulfuric Acid	25	gal
061808-KMB-0731	6/18/2008 07:31	Marshall	Alliant Energy	Handling And Storage	Petroleum	×	-	-	-	Fuel Oil	2	gal
072708-WCG-1750	7/27/2008 17:50	Marshall	Koch Nitrogen Company	Pipeline	Ammonia (anhydrous)	-	×	-	-	Anhydrous ammonia	6	lbs
110208-DLP-1114	11/2/2008 11:14	Marshall	Edler Brothers	Manure	Manure	×	-	-	-	Manure	5000	gal
121008-AHB-1606	12/10/2008 16:06	Marshall	JBS (Swift & Co.)	Handling And Storage	Petroleum	×	-	-	-	Oil	30	gal
011709-WCG-0853	1/17/2009 08:53	Marshall	JBS (Swift & Co.)	Handling And Storage	Animal/Vegetable Product	×	-	-	-	Animal fat	200	gal
013009-KAL-1053	1/30/2009 10:53	Marshall	Eggers Farms	Manure	Ammonia /Ag-related	-	×	-	-	Ammonia	1	unk
020409-AHB-1106	2/4/2009 11:06	Marshall	Burt Farm & Livestock Co.	Manure	Ammonia /Ag-related	-	×	-	-	Ammonia	1	unk
020409-AHB-1133	2/4/2009 11:33	Marshall	Hibbs,Troy	Manure	Ammonia /Ag-related	-	×	-	-	Ammonia	1	unk
020409-AHB-1556	2/4/2009 15:56	Marshall	Blood,Kevin	Manure	Ammonia /Ag-related	-	×	-	-	Ammonia	1	unk
021609-RLT-1400	2/16/2009 14:00	Marshall	JBS (Swift & Co.)	Handling And Storage	Inorganic Chemical	×	-	×	-	Process Wastewater	100	gal
021909-KAL-0904	2/19/2009 09:04	Marshall	Marine Pollution Control	Transportation	Petroleum	×	-	-	-	Diesel Fuel	20	gal
										Hydraulic Fluid	1	gal

022009-AHB-1138	2/20/2009 11:38	Marshall	MTM Farms, LC	Manure	Ammonia /Ag-related	-	×	-	-	Ammonia	1	unk
040109-AHB-1245	4/1/2009 12:45	Marshall	Midwest Express	Transportation	Organic Chemical	×	-	-	-	Nicotine	1	gal
040709-DLP-0051	4/7/2009 00:51	Marshall	JBS (Swift & Co.)	Handling And Storage	Ammonia /Ag-related	-	×	-	-	Ammonia	202	lbs
043009-AHB-1444	4/30/2009 14:44	Marshall	Breja,Jeff	Manure	Inorganic Chemical	-	×	-	-	Ammonia (NH3)	1	Unknown
043009-AHB-1445	4/30/2009 14:45	Marshall	Edler Brothers	Manure	Inorganic Chemical	-	×	-	-	Ammonia (NH3)	1	Unknown
043009-AHB-1446	4/30/2009 14:46	Marshall	Edler Brothers	Manure	Inorganic Chemical	-	×	-	-	Ammonia (NH3)	1	Unknown
043009-AHB-1447	4/30/2009 14:47	Marshall	Edler Brothers	Manure	Inorganic Chemical	-	×	-	-	Ammonia (NH3)	1	Unknown
043009-AHB-1448	4/30/2009 14:48	Marshall	Edler Brothers	Manure	Inorganic Chemical	-	×	-	-	Ammonia (NH3)	1	Unknown
062409-WCG-1015	6/24/2009 10:15	Marshall	JBS (Swift & Co.)	Handling And Storage	Animal/Vegetable Product	×	-	-	-	grease and washwater	1000	gal
091409-AHB-1601	9/14/2009 16:01	Marshall	Consumers Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil (Non PCB)	5	gal
111609-WCG-0325	11/16/2009 03:25	Marshall	Union Pacific Railroad	Railroad	Petroleum	×	-	-	-	Diesel Fuel	700	gal
111909-TAP-0340	11/19/2009 03:40	Marshall	Faris Custom LLC	Manure	Manure	×	-	-	-	Swine BBP Manure	4000	gal
111909-TAP-1530	11/19/2009 15:30	Marshall	Oros & Busch Applications Technologies, Inc.	Transportation	Ammonia /Ag-related	×	-	-	-	Waste lime	5000	gal
012010-AHB-1422	1/20/2010 14:22	Marshall	John Christner Trucking	Transportation	Petroleum	×	-	-	-	Diesel Fuel	45	gal
020410-JAT-1000	2/4/2010 10:00	Marshall	Darling International	Transportation	Animal/Vegetable Product	×	-	-	-	Animal by products	1	Unknown
062210-KMB-1325	6/22/2010 13:25	Marshall	Stone Sanitation	Transportation	Petroleum	×	-	-	-	Hydraulic Oil	25	gal
071510-AHB-0953	7/15/2010 09:53	Marshall	Union Pacific Railroad	Railroad	Petroleum	×	-	-	-	Petroleum Product - Unknown Type	1	Unknown
072110-RLT-1257	7/21/2010 12:57	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil (Non PCB)	40	gal
082110-DLP-1104	8/21/2010 11:04	Marshall	Sully Transport Co.	Transportation	Petroleum	×	-	-	-	Gasoline E-10	1826	gal
092010-RLT-1520	9/20/2010 15:20	Marshall	Consumers Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil (Non PCB)	1	gal
113010-AHB-1631	11/30/2010 16:31	Marshall	Martin Marietta Aggregates	Handling And Storage	Petroleum	×	-	-	-	Diesel Fuel	25	gal
021911-JAT-1258	2/19/2011 12:58	Marshall	ITC Midwest	Transformer		×	-	-	-		10	gal
					Transformer oil/PCB					Transformer oil (PCB)	10	gal
030711-RLT-1241	3/7/2011 12:41	Marshall	Union Pacific Railroad	Handling And Storage	Petroleum	×	-	-	×	Waste Oil	50	gal
030911-AHB-1546	3/9/2011 15:46	Marshall	Union Pacific Railroad	Railroad	Petroleum	×	-	-	-	Diesel Fuel	25	gal

031011-AHB-1321	3/10/2011 13:21	Marshall	SaniMax	Handling And Storage	Petroleum	×	-	-	×	Hydraulic Oil	25	gal
031311-DLP-0830	3/13/2011 08:30	Marshall	Union Pacific Railroad	Railroad	Petroleum	×	-	-	-	Diesel Fuel	1	gal
033011-AHB-1609	3/30/2011 16:09	Marshall	Unknown	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil (Unknown PCB)	1	Unknown
042711-WCG-1130	4/27/2011 11:30	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil	5	gal
052411-AHB-1604	5/24/2011 16:04	Marshall	Consumers Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil (Non PCB)	4	gal
071111-AHB-1001	7/11/2011 10:01	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil (Unknown PCB)	1	Unknown
080211-WCG-1823	8/2/2011 18:23	Marshall	Lennox Industries	Handling And Storage	Organic Chemical	-	×	-	-	R-410A	11000	lbs
091511-AHB-0955	9/15/2011 09:55	Marshall	John Christner Trucking	Transportation	Petroleum	×	-	-	-	Diesel Fuel	200	gal
031912-DLP-1712	3/19/2012 17:12	Marshall	Koch Nitrogen Company	Handling And Storage	Inorganic Chemical	-	×	-	-	Ammonia (anhydrous) - Industrial	15	gal
040412-AHB-1419	4/4/2012 14:19	Marshall	Scott Ag Services, Inc.	Transportation	Fertilizer/ Pesticide	×	-	-	-	2,4-D	8	gal
090412-KMB-1515	9/4/2012 15:15	Marshall	Marshall Cold Storage	Pipeline	Organic Chemical	×	-	-	-	Antifreeze	35	gal
090512-MS1-1911	9/5/2012 19:11	Marshall	Keith Barkema Trucking	Transportation	Animal/Vegetable Product	×	-	-	-	Animal by products	300	gal
090912-MS1-1445	9/9/2012 14:45	Marshall	Darling International	Transportation	Animal/Vegetable Product	×	-	-	-	Animal by products	60	gal
092412-AHB-1234	9/24/2012 12:34	Marshall	Pothast Truck Line	Transportation	Petroleum	×	-	-	-	Hydraulic Oil	1	Unknown
										Diesel Fuel	50	gal
										Engine oil	1	Unknown
122012-AHB-1451	12/20/2012 14:51	Marshall	Premium Environmental Services	Transportation	Petroleum	×	-	-	-	Diesel Fuel	75	gal
012213-RLT-1251	1/22/2013 12:51	Marshall	JBS (Swift & Co.)	Handling And Storage	Petroleum	×	-	-	-	Diesel Fuel	1	gal
030113-AHB-1245	3/1/2013 12:45	Marshall	Ruan Transportation	Handling And Storage	Petroleum	×	-	-	-	Hydraulic Oil	5	gal
042913-RLT-1228	4/29/2013 12:28	Marshall	Sully Transport Co.	Handling And Storage	Inorganic Chemical	-	×	-	-	Anhydrous Ammonia - industrial use	1	Unknown
050713-AHB-1528	5/7/2013 15:28	Marshall	All American Turf Beauty Inc.	Handling And Storage	Chlorine	×	-	-	-	Water	1	Unknown
					Fertilizer/ Pesticide					Barricade (Prodiamine)	1	Unknown
										NPK fertilizer	1	Unknown
051613-RLT-1138	5/16/2013 11:38	Marshall	Marine Pollution Control	Handling And Storage	Petroleum	×	-	-	-	Hydraulic Fluid	5	gal
080613-DLP-2301	8/6/2013 23:01	Marshall	Ben's Tire & Auto	Handling And Storage	Inorganic Chemical	×	-	-	×	Rim Guard	250	gal

082713-WDG-1006	8/27/2013 10:06	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil (Non PCB)	1	gal
090113-JAG-0124	9/1/2013 01:24	Marshall	Union Pacific Railroad	Railroad	Petroleum	×	-	-	-	Engine oil	10	gal
100113-WDG-0806	10/1/2013 08:06	Marshall	ITC Midwest	Transportation	Organic Chemical	×	-	-	-	Antifreeze	15	gal
100813-RDS-0702	10/8/2013 07:02	Marshall	JBS (Swift & Co.)	Handling And Storage	Inorganic Chemical	-	×	-	-	Ammonia (NH3)	56	lbs
112513-JAT-1540	11/25/2013 15:40	Marshall	Union Pacific Railroad	Handling And Storage	Petroleum	×	-	-	-	Petroleum Products - unknown type	1000	gal
011014-WCG-1052	1/10/2014 10:52	Marshall	Union Pacific Railroad	Railroad	Animal/Vegetable Product	×	-	-	-	Sweet Water	650	gal
021014-WDG-1623	2/10/2014 16:23	Marshall	JBS (Swift & Co.)	Handling And Storage	Inorganic Chemical	-	×	-	-	Ammonia (anhydrous) - Industrial	1	lbs
022414-DJA-1204	2/24/2014 12:04	Marshall	Alliant Energy	Transportation	Petroleum	×	-	-	-	Hydraulic Oil	2	gal
030414-DLP-1600	3/4/2014 16:00	Marshall	Fisher Controls	Handling And Storage	Petroleum	×	-	-	-	Compressor oil	84	gal
031314-WCG-1025	3/13/2014 10:25	Marshall	Specialized Transport	Transportation	Petroleum	×	-	-	-	Diesel Fuel	5	gal
061914-WDG-1844	6/19/2014 18:44	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	×	Transformer Oil (Non PCB)	75	gal
071714-CSG-1813	7/17/2014 18:13	Marshall	Mid-State Milling	Transportation	Petroleum	×	-	-	-	Diesel Fuel	50	gal
072014-JAT-0242	7/20/2014 02:42	Marshall	Alliant Energy	Transformer	Transformer oil/PCB	×	-	-	-	Transformer Oil (Unknown PCB)	25	gal
101714-WDG-1250	10/17/2014 12:50	Marshall	Consumers Energy	Other	Petroleum	×	-	-	-	Hydraulic Oil	14	gal
102714-TJB-0945	10/27/2014 09:45	Marshall	Heartland COOP	Handling And Storage	Fertilizer/ Pesticide	-	×	-	-	Anhydrous Ammonia - Ag related	850	gal

Appendix H. List of Levees Within 75 Miles of Marshall County

Below is a list of 29 levees that are within 75 miles of Marshall County. The list is organized in alphabetical order by county.

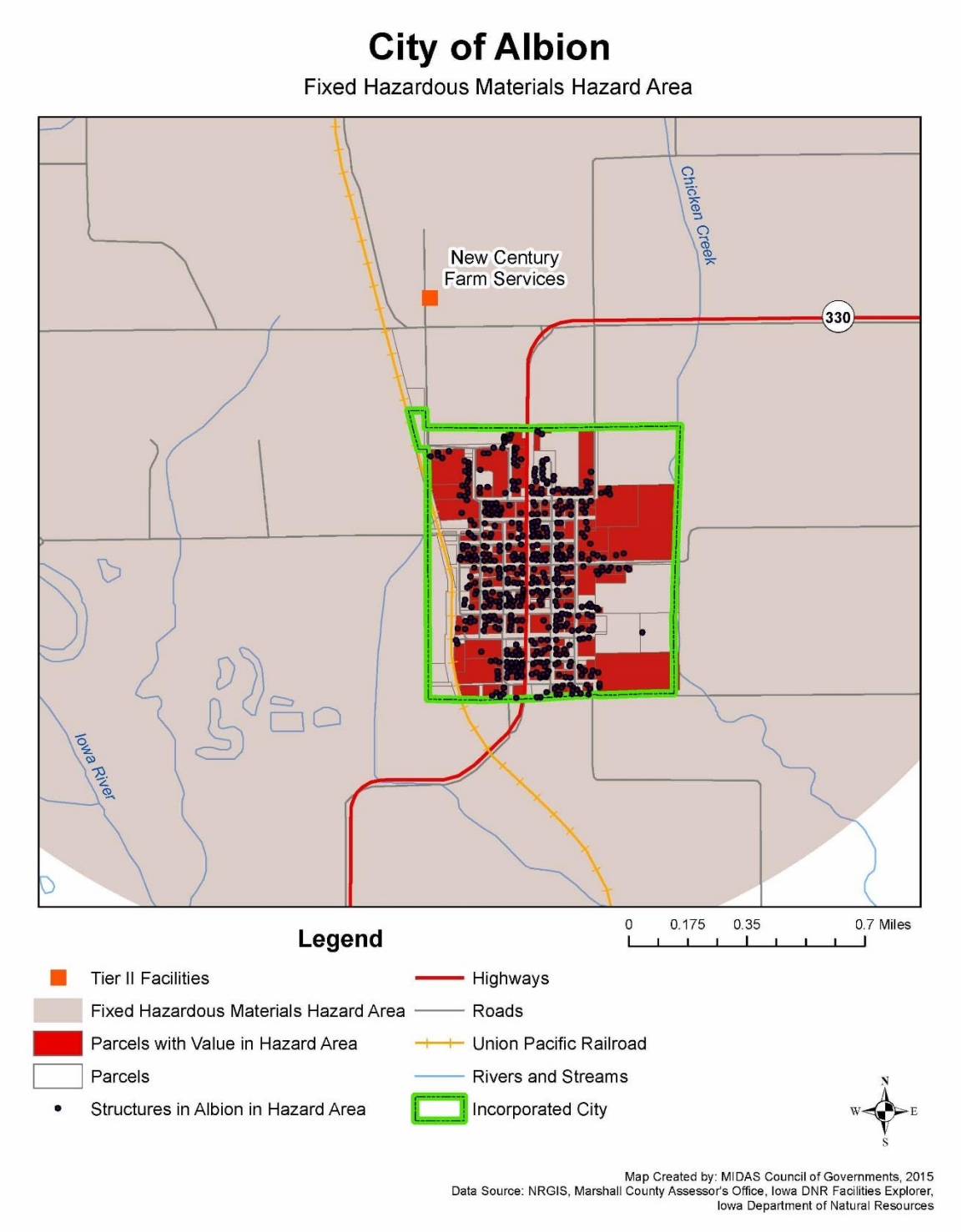
Levees Within 75 Miles of Marshall County

County	System Name	Length (Miles)	Inspection Type	Inspection Date	Inspection Rating	Leveed Area Type	Leveed Area Acreage
Black Hawk County	WATERLOO, IA - RDB CEDAR RIVER / LDB BLACK HAWK CK. (NORTH WEST)	4.61	Periodic	15-May-12	UNACCEPTABLE	Urban	811.92
Black Hawk County	WATERLOO, IA - RDB CEDAR RIVER / RDB BLACK HAWK CK. (SOUTH WEST)	6.41	Periodic	16-May-12	UNACCEPTABLE	Urban	899.3
Black Hawk County	WATERLOO & EVANSDALE, IA - LDB CEDAR RIVER	11.39	Periodic	5-May-10	UNACCEPTABLE	Urban	3,485.06
Black Hawk County	Cedar Falls, IA	1.09	Routine	20-Nov-13	ACCEPTABLE	Urban	71.38
Black Hawk County	WATERLOO, IA - VIRDEN CREEK DRY RESERVIOR	0.58	-	-	-	Urban	485.67
Black Hawk County	WATERLOO, IA - WASTE WATER TREATMENT PLANT (SOUTH)	1.08	Periodic	5-May-10	UNACCEPTABLE	Urban	53.28
Dallas County	VAN METER, IA - LEFT DESCENDING BANK	0.08	Routine	15-Nov-10	MINIMALLY ACCEPTABLE	Urban	11.07
Dallas County	VAN METER, IA - RIGHT DESCENDING BANK	0.8	Periodic	2-May-12	UNACCEPTABLE	Urban	69.43
Fayette County	OELWEIN, IL - DRY RUN CREEK	0	Routine	27-Nov-13	ACCEPTABLE	Urban	105.73
Iowa County	AMANA, IA - CORALVILLE REMEDIAL WORKS	0.44	Periodic	18-Jun-14	MINIMALLY ACCEPTABLE	Agricultural	10.5
Iowa County	Marengo, IA	4.57	Routine	13-Nov-13	ACCEPTABLE	Urban	1,297.30
Marshall County	MARSHALLTOWN, IA - RDB LINN CREEK/RDB ANSON CREEK (SOUTH EAST)	2.32	Routine	14-Nov-14	MINIMALLY ACCEPTABLE	Urban	272.63
Marshall County	MARSHALLTOWN, IA - RDB LINN CREEK/LDB ANSON CREEK (SOUTH WEST)	1.28	Routine	14-Nov-14	MINIMALLY ACCEPTABLE	Urban	74.55
Marshall County	MARSHALLTOWN, IA - RDB IOWA RIVER / LDB LINN CREEK (NORTH)	5.51	Routine	14-Nov-14	MINIMALLY ACCEPTABLE	Urban	1,014.12

Polk County	DES MOINES, IA - DM III - RDB DES MOINES RIVER / RACCOON RIVER	2.1	Periodic	1-May-12	MINIMALLY ACCEPTABLE	Urban	462.28
Polk County	WEST DES MOINES & DES MOINES, IA	4.27	Periodic	3-Apr-12	MINIMALLY ACCEPTABLE	Urban	857.53
Polk County	DES MOINES, IA - DM II - RDB DES MOINES RIVER / LDB RACCOON RIVER	3.14	Periodic	27-Apr-10	MINIMALLY ACCEPTABLE	Urban	749.26
Polk County	AVON STATION, IA - RED ROCKS REMEDIAL WORKS	2.05	Periodic	6-Mar-12	MINIMALLY ACCEPTABLE	Urban	266.92
Polk County	Des Moines, IA - LDB Des Moines River (Birdland)	1.44	Periodic	8-Aug-13	ACCEPTABLE	Urban	211.48
Polk County	DES MOINES, IA & SE DM - SW PLEASANT HILL RED ROCK REMEDIAL WORKS	10.19	Periodic	21-Mar-11	MINIMALLY ACCEPTABLE	Urban	2,574.16
Polk County	Des Moines, IA - RDB Des Moines River (Central Place)	1.11	Periodic	8-Aug-13	ACCEPTABLE	Urban	174.65
Polk County	DES MOINES, IA - RR I - RDB RACCOON RIVER	1.52	Periodic	27-May-14	MINIMALLY ACCEPTABLE	Urban	177.18
Tama County	TAMA, IA	2.71	Routine	13-Nov-13	MINIMALLY ACCEPTABLE	Urban	498.89
Wapello County	Ottumwa, IA - LDB Des Moines R RDB Har. B CK LDB Dr D (Westside-Middle C.)	0.93	-	-	-	Urban	64.11
Wapello County	Ottumwa, IA - LDB Des Moines R RDB Drainage D (Westside - Upper Cell)	0.62	-	-	-	Urban	27.16
Wapello County	OTTUMWA, IA - RDB DES MOINES R (NORTH)	3.67	-	-	-	Urban	495.23
Wapello County	OTTUMWA, IA - LDB DES MOINES R (SOUTH)	3.03	-	-	-	Urban	980.78
Wapello County	Ottumwa, IA - LDB Des Moines R LDB Harrows B CK (Westside - Lower Cell)	0.48	-	-	-	Urban	13.95
Warren County	CARLISLE, IA - RED ROCK REMEDIAL WORKS	1.33	Periodic	6-Mar-12	MINIMALLY ACCEPTABLE	Urban	144.29

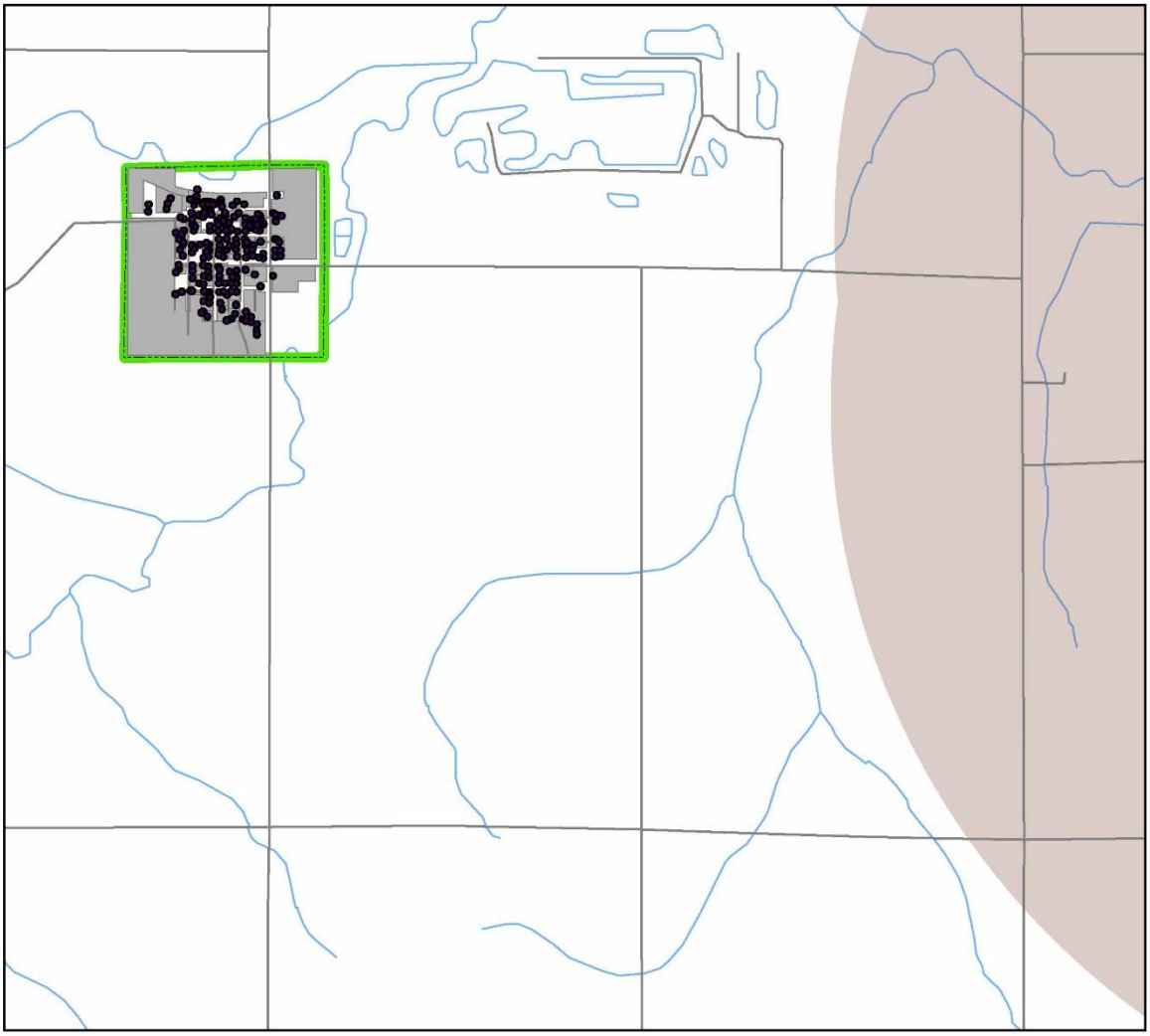
Data Source: US Army Corps of Engineers Levee Database 2015
http://nld.usace.army.mil/egis/f?p=471:69:0::NO:::

Appendix I. Fixed Hazardous Materials Hazard Areas



City of Clemons

Fixed Hazardous Materials Hazard Area



Legend

- Tier II Facilities
- Fixed Hazardous Materials Hazard Area
- Structures in Clemons
- Parcels With Value
- Highways
- Roads
- Rivers and Streams
- Incorporated City

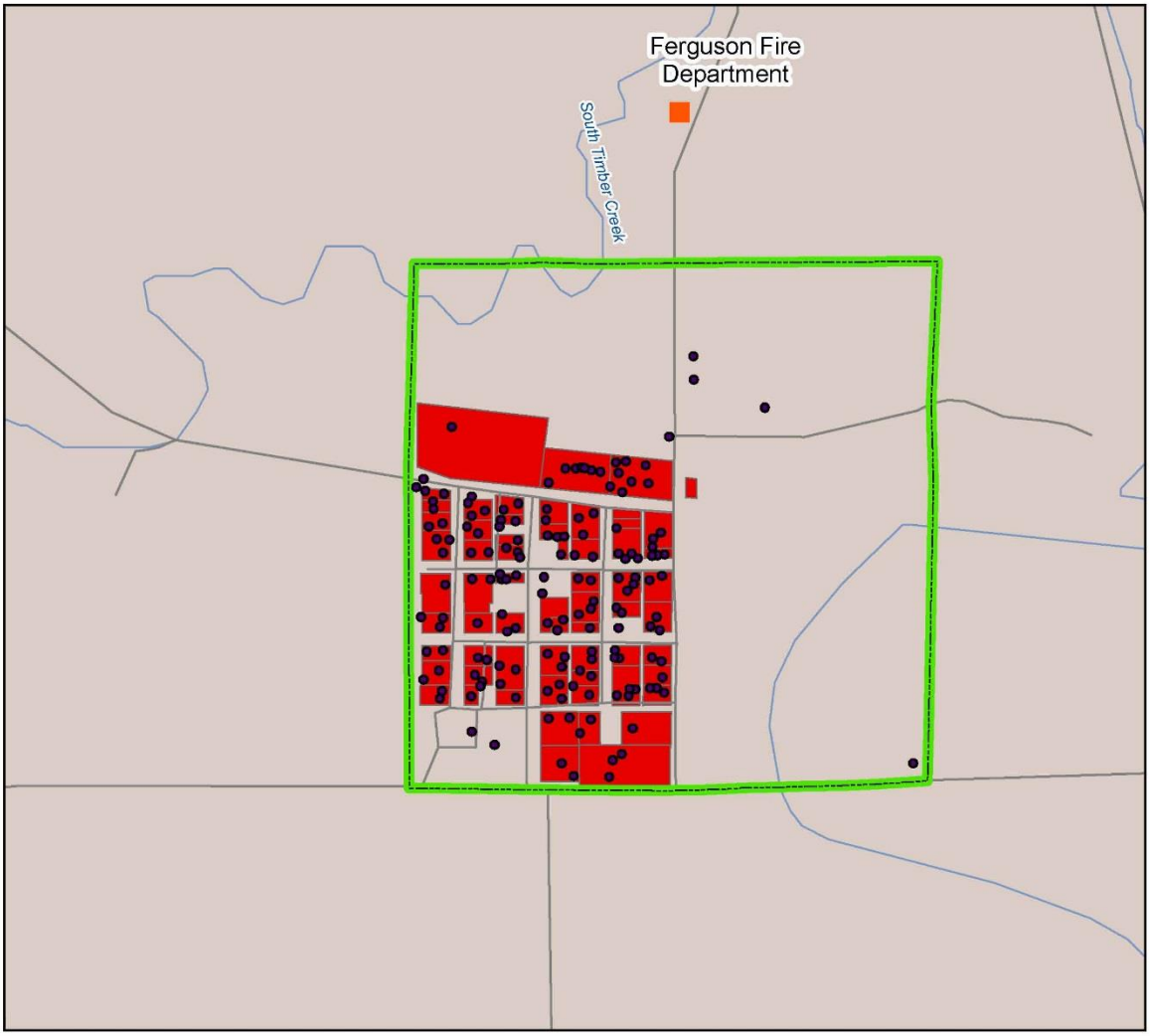
0 0.225 0.45 0.9 Miles

N W E S

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

City of Ferguson

Fixed Hazardous Materials Hazard Area



Legend

- Tier II Facilities
- Fixed Hazardous Materials Hazard Area
- Parcels With Value in Hazard Area
- Structures in Ferguson in Hazard Area
- Highways
- Roads
- Rivers and Streams
- Incorporated City

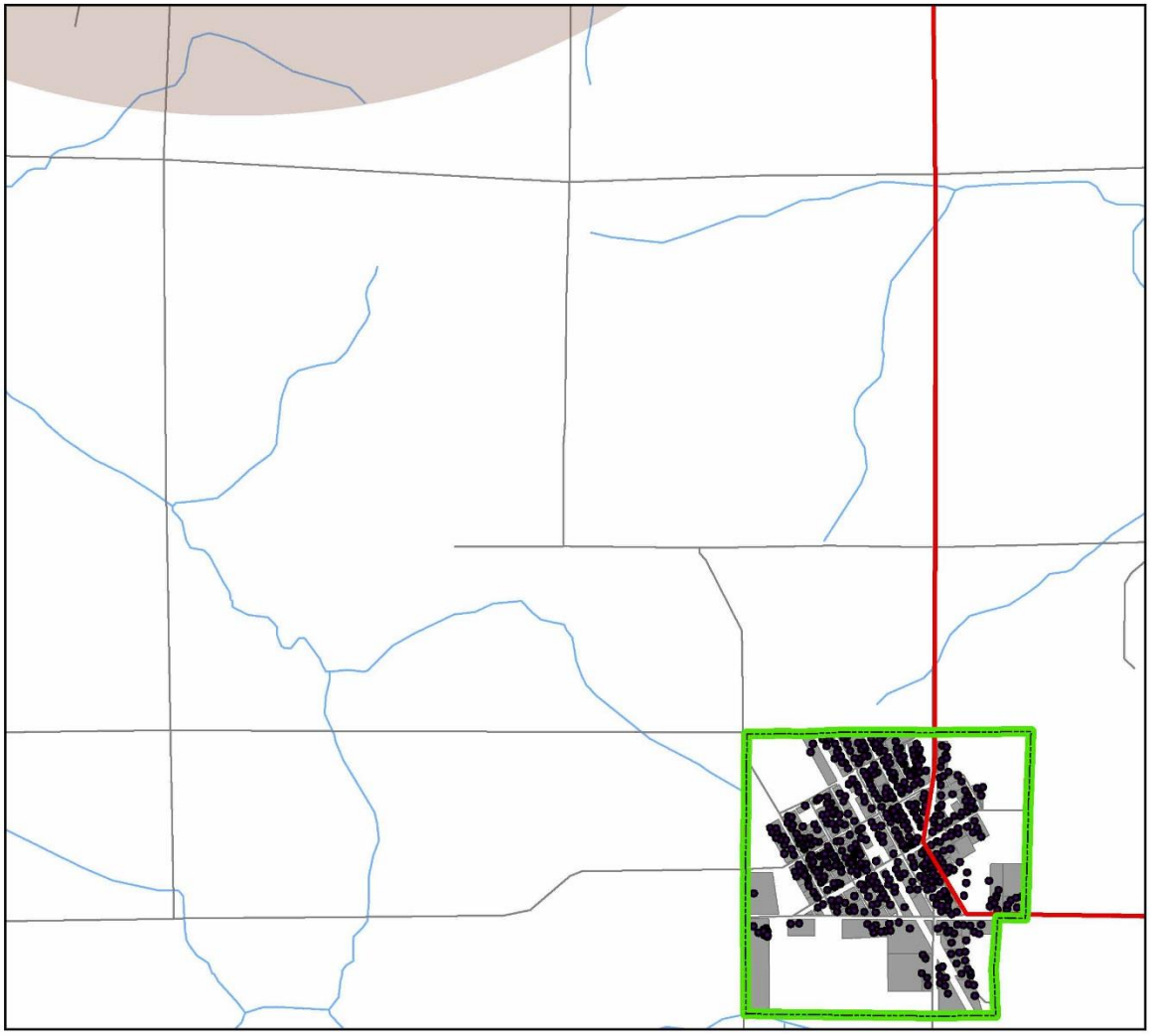
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0 0.075 0.15 0.3 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

City of Gilman

Fixed Hazardous Materials Hazard Area



0 0.2 0.4 0.8 Miles

Legend

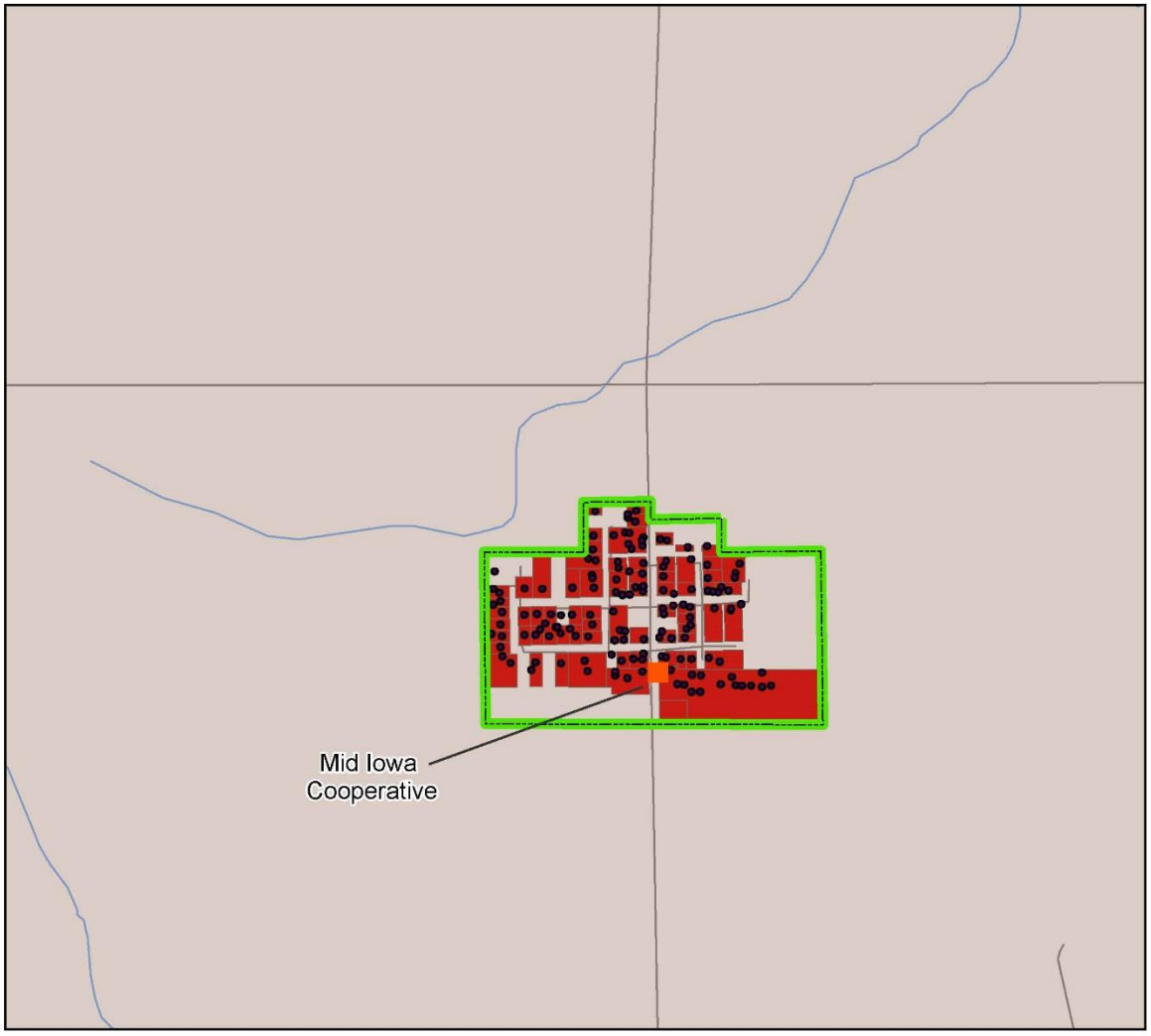
- Tier II Facilities
- Fixed Hazardous Materials Hazard Area
- Parcels With Value
- Structures in Gilman
- Highways
- Roads
- Rivers and Streams
- Incorporated City

N W E S

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

City of Haverhill

Fixed Hazardous Materials Hazard Area



Legend

- Tier II Facilities
- Fixed Hazardous Materials Hazard Area
- Structures in Haverhill in Hazard Area
- Parcels With Value in Hazard Area
- Highways
- Roads
- Rivers and Streams
- Incorporated City

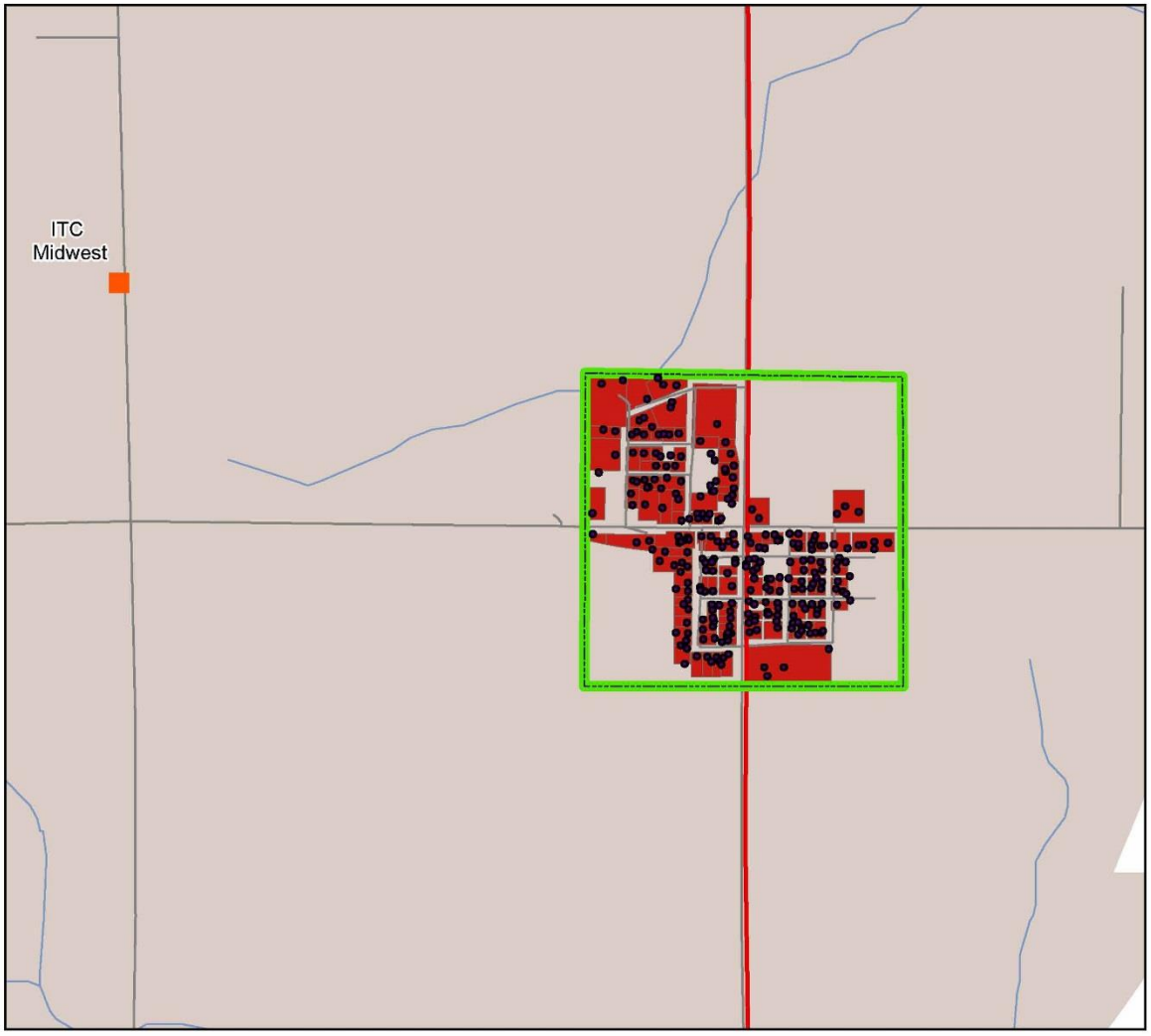
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N W E S

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

City of Laurel

Fixed Hazardous Materials Hazard Area



Legend

- Tier II Facilities
- Fixed Hazardous Materials Hazard Area
- Parcels With Value in Hazard Area
- Structures in Laurel in Hazard Area
- Highways
- Roads
- Rivers and Streams
- Incorporated City

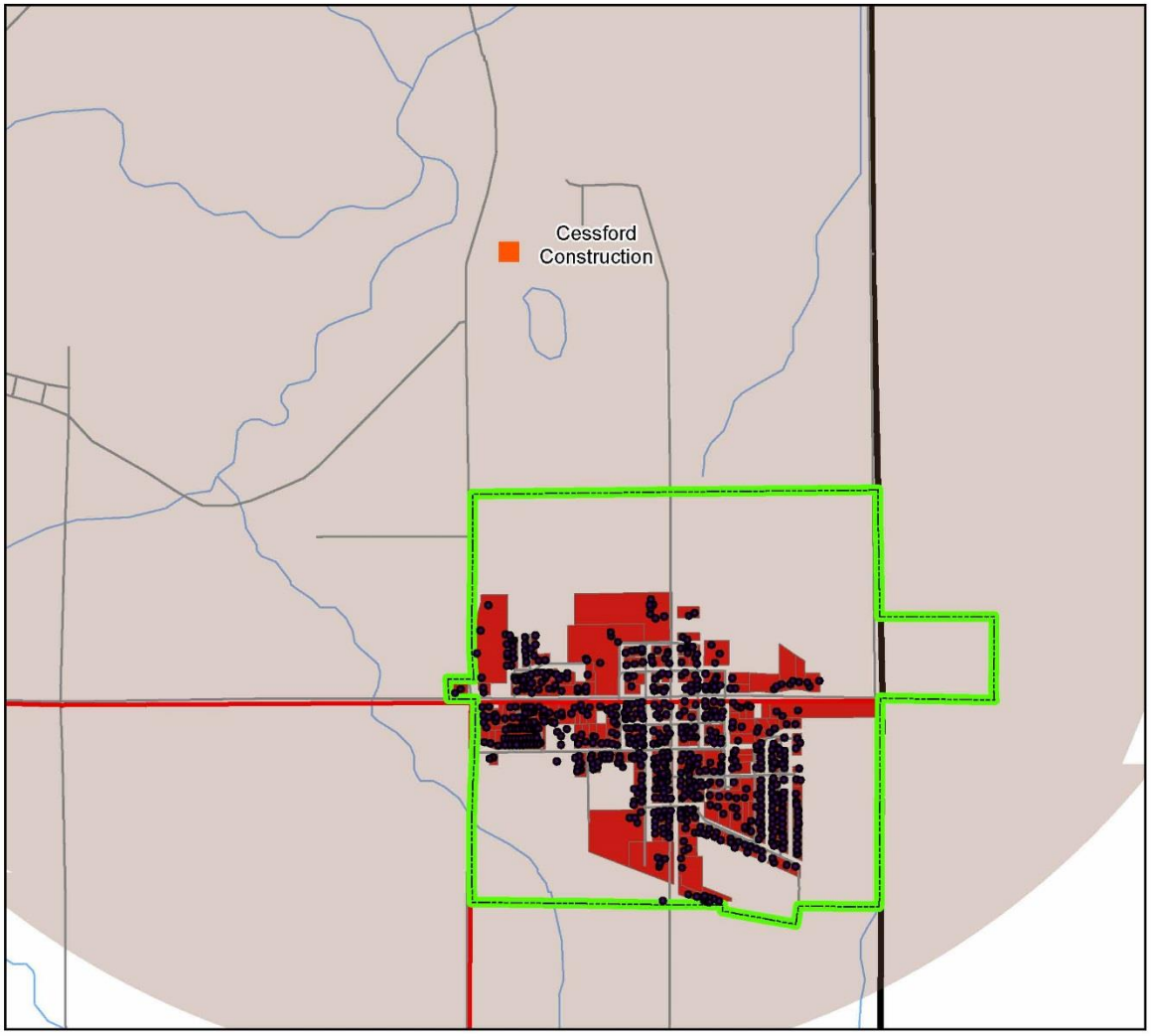
0 0.125 0.25 0.5 Miles

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Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

City of Le Grand

Fixed Hazardous Materials Hazard Area



Legend

- Tier II Facilities
- Fixed Hazardous Materials Hazard Area
- Parcels With Value in Hazard Area
- Structures in Le Grand in Hazard Area
- Highways
- Roads
- Rivers and Streams
- County Boundary
- Incorporated City

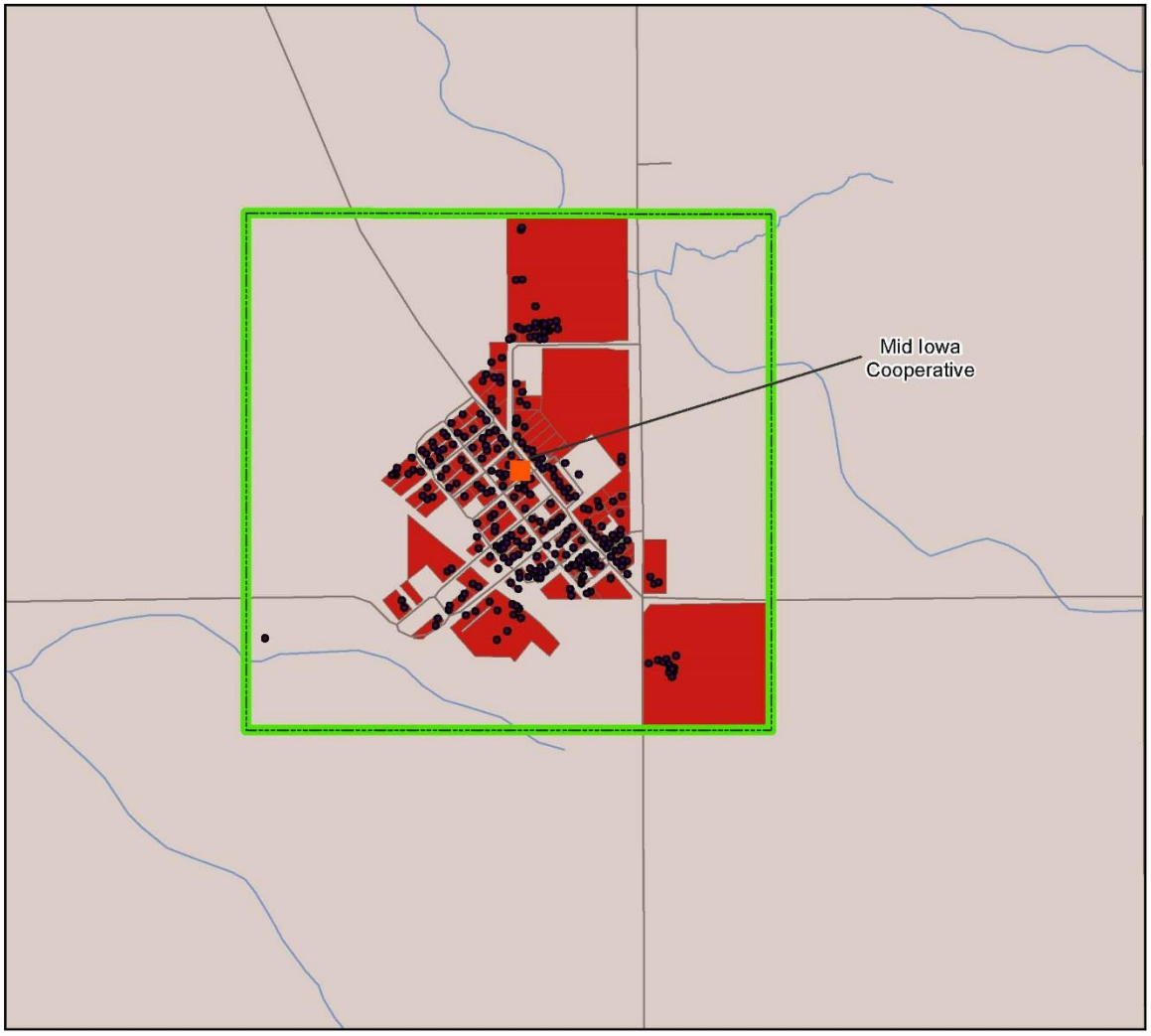
0 0.2 0.4 0.8 Miles

N
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Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

City of Liscomb

Fixed Hazardous Materials Hazard Area



Legend

- Tier II Facilities
- Fixed Hazardous Materials Hazard Area
- Parcels With Value in Hazard Area
- Structures in Liscomb in Hazard Area
- Highways
- Roads
- Rivers and Streams
- Incorporated City

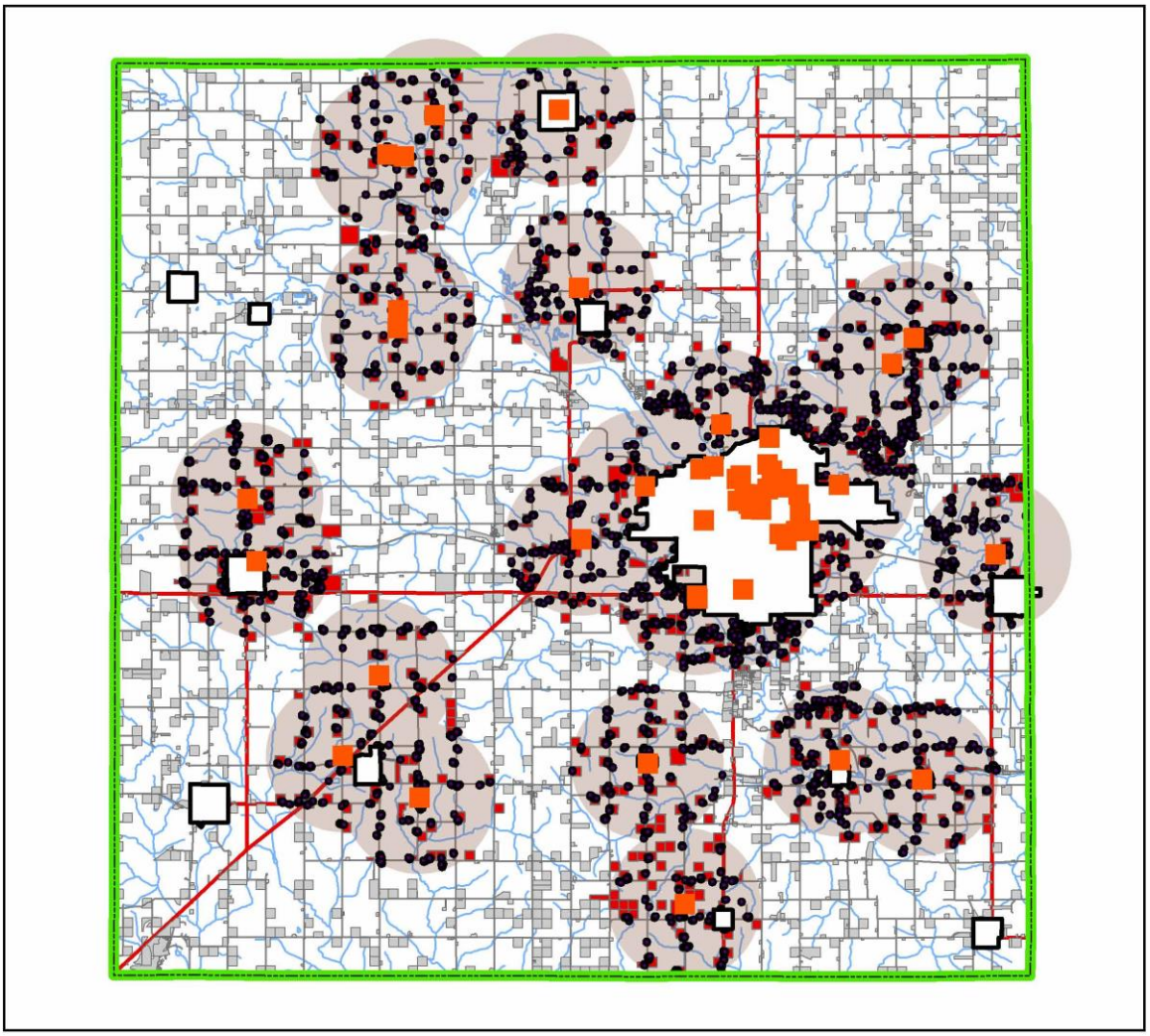
0 0.15 0.3 0.6 Miles

N
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Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

Marshall County

Fixed Hazardous Materials Hazard Area



Legend

- Tier II Facilities
- Fixed Hazardous Materials Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Structures in Marshall County in Hazard Area
- Highways
- Roads
- Rivers and Streams
- Incorporated City
- County Boundary

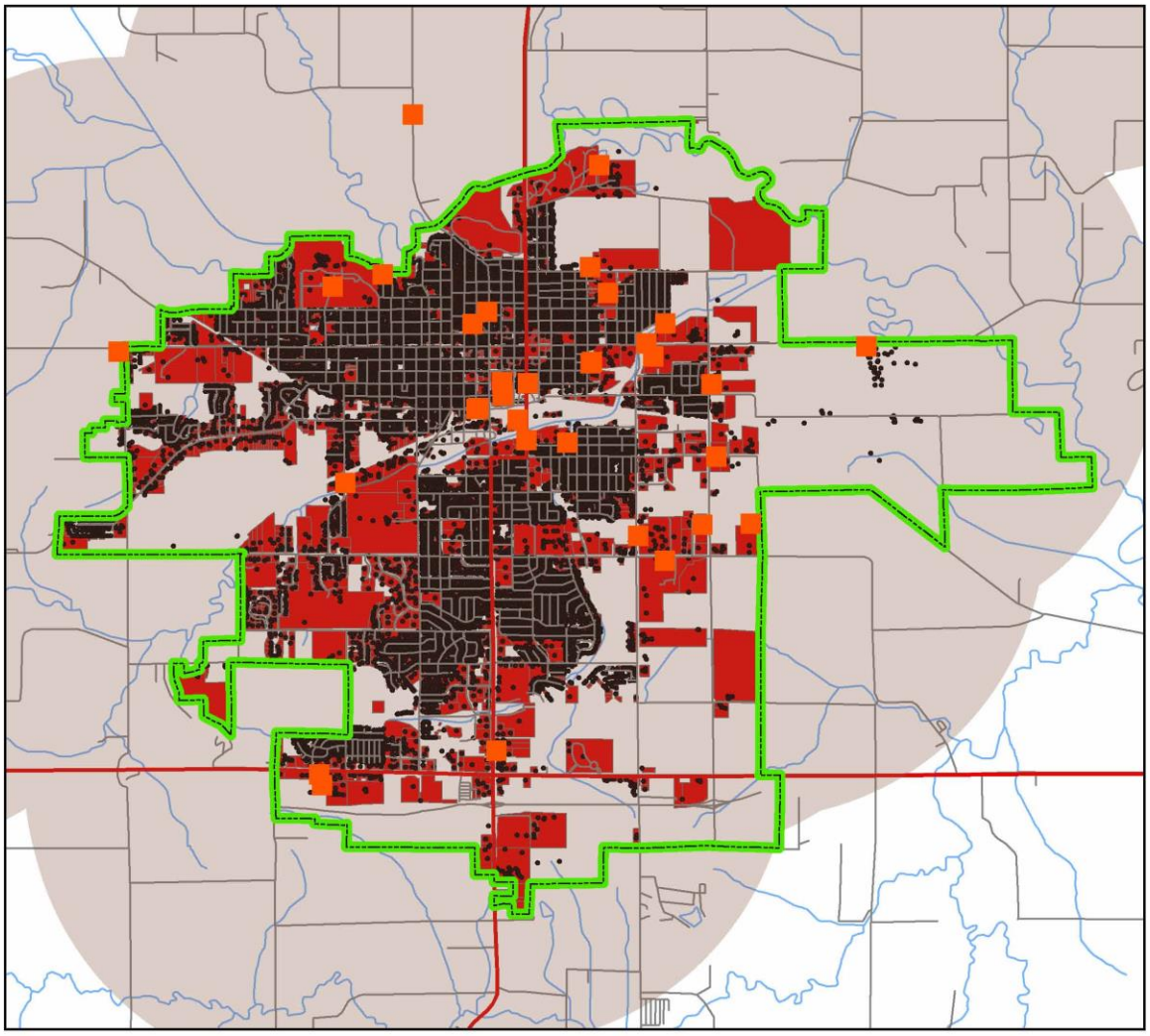
0 2.25 4.5 9 Miles

N W E S

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

City of Marshalltown

Fixed Hazardous Materials Hazard Area



Legend

- Tier II Facilities
- Incorporated City
- Fixed Hazardous Materials Hazard Area
- Parcels With Value in Hazard Area
- Structures in Marshalltown in Hazard Area
- Highways
- Roads
- Rivers and Streams

0 0.5 1 2 Miles

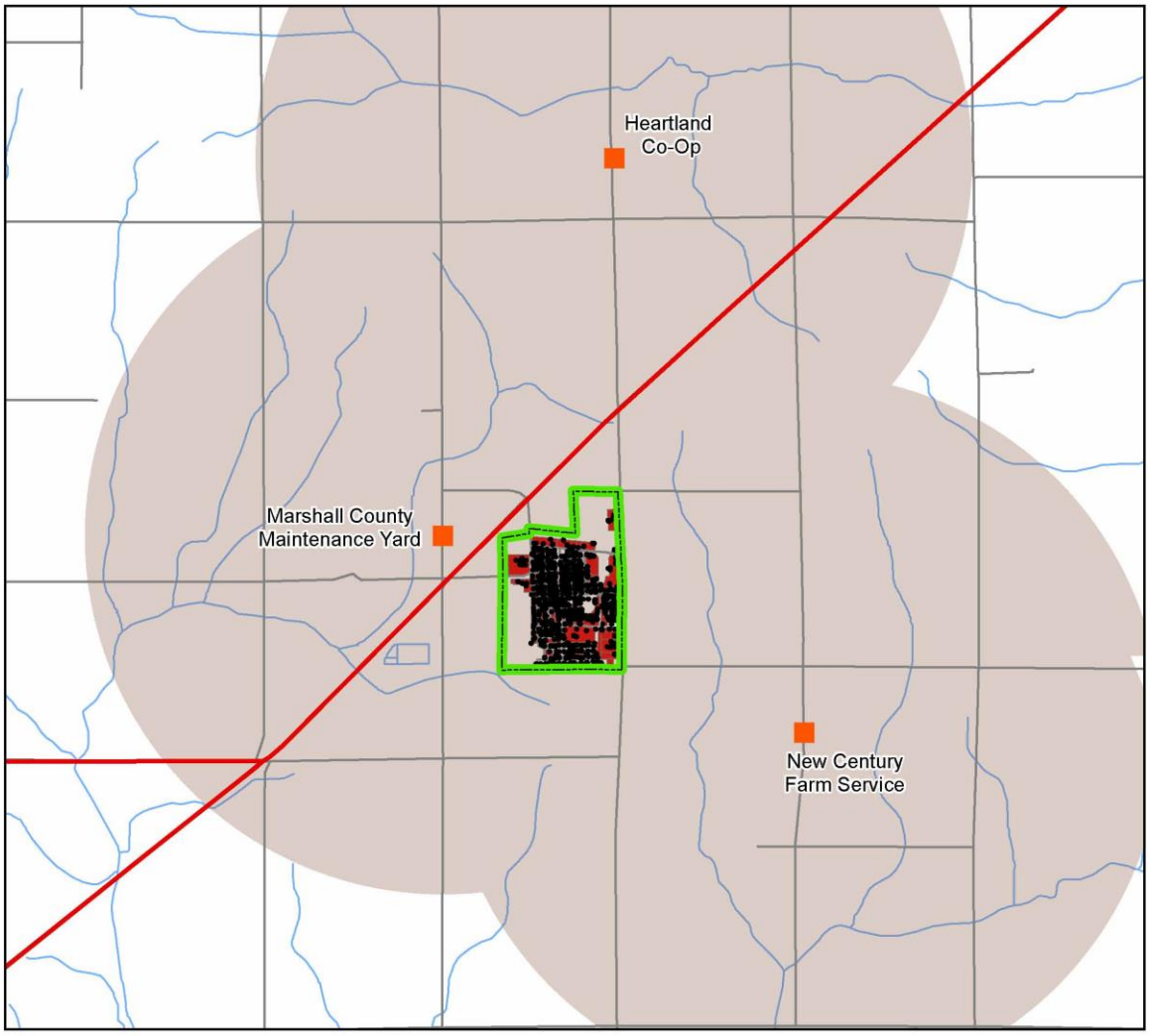
Marshalltown has total of 34 Tier II Facilities

N
W E
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Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

City of Melbourne

Fixed Hazardous Materials Hazard Area



Legend

- Tier II Facilities
- Fixed Hazardous Materials Hazard Area
- Parcels With Value in Hazard Area
- Structures in Melbourne in Hazard Area
- Highways
- Roads
- Rivers and Streams
- Incorporated City

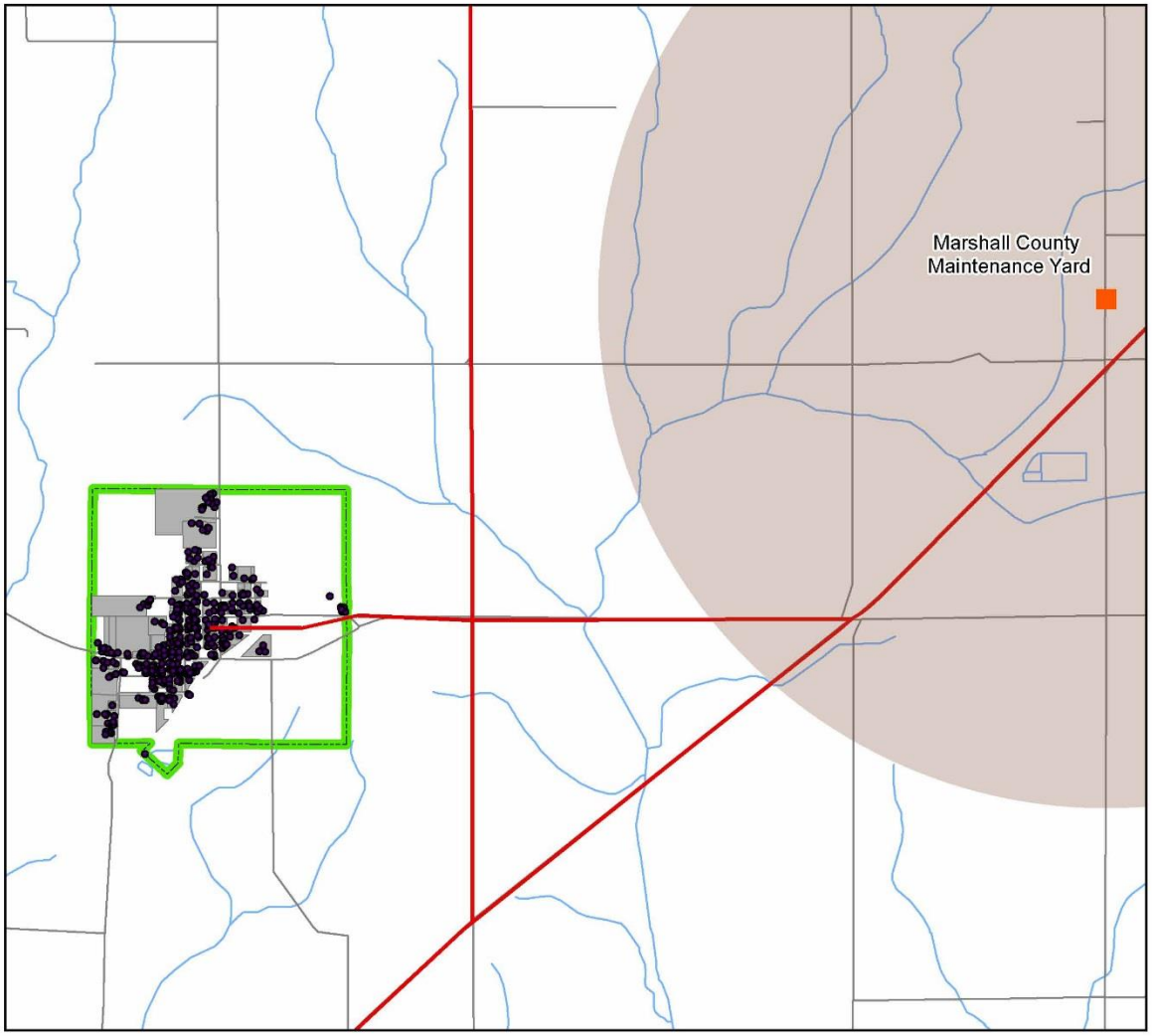
0 0.45 0.9 1.8 Miles

N
W E
S

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

City of Rhodes

Fixed Hazardous Materials Hazard Area



Legend

- Tier II Facilities
- Fixed Hazardous Materials Hazard Area
- Parcels With Value
- Structures in Rhodes
- Highways
- Roads
- Rivers and Streams
- Incorporated City

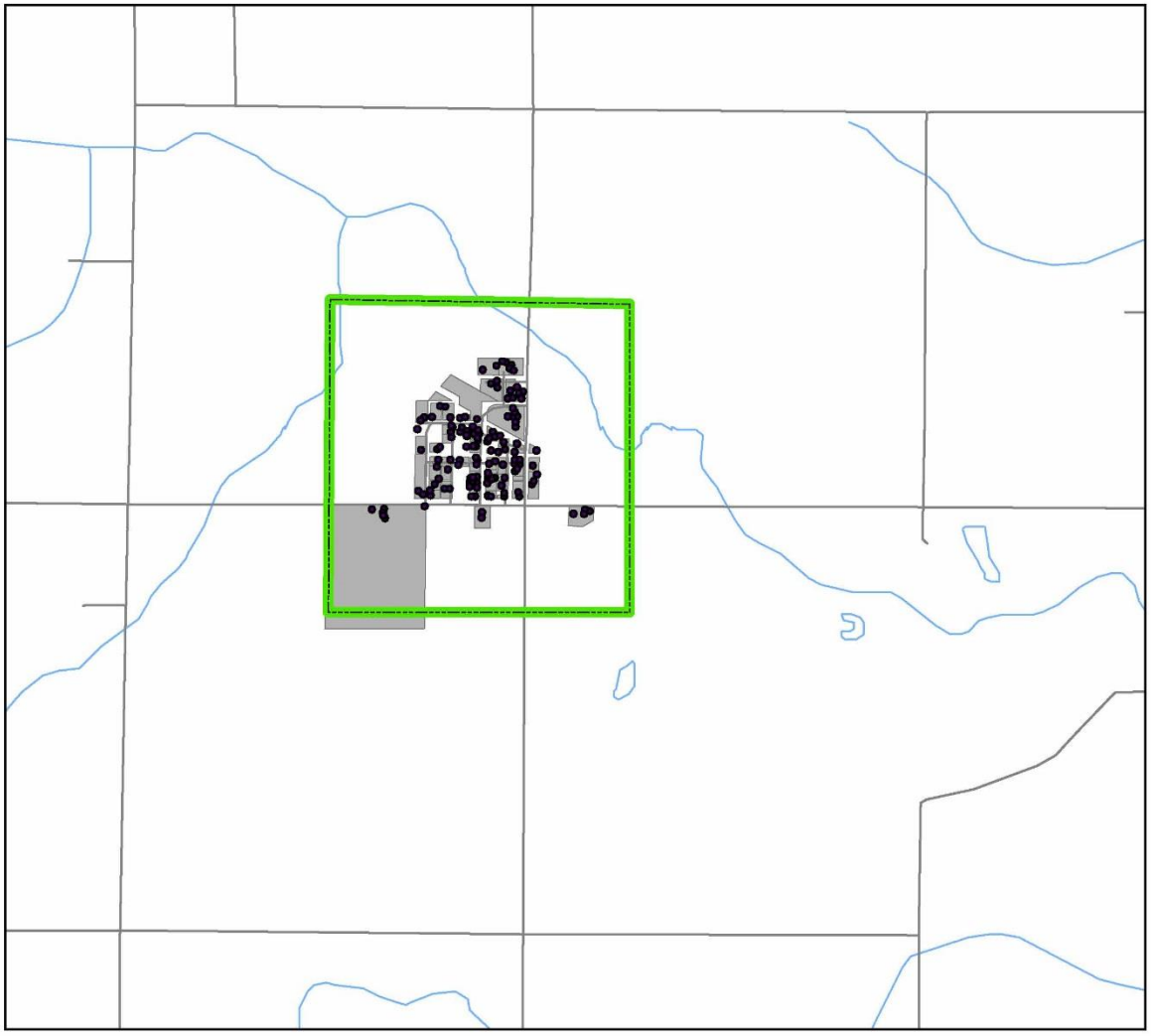
0 0.325 0.65 1.3 Miles

N
W E
S

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

City of St. Anthony

Fixed Hazardous Materials Hazard Area



0 0.2 0.4 0.8 Miles

Legend

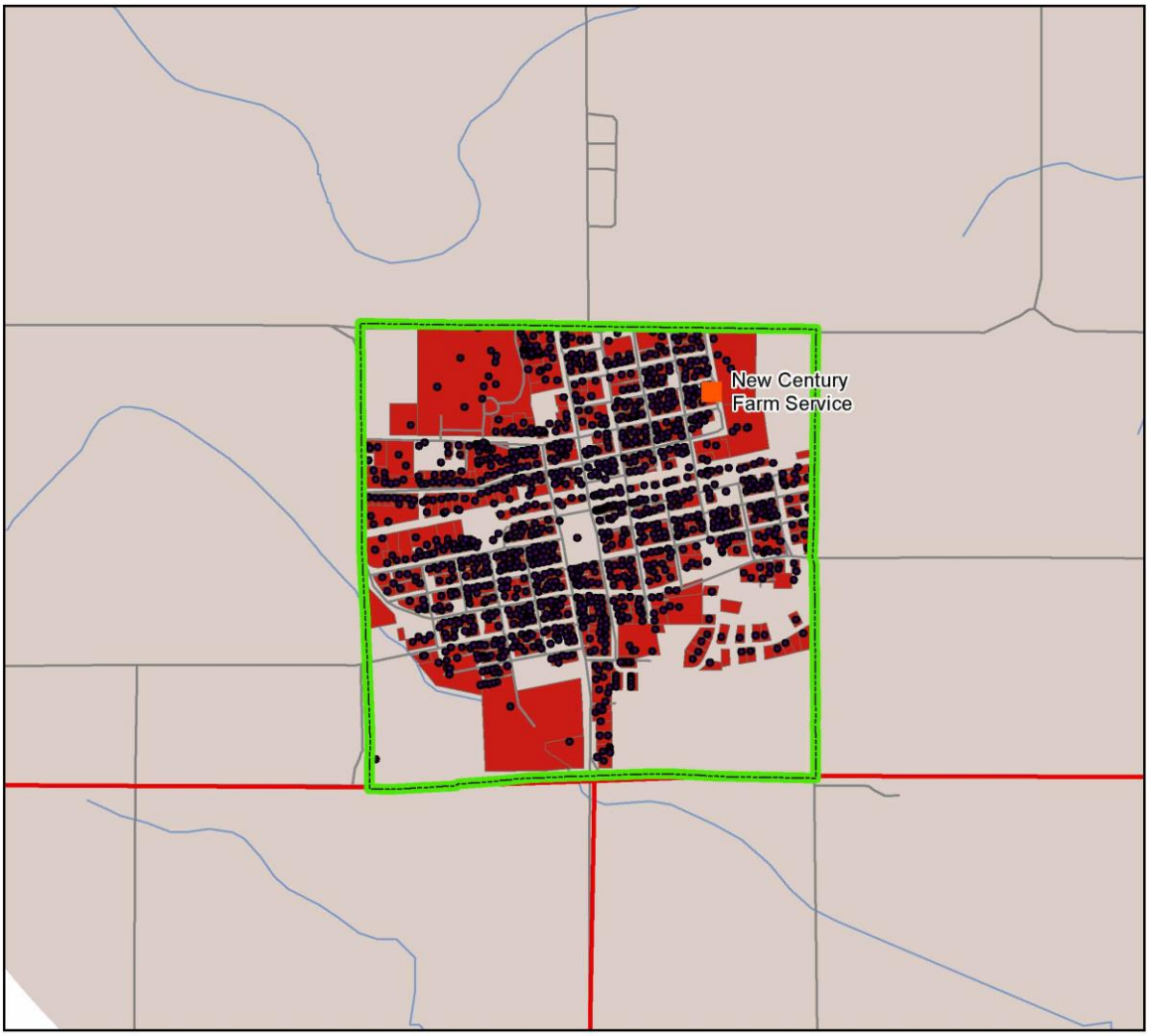
- Tier II Facilities
- Fixed Hazardous Materials Hazard Area
- Parcels With Value
- Structures in St. Anthony
- Highways
- Roads
- Rivers and Streams
- Incorporated City

N W E S

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

City of State Center

Fixed Hazardous Materials Hazard Area



Legend

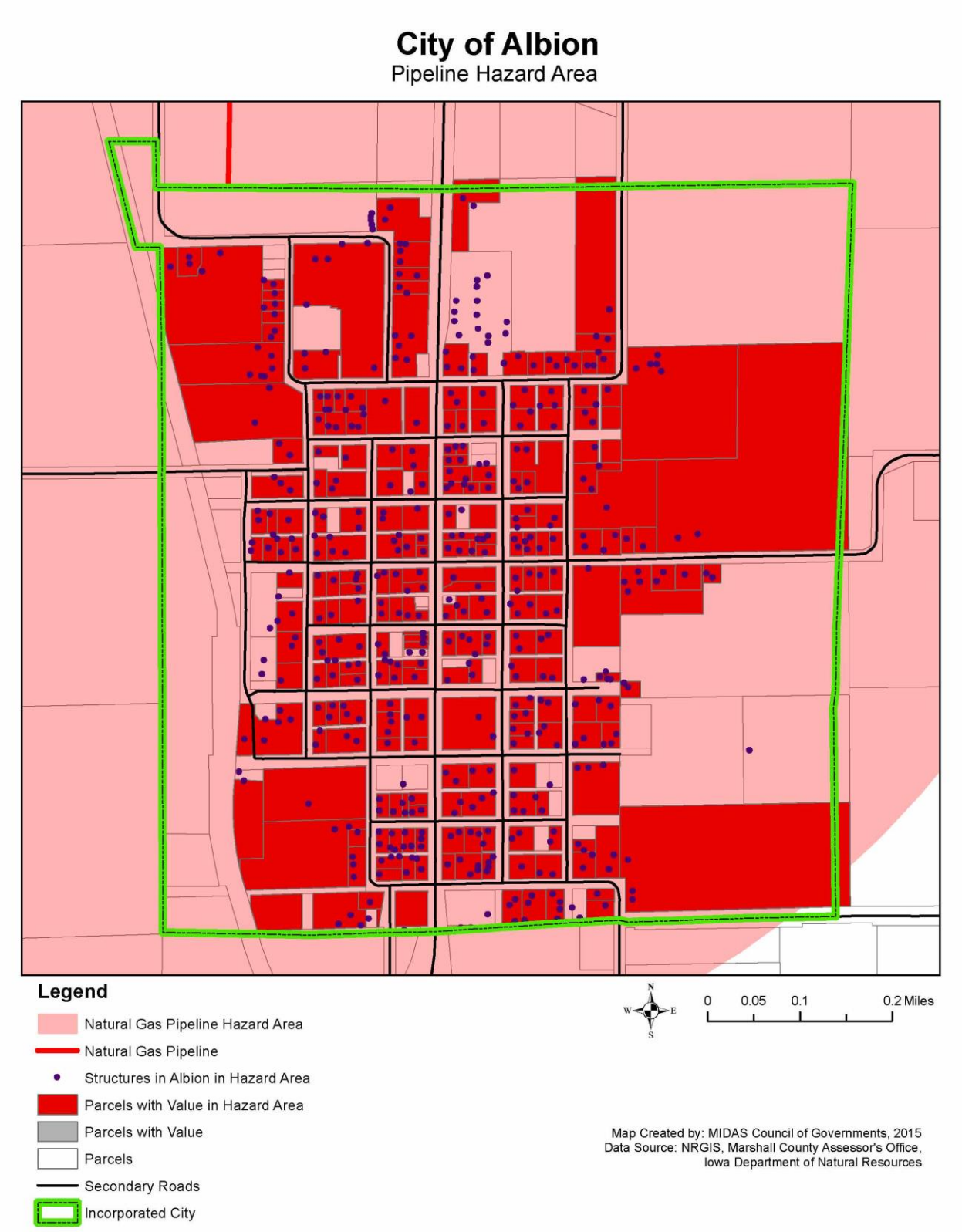
- Tier II Facilities
- Fixed Hazardous Materials Hazard Area
- Parcels With Value in Hazard Area
- Structures in State Center in Hazard Area
- Highways
- Roads
- Rivers and Streams
- Incorporated City

0 0.175 0.35 0.7 Miles

N
W E
S

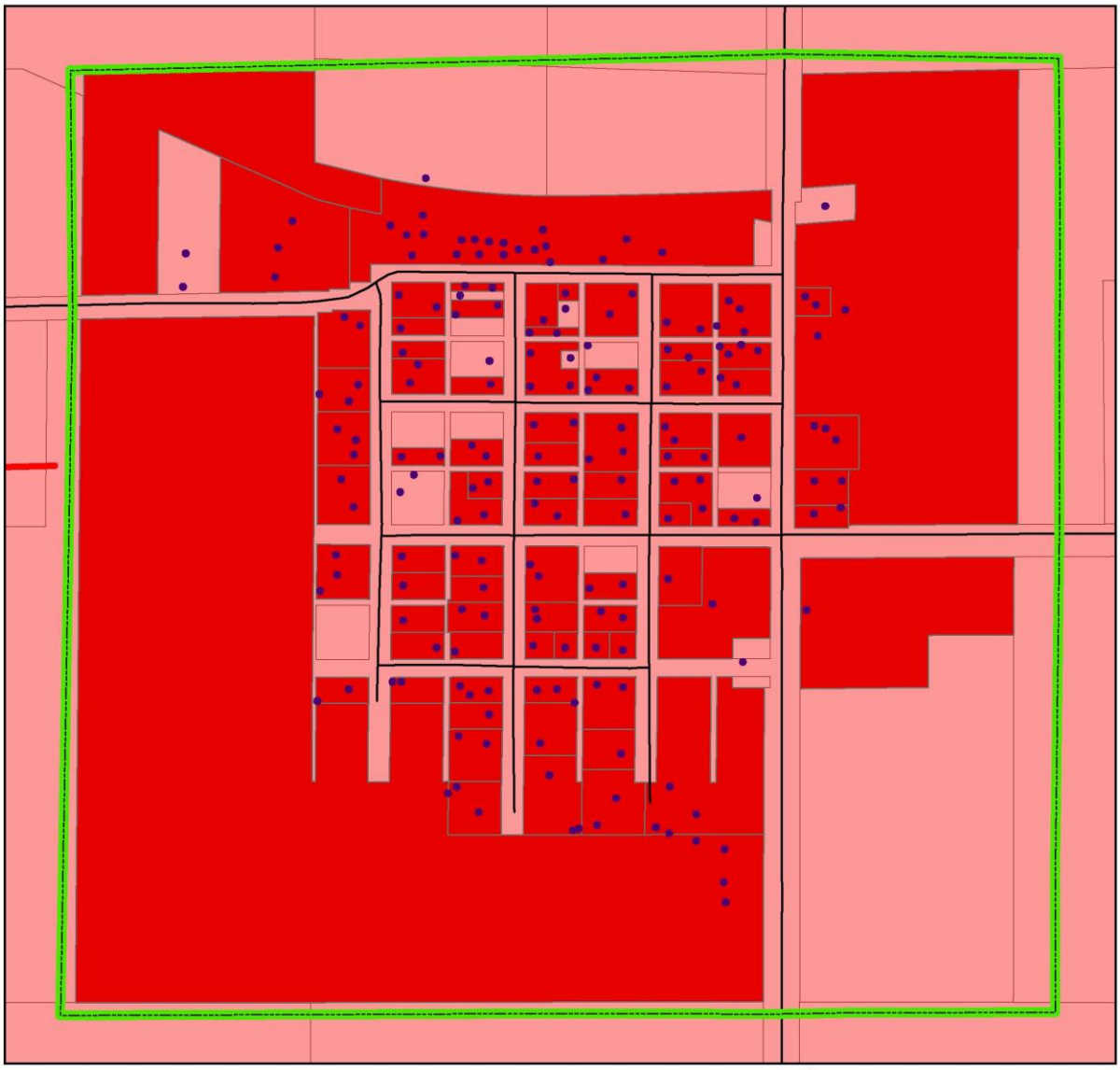
Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa DNR Facilities Explorer, Iowa Department of Natural Resources

Appendix J. Pipeline Hazard Areas



City of Clemons

Pipeline Hazard Area



Legend

- Natural Gas Pipeline Hazard Area
- Natural Gas Pipeline
- Structures in Clemons in Hazard Area
- Parcels With Value in Hazard Area
- Parcels
- Secondary Roads
- Incorporated City

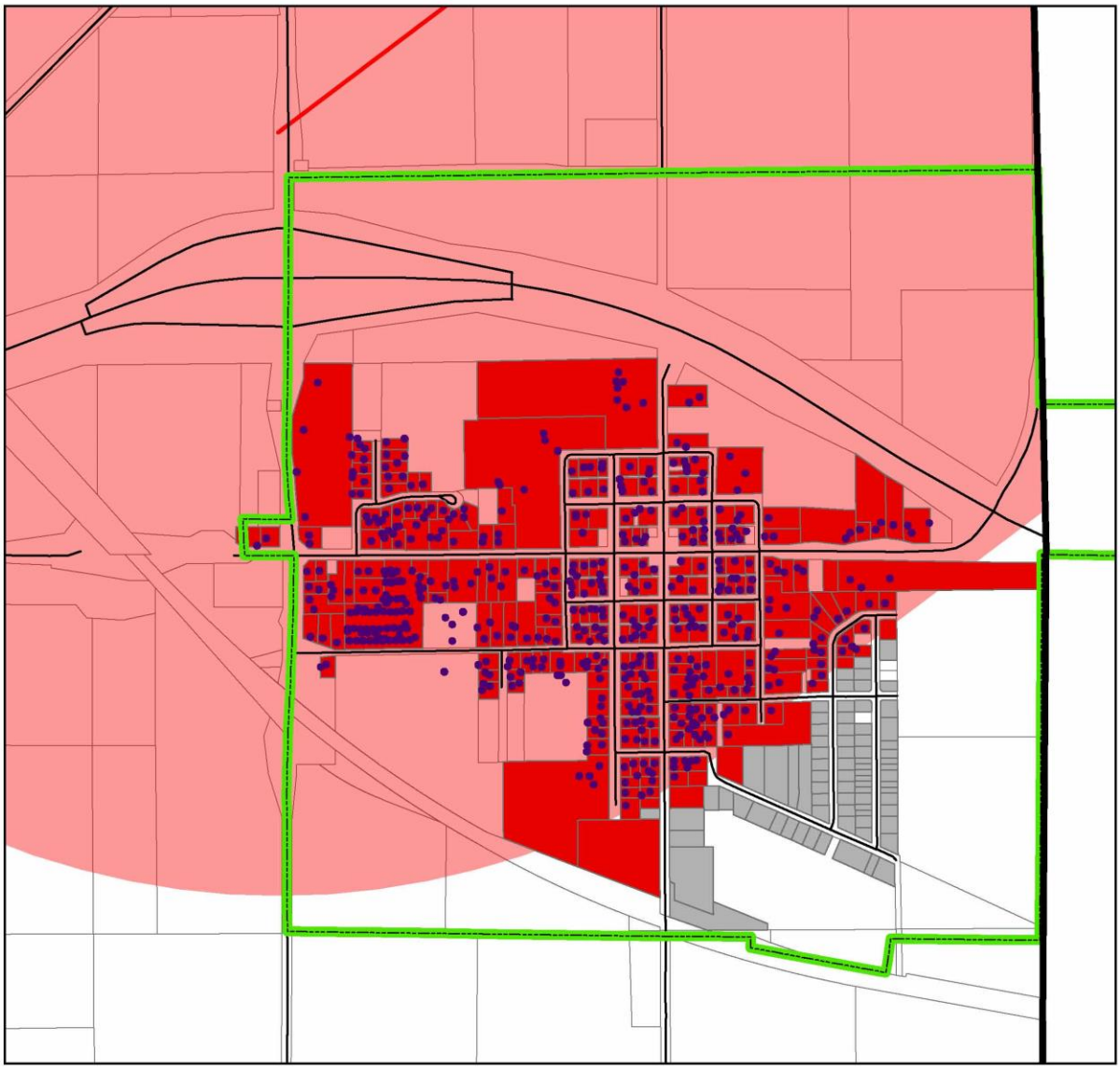
N W E S

0 0.025 0.05 0.1 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Le Grand

Pipeline Hazard Area



N
W E
S

0 0.05 0.1 0.2 Miles

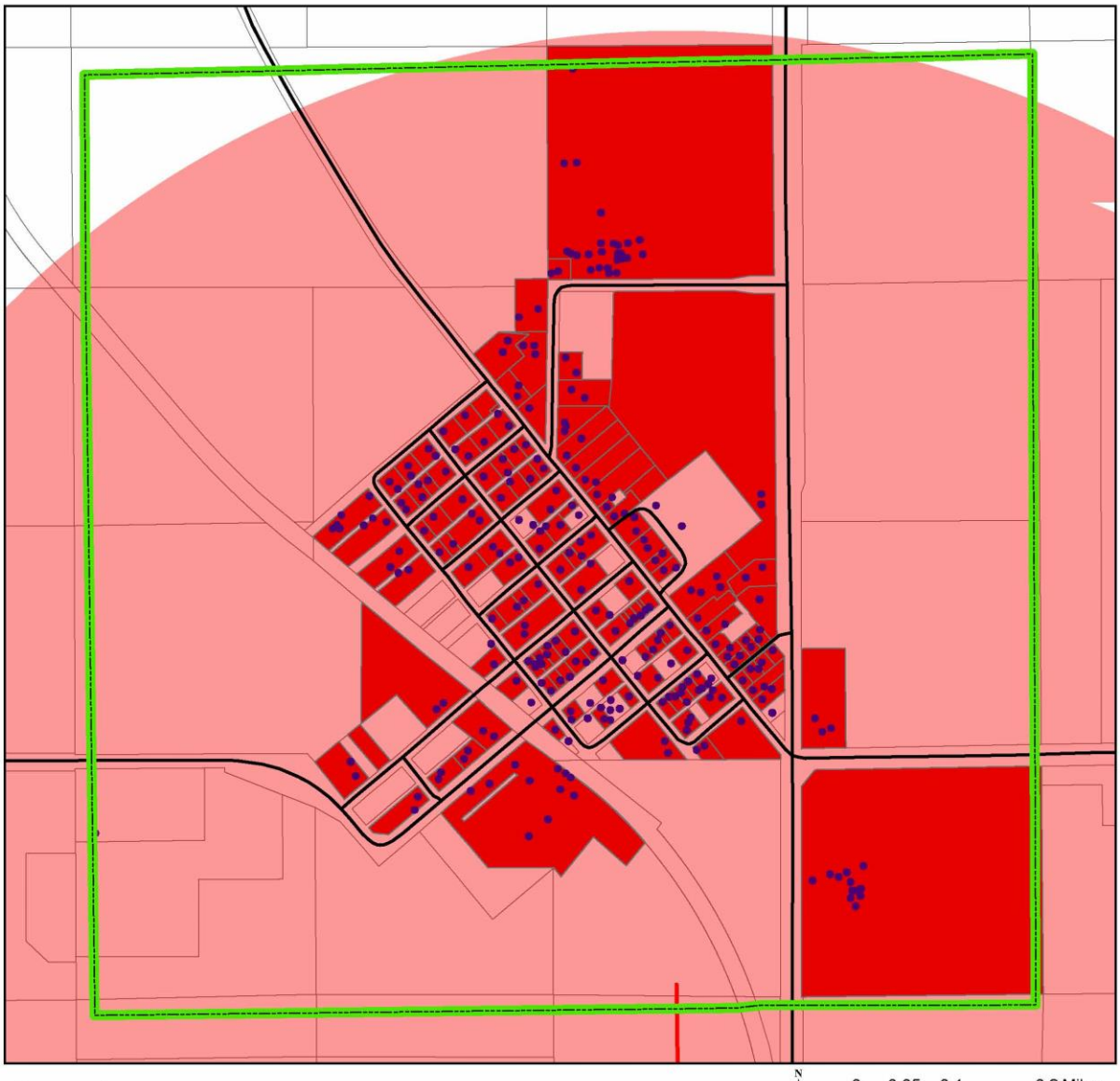
Legend

- Natural Gas Pipeline Hazard Area
- Natural Gas Pipeline
- Structures in Le Grand in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Secondary Roads
- Incorporated City
- County Boundary

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Liscomb

Pipeline Hazard Area



Legend

- Natural Gas Pipeline Hazard Area
- Natural Gas Pipeline
- Structures in Liscomb in Hazard Area
- Parcels With Value in Hazard Area
- Parcels
- Secondary Roads
- Incorporated City

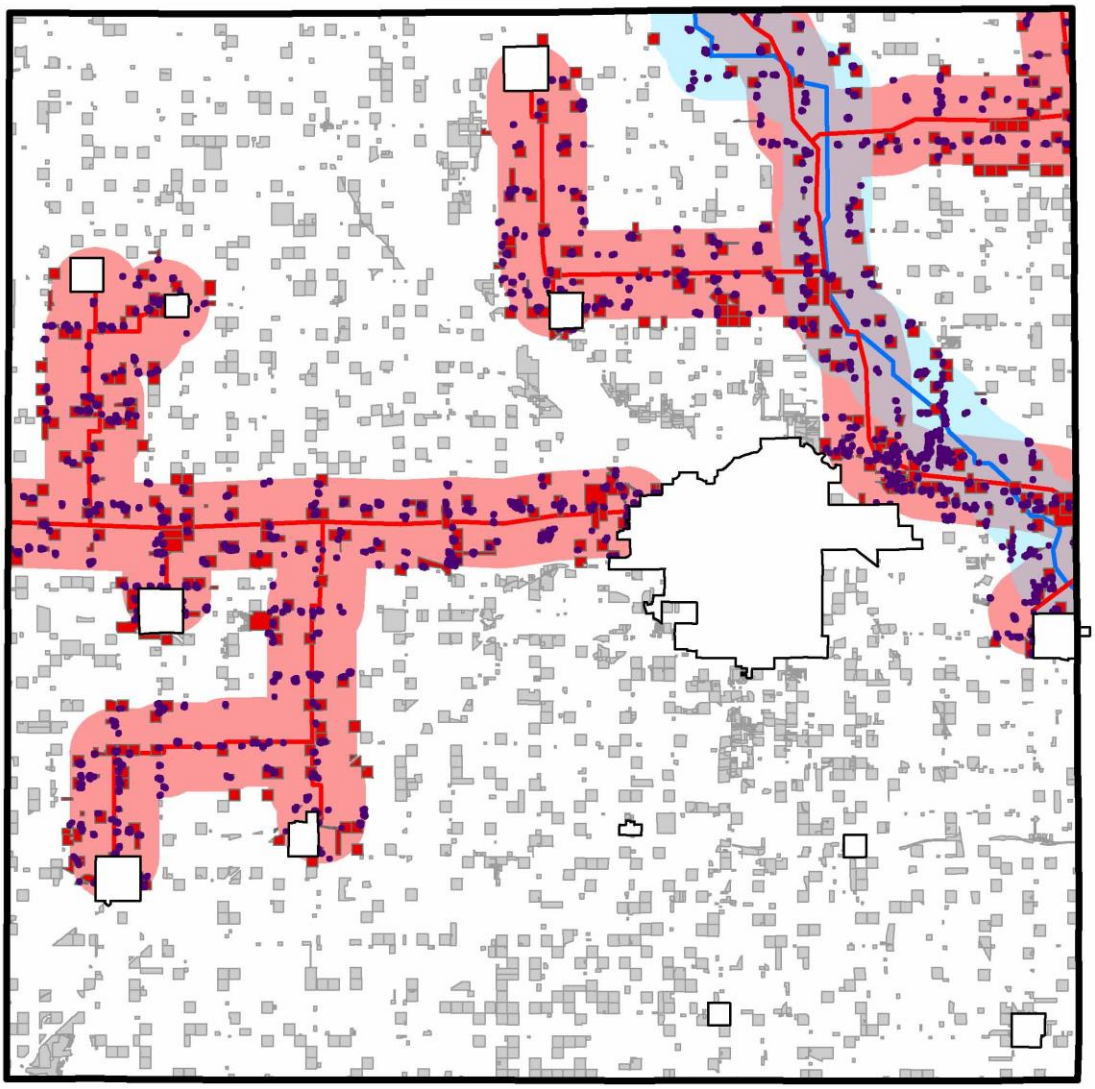
N W E S

0 0.05 0.1 0.2 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

Marshall County

Pipeline Hazard Area



Legend

- Ammonia Pipeline
- Natural Gas Pipeline
- Ammonia Pipeline Hazard Area
- Natural Gas Pipeline Hazard Area
- Structures in Marshall County in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Incorporated City
- County Boundary

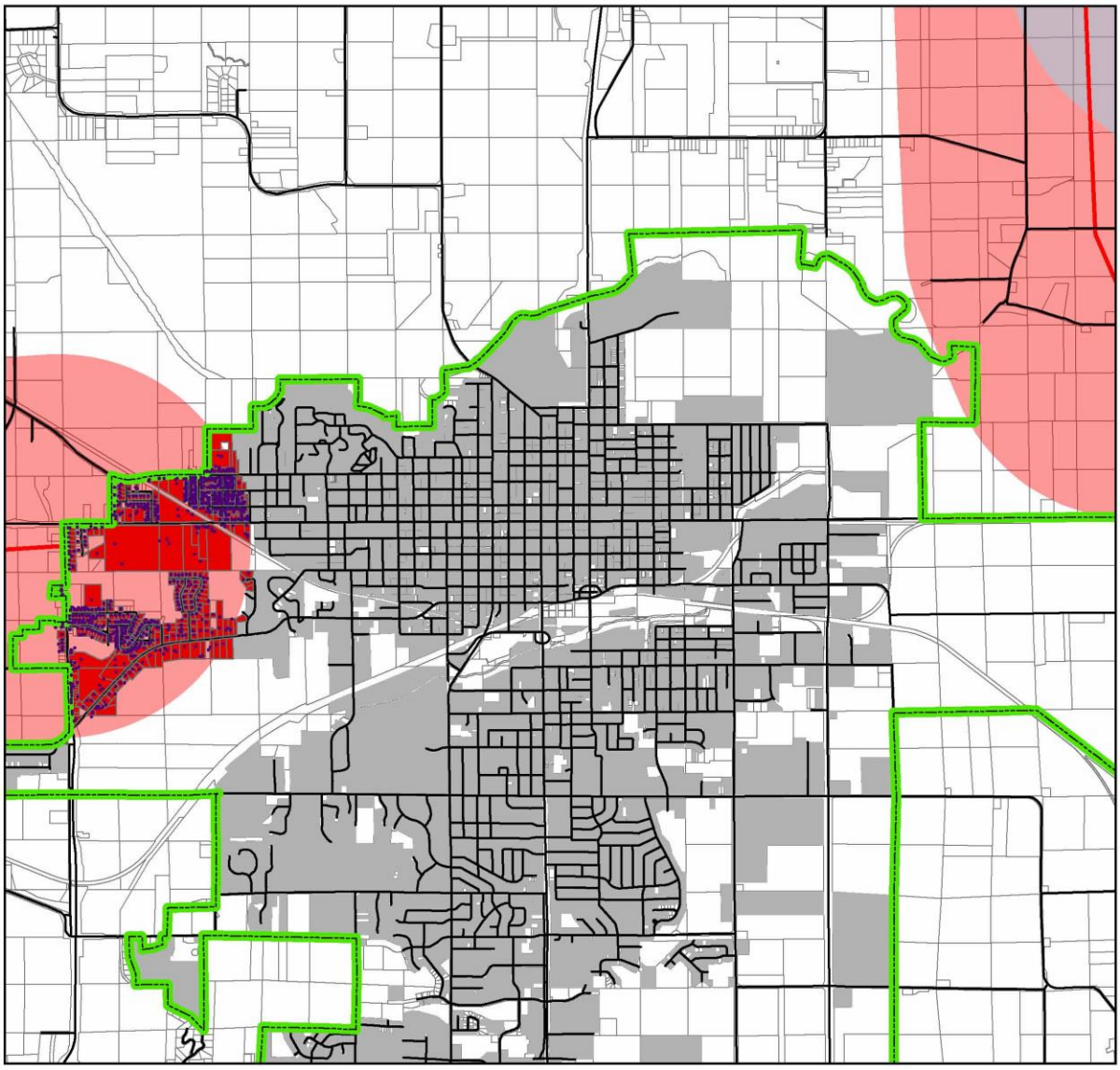
N W E S

0 0.75 1.5 3 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Marshalltown

Pipeline Hazard Area



Legend

- Ammonia Pipeline Hazard Area
- Natural Gas Pipeline Hazard Area
- Ammonia Pipeline
- Natural Gas Pipeline
- Structures in Marshalltown in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Secondary Roads
- Incorporated City

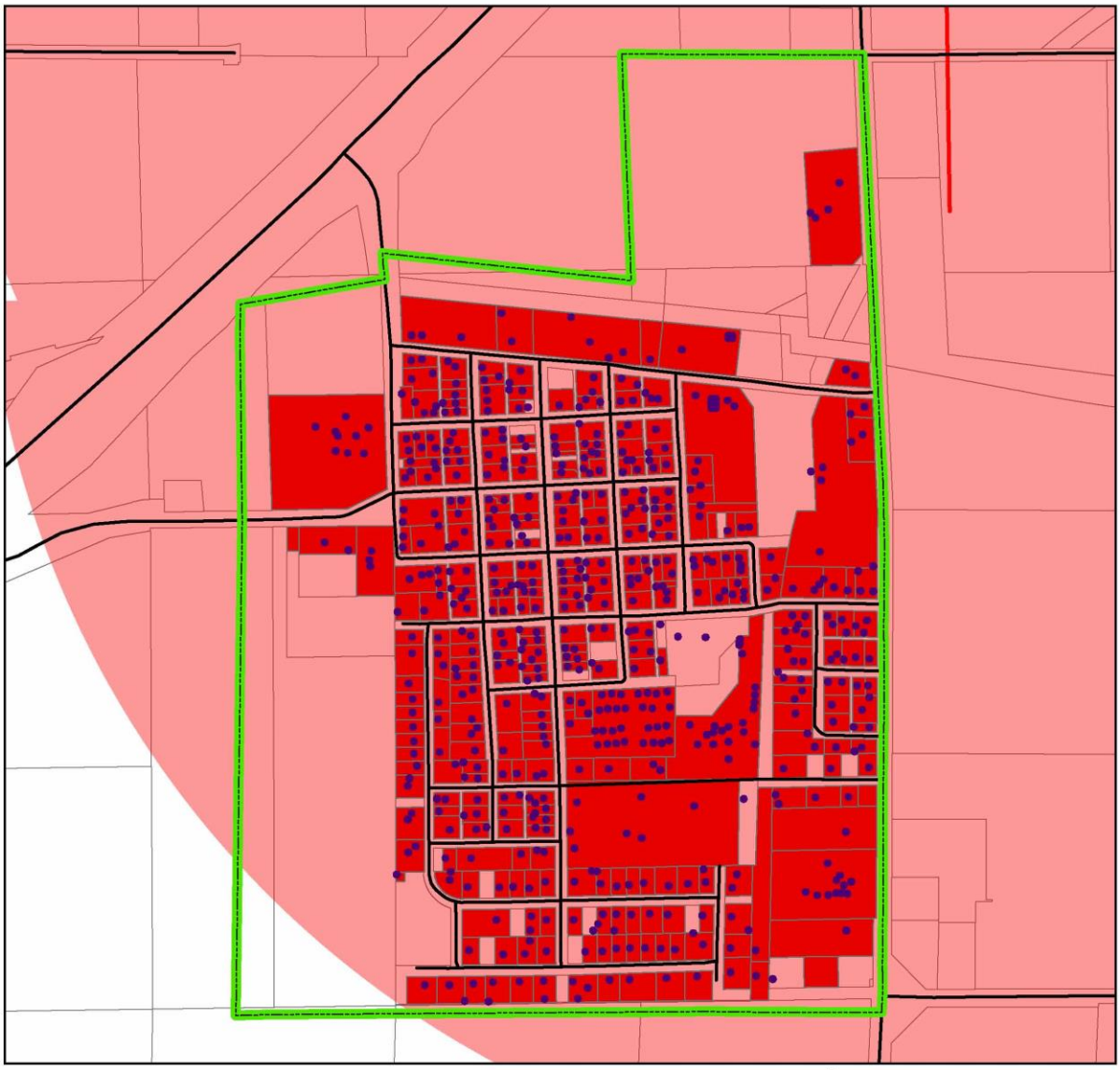
N W E S

0 0.2 0.4 0.8 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office,
Iowa Department of Natural Resources

City of Melbourne

Pipeline Hazard Area



Legend

- Natural Gas Pipeline Hazard Area
- Natural Gas Pipeline
- Structures in Melbourne in Hazard Area
- Parcels With Value in Hazard Area
- Parcels
- Secondary Roads
- Incorporated City

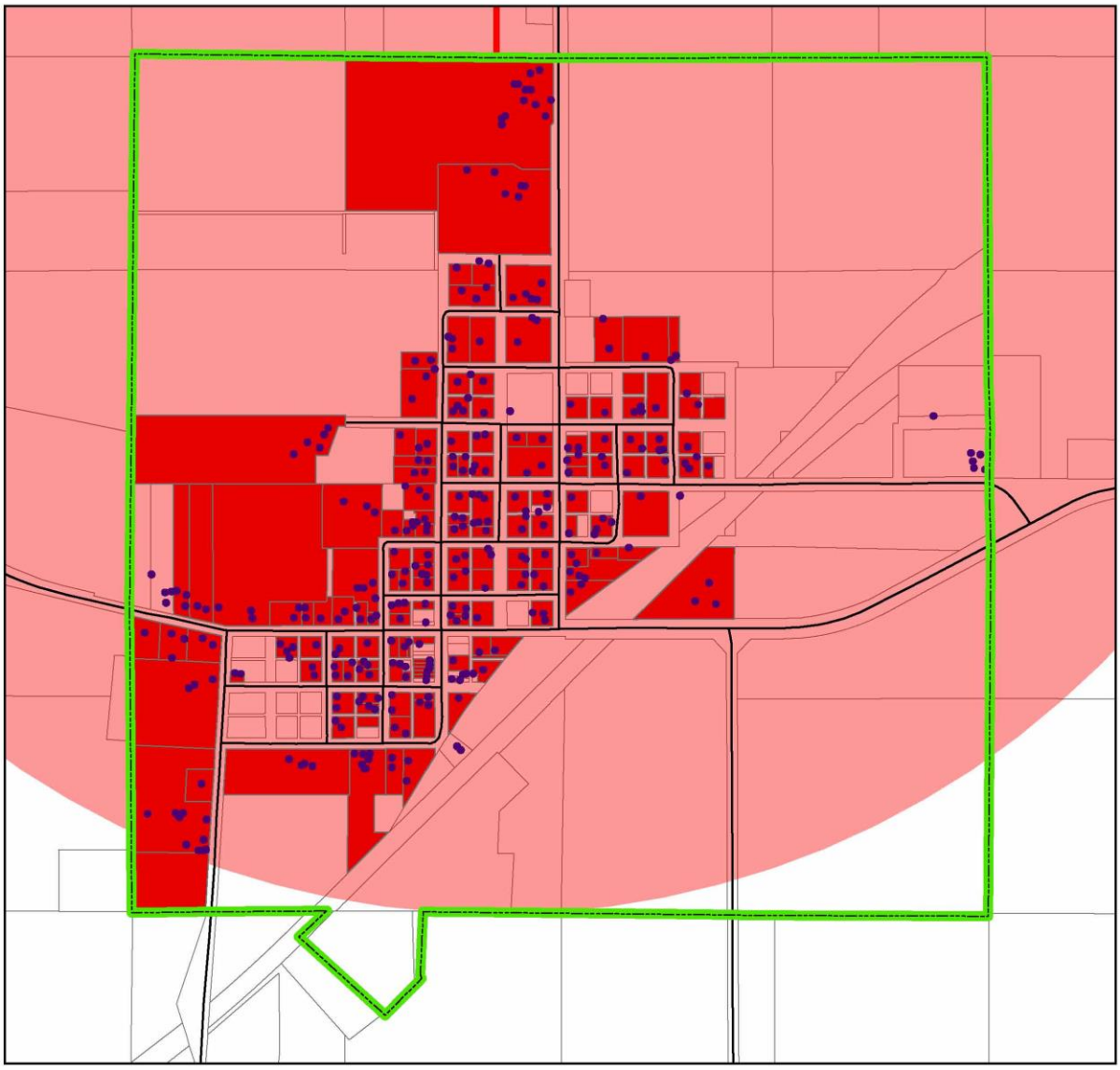
N W E S

0 0.05 0.1 0.2 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Rhodes

Pipeline Hazard Area



Legend

- Natural Gas Pipeline Hazard Area
- Natural Gas Pipeline
- Structures in Rhodes in Hazard Area
- Parcels With Value in Hazard Area
- Parcels
- Secondary Roads
- Incorporated City

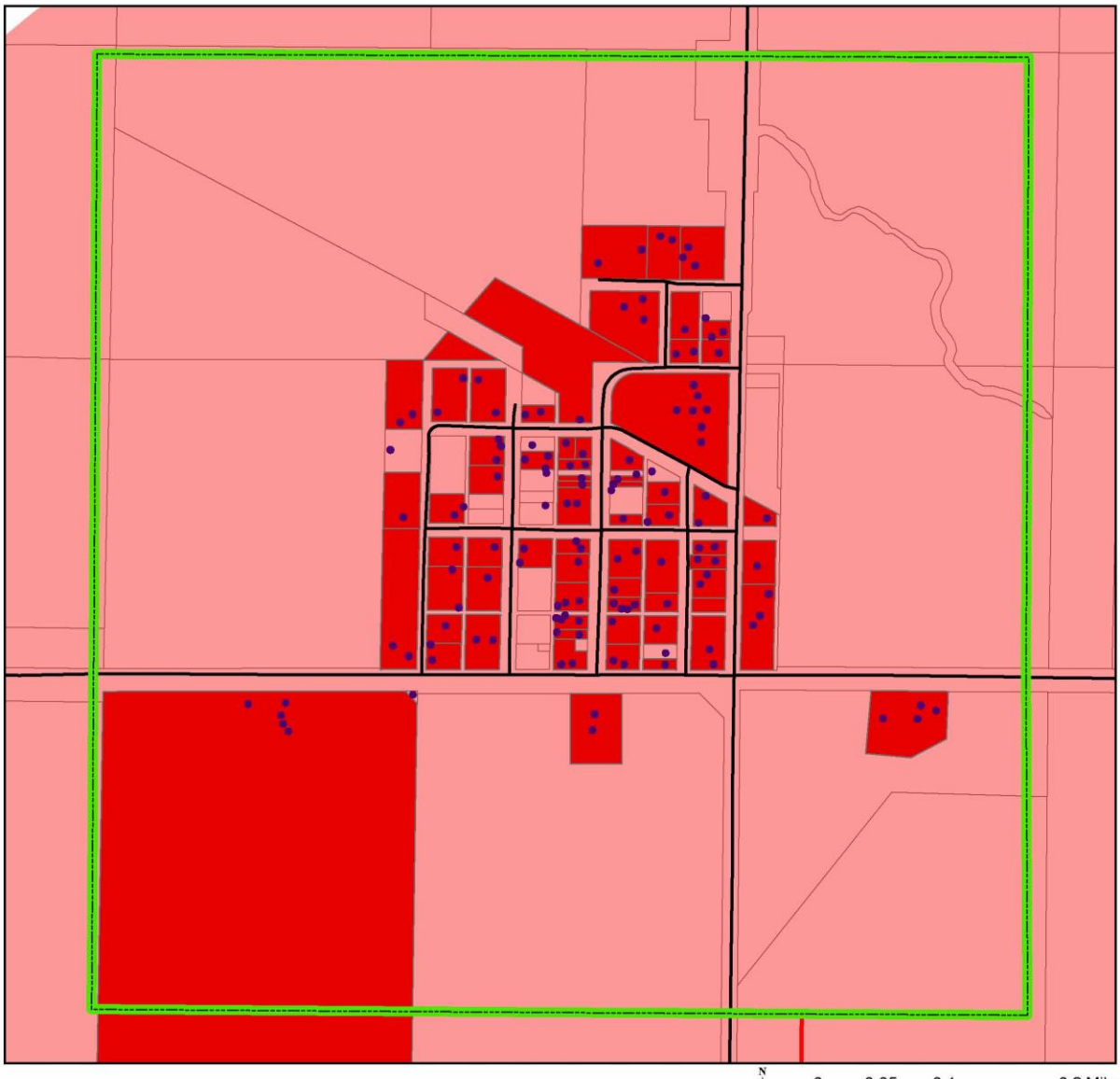
N W E S

0 0.05 0.1 0.2 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of St. Anthony

Pipeline Hazard Area



Legend

- Natural Gas Pipeline Hazard Area
- Natural Gas Pipeline
- Structures in St. Anthony in Hazard Area
- Parcels With Value in Hazard Area
- Parcels
- Secondary Roads
- Incorporated City

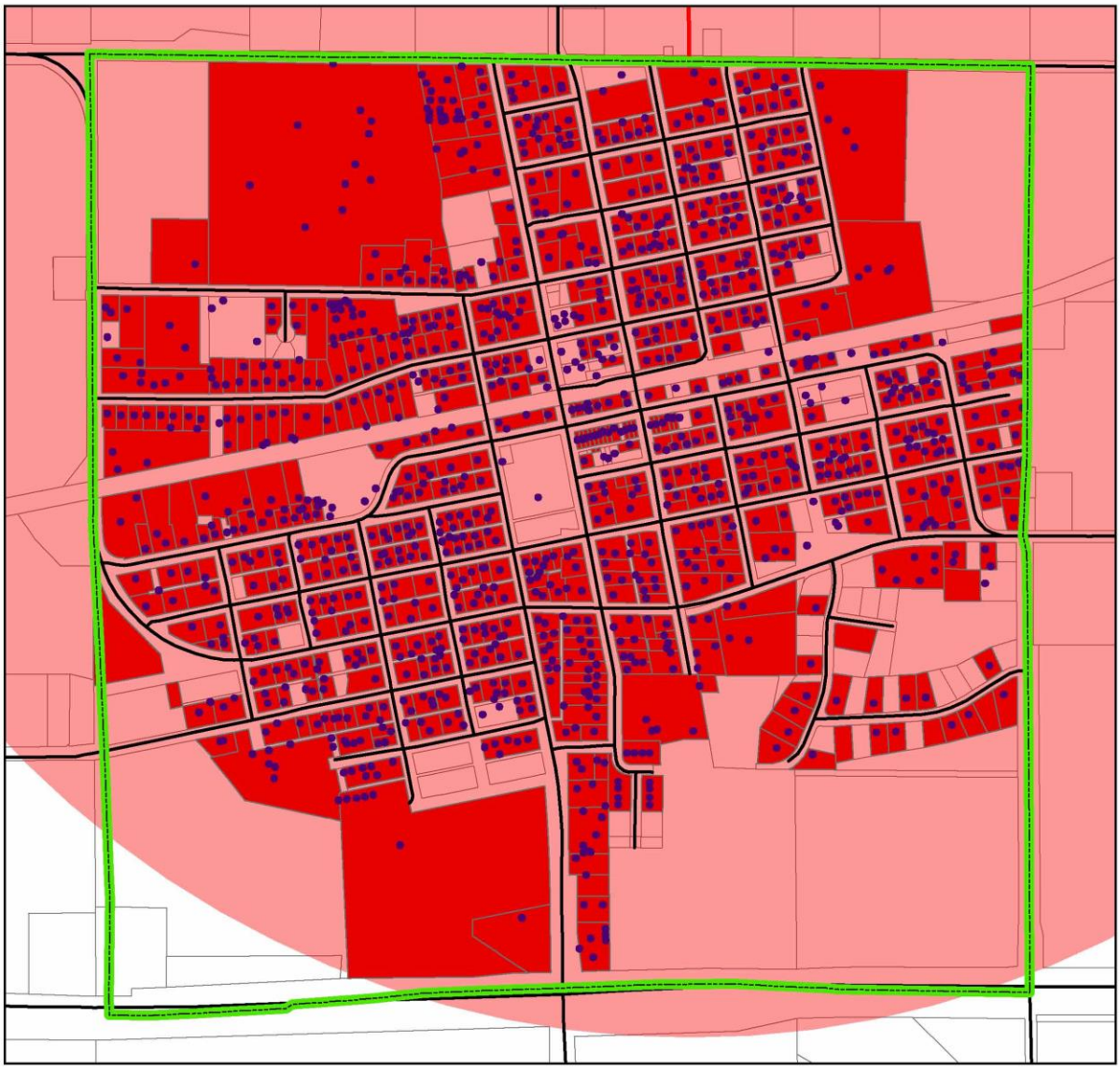
N W E S

0 0.05 0.1 0.2 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of State Center

Pipeline Hazard Area



Legend

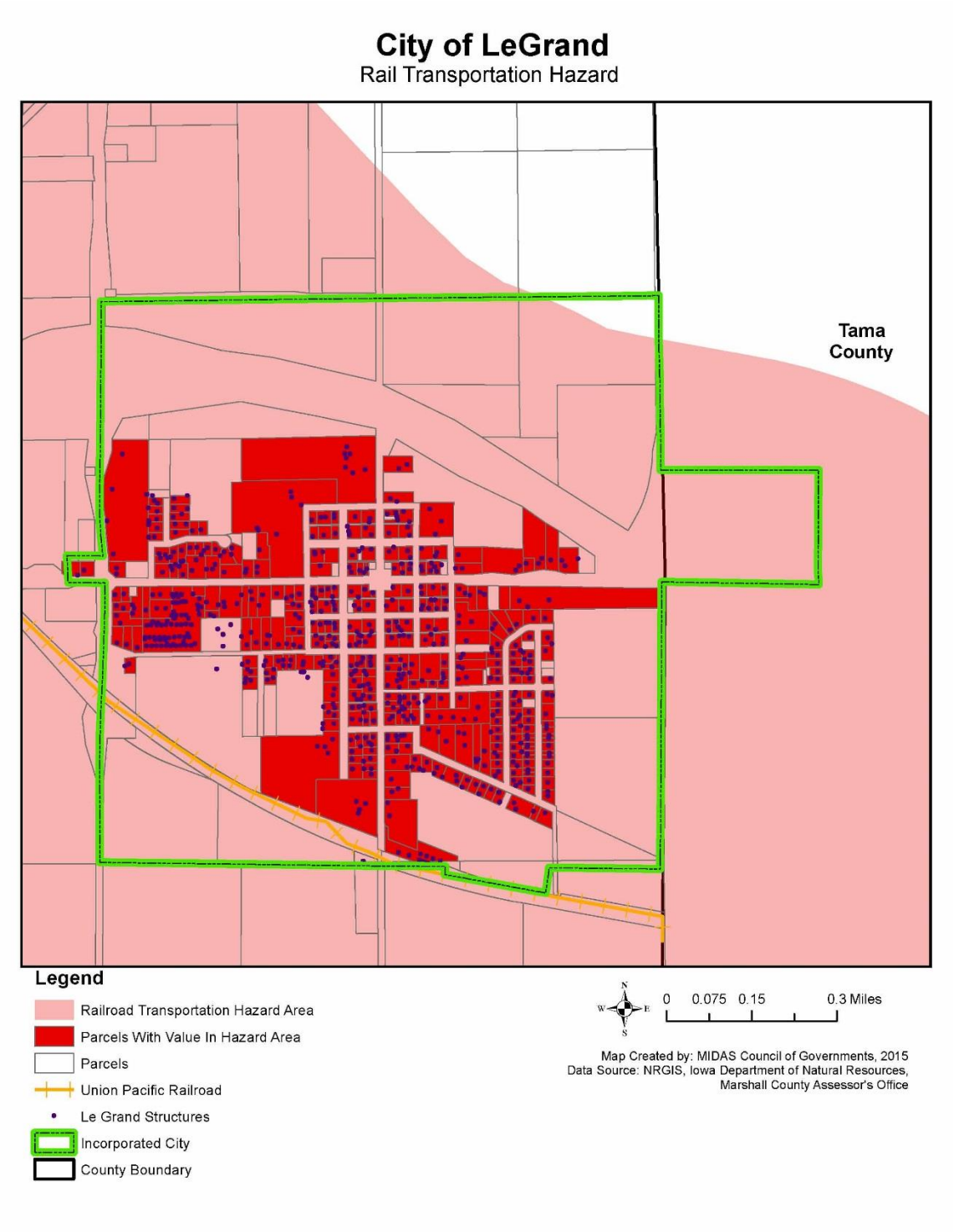
- Natural Gas Pipeline Hazard Area
- Natural Gas Pipeline
- Structures in State Center in Hazard Area
- Parcels With Value in Hazard Area
- Parcels
- Secondary Roads
- Incorporated City

N W E S

0 0.05 0.1 0.2 Miles

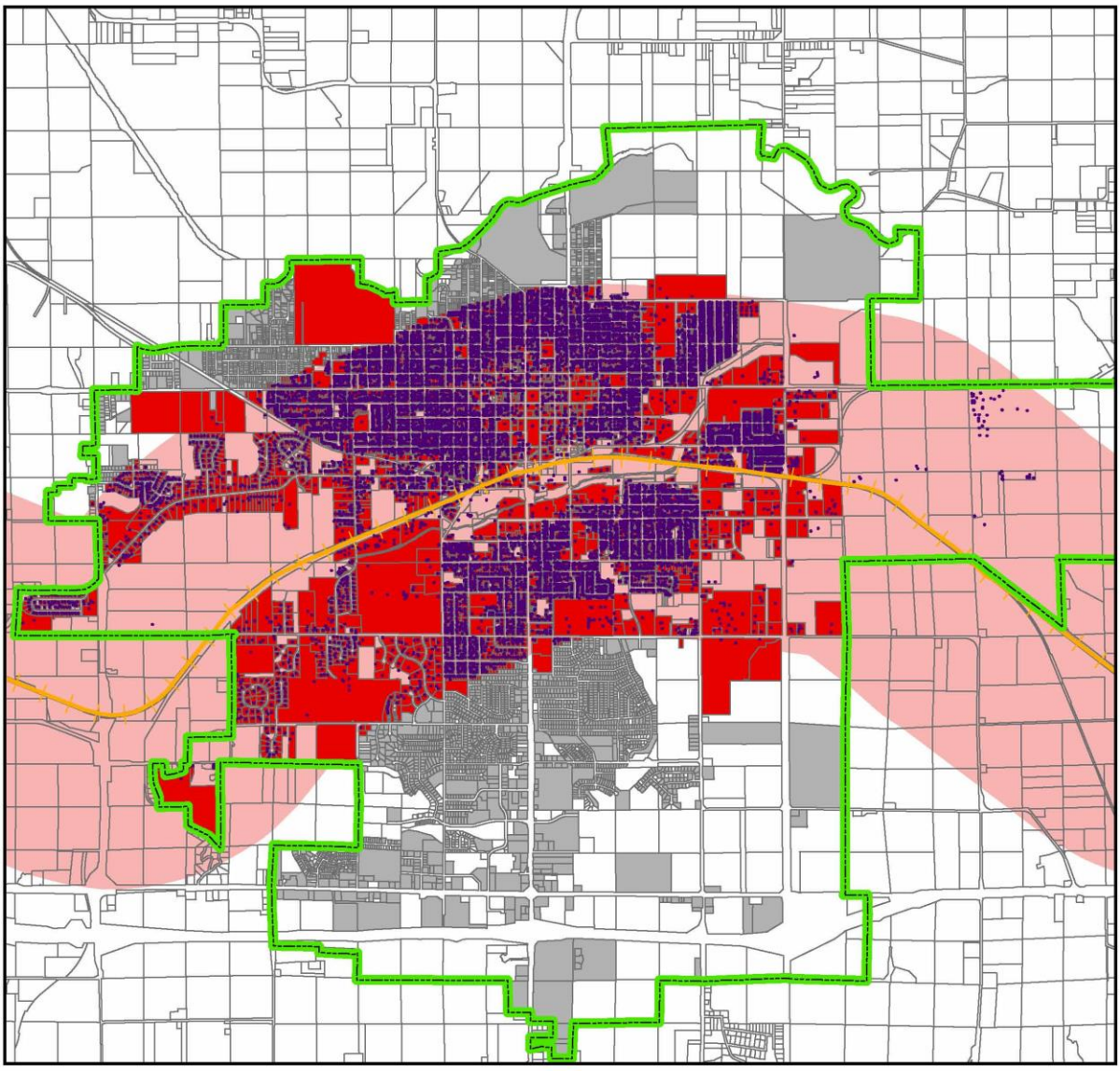
Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

Appendix K. Rail Transportation Hazard Areas



City of Marshalltown

Rail Transportation Hazard



Legend

- Railroad Transportation Hazard Area
- Union Pacific Railroad
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Marshalltown Structures in Hazard Area
- Incorporated City
- County Boundary

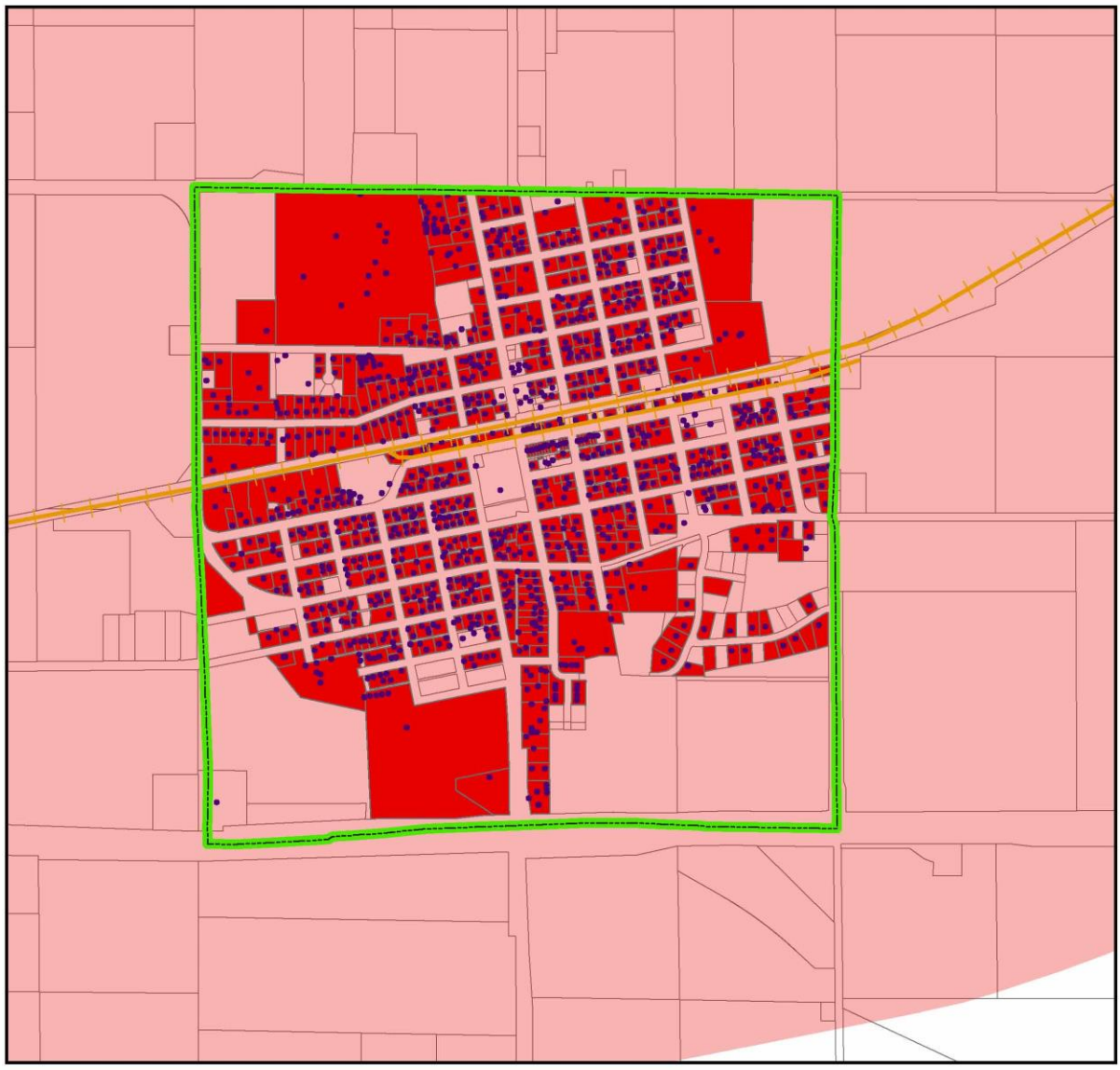
N W E S

0 0.275 0.55 1.1 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Iowa Department of Natural Resources, Marshall County Assessor's Office

State Center

RailTransportation Hazard



Legend

- Railroad Transportation Hazard Area
- Parcels With Value in Hazard Area
- Parcels
- Union Pacific Railroad
- Structures in State Center in Hazard Area
- Incorporated City
- County Boundary

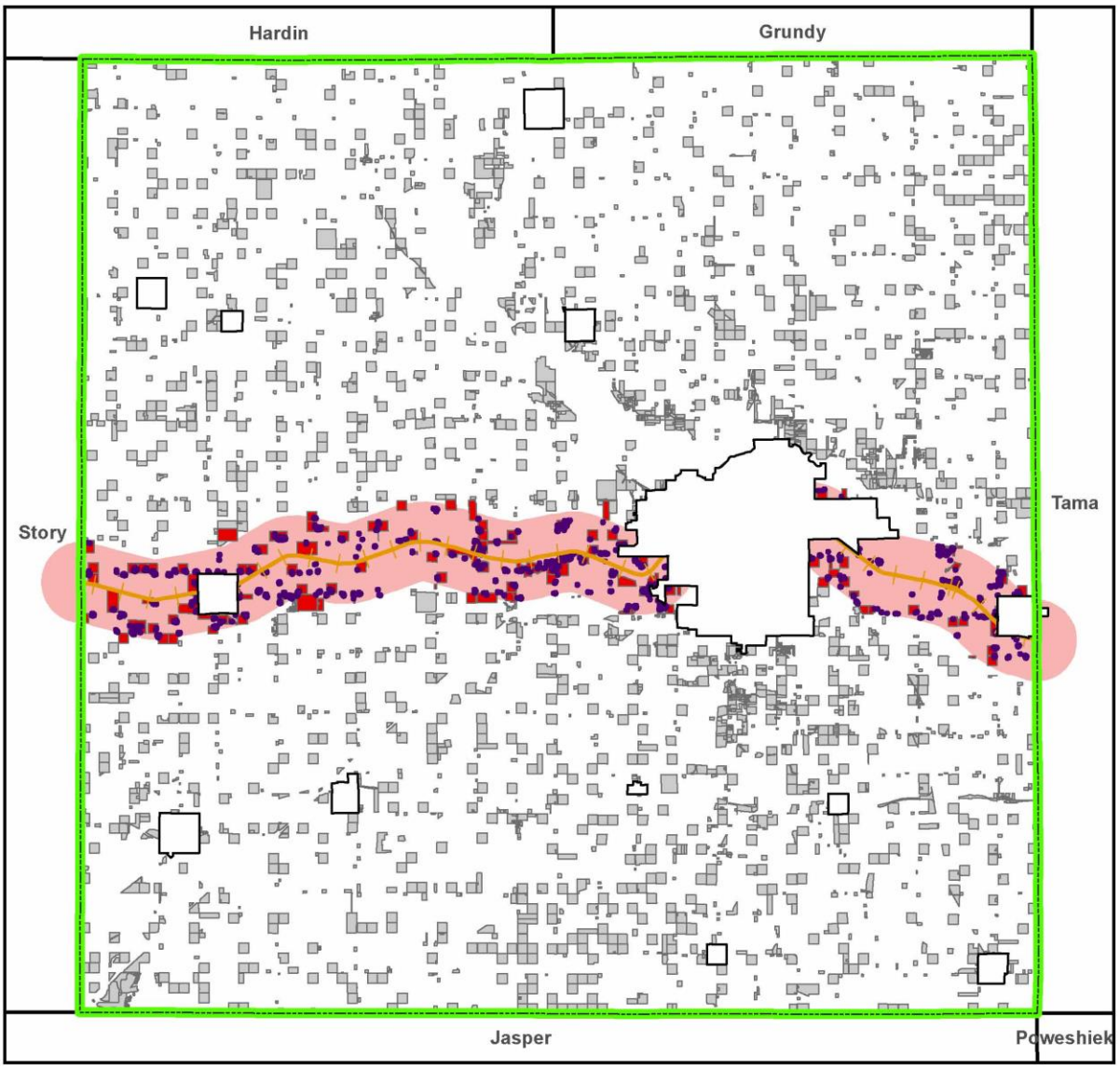
N W E S

0 0.075 0.15 0.3 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Iowa Department of Natural Resources, Marshall County Assessor's Office

Marshall County

Rail Transportation Hazard



Legend

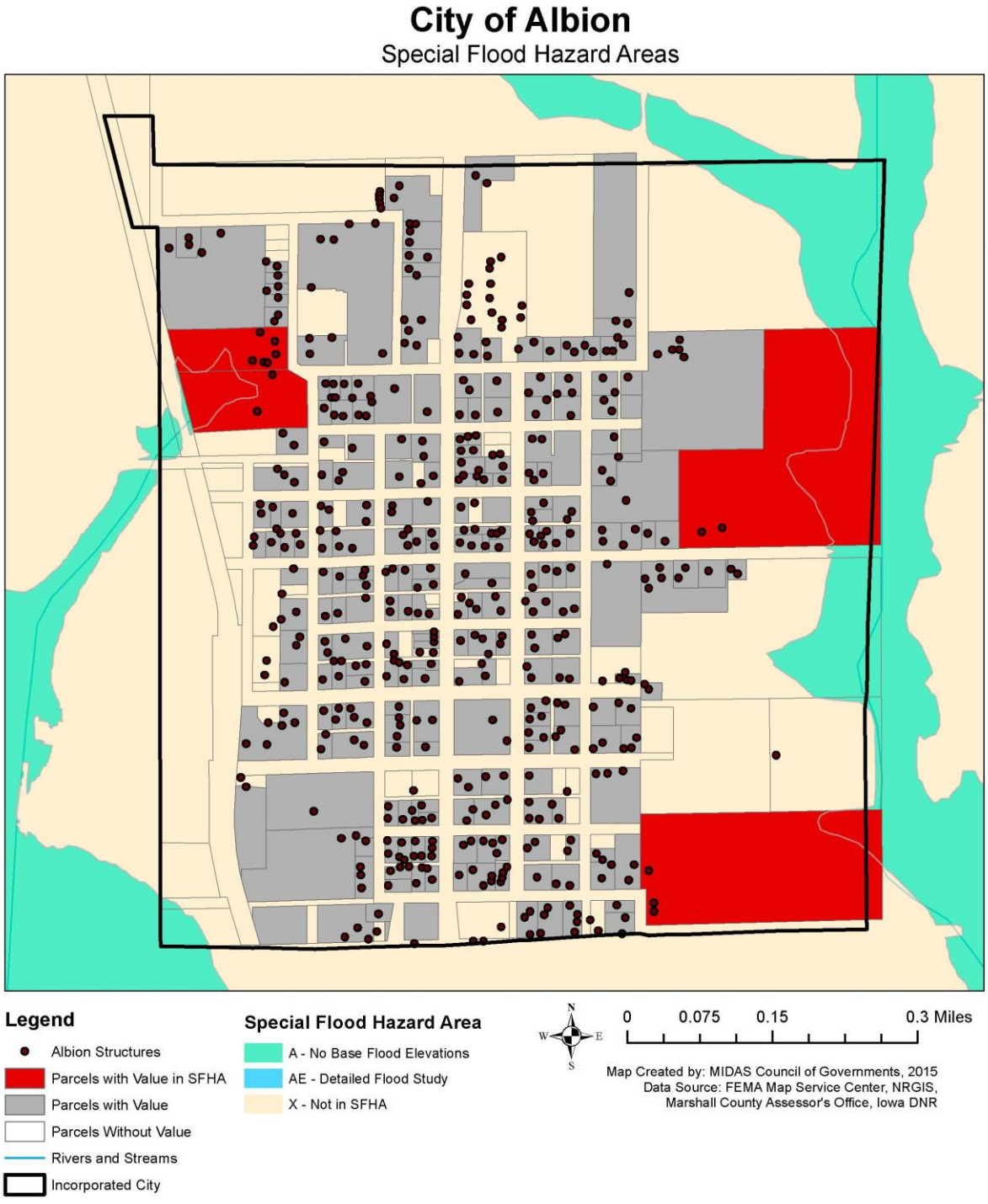
- Railroad Transportation Hazard Area
- Union Pacific Railroad
- Parcels With Value in Hazard Area
- Parcels With Value
- Structures in Marshall County in Hazard Area
- Incorporated City
- County Boundary

N W E S

0 1 2 4 Miles

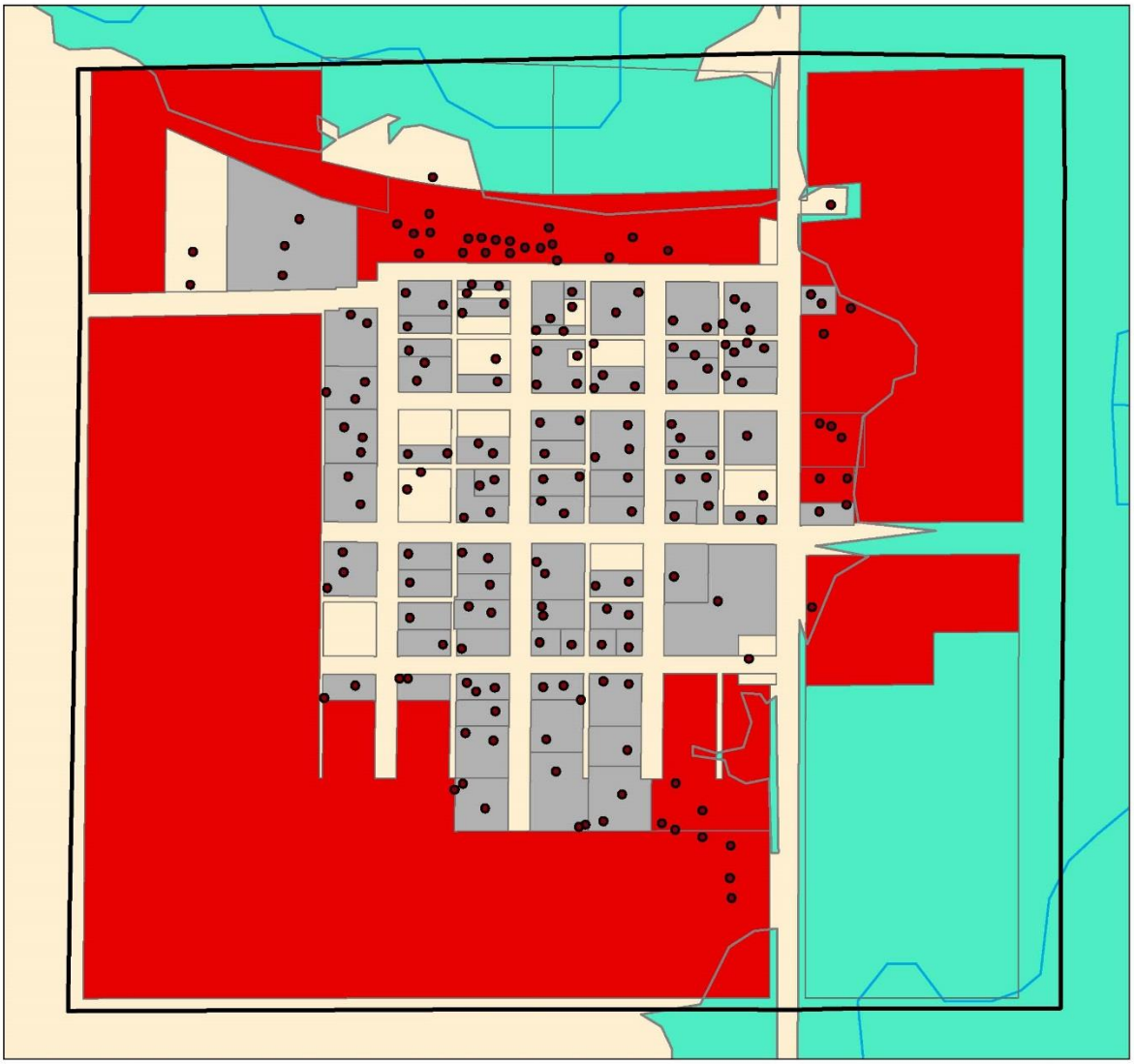
Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Iowa Department of Natural Resources, Marshall County Assessor's Office

Appendix L. Special Flood Hazard Areas



City of Clemons

Special Flood Hazard Areas



Legend

- Clemons Structures
- A - No Base Flood Elevations
- AE - Detailed Flood Study
- Parcels With Value in SFHA
- Parcels With Value
- Parcels Without Value
- Rivers and Streams
- Incorporated City

Special Flood Hazard Area

- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

N W E S

0 0.045 0.09 0.18 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS,
Marshall County Assessor's Office, Iowa DNR

City of Ferguson

Special Flood Hazard Areas



Legend

- Ferguson Structures
- Parcels With Value
- Parcels Without Value
- Rivers and Streams
- Incorporated City

Special Flood Hazard Area

- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

N W E S

0 0.045 0.09 0.18 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS,
Marshall County Assessor's Office, Iowa DNR

City of Gilman

Special Flood Hazard Areas



Legend

- Gilman Structures
- Parcels With Value in SFHA
- Parcels With Value
- Parcels Without Value
- Rivers and Streams
- Incorporated City

Special Flood Hazard Area

- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

N W E S

0 0.075 0.15 0.3 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS,
Marshall County Assessor's Office, Iowa DNR

City of Haverhill

Special Flood Hazard Areas



Legend

- Haverhill Structures
- Parcels With Value
- Parcels Without Value
- Rivers and Streams
- Incorporated City

Special Flood Hazard Area

- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

N W E S

0 0.04 0.08 0.16 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS,
Marshall County Assessor's Office, Iowa DNR

City of Laurel

Special Flood Hazard Areas



Legend

- Laurel Structures in Hazard Area
- Laurel Structures
- Parcels With Value in SFHA
- Parcels With Value
- Parcels Without Value
- Rivers and Streams
- Incorporated City

Special Flood Hazard Area

- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

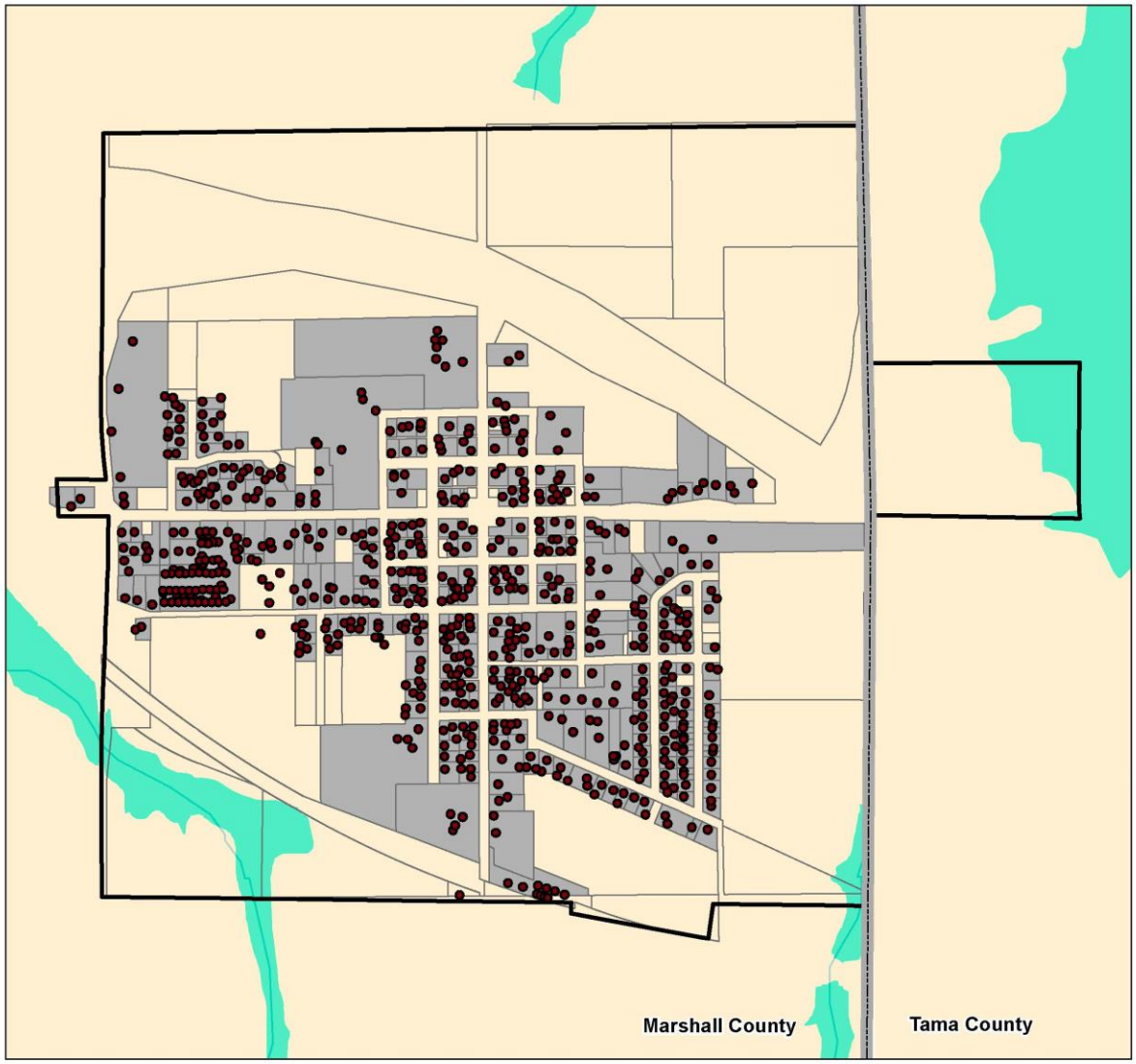
N W E S

0 0.045 0.09 0.18 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS,
Marshall County Assessor's Office, Iowa DNR

City of LeGrand

Special Flood Hazard Areas



Legend

- Le Grand Structures
- Parcels With Value
- Parcels Without Value
- Rivers and Streams
- Incorporated City
- County Boundary

Special Flood Hazard Area

- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

N W E S

0 0.1 0.2 0.4 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS, Marshall County Assessor's Office

City of Liscomb

Special Flood Hazard Areas



Legend

- Liscomb Structures
- Parcels With Value In SFHA
- Parcels With Value
- Parcels Without Value
- Rivers and Streams
- Incorporated City

Special Flood Hazard Area

- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

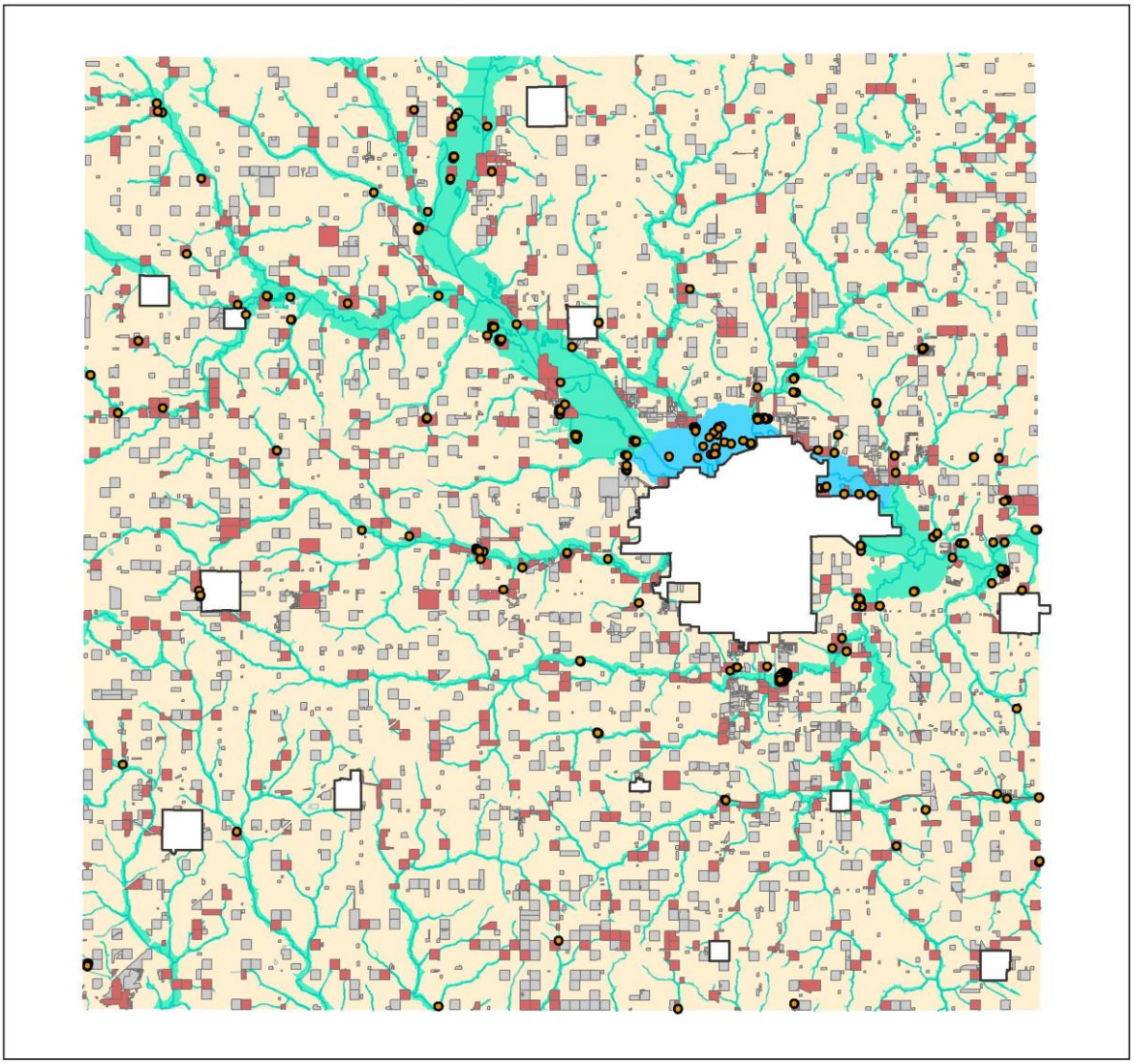
N W E S

0 0.075 0.15 0.3 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS,
Marshall County Assessor's Office, Iowa DNR

Unincorporated Marshall County

Special Flood Hazard Areas



Legend

- Marshall County Structures in Hazard Area
- Parcels With Value in SFHA
- Parcels With Value
- Rivers and Streams
- Incorporated City (not included in analysis)

Special Flood Hazard Area

- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

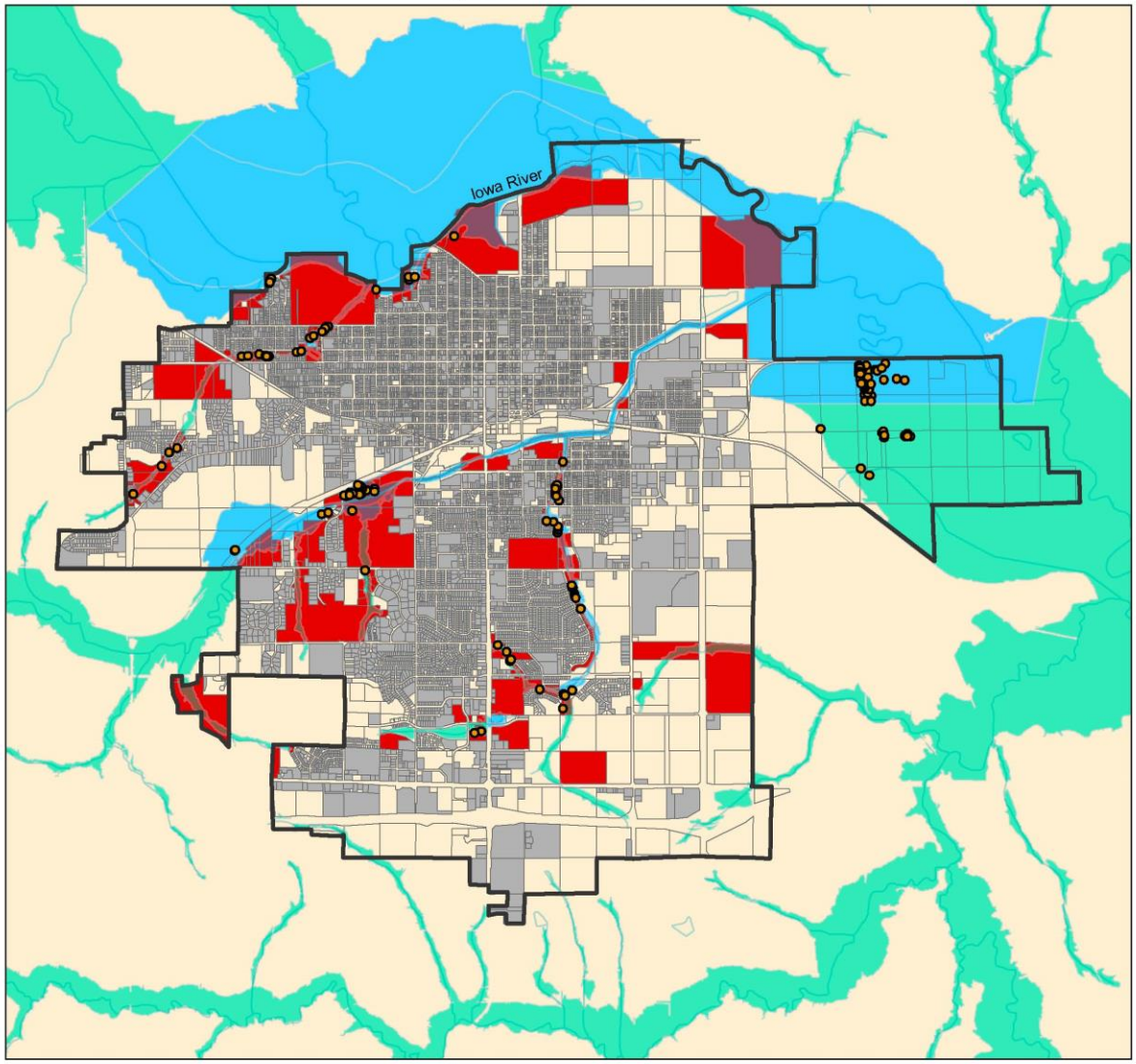
N W E S

0 2 4 8 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS,
Marshall County Assessor's Office, Iowa DNR

City of Marshalltown

Special Flood Hazard Areas



Legend

- Marshalltown Structures in Hazard Area
- Parcels With Value in SFHA
- Parcels With Value
- Parcels Without Value
- Rivers and Streams
- Incorporated City

Special Flood Hazard Area

- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

N W E S

0 0.5 1 2 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS,
Marshall County Assessor's Office, Iowa DNR

City of Melbourne

Special Flood Hazard Areas



Legend

- Melbourne Structures
- Parcels With Value
- Parcels Without Value
- Incorporated City
- Rivers and Streams

Special Flood Hazard Area

- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

N W E S

0 0.075 0.15 0.3 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS,
Marshall County Assessor's Office, Iowa DNR

City of Rhodes

Special Flood Hazard Areas



Legend

- Rhodes Structures
- Parcels With Value
- Parcels Without Value
- Incorporated City
- Rivers and Streams

Special Flood Hazard Area

- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

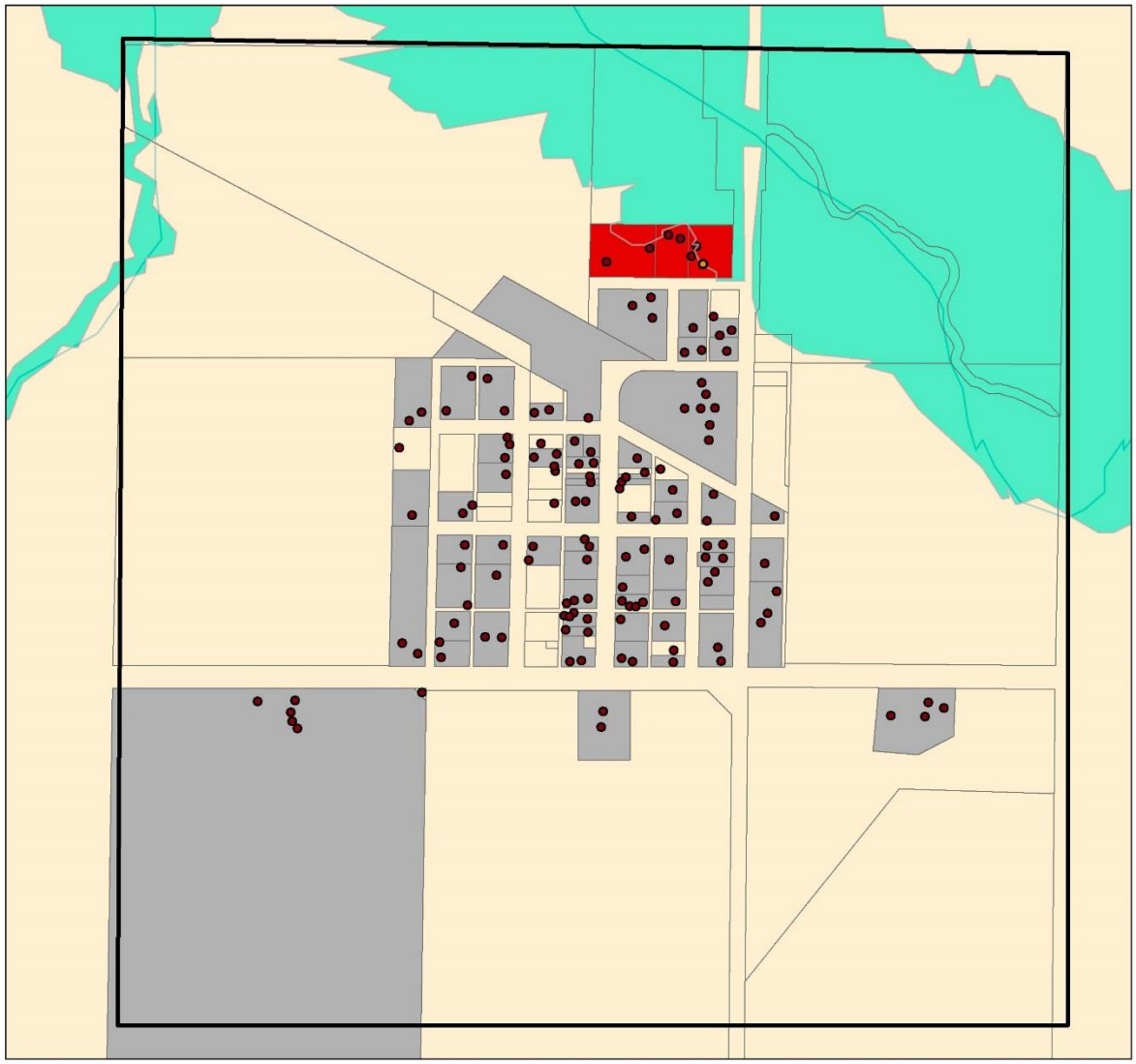
N W E S

0 0.1 0.2 0.4 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS,
Marshall County Assessor's Office, Iowa DNR

City of St. Anthony

Special Flood Hazard Areas



Legend

- St. Anthony Structures in Hazard Area
- St. Anthony Structures
- Parcels With Value in SFHA
- Parcels With Value
- Parcels Without Value
- Rivers and Streams
- Incorporated City

Special Flood Hazard Area

- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

N W E S

0 0.05 0.1 0.2 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS,
Marshall County Assessor's Office, Iowa DNR

City of State Center

Special Flood Hazard Areas



Legend

- State Center Structures in Hazard Area
- State Center Structures
- Parcels With Value in SFHA
- Parcels With Value
- Parcels Without Value
- Rivers and Streams
- Incorporated City

Special Flood Hazard Area

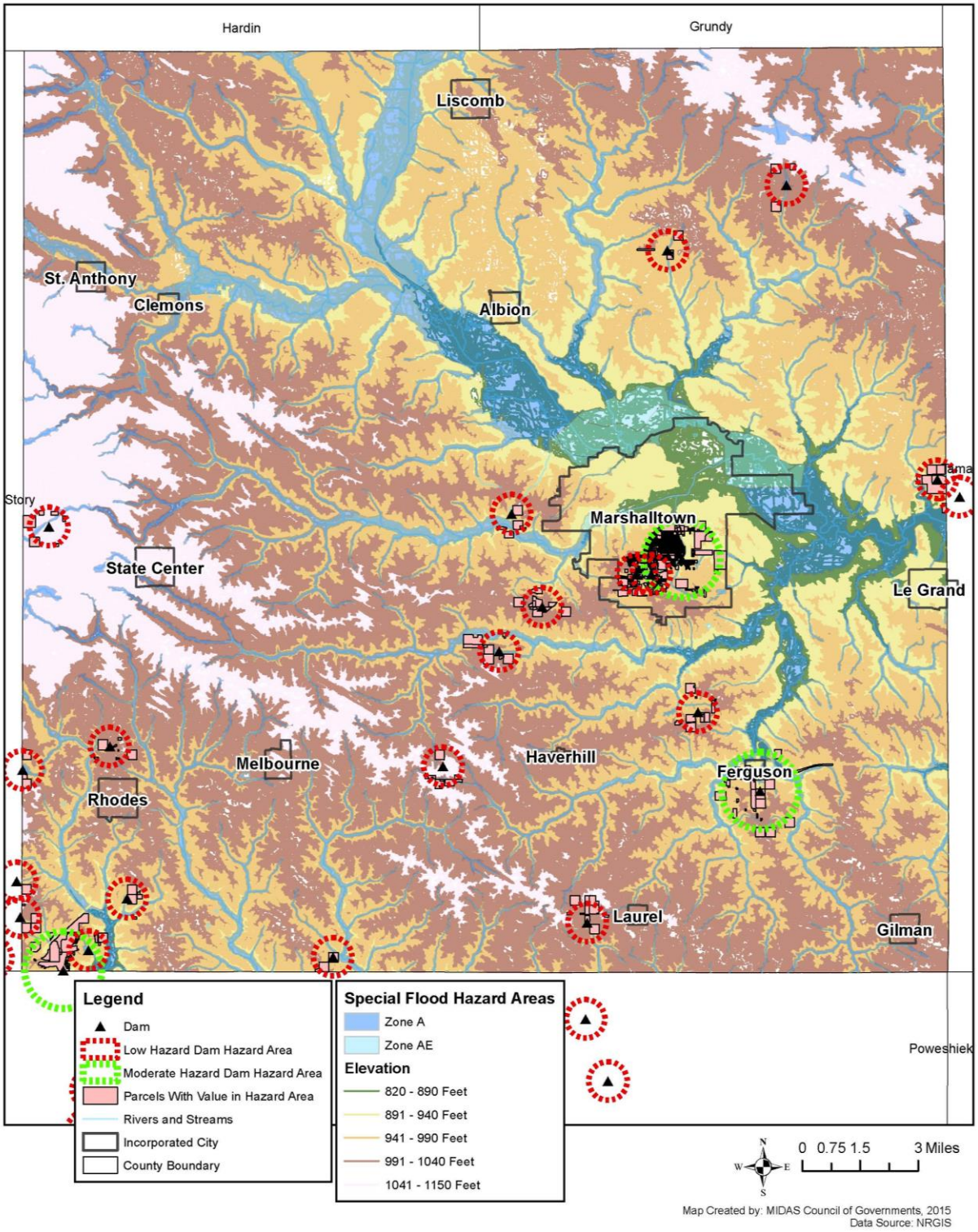
- A - No Base Flood Elevations
- AE - Detailed Flood Study
- X - Not in SFHA

N W E S

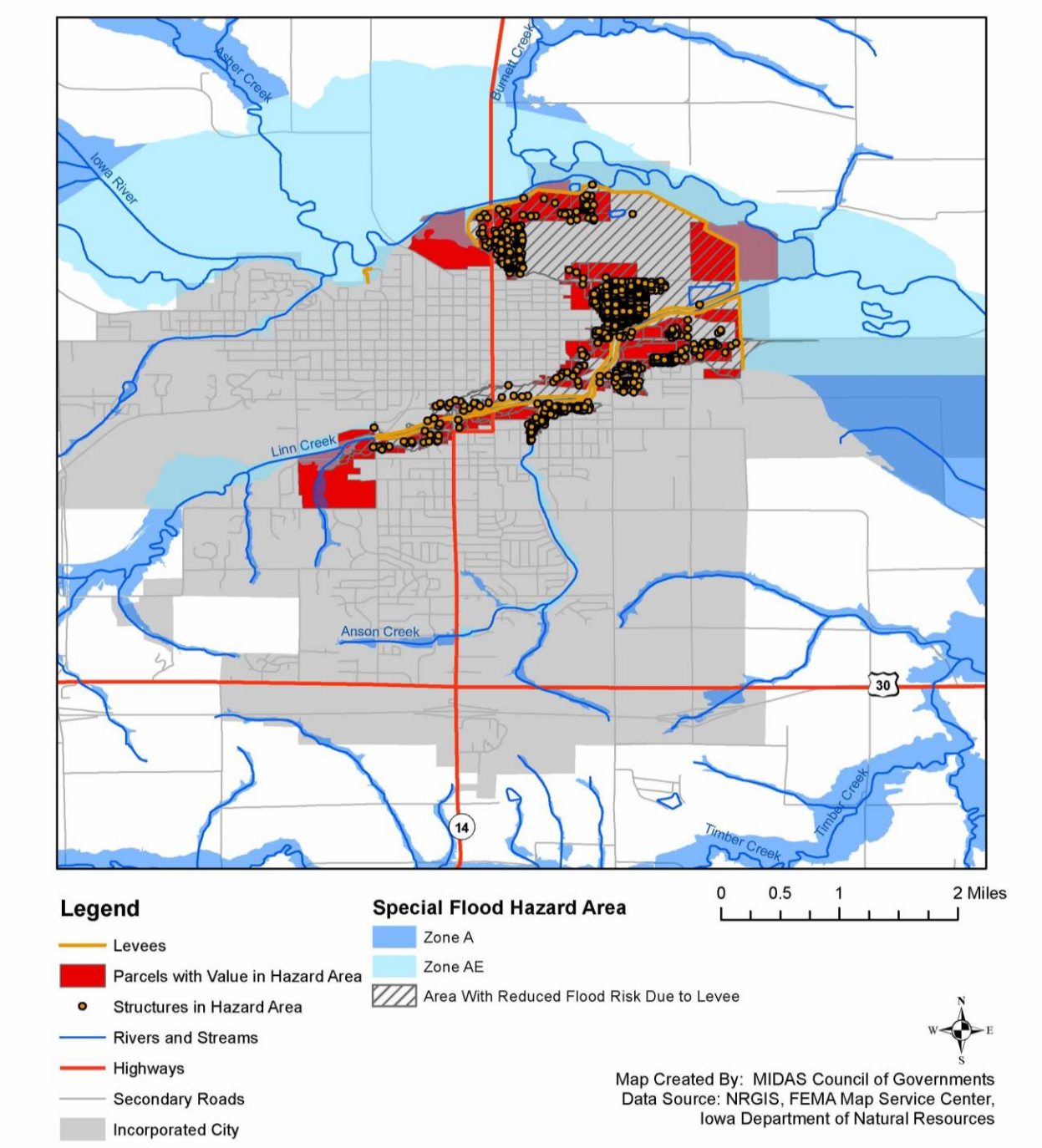
0 0.075 0.15 0.3 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: FEMA Map Service Center, NRGIS,
Marshall County Assessor's Office, Iowa DNR

Appendix M. Dam Hazard Areas in Marshall County



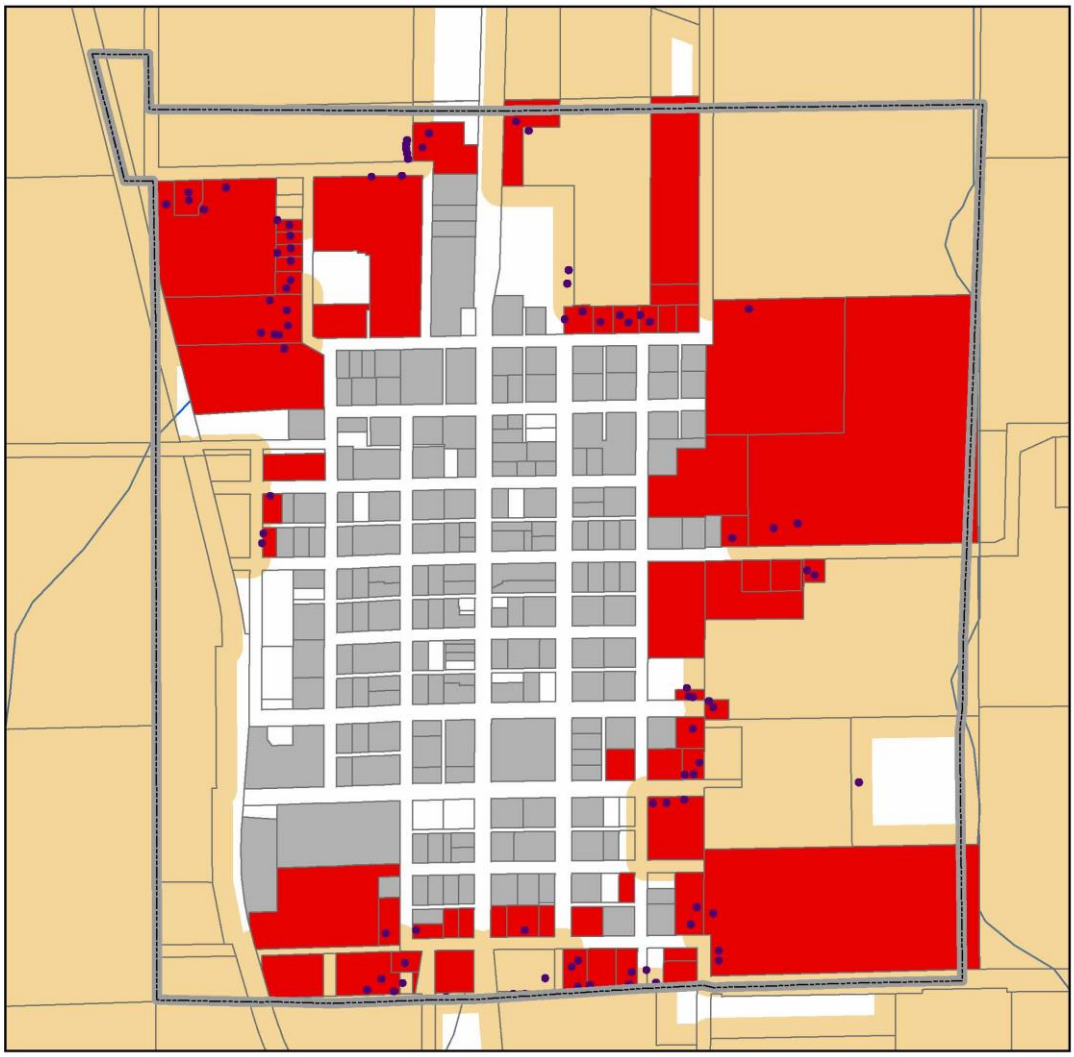
Appendix N. City of Marshalltown Levee Failure Hazard Area



Appendix O. Grass and Wildland Fire Hazard Areas

City of Albion

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structures in Albion in Hazard Area
- Parcels with Value in Hazard Area
- Parcels with Value
- Parcels with No Value
- Incorporated City

N W E S

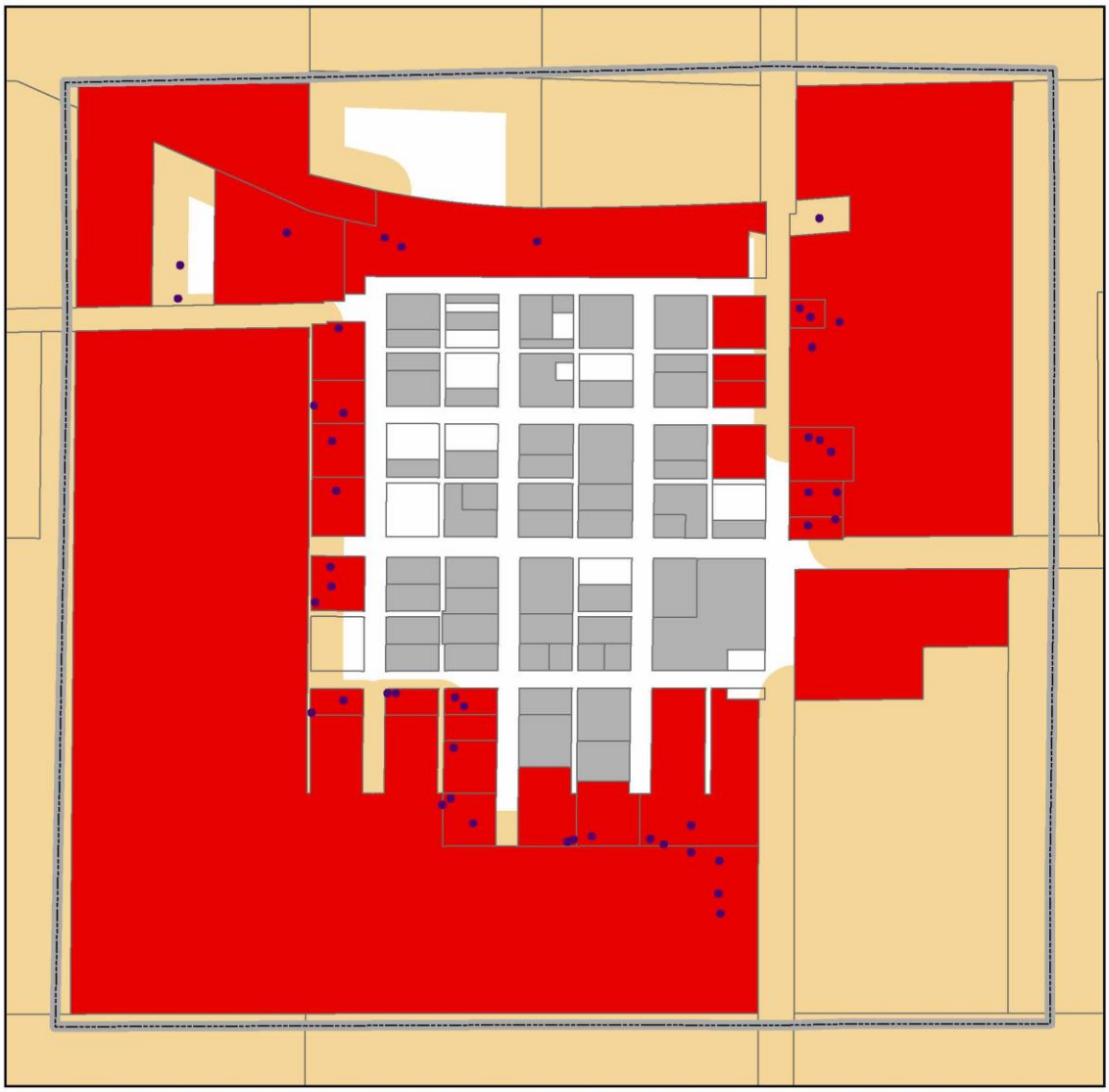
0 0.1 0.2 0.4 Miles

The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Clemons

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structures in Clemons in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Incorporated City

N W E S

0 0.05 0.1 0.2 Miles

The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Ferguson

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structures in Ferguson in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Incorporated City

N W E S

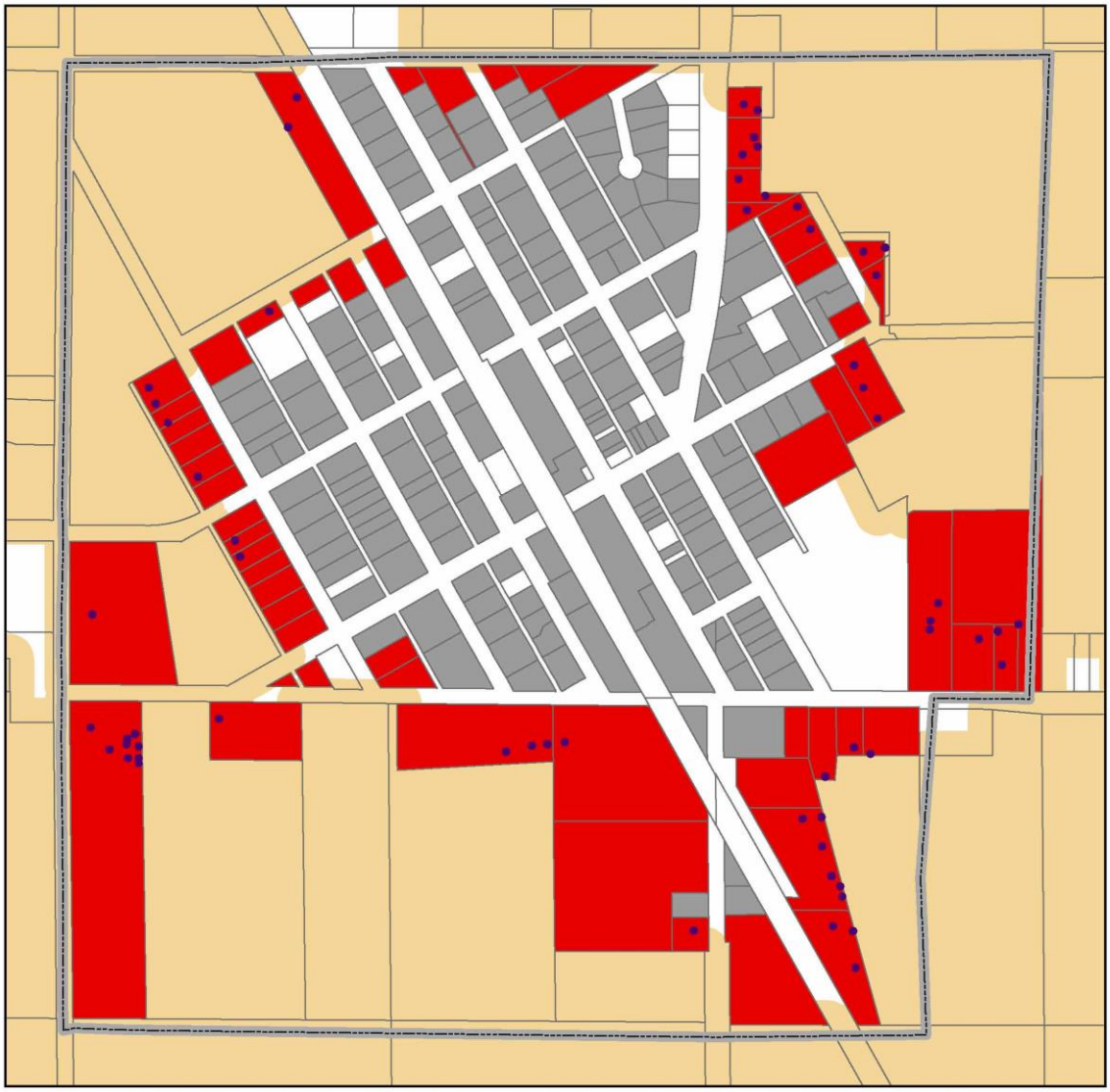
0 0.05 0.1 0.2 Miles

The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Gilman

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structures in Gilman in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Incorporated City

N W E S

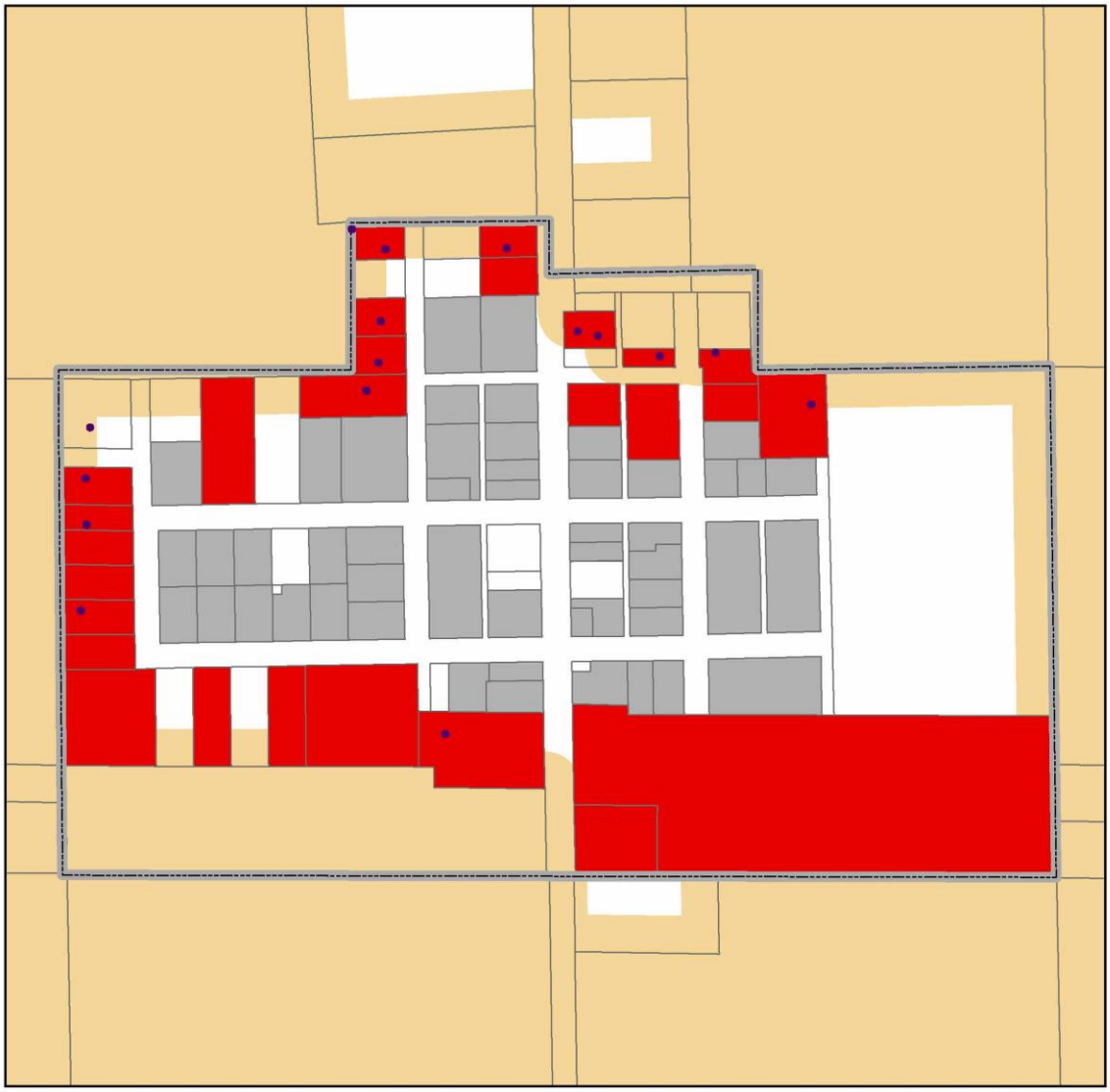
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The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Haverhill

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structure in Haverhill in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Incorporated City

N W E S

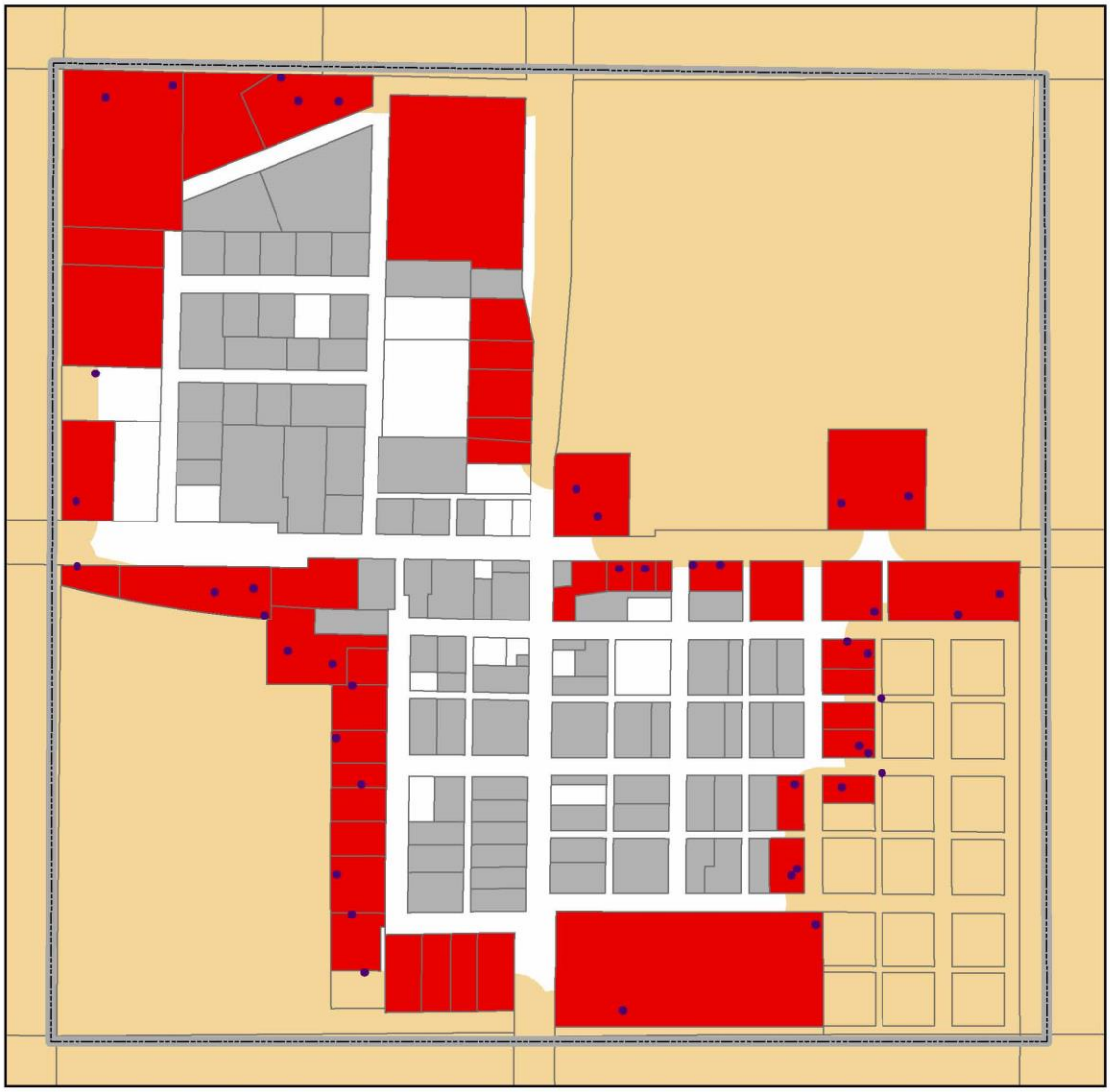
0 0.05 0.1 0.2 Miles

The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Laurel

Grass or Wildland Fire Hazard Area



Legend

- Structures in Laurel in Hazard Area
- Incorporated City
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Grass or Wildland Fire Hazard Area

N W E S

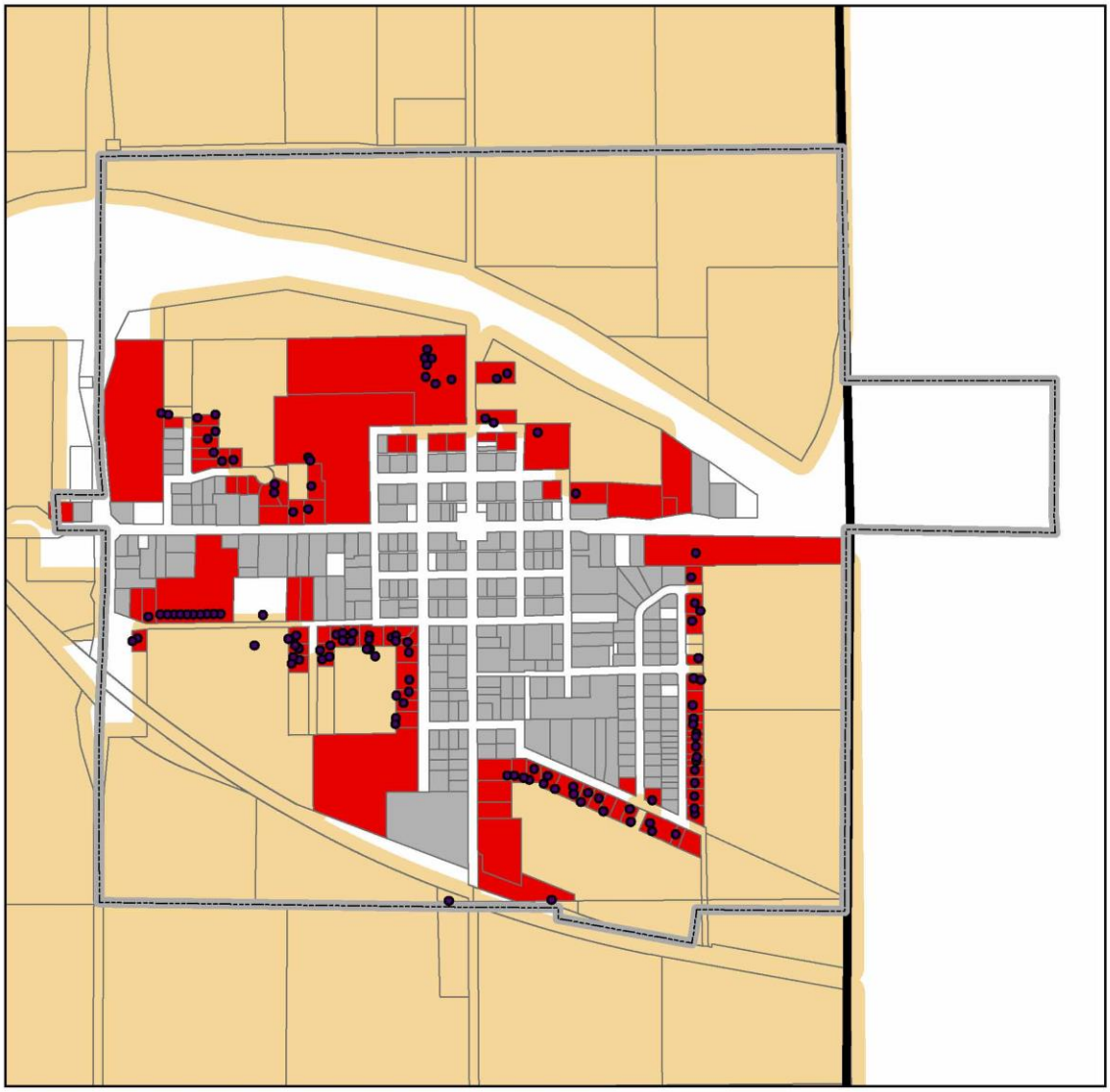
0 0.05 0.1 0.2 Miles

The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Le Grand

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structures in Le Grand in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Incorporated City
- County Boundary

N W E S

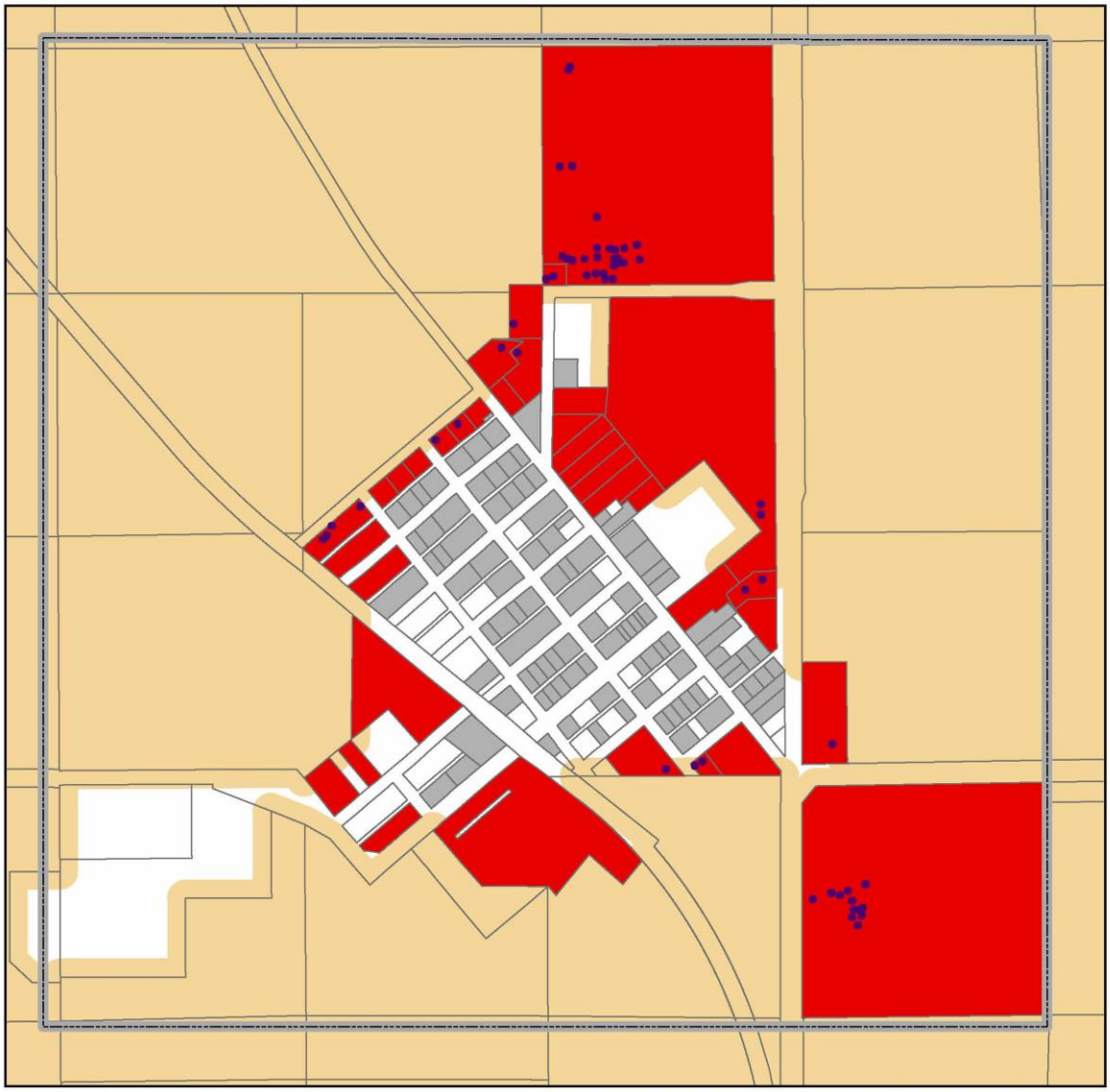
0 0.175 0.35 0.7 Miles

The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Liscomb

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structures in Liscomb in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Incorporated City

N W E S

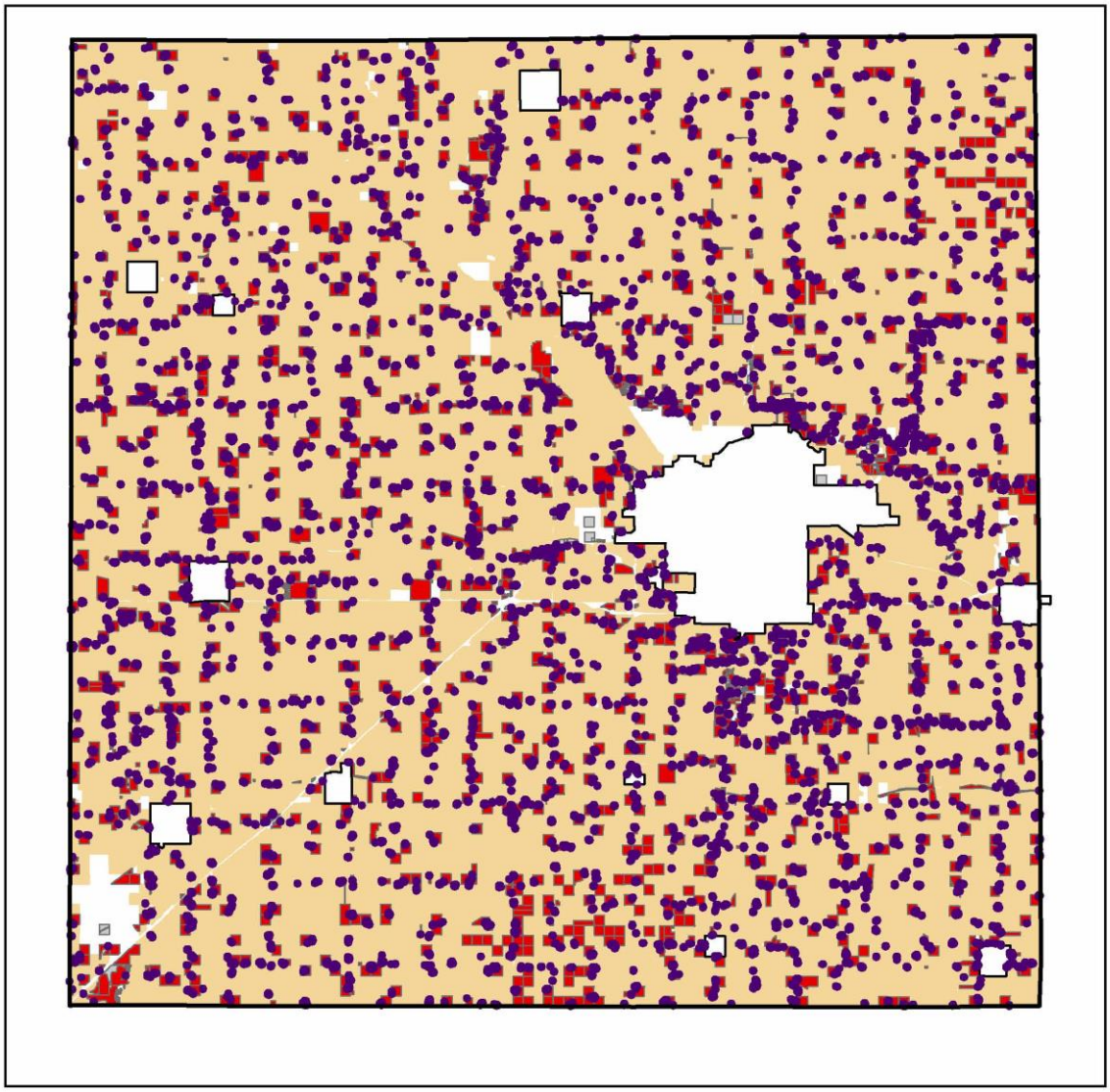
0 0.125 0.25 0.5 Miles

The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

Marshall County

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structures in Marshall County in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Incorporated City
- County Boundary

N W E S

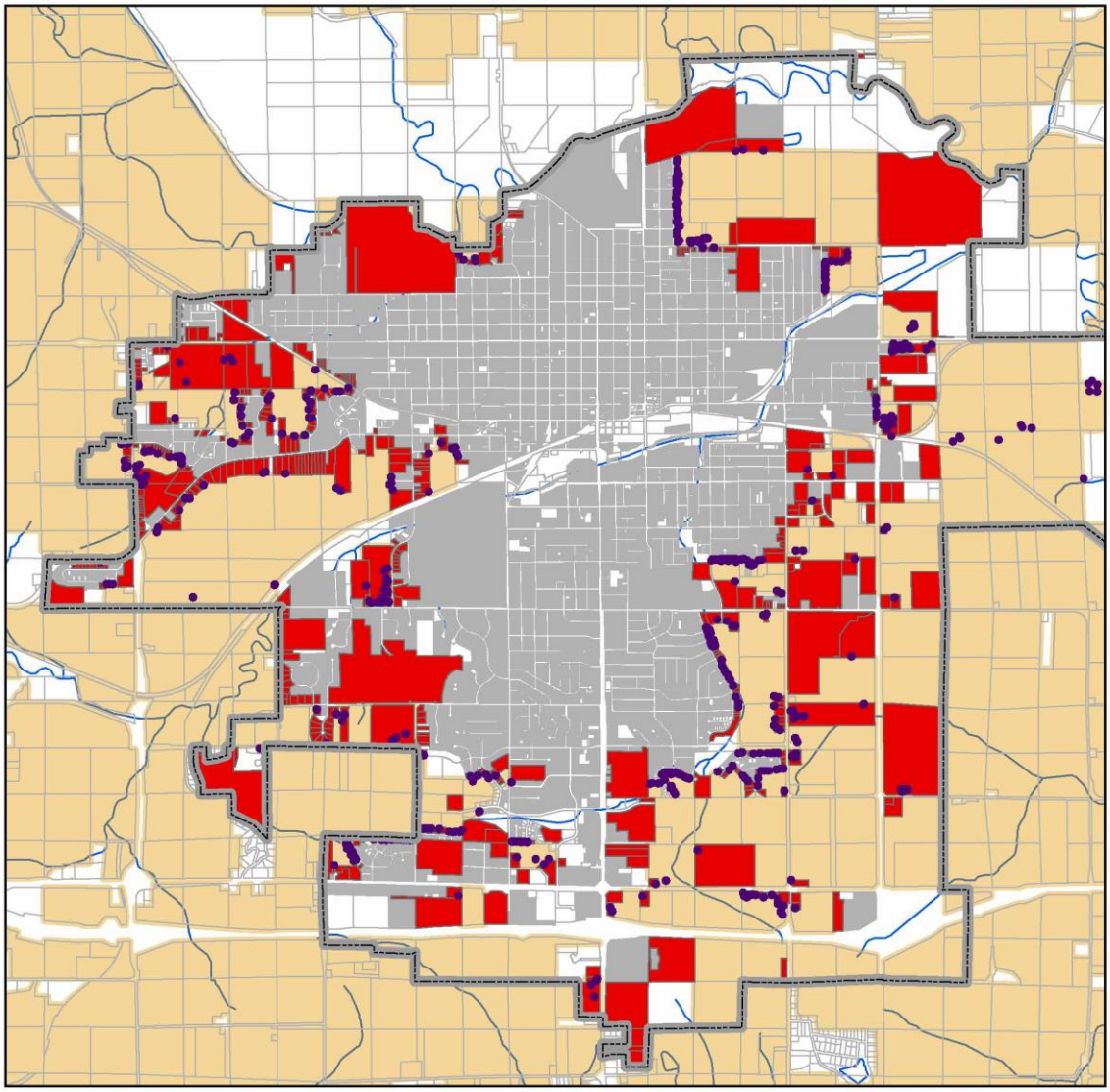
0 3.25 6.5 13 Miles

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Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Marshalltown

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structures in Marshalltown in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Incorporated City

N W E S

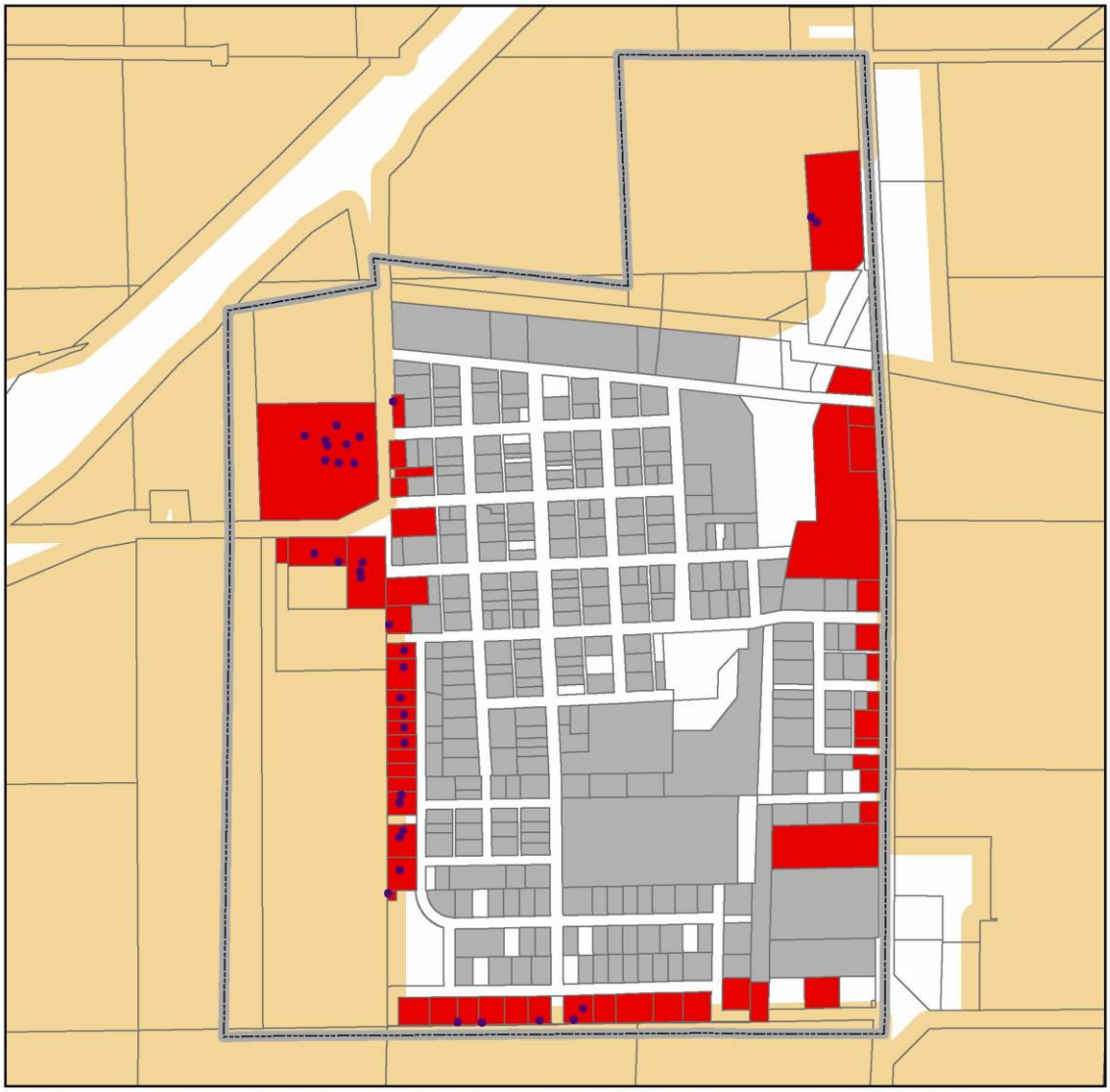
0 0.5 1 2 Miles

The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Melbourne

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structures in Melbourne in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Incorporated City

N W E S

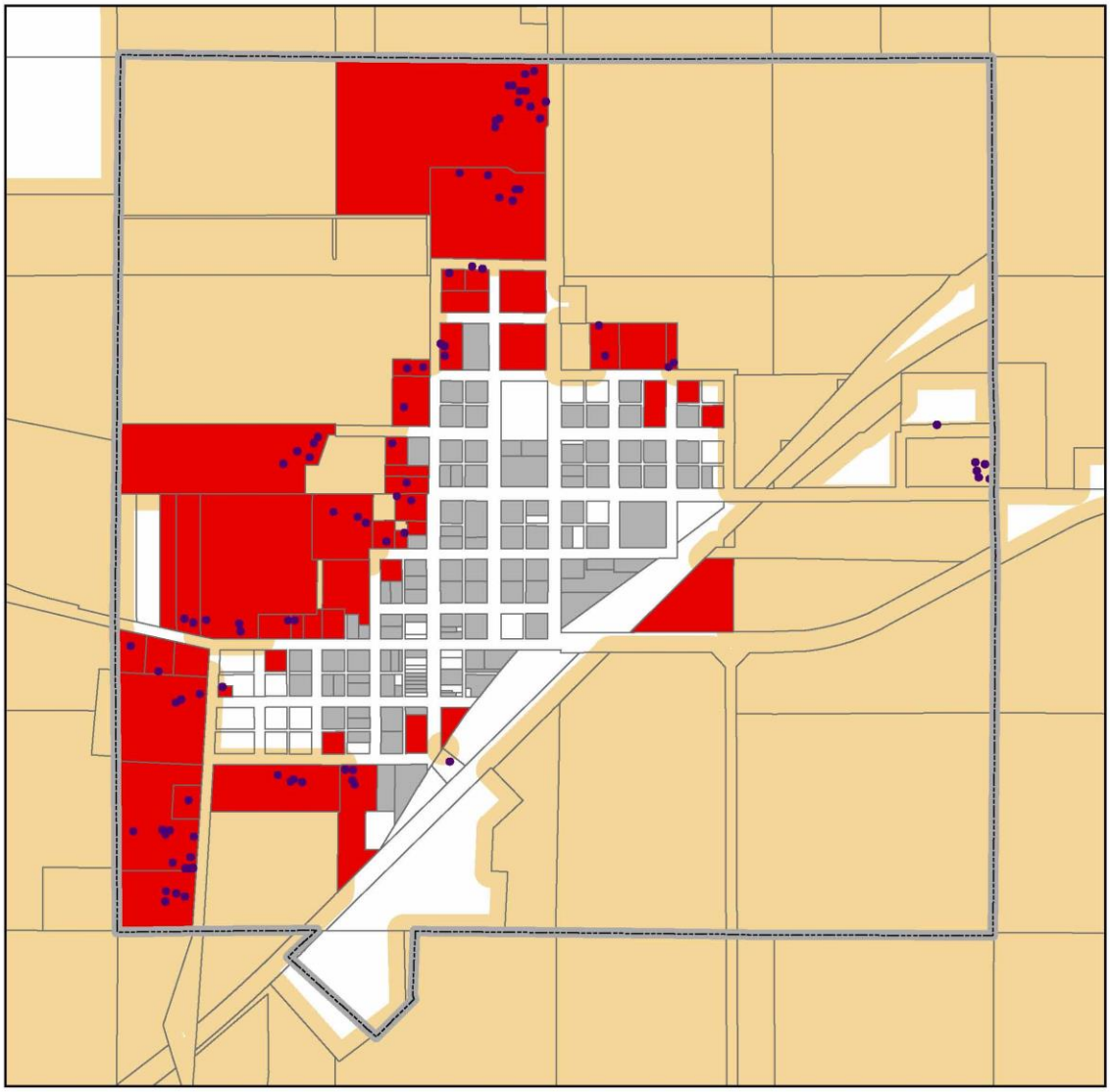
0 0.125 0.25 0.5 Miles

The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of Rhodes

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structures in Rhodes in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Incorporated City

N W E S

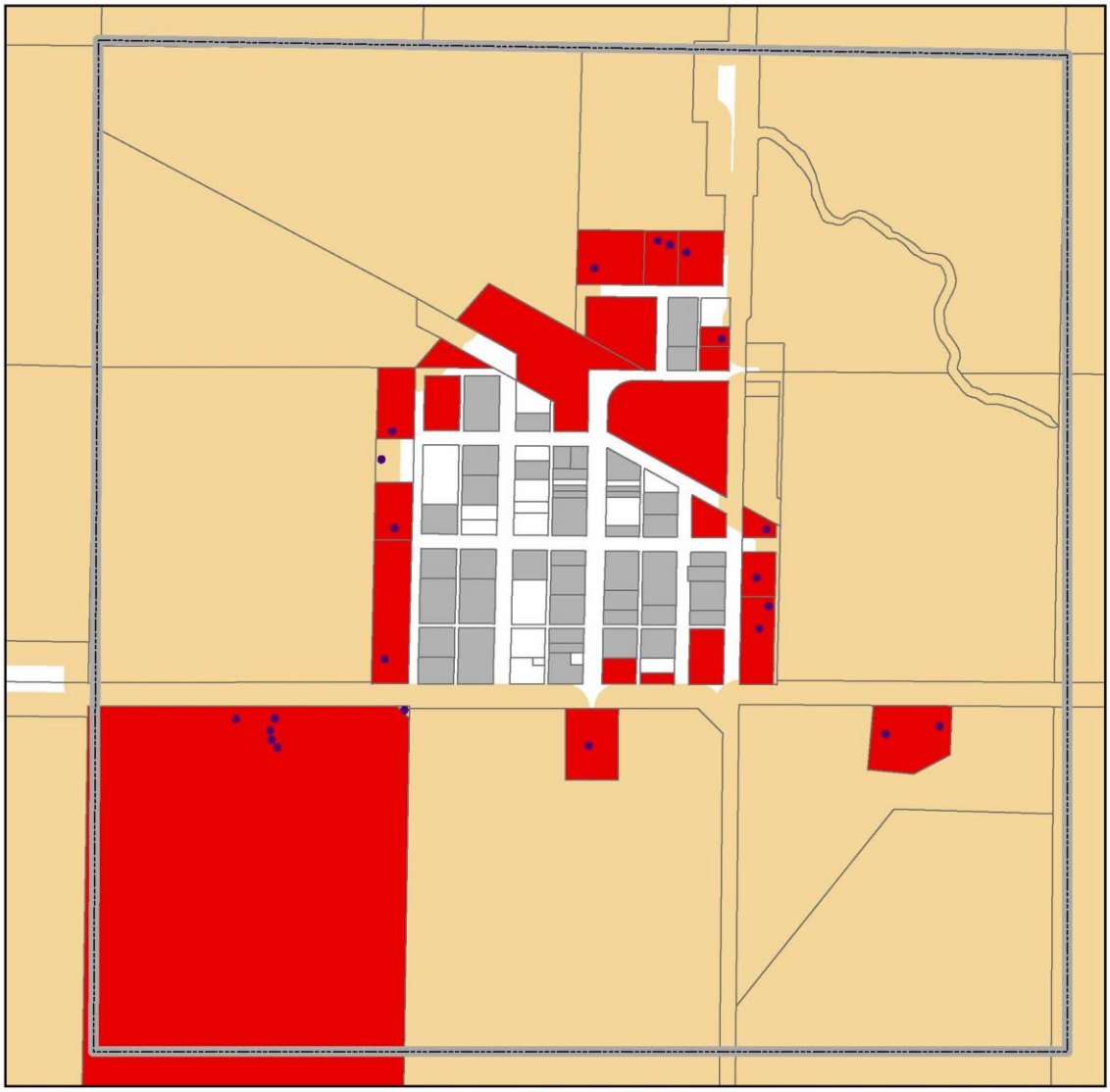
0 0.15 0.3 0.6 Miles

The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of St. Anthony

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structures in St. Anthony in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Incorporated City

N W E S

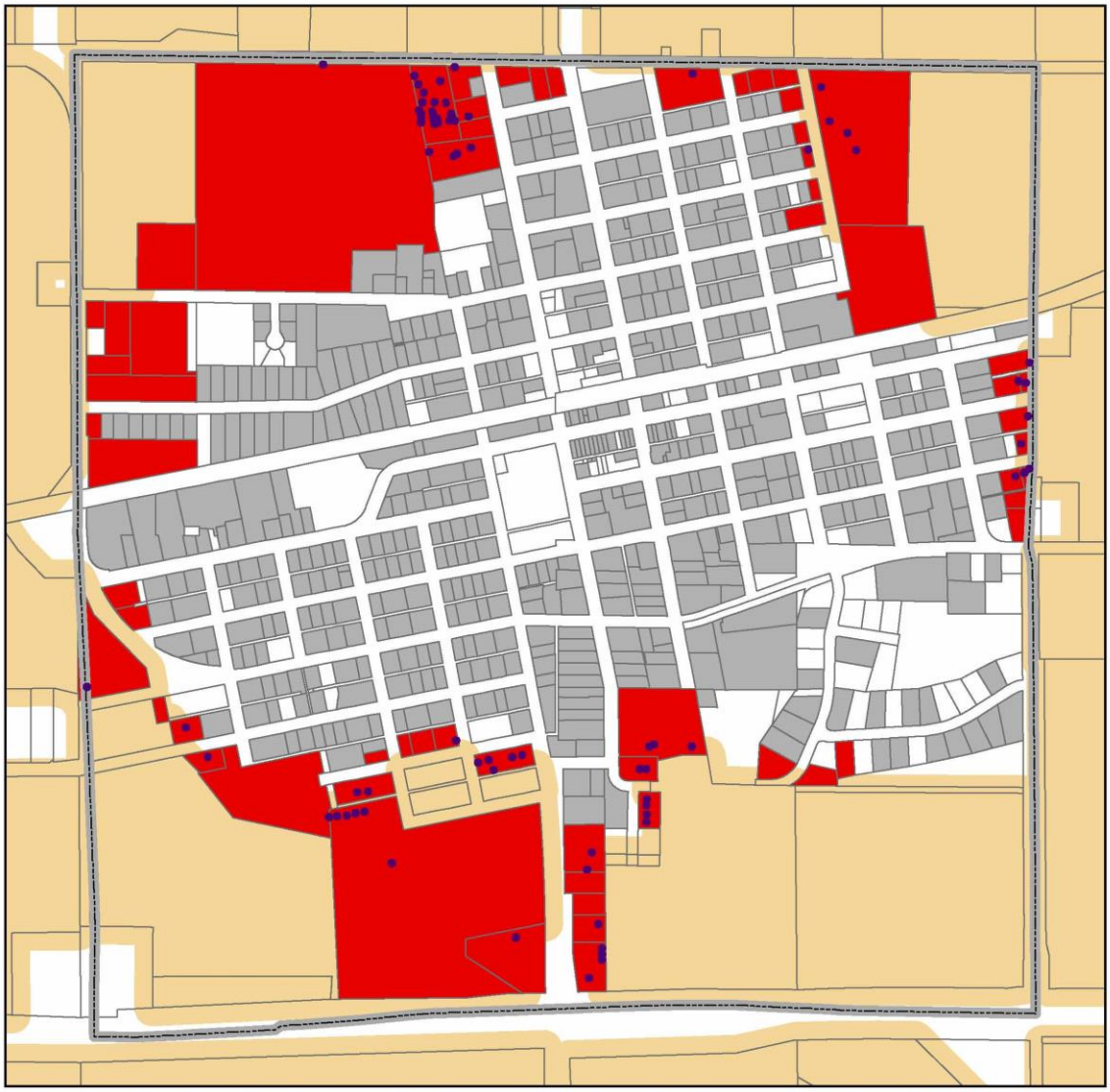
0 0.1 0.2 0.4 Miles

The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

City of State Center

Grass or Wildland Fire Hazard Area



Legend

- Grass or Wildland Fire Hazard Area
- Structures in State Center in Hazard Area
- Parcels With Value in Hazard Area
- Parcels With Value
- Parcels
- Incorporated City

N W E S

0 0.125 0.25 0.5 Miles

The Grass or Wild Land Fire Hazard Area includes all agricultural parcels both inside and outside of the incorporated area and a 100 foot buffer zone around those parcels. Agricultural areas were identified by the Task Force as areas that were most prone to a fire.

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Marshall County Assessor's Office, Iowa Department of Natural Resources

Appendix P. Results of Mitigation Action Prioritization

The following appendix provides the complete results of the mitigation action prioritization by jurisdiction. For an explanation of the methodology that was used to rank actions, see the Mitigation Strategy Section of this plan. STAPLEE worksheets that each jurisdiction filled out were not included in this appendix to avoid redundancy. The exact questions that communities used to obtain their STAPLEE score are covered in the section referenced above.

Albion

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Water well improvements	1	4	1	1	7
	Purchase warning siren with backup power and remote triggering	4	2	1		7
2	Bigger rural water line for backup water	3	1	1	1	6
3	Construct a safe room that doubles as communications storage and backup	4	2	-1		5
4	Sewer Backup	1	1	1	1	4

Clemons

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Ensure that people in the community have access to weather updates	4	4	3		11
2	Remove junk cars and farm machinery	1	4	3	1	9
3	Maintain existing culverts and add new culverts	2	3	1	1	7
3	Add lift station	2	3	1	1	7
3	Address derelict houses and buildings	1	3	3		7
4	Flood-proof wastewater treatment facility	2	3	1		6

Ferguson

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Continue mutual aid with other fire departments	2	4	3	1	10
2	Tear down dilapidated structures in the city	4	4	1		9
2	Identify a storm shelter in the community and make signs informing residents of its location	4	4	1		9
2	Post signs in the parks to notify the public where to go during severe weather	4	4	1		9
2	Add hazard information inserts to water bills and city newsletter	4	4	1		9
2	Encourage citizens to enroll in weather alerts	4	4	1		9
2	Build public awareness to “Call Before You Dig”	2	4	3		9
3	Upgrade and purchase new emergency siren	4	2	1	1	8
3	Electronically connect city emergency sirens to the community center	4	2	1	1	8
3	Enforce burn bans when they are issued	2	4	2		8
3	Further emergency education and training opportunities between jurisdictions	4	4	0		8
4	Purchase generator for community center	4	2	1		7
4	Public education on open burning	2	4	1		7
5	Educate the public on the Emerald Ash Borer	1	4	1		6

Gilman

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Update fire rescue equipment	4	4	1		9

1	Public education sessions on warning siren	4	4	1		9
2	Remove debris from abandoned properties	2	4	2		8

Haverhill

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Emergency equipment upgrades for first responders	4	4	3		11
1	Mutual aid for disaster clean up	4	4	3		11
2	Replace drainage tile lines in city limits	4	2	3		9
3	Improve roads	1	4	3		8
4	Public education sessions on hazard procedures	4	1	1		6

Laurel

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Continue to participate in Alert Iowa	4	4	3		11
1	Continue mutual aid agreements with other fire departments	4	4	3		11
1	Ensure that fire personnel are properly trained	4	4	3		11
2	Continue to host a community household hazardous materials drop-off program	2	4	3		9
2	Purchase generators	4	4	1	1	10
3	Continue to participate in the NFIP and continue to update and enforce the floodplain ordinance	1	4	3		8
3	New emergency siren	4	3	1	1	9
3	Improve aging water/sewer lines	4	4	1		9

LeGrand

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Mutual aid for disaster relief	4	4	3		11
2	Identify each critical facility's function in a hazard event	4	3	3		10
2	Locate grants and subsidies for NOAA weather radios	4	3	3		10
2	Promote NOAA weather radios to new residents through welcome packets	4	3	3		10
2	Create online forms of hazard information	4	3	3		10
2	Create an emergency phone tree	4	3	3		10
3	Lagoon improvements	3	4	1	1	9
3	Public education program	4	3	2		9
3	Continued water tower updates and maintenance	3	4	2		9
3	Ensure online emergency system is working	4	3	2		9
4	Purchase generators for all critical facilities	4	2	1	1	8
4	Install alternate communication devices in all critical facilities	4	3	1		8
4	Encourage residents to purchase weather radios	4	3	1		8
5	Improve and update all city buildings	4	2	1		7
5	Hydrant improvements	3	2	1	1	7
5	Research backup power source for emergency siren	4	2	1		7
6	Construct safe room	4	1	1		6

Liscomb

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Ensure fire department response capacity	4	3	3		10
1	Encourage participation in local volunteer fire department/first responders	4	3	3		10
1	Reduce runoff and erosion	4	2	3	1	10
2	New automatic emergency siren	4	3	1	1	9
3	Remind residents about current and potential hazards	4	3	1		8
3	CERT awareness	4	3	1		8
4	Tear down dilapidated structures	4	2	1		7
5	Minimize flooding potential	2	2	2		6
6	Tornado/wind shelter	4	1	-1		4

Marshalltown

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Public education program	4	4	4		12
2	Structural inspections of levee	3	4	4		11
3	Further education and training opportunities between jurisdictions	4	4	2		10
4	Flood protection and repairs for sewer lift station and levees	3	4	2		9
4	Backup power for water treatment plant	4	3	2		9
5	Backup generator for hospital	4	3	1		8
6	Floodproof water treatment plant	3	1	2		6
7	Boat ramps for emergency rescue	3	2	0		5

Melbourne

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Continue to identify I and I sources and repair	2	4	3	1	10
2	Demolish hazardous buildings in town	2	4	1	1	8
2	Add hazard information articles to quarterly newsletter	4	4	-1		7
2	Encourage more residents to sign up for Alert Iowa	4	4	-1		7
3	Develop public shelter plan and public information plan for shelter	4	3	-1		6
3	Post signs at park/city locations that inform residents of shelter locations	4	3	-1		6
3	Purchase backup generator for critical facilities	4	1	1		6
4	Sewer improvements	2	1	1	1	5
4	Hazardous materials pick up program	3	3	-1		5
5	Update lagoon	3	1	-1		3

Rhodes

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Inform residents of shelter areas in town	4	3	1		8
1	Purchase and install signs that direct residents to shelter location	4	3	1		8

St. Anthony

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Recruiting emergency responders	4	4	3		12
2	Backup power for shelter and critical facilities	4	4	1		9

State Center

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Purchase new emergency response vehicle	4	3	4	1	12
1	Coordinate city public awareness	4	4	4		12
2	New fire station	4	4	2	1	11
3	Backup power for critical facilities	4	2	2	1	9
4	New warning siren	4	3	1		8
4	Construct a safe room	4	2	2		8

Marshall County

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Coordinate public awareness	4	4	4		12
2	Create a public information session and conservation (water) program	4	3	4		11
3	Ground water protection	4	4	2		10
3	Public education program	4	4	2		10
3	CERT responder training	4	4	2		10
4	Plant windbreaks	4	3	2		9
4	Train fire departments for grass fires and maintain needed equipment	3	4	2		9
4	Purchase/update snow removal equipment	4	3	2		9

4	Maintain quality of courthouse's technological equipment with temperature regulation	4	3	2		9
5	Courthouse security	2	4	2		8
5	Purchase generators for critical facilities	4	2	2		8
5	Improve communication systems	4	2	2		8
6	Construct safe rooms in vulnerable areas of the county	4	1	2		7
6	Animal/Crop/Plant and Human Disease Epidemic planning and training	1	4	2		7
6	Elevate roads	3	2	2		7
6	Laminated glass for use during hailstorms	4	1	2		7
7	Reinforce levee and surrounding land	3	1	2		6
7	Acquisition and elevation of structures	3	1	2		6
8	Install radiology monitors in all county vehicles	3	4	-2		5

East Marshall Community School District

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Complete required hazard drills every year	4	4	3	1	12
1	Purchase/update snow removal equipment	4	4	3	1	12
2	Ensure proper grounding of facilities during hazard events	4	4	3		11
3	Create debris removal plan	4	2	3		9
3	Public education sessions on safe room procedures	4	2	3		9
3	Coordinate city public awareness and emergency plan	4	2	3		9

4	Retrofit school buildings as shelters	4	1	-1		4
5	Reinforce school buildings	2	1	-1	1	3

Marshalltown Community School District

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Maintain facility standards and safe code compliance	4	4	4		12
1	Update and review facility safety awareness program	4	4	4		12
2	District-wide training	4	2	4	1	11
2	K-12 education on hazards	4	2	4	1	11
3	Write an emergency plan for city, emergency response, and schools	4	2	4		10
4	Purchase backup power generators	4	2	2		8
4	Create a hazard/safety information session for students	4	2	2		8
5	Build safe room shelters	4	1	2		7

West Marshall Community School District

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Crisis planning and drills - communication with safety education (public safety, CPR, ED's)	4	4	1		9
1	Radon testing	3	4	1	1	9
1	Crisis plan review and update	4	4	1		9
2	Asbestos removal	3	4	1		8
3	Improved communication systems	4	3	-1	1	7
4	Security cameras in buildings and on buses	2	4	-1	1	6
4	Environmental concerns (air quality at high	3	2	1		6

	school, water quality, etc.)					
5	Roof improvement	4	2	-1		5
6	Purchase generators	4	1	-1		4
7	Improve vehicle access to elementary and pre-school	2	2	-1		3
8	Emergency planning including card readers, etc.	2	1	-1		2

GMG Community School District

Rank	Mitigation Action	Risk Assessment	Start Date	STAPLEE (Economic) Rating	Local Significance	Total Score
1	Provide elementary school as a shelter and place to coordinate emergency personnel during an emergency	4	4	4		12
2	Purchase of a generator for elementary school	4	2	2		8
3	Increase tree planting around school	2	3	2		7

Appendix Q. Resolutions

This section includes copies of each jurisdiction's Resolution to Adopt the Marshall County Multi-Jurisdictional Hazard Mitigation Plan.

b.) Change Rate of Pay, **Kody Hilderbrand**, Buildings and Grounds Department, Change Rate of Pay from $13.25 to $14.75, effective November 17, 2015.

Motion by Thompson, second by Patten, to approve personnel action, Change Rate of Pay, Kody Hilderbrand, Buildings and Grounds Department, Change Rate of Pay from $13.25 to $14.75, effective November 17, 2015. Note: Approval due to Department restructuring and employee coming off probation status.

Roll call vote:	Thompson-Aye	Patten-Aye	Grabenbauer-Aye
	Vice Chairman	Member	Chairman

6. Resolution

A RESOLUTION OF THE MARSHALL COUNTY BOARD OF SUPERVISORS ADOPTING THE MARSHALL COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

RESOLUTION NO. 2015-0048

WHEREAS, the Board of Supervisors of Marshall County has authorized the development of a Multi-Jurisdictional Hazard Mitigation Plan; and,

WHEREAS, the Marshall County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division; and,

WHEREAS, all meetings of the Marshall County Planning Committee were open to the public; and,

WHEREAS, the municipalities within Marshall County that participated in the multi-jurisdictional plan process will each pass their own resolution to approve and adopt the plan.

NOW THEREFORE BE IT RESOLVED, that the Marshall County Board of Supervisors herewith adopts said plan, incorporating citizen comment and recommendation.

PASSED AND ADOPTED this 17th day of November, 2015

Chairman

Attest: Deanne Raymond
Auditor

Appendix R. Data Sources Used in Plan

Council of State Governments Midwestern Office. Handbook of radioactive waste transportation. http://www.csgmidwest.org/%5C/MRMTP/documents/HandbookofRadioactiveWaste.pdf

Federal Railroad Administration Railroad Accident Reports. 2015. [via the Des Moines Register] http://db.desmoinesregister.com/dangerous-crossings/page=3&searchterms%5Bcol8%5D=tama&searchterms%5Bcol1%5D=&searchterms%5Bcol3%5D=&searchterms%5Bcol7%5D=&searchterms%5Bcol9%5D=&searchterms%5Bcol10%5D=&searchterms%5Bcol11%5D=

FEMA Disaster Declarations for Iowa. January 2015. https://www.fema.gov/disasters/grid/state-tribal-government/65

FEMA Map Service Center. 2014. https://msc.fema.gov/portal

Insurance Institute for Business and Home Safety. 2015. Creating Defensible Space Zones [against grass and wildlife fires]. https://www.disastersafety.org/wildfire/defensible_space/

Iowa Department of Agricultural and Land Stewardship. 2014. Information about Scapies. http://www.iowaagriculture.gov/animalIndustry/pdf/2014/2014FINALNewsletter.pdf

Iowa Department of Agricultural and Land Stewardship. 2015. Information about Bird Flu. http://www.iowaagriculture.gov/avianinfluenza.asp

Iowa Department of Natural Resources Facility Explorer. 2015. https://facilityexplorer.iowadnr.gov/FacilityExplorer/

Iowa Department of Natural Resources Hazardous Materials Release Database. 2014. https://programs.iowadnr.gov/hazardousspills/Introductory.aspx

Iowa Department of Natural Resources Hazardous Spills Summary Report. 2014. https://programs.iowadnr.gov/hazardousspills/Reports/SpillSummary.aspx

Iowa Department of Public Health, Center for Acute Disease Epidemiology (CADE). 2015. Annual Reports. http://www.idph.state.ia.us/cade/Default.aspx#CR

Iowa Department of Transportation. 2015. [Email]

Iowa Emergency Management Association. 2014. Nuclear Event Classifications. http://homelandsecurity.iowa.gov/programs/radio_emerg_prep.html

Iowa Geological Survey. 2015. Earthquake map. http://www.iihr.uiowa.edu/igs/browse/quakes/quakes.htm

Iowa Homeland Security and Emergency Management Department (HSEMD) 2008. [Email]

Iowa State Hazard Mitigation Plan 2007.

Iowa State Hazard Mitigation Plan 2013.

Iowa State University Veterinary Medical Center. 2013. http://vetmed.iastate.edu/sites/default/files/vdpam/Disease_Topics/PED-virus-fact-sheet-5-17-13.pdf

Marshall County Assessor's Office. 2014. [Email]

Marshall County Conservation. 2011. [Email]

Marshall County Emergency Management. 2010, 2015. [in person, email]

Marshall County Planning and Zoning. 2004. [Email]

Marshall County Soil Survey. 1981.

Melbourne, Iowa Centennial History. 1982.

National Agriculture Statistics Service Cropscape Tool. 2014. http://nassgeodata.gmu.edu/CropScape/

National Agriculture Statistics Service. 2015. http://quickstats.nass.usda.gov/

National Climate Data Center (NCDC). 2015. Storm Events Database. http://www.ncdc.noaa.gov/stormevents/

National Drought Mitigation Center. 2015.
http://droughtmonitor.unl.edu/AboutUs/ClassificationScheme.aspx
National Flood Insurance Program (NFIP) Bureau Net. 2015.
http://bsa.nfipstat.fema.gov/reports/1011.htm#IAT
National Flood Insurance Program (NFIP) Community Status Book. 2015.
https://www.fema.gov/cis/IA.pdf
National Inventory of Dams. 2015. US Army Corps of Engineers.
http://nid.usace.army.mil/cm_apex/f?p=838:12
National Levee Database. 2015. US Army Corps of Engineers.
http://nld.usace.army.mil/egis/f?p=471:1:
National Oceanic and Atmospheric Association. 2015. Fujita Tornado Damage Scale.
http://www.spc.noaa.gov/faq/tornado/f-scale.html
National Oceanic and Atmospheric Association. 2015. Wind Chill Chart.
http://www.nws.noaa.gov/om/winter/windchill.shtml
National Oceanic and Atmospheric Association. 2015. Climate Chart.
http://www.crh.noaa.gov/dmx/?n=climategraphicsDSM2014
National Oceanic and Atmospheric Association. 2015. Beaufort Wind Scale.
http://www.spc.noaa.gov/faq/tornado/beaufort.html
National Oceanic and Atmospheric Association. 2014. Climate Data Online Search.
http://www.ncdc.noaa.gov/cdo-web/search?datasetid=GHCND
Natural Resources Geographic Information Systems (NRGIS) Library. 2014, 2015.
https://programs.iowadnr.gov/nrgislibx/
National Transportation Safety Board Aviation Accident Reports. 2015.
http://www.ntsb.gov/investigations/AccidentReports/Pages/aviation.aspx
State Data Center of Iowa. 2009. www.iowadatacenter.org
Sure Void Products. 2015. Swelling Clays Map. http://www.surevoid.com/soil_maps/ia.php
US Census Bureau. 2014. www.factfinder.census.gov/
US Census Bureau "On The Map" Tool. 2014. http://onthemap.ces.census.gov/
US DOT Pipeline and Hazardous Materials Safety Administration. 2014.
http://www.phmsa.dot.gov/pipeline/library/datastatistics/pipelineincidenttrends
Weather.gov. Heat index chart http://www.weather.gov/om/heat/index.shtml
Woods and Poole Economics, Inc. 2007.