



Tama County, Iowa Hazard Mitigation Plan 2015 - 2020

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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, Tama 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 Tama 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 – Tama 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 Tama 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 Tama 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 Tama 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 Tama County during the previous planning process as they removed structures from the floodplain, installed lift stations, purchased backup generators for critical facilities, and kept firefighting and emergency equipment up to date. 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.

Though all jurisdictions of Tama County are affected by several hazards, the City of Chelsea is of particular concern and priority in the plan. The Repetitive Loss Properties subsection of the plan identifies Chelsea as a jurisdiction with flood-insured properties that have been damaged by flooding repeatedly.

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 17 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 Chelsea
- City of Clutier
- City of Dysart
- City of Elberon
- City of Garwin
- City of Gladbrook
- City of Lincoln
- City of Montour
- City of Tama
- City of Toledo
- City of Traer
- City of Vining
- Tama County (Unincorporated)
- GMG Community School District
- North Tama County Community School District
- South Tama County Community School District
- Union Community School District

It should be noted that the Meskwaki Settlement is located in Tama County along U.S. Highway 30 between Marshalltown and Tama. The settlement is completely independent from the county, so it was not included in this hazard mitigation plan. Excepting the Meskwaki Settlement, the planning boundary for this multi-jurisdictional hazard mitigation plan includes all of the incorporated and unincorporated areas of Tama County, Iowa.

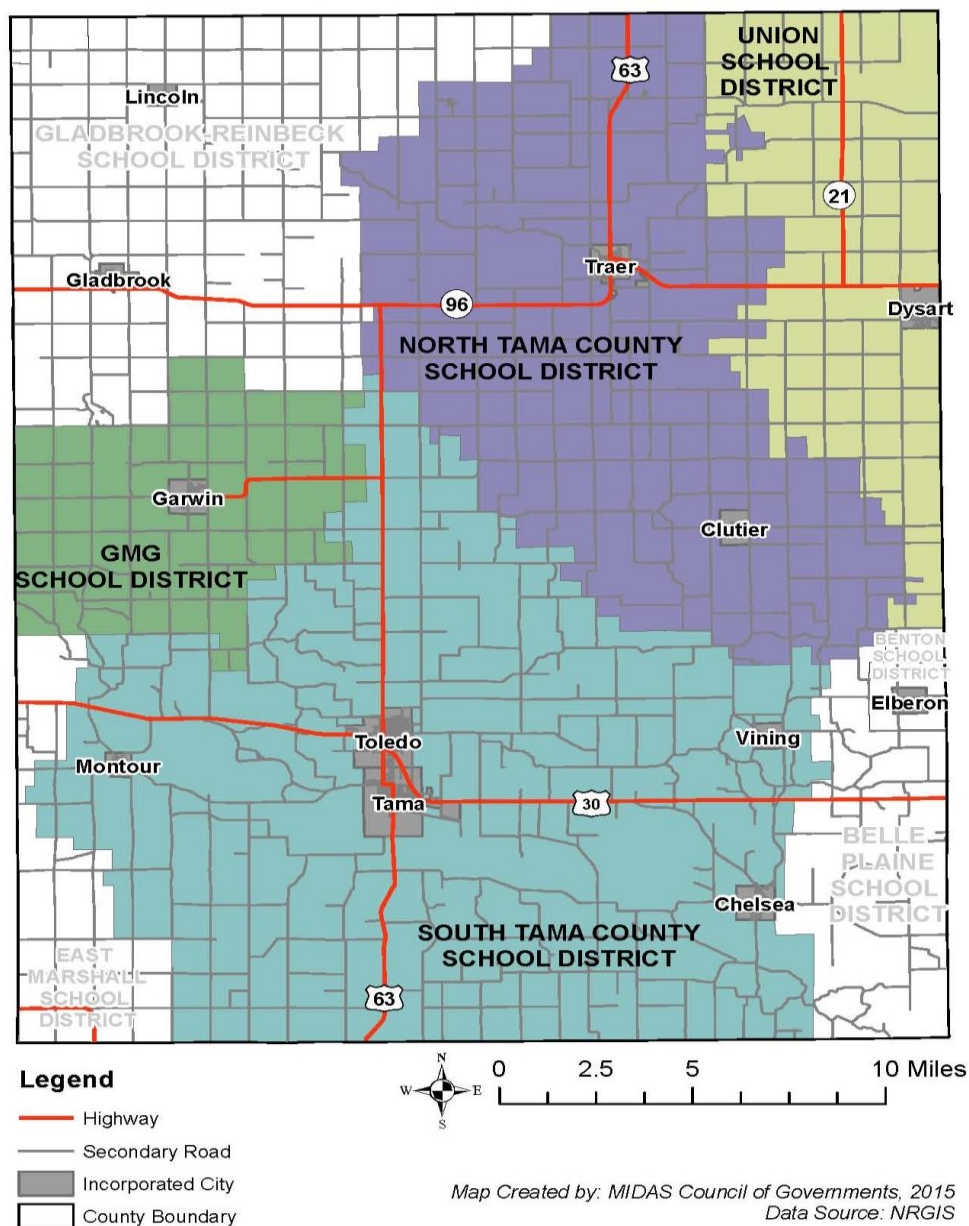
All incorporated jurisdictions within Tama County participated in this plan update. In addition to jurisdictional representatives from within Tama County, a variety of stakeholders were invited to participate in the planning process. Those invited to the meetings included Emergency Managers from the 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 did not participate in the previous Multi-Jurisdictional Hazard Mitigation Plan for Tama County that was approved in 2010. The school district chose to participate in the plan update, and as a result, they put forth several mitigation actions for the school district. Second, Gladbrook-Reinbeck Community School District participated in the previous 2010 plan but chose not to participate in the plan update. The school district was invited

to all meetings, but the district's only facilities in Tama County, the elementary and middle school campus, will be closing in the near future. The school district chose not to participate in the plan update because of this circumstance.

Finally, all school districts in Tama County were invited to participate in the planning process. Gladbrook-Reinbeck, East Marshall, Belle-Plaine, and Benton School Districts did not respond to invitations. Excepting Gladbrook-Reinbeck, none of these school districts have district facilities in Tama County. See Figure 1 for a map of participating jurisdictions. Note that the school districts *not* participating in the plan update have been grayed out.

Figure 1: Tama 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 Tama County Multi-Jurisdictional Hazard Mitigation Plan

Other information that was gathered during the planning process for the 2010 Multi-Jurisdictional Hazard Mitigation Plan for Tama 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 Tama 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: Tama 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 Chelsea	Dianna Dunning	Clerk	---	---	---	X
City of Clutier	Gordon Fassett	Mayor	X	X	X	
	Keri Kopriva	Clerk	---	X	---	
City of Dysart	Pam Thiele	Mayor	---	X	X	
City of Elberon	Linda Kaloupek	Clerk	---	---	---	X
City of Garwin	Lori Speck	Clerk	---	X	X	
City of Gladbrook	Lori Bearden	Clerk	X	X	X	
City of Lincoln	Deb Wentzien	Clerk	---	---	---	X
City of Montour	Susan Eberhart	Mayor	---	X	X	
City of Tama	Dan Zimmerman	Mayor	X	---	---	
	John Lloyd	Public Works	X	X	X	
City of Toledo	Dave Svoboda	Mayor	---	X	X	
	Mark Zmolek	Superintendent of Public Works	X	---	---	
City of Traer	Jon Panfil	Clerk	---	---	---	X
City of Vining	George Bazal	Mayor	---	X	---	X
	Fred Vore	Councilman	---	X	---	
Tama County Emergency Mgmt.	Mindy Benson	Coordinator	X	X	X	
	April McIntire		X	---	---	
	Jeremy Cremeans		---	---	X	
Tama County Board of Supervisors	Larry Yest	Board Member	---	X	---	X
	Kendall Jordan	Board Member	---	X	---	
Union Community School District	Neil Mullen	Superintendent	---	---	---	X
GMG Community School District	Mark Polich	Principal	X	X	---	
North Tama County School District	Bob Cue	Superintendent	---	---	---	X
South Tama County School District	Steve McAdoo	Bus Barn and Maintenance Supervisor	X	X	X	
Tama County Public Health	Linda Rosenberger		---	---	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 Tama County Emergency Management to write the Tama 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 Tama 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.

Tama County Hazard Mitigation Planning Process

1. Organize Community Resources

- A. Region 6 meets with Tama County Emergency Management Coordinator
- B. Complete community inventory from each jurisdiction (carried over from previous 2010 Tama County planning process and updated in plan update)
- C. Complete county and community profiles (carried over from previous 2010 Tama 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. Tama 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 Tama County and determine boundaries
 - iii. Profile all hazards in Tama County
 - iv. Complete the hazard risk assessment
 - v. Identify areas prone to flash flooding
 - vi. Complete take-home community "homework"
- B. Tama 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. Tama 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 Tama County Emergency Management Coordinator

In 2014, Region 6 met with the Emergency Management Coordinator (EMC) for Tama County, Mindy Benson. 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 Tama County. Throughout the hazard mitigation planning process, the Tama 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 2010 Tama 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:

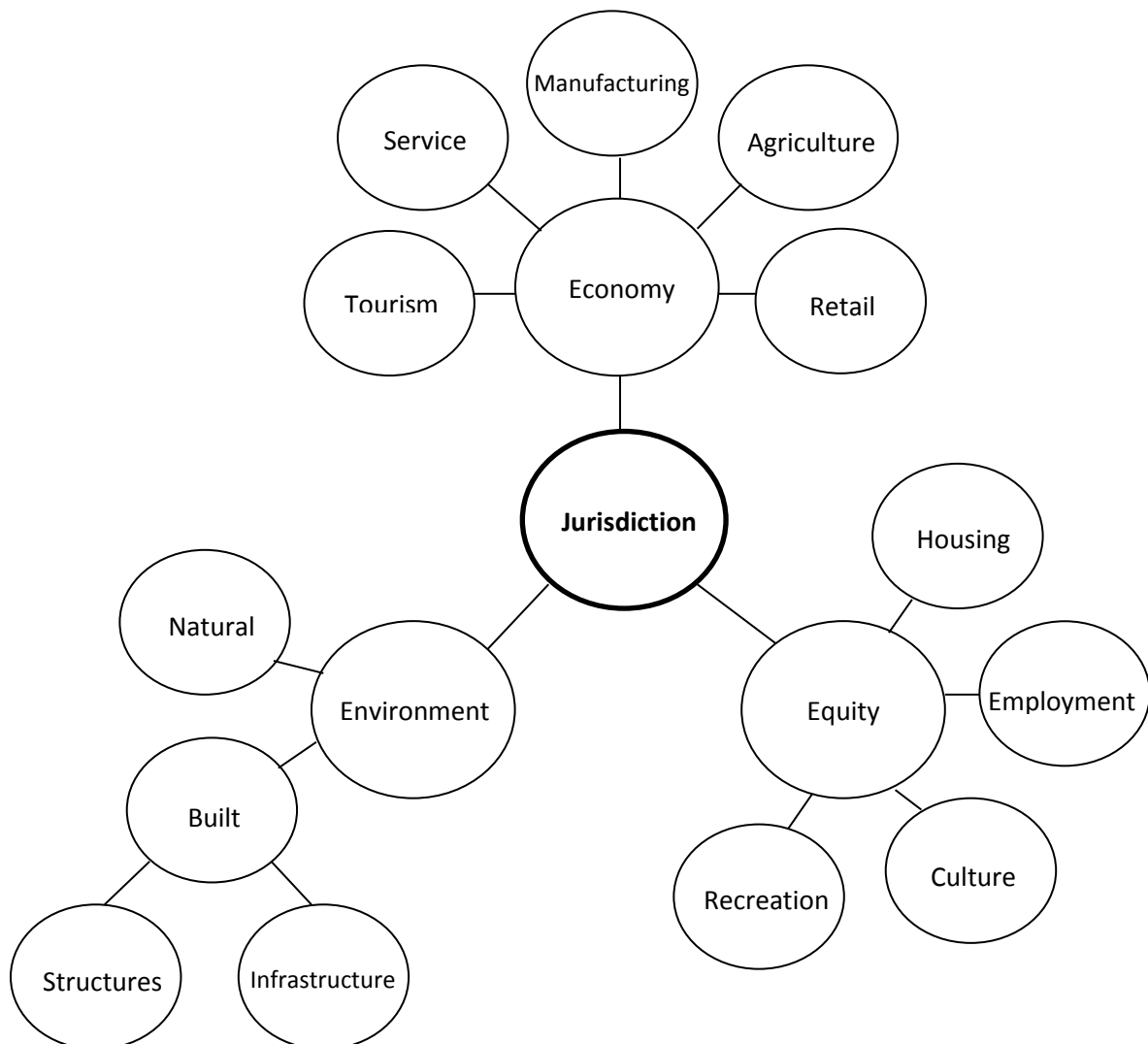
- City of Dysart
- City of Gladbrook
- City of Montour (only water infrastructure)
- City of Tama
- City of Toledo
- City of Traer

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.

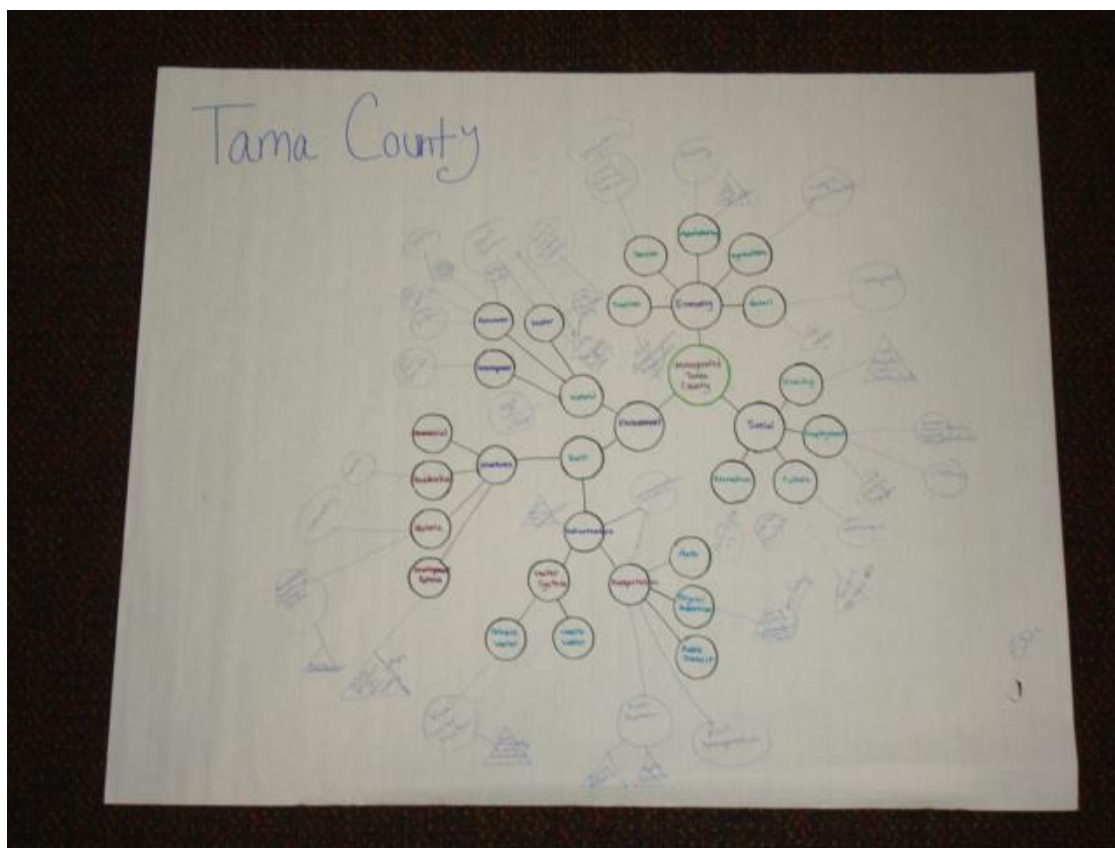
Region 6 developed a concept mapping activity that guided meeting participants through the asset inventory process. A diagram was developed and used to complete a comprehensive review of both assets and weaknesses. A simplified example of the diagram that was used is below in Figure 2.1.

Figure 2.1: Basic Asset Identification Diagram



A community asset diagram was completed for each individual jurisdiction and the unincorporated areas of Tama 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



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 2010 Tama County Hazard Mitigation Plan, extensive research and local knowledge was combined by Region 6 to complete a profile for Tama 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 Tama 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 Tama County Strategic Planning Task Force was made up of nearly 30 people who live in Tama County, and a majority also works in Tama 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 Tama 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. Tama 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. Other counties were invited to the meeting so they could provide input on goals, projects, and possible collaborations. No other county representation outside of Tama County was present.

On February 10, 2015, the first Task Force meeting was held in the City of Toledo (county seat) at the Reinig Center at 2:00 PM. 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 Tama 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.

Tama County Strategic Planning Task Force Meeting #1

i. Identify hazards for Tama 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 Tama 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 Tama County hazards

All hazards that were identified for Tama County were profiled. This was done through review of the Iowa Hazard Mitigation Plan, past events and declared disasters, research, and reviewing data from Tama 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 Tama 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 Tama 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 Tama 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. Tama 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. Tama County Strategic Planning Task Force Meeting #2

A second countywide meeting was held at the Reinig Center in Toledo on March 17, 2015 at 2:00 PM. 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 these local newspapers: The Dysart Reporter and The Traer Star Clipper. See Appendix C for these postings. To encourage a regional effort, emergency management coordinators from other counties (Region 6 Counties: Hardin, Marshall, and Poweshiek) 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.

Tama 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 Tama 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 with the exception of one wording change. The first goals from the previous plan, “Minimize losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority structures,” was shortened to “Minimize losses to existing and future structures within hazard areas.” to avoid repetition. 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 Tama County residents and visitors.
3. Educate Tama 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 Tama 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. Tama County Strategic Planning Task Force Meeting #3

A third and final countywide meeting was held at the Reinig Center in Toledo on April 21, 2015 at 2:00 PM. 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 these local newspapers: The Dysart Reporter and The Traer Star Clipper. See Appendix C for these postings. To encourage a regional effort, emergency management coordinators from other counties (Region 6 Counties: Hardin, Marshall, and Poweshiek) 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.

Tama 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 Tama County 2010 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:

- Tama County 2010 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 Chelsea, City of Tama)
- Repetitive loss property information from IHSEM
- 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

The comment period for this plan began on October 28, 2015 and ended on November 30, 2015. 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 Tama County so residents were aware of their ability to review and comment on the written plan. Copies of the plan were located at the Tama County Auditor's Office in Toledo. An electronic copy of the plan was available by request. A copy of the notice along with public comments will be available in Appendix C once the affidavit of publications is received from each newspaper.

5. Submit Plan

The plan was submitted by Dropbox to the state plan review staff and the State Hazard Mitigation Officer on October 20, 2015.

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.

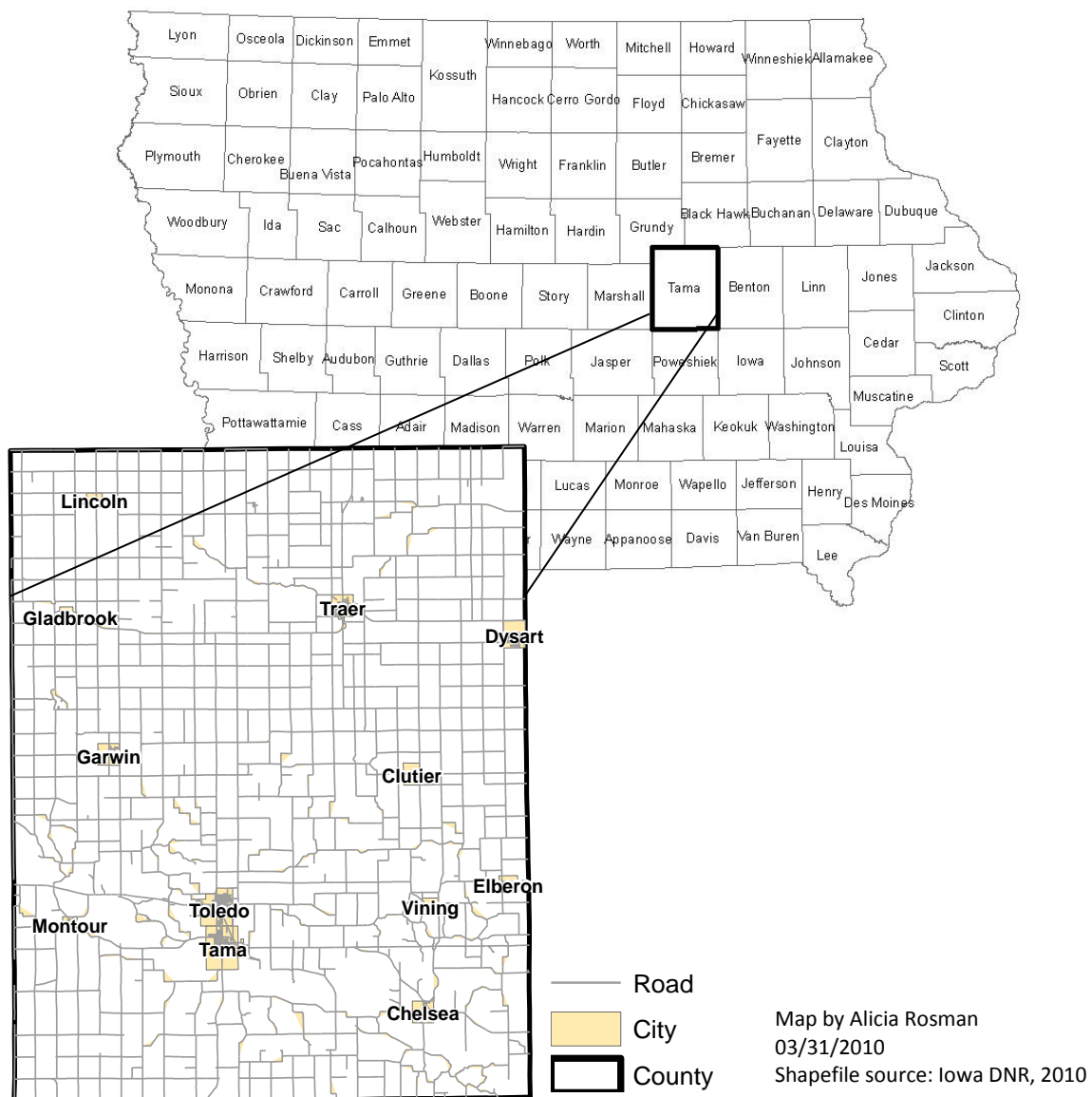
Chapter 3: Planning Area

3.1: Planning Area Profile

Location

Tama County is a fifth tier county located in east central Iowa. The county is bordered on its north side by Grundy and Black Hawk Counties, Benton County on the east, Poweshiek County on the south side, and Marshall County on the west side. The entire county is approximately 720 square miles, which is just over one percent of Iowa's land area. The county seat and largest city is Toledo. In Figure 3.1.1, Tama County is in bold to show its location in relation to all Iowa counties.

Figure 3.1.1: Iowa Counties



Geography, Topography, and Hydrology

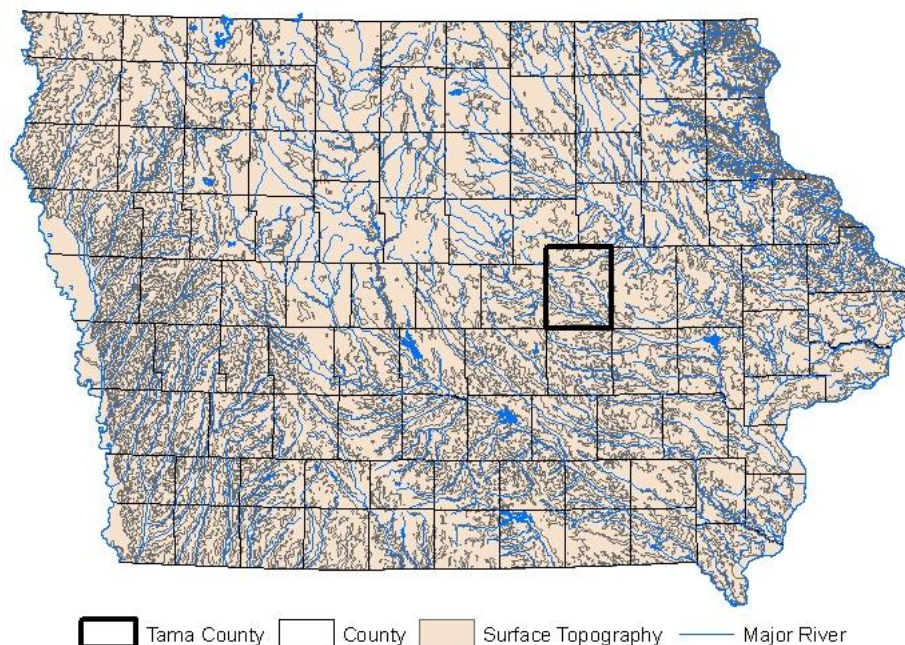
Tama County has an area of 462,300 acres, or about 720 square miles. The Iowa River, one of the main rivers in the state, crosses the southern part of the county and runs in a southeasterly direction to its southeast corner. It is of medium gradient and is subject to flooding of low velocity and short duration in the spring and after periods of heavy rainfall. Damage by flooding is chiefly to the agricultural land in the county. In some areas, loess hills rise quite abruptly to a height of 150 to 200 feet above the river.

Most of Tama County is on dissected uplands. About three-fourths of the county is drained by the Iowa River and its principal tributaries-Deer Creek, Richland Creek, and Salt Creek. Wolf Creek, in the northern part of the county, drains the rest of the county. It runs from Gladbrook to about 3 miles south of the northeast corner of the county. The entire drainage system eventually empties into the Mississippi River.

The highest surface elevation in the county is about 1,060 feet above sea level. It is in the northwest corner of the county. The lowest elevation is about 770 feet above sea level. It is in the southeast corner of the county where the Iowa River leaves the county.

Generally, the topography is nearly level to rolling to very steep in the southern half, along the Iowa River and its tributaries. Some small areas between the rivers and creeks on the major divides are level or nearly level. Refer to Figure 3.1.2. Pahas, or prominent elongated ridges or elliptical mounds that are 50 to 75 feet above the nearly level plain, are in the northern part of the county. They are oriented in a northwest-southeast direction. The word “paha” means small in some Native American languages.

Figure 3.1.2: Topography and Waterways of Iowa



Legend: Tama County County Surface Topography — Major River

Map by Alicia Rosman, 04/02/2010, 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. Tama County is not entirely as flat as some parts of Iowa, but it does not have near as much variation in elevation as other counties in Iowa.

Most of the soils in Tama County formed in material that transported from other locations and redeposited through the action of glacial ice, water, wind, or gravity. The main kinds of parent material in the county are loess, alluvium, glacial drift, and sand eolian material.

Loess, a silt material deposited by wind, covers about 83 percent of the county. It ranges in depth from about 15 to 20 feet on the more stable ridge tops south of the Iowa River to about 4 to 8 feet on the ridge tops of the Iowa erosion surface in the northern half of the county. In most areas it overlies glacial till.

About 17 percent of the soils in the county formed in alluvium. The major areas of these soils are along the Iowa River and Wolf Creek and their tributaries. The flood plains along the Iowa River and some of the alluvial terraces are large. The flood plain along the Iowa River from the City of Tama to the eastern edge of the county is 0.5 mile to 1.5 miles wide. The stream terrace near the junction of Otter Creek and the Iowa River is about 960 acres in size. The stream terrace near the junction of Salt Creek and the Iowa River is about 1,200 acres in size. (Soil Survey of Tama County, Iowa, 1989)

For more extensive information on the soils in Tama County, refer to the Soil Survey of Tama County, Iowa. This survey was completed in 1988-89 by the USDA and several Iowa government departments and institutions.

Land Development

Tama County is settled primarily as a rural county with almost three quarters (12,863 people) of its population living in rural areas. Today, the urban population, which is about 25% (4,904 people) of the county's total population, lives in the county area characterized as an urban cluster. Refer to Table 3.1.1 for more information.

Table 3.1.1: Urban Vs. Rural Population in 2010

		Urban			Rural
Area	Total Population	Total	Inside Urbanized Areas	Inside Urban Clusters	Total Rural
State of Iowa	3,046,355	1,950,256	1,268,964	681,292	1,096,099
Tama County	17,767	4,904	0	4,904	12,863
Chelsea	267	0	0	0	267
Clutier	213	0	0	0	213
Dysart	1,379	0	0	0	1379
Elberon	196	0	0	0	196
Garwin	527	0	0	0	527
Gladbrook	945	0	0	0	945
Lincoln	162	0	0	0	162
Montour	249	0	0	0	249
Tama	2,877	2,660	0	2,660	217
Toledo	2,341	2,187	0	2,187	154
Traer	1,703	0	0	0	1,703
Vining	50	0	0	0	50

Data Source: US Census Bureau, 2014

The most urban cities in Tama County are considered Tama (2,877 people) and Toledo (2,341 people). These two cities, which are located in the south central part of the county, share a boundary making one contiguous urban area or cluster. These cities may have a larger urban population due to their location at the intersections of U.S. Highway 30 and Iowa Highway 63. The intersection of these two highways is an important connection in the county and state transportation network. Toledo is also the county seat where government offices are located. Major industries of Tama County are also located in Tama and Toledo, which may also explain the higher urban population of the two cities. Based on Tama County's history, the county is likely to remain more rural than urban in terms of human settlement patterns.

In the rural, unincorporated areas of the county, there are two densely developed residential areas, Hickory Hollow and Union Grove Lake, in Tama County. Hickory Hollow is a subdivided residential area with just under 40 developed lots. This area is well-established and is no longer experiencing major expansion.

The area around Union Grove Lake is where the majority of new residential development is occurring in Tama County. The development ranges from traditional homes to cabins to manufactured units. This development has approximately 100 homes.

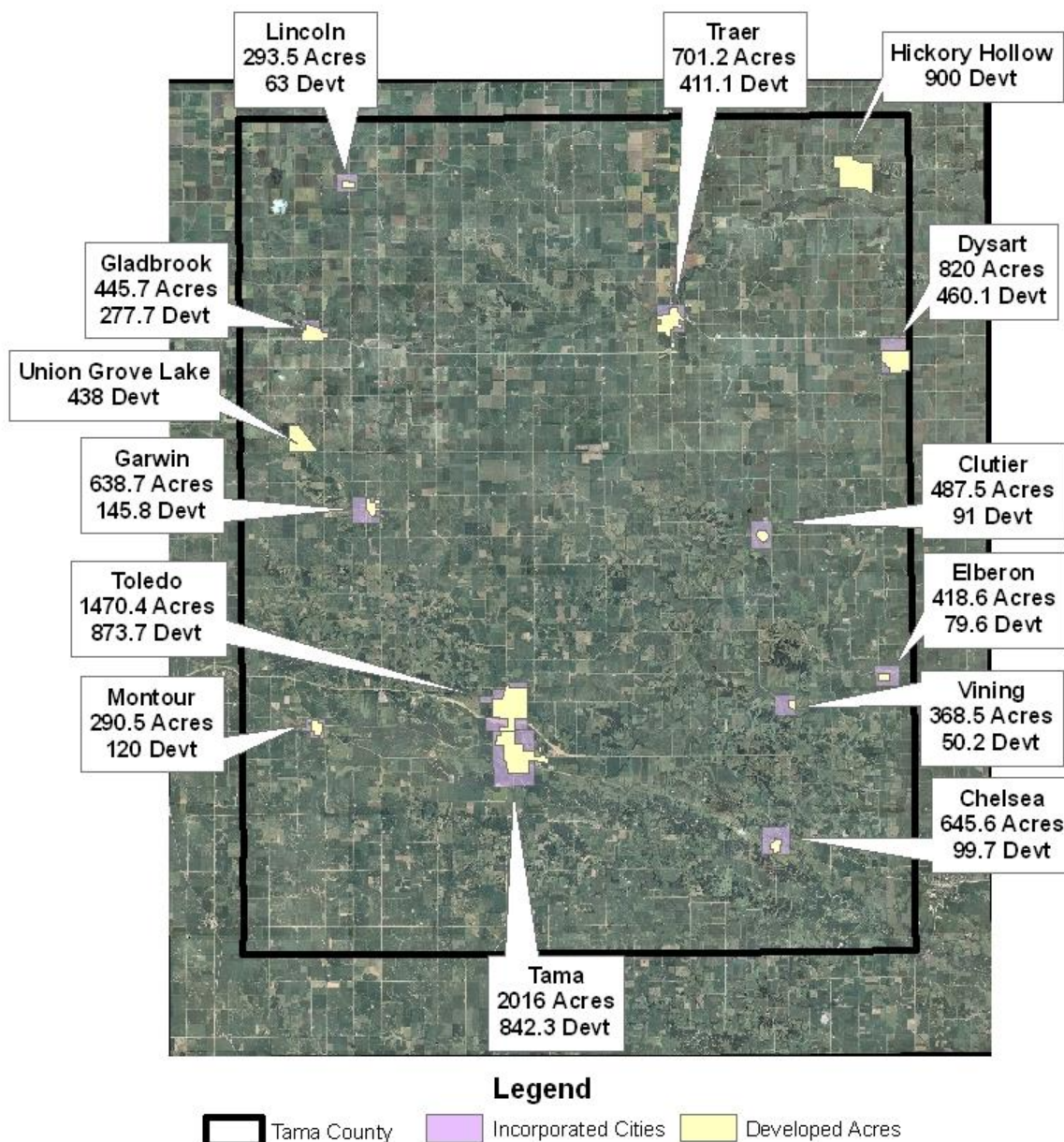
Figure 3.1.3: Union Grove Lake Area



Overall, only one percent (4,852 acres) of Tama County is developed land according to these calculations. The majority of the development, as seen in Figure 3.1.2, is located in the center of

each incorporated city. Most of the cities have at least half of their acres undeveloped. The cities are generally positioned close to the Tama County boundary lines or county periphery. Two rural developments, Hickory Hollow and Union Grove Lake are also located towards the outside edges of the county. The biggest cities in Tama County, Toledo and Tama, are situated in the south central part of the county where U.S. Highway 30 and Highway 63 intersect.

Figure 3.1.4: Current Tama County Land Development



Created by: Alyson Lutz, 4/22/10
 Shapefile Source: Natural Resources Geographic Information System Library
 & Iowa Department of Natural Resources

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

Population Trends and Characteristics

Current and Past Trends

According to the US Census Bureau, the population of Tama County in 2013 was estimated at 17,576. Of this total, 10,743 people live in the incorporated cities of the County leaving the remaining 6,833 people in the unincorporated areas of Tama County. Refer to Table 3.1.2. This means that over a third of the Tama County population is under regulation by county government, and the remaining two-thirds are under the regulation of the jurisdiction in which they reside.

Table 3.1.2: Population Trend 2007 to 2013

				2007 to 2013	
Area	2013 Estimate	2010 Official	2007 Estimate	Numeric change	Percent change
State of Iowa	3,090,416	3,046,355	2,978,719	111,697	3.7%
Tama County	17,576	17,767	17,670	-94	-.5%
Chelsea	264	265	273	-9	-3.3%
Clutier	212	213	223	-11	-4.9%
Dysart	1,376	1,379	1,273	103	8.0%
Elberon	195	196	232	-32	-13.8%
Garwin	518	527	538	-20	-3.7%
Gladbrook	926	945	986	-60	-6.1%
Lincoln	159	162	154	5	3.2%
Montour	248	249	279	-31	-11.1%
Tama	2,842	2,877	2,562	280	10.9%
Toledo	2,276	2,341	2,644	-368	-13.9%
Traer	1,677	1,703	1,569	108	6.9%
Vining	50	50	50	0	0%

Data Source: US Census Bureau, 2014

Out of all Tama County jurisdictions, Tama and Toledo are the largest cities followed by Traer and Dysart. The smallest city in Tama County is Vining with a population of 50 people.

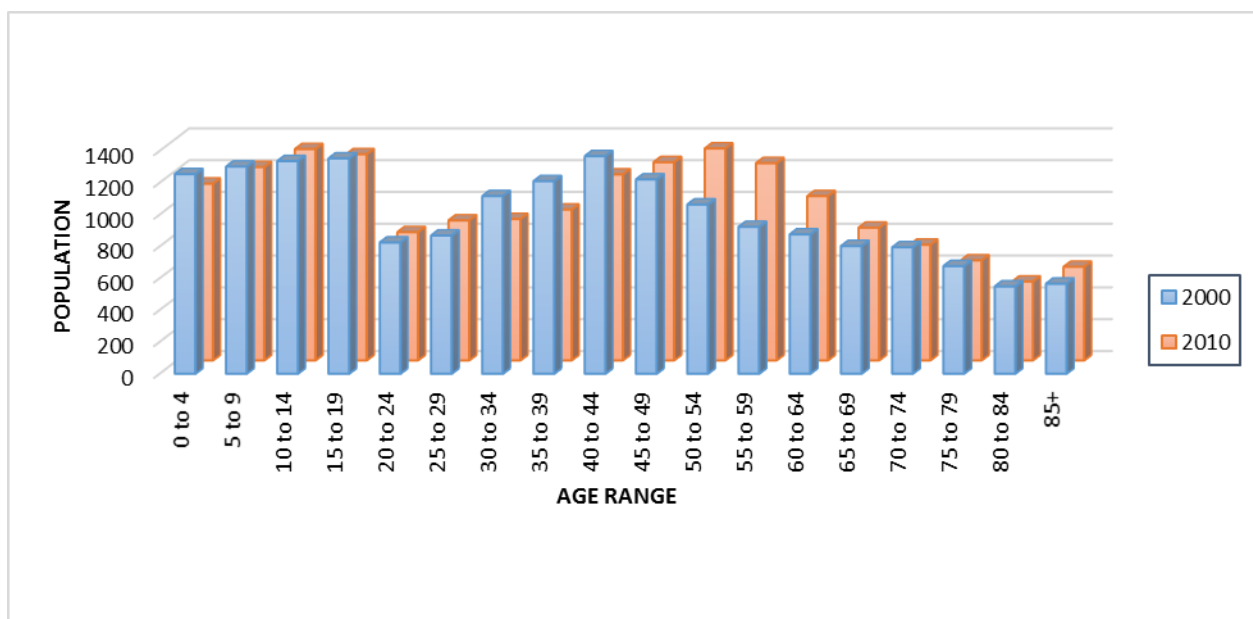
In the past six years, Tama County experienced a population decrease; however some jurisdictions experienced a growth in population, including Tama (+10.9%), Dysart (+8.0%), Traer (6.9%), and Lincoln (+3.2%). Overall, Tama County's decrease in population (-.5%) does not coincide with larger trends in Iowa, which experienced a population increase of 3.7% since 2007. The cities with the largest population loss in terms of percentage are Toledo (-13.9%) and Elberon (-13.8%). The largest loss in terms of number of people occurred in Toledo with a loss of 368 people between 2007 and 2013. Refer to Table 3.3.1 for the population changes in each jurisdiction.

When looking at population growth trends, there has been little population growth in Tama County. New development in most jurisdictions in Tama County is uncommon. If new development has occurred since the previous planning process, it has been in-fill development in areas that are already developed. Toledo has areas around the former Toledo juvenile home that would be sufficient in-fill development areas. Traer has a subdivision on the West side for more housing growth. Any growth in Gladbrook will be on in-fill lots around the city. Dysart has some locations for housing growth along the southern edge of the city. Other communities will not see much, if any, housing growth. All have sufficient in-fill lots for the future limited housing growth. All cities have proper controls so that housing growth is not in floodplains.

Age

From 2000 to 2010, Tama County maintained roughly the same population in the age ranges of 0 to 19 years old and 75 to 84 years old. There was a slight increase in population in the age ranges of 20 to 29 and a significant increase in population in the age ranges of 45 to 69. A significant decrease in population occurred in the population group ranging from the ages of 30 to 44. See Figure 3.1.5 for more information.

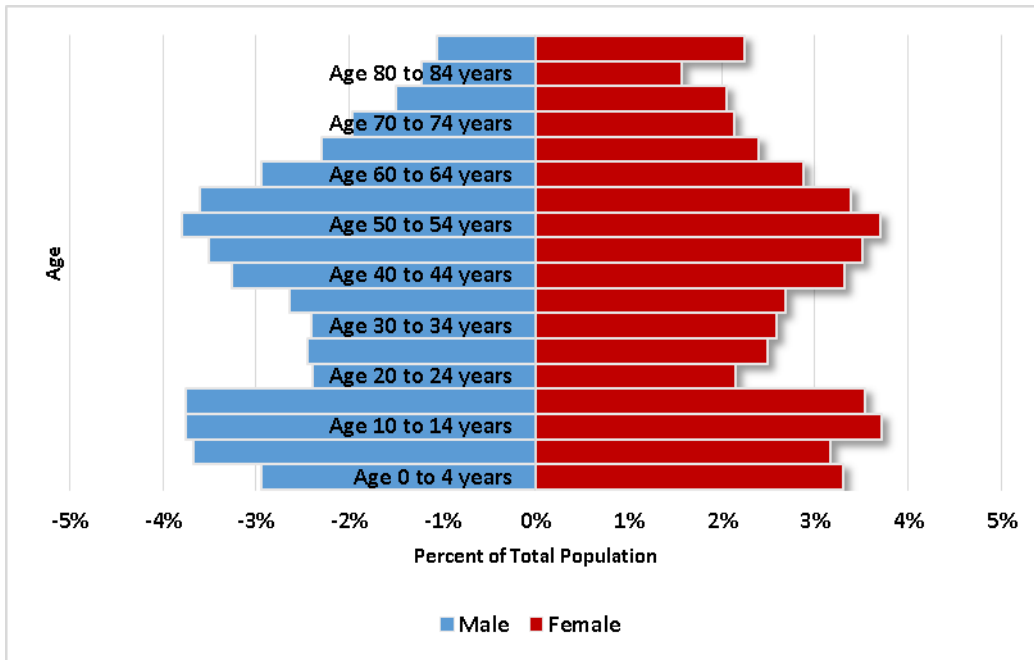
Figure 3.1.5: Total Population of Tama County by 5 Year Age Groups 2000-2010



Data Source: US Census Bureau 2014

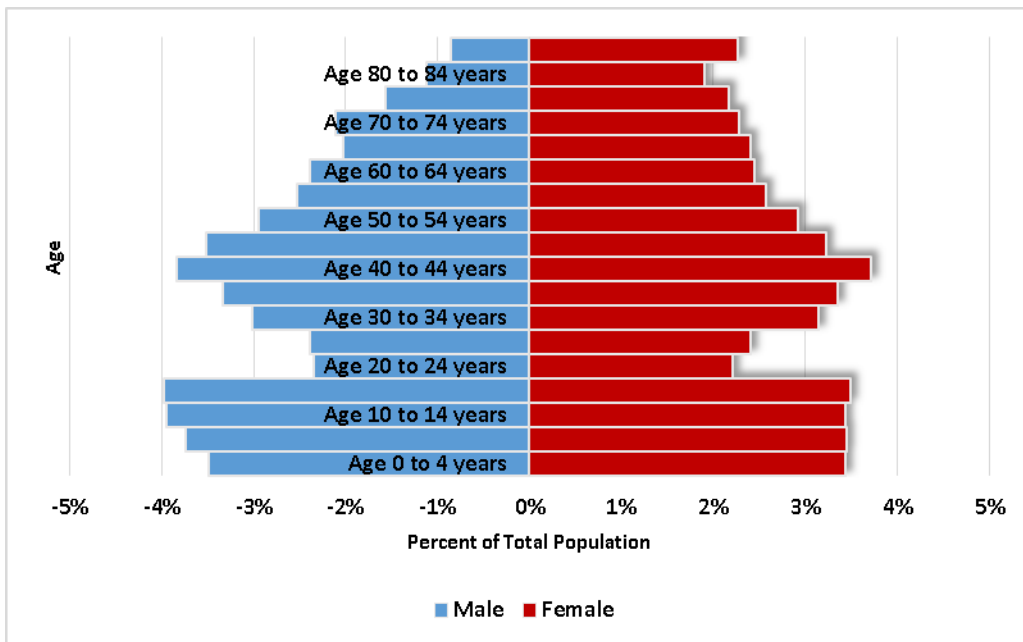
If we compare Tama County's population pyramid to that of the state of Iowa, we find that both population groups have similar percentages of youth population (age 0 to 19), and both population groups experience a dip in population in 20-29 year olds. The state of Iowa's largest adult population group is those between 40 and 44 years old, while Tama County's largest population group is those aged 50 to 54. See Figures 3.1.6 and 3.1.7 for more information.

Figure 3.1.6: Tama County Population Pyramid 2010



Data Source: US Census Bureau, 2014

Figure 3.1.7: State of Iowa Population Pyramid 2010



Data Source: US Census Bureau, 2014

In 2010, Tama County had a median age of 41.8 while the State of Iowa had a median age of 38.1. Compared to the state, the county has an older population. Refer to Table 3.1.3 for a breakdown of median age by city in Tama County.

Table 3.1.3: Tama County Median Age in 2010

City	Median Age	City	Median Age
Chelsea	30.8	Lincoln	39.3
Clutier	41.8	Montour	45.1
Dysart	42.0	Tama	35.6
Elberon	38.5	Toledo	40.3
Garwin	41.3	Traer	43.5
Gladbrook	47.2	Vining	50.5

Data Source: US Census Bureau, 2014

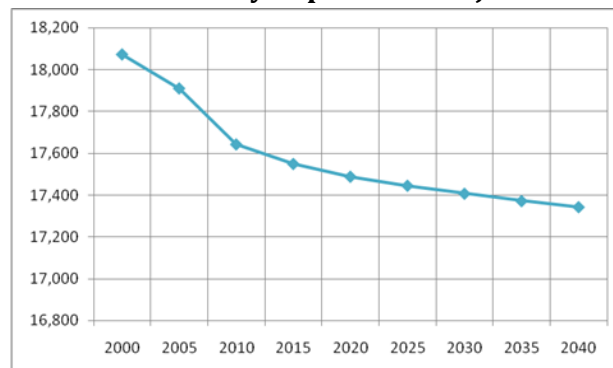
There is a range of 20 years in the median age in cities across Tama County. Of all Tama County cities, Vining has the highest median age of almost 51. Gladbrook closely follows with 47 as the median age of residents. The City of Chelsea is the youngest with a median age that is just over 30 years of age. Tama is the next youngest city in Tama County with a median age just over 35.

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 2007, Tama County's population will steadily decrease as the year 2040 approaches. By 2040, the population is predicted to be below 17,400, which is a decrease from the estimated current population of 17,576 in 2013. When comparing the population projection with 2013's estimated population, the projection is accurate. Refer to Figure 3.1.8 for more information.

Figure 3.1.8: Tama County Population Projection 2000-2040



Data Source: State Data Center of Iowa, 2009; Woods and Poole Economics, Inc., 2007

The population projection from Woods and Poole illustrates a slow, downward trend in population loss that may create lasting effects throughout the County. A reduction in population can reduce the amount of federal and state funding the county will receive, which can reduce services and infrastructure investments. This predicted population decrease is most likely due to young adults leaving the county for higher education and professional opportunities.

Housing Characteristics and Market

Amount and Occupancy

According to the US Census Bureau, Tama County had 5,480 owner-occupied housing units and 1,467 rental-occupied housing units in 2010. More than a third of these housing units are located in unincorporated Tama County while the remaining two-thirds are located within an incorporated city. Refer to Table 3.1.4 for the total number of housing units in each jurisdiction.

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

Jurisdiction	Number of Housing Units
Tama County	7,766
Chelsea	111
Clutier	121
Dysart	598
Elberon	90
Garwin	254
Gladbrook	467
Lincoln	81
Montour	116
Tama	1,234
Toledo	993
Traer	778
Vining	30

Data Source: US Census Bureau, 2014

Incorporated areas with larger populations tend to have a larger number of housing units. The City of Tama has the largest population and the largest share of Tama County's housing stock while Vining has the smallest population and smallest share of Tama County's housing stock.

Out of all housing units in Tama County, 10.5% units were vacant in 2010. This is slightly higher than the state vacancy rate, which was 8.6%.

Table 3.1.5: Housing Occupancy in 2010

	Tama County	State of Iowa
Percent Occupied Housing	89.5%	91.4%
Homeowner Vacancy Rate	2.0%	2.0%
Rental Housing Vacancy Rate	10.9%	8.5%

Data Source: US Census Bureau, 2014

Type of Housing Available

As shown in Figure 3.1.9, the type of housing in Tama County is predominantly 1-unit detached homes (homes that do not share common walls) while multiple-unit structures like duplexes or apartment buildings make up the smallest share of the county's housing.

Figure 3.1.9: Tama County Housing by Type in 2010

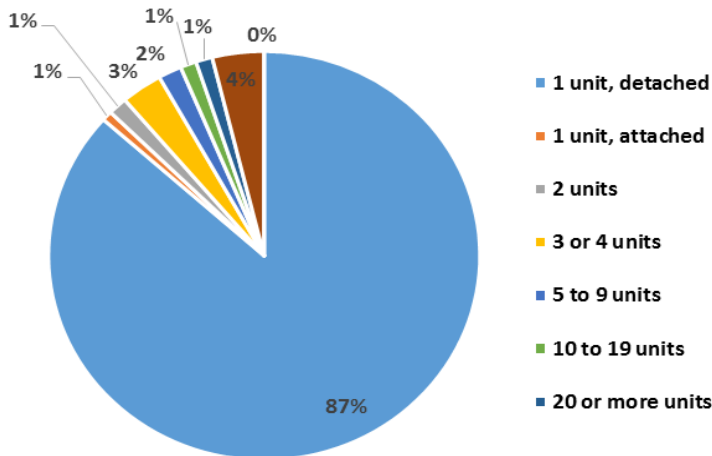
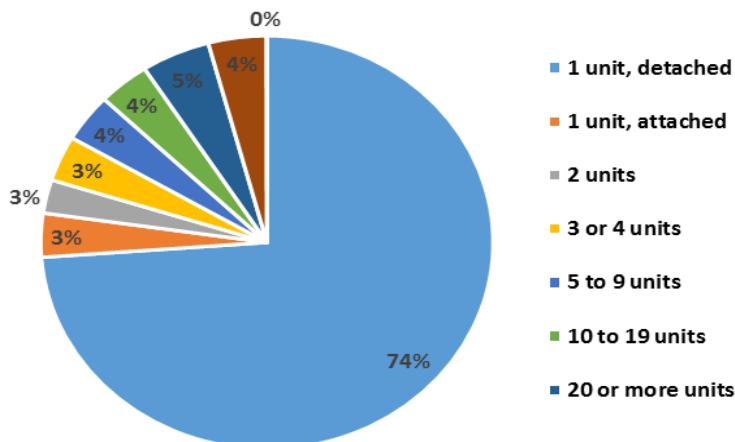


Figure 3.1.10: Iowa Housing by Type in 2010



Data Source: US Census Bureau, 2014

Compared to the state, Tama County has a larger share of 1-unit detached housing units with 87% versus only 74% for the state. On the other hand, Tama has a smaller share of multiple-unit housing structures than the state so Tama 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 Tama County.

Age and Condition

According to the US Census Bureau, in 2010, the median built year for Iowa's housing stock was 1964 while Tama County had a 1950 median built year. Compared to all of Iowa, Tama 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 Tama County cities have an extremely high percentage of these aged units. Over 92% of the homes in Vining, 73% of the homes in Elberon, and 70% of homes in Clutier were built before 1940. Toledo has the smallest percentage (39.2%) of older homes. Refer to Table 3.1.6 for more information.

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

Jurisdiction	Percentage
Tama County	43.4
Chelsea	51.1
Clutier	70.7
Dysart	45.9
Elberon	73.0
Garwin	50.0
Gladbrook	55.1
Lincoln	41.4
Montour	51.3
Tama	44.8
Toledo	39.2
Traer	39.9
Vining	92.3

Data Source: US Census Bureau 2014

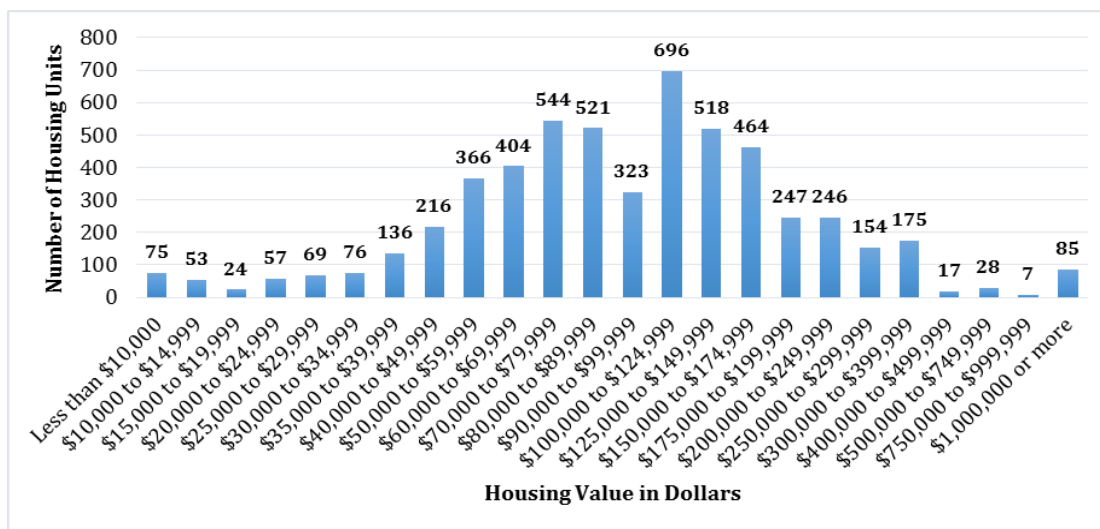
Since nearly half of all housing units in Tama County have been built in 1939 or earlier, there may be common issues associated with an older housing stock. Anything from electrical to structural issues could be a problem in homes across the county. In terms of hazard mitigation, some older housing may 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 Tama County varies tremendously. There is housing built recently in excellent condition but also older homes that are still in excellent condition considering their age. On the other end of the spectrum, there is abandoned or extremely dilapidated housing. The majority of the housing in Tama County falls between these extremes. The housing in Tama County is generally older but relatively well maintained.

Housing Values

There is a trend in housing values of owner occupied units in Tama County. Of the 5,480 owner occupied housing units, nearly 90% have a housing value over \$40,000. This is illustrated in Figure 3.1.11. The range with the highest percent of housing units is \$100,000 - \$124,000 with almost 13% of the county's units. In 2010, the median home value for owner occupied housing units in Tama County was \$96,500.

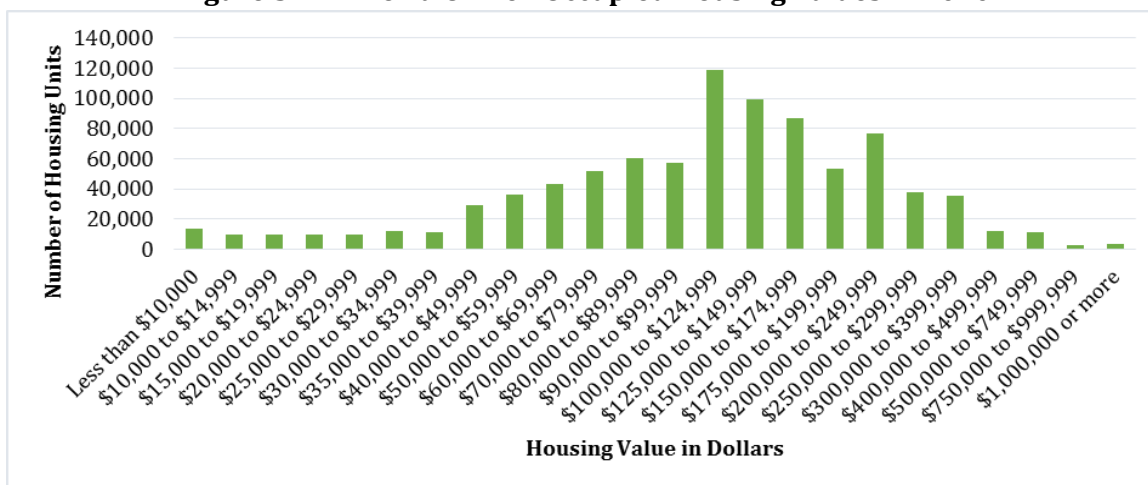
Figure 3.1.11: Tama County Owner-Occupied Housing Values in 2010



Data Source: US Census Bureau 2014

The state of Iowa (Figure 3.1.12) has slightly higher owner occupied housing values than that of Tama County. In 2010, the median home value for owner occupied housing units in the state was \$119,200. Similar to Tama County, the range with the highest percent of housing units is \$100,000 - \$124,000 with just over 13% of the state's total owner occupied units.

Figure 3.1.12: Iowa Owner-Occupied Housing Values in 2010



Data Source: US Census Bureau 2014

Approximately 8.6% of the state of Iowa's owner-occupied housing stock is \$39,999 or less in value. Beginning at \$40,000 - \$49,999 range, owner-occupied housing values increase steadily. Housing values peak at the most common range of \$100,000 - \$124,000. Similarly, approximately 8.9% of Tama County's owner-occupied housing stock is \$39,999 or less in value. At \$40,000, Tama County's housing values increase until they reach the most common housing value range of \$100,000 - \$124,999.

As seen in Table 3.1.7, Tama County's median housing value for owner-occupied housing is significantly lower at \$96,500 than that of the state of Iowa's at \$119,200. Some jurisdictions in Tama County have less than half of the median housing value when compared to the state numbers (Chelsea, Clutier, and Montour). Traer and Dysart have the largest median housing values in Tama County.

Tama County's average median gross rent of \$559 is lower than the state average at \$617, but median gross rents vary throughout the county. The highest gross rent is in the City of Montour (\$708), while the lowest is in the City of Dysart (\$472). Across Tama County, there is a range of \$236 for gross rent. Refer to Table 3.1.7 for more information.

Table 3.1.7: Median Owner-Occupied Housing Values and Gross Rent for Renter-Occupied Housing in 2010

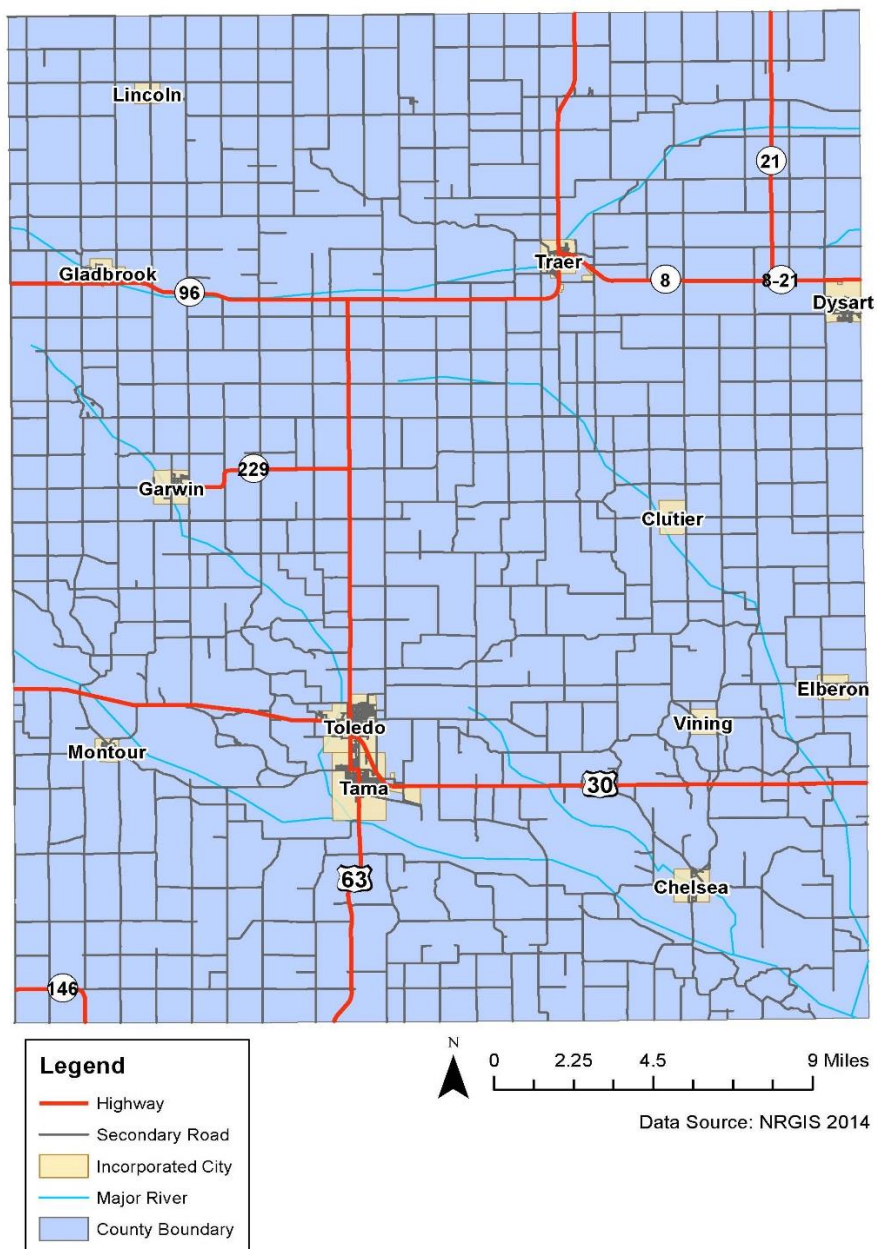
Jurisdiction	Median Housing Value	Median Gross Rent
Iowa	\$119,200	\$617
Tama County	\$96,500	\$559
Chelsea	\$44,700	---
Clutier	\$52,700	\$523
Dysart	\$96,400	\$472
Elberon	\$74,400	---
Garwin	\$72,900	\$656
Gladbrook	\$82,700	\$541
Lincoln	\$61,700	---
Montour	\$55,300	\$708
Tama	\$81,900	\$613
Toledo	\$76,700	\$534
Traer	101,300	\$625
Vining	\$75,000	---

Data Source: US Census Bureau, 2014

Transportation

The automobile is the main mode of transportation in Tama County. U.S. Highway 30, which runs east and west, and U.S. Highway 63, which runs north and south, intersect at the cities of Tama and Toledo. U.S. Highway 30 also intersects State Highway 21, which runs north and south along the eastern border, in the southeast portion of the county. These routes are connected to all parts of the county by paved or crushed rock roads. Most of the farmsteads in the county are along all-weather roads.

Figure 3.1.13: Tama County Highways and Roads



Several Tama County cities are located along main Union Pacific Railroad lines. Scheduled airline transportation is available in Cedar Rapids, Des Moines, and Waterloo, all of which are within 50 to 70 miles of the county. Toledo and Traer each have a small municipal airport, and Tama has a small private airport. Bus transportation is available on U.S. Highway 30, and bus connections for north-south routes are available in Cedar Rapids and Des Moines.

Peoplerides, a public transit service operated by the Region 6 Planning Commission, serves all of Tama and surrounding counties with both regular routes and scheduled trips. Motor freight lines serve trading centers in the county. There are 13 trucking companies that operate in Tama County. (Tama County Economic Development Commission 2015).

Another mode of transportation being developed throughout the county is a trail system for walking, jogging, and bike riding. At this point, there are several sections of trail located across the county, but are not yet connected. Although these sections of trail are mainly used for recreational purposes, a well-connected network of trails could serve both recreation and alternative transit needs in the county especially where cities are located within a reasonable biking distance.

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. The trail will run through the south edge of both Tama and Chelsea before it reaches the County's southeast corner.

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

The per capita income for Tama County in 2010 was \$23,041. This number is only \$2,294 lower than the State's per capita income of \$25,335. Tama County's median family income was \$55,011 compared to the state's \$61,804 (US Census Bureau 2014).

In 2010, 40.9 million people lived in poverty in the United States. This is a rate of 13.8%. In Iowa, the poverty rate was 11.6%, and in Tama County, the poverty rate was slightly lower at 10.6%.

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 themselves and their loved ones. Tama County has a higher rate of violent crime in comparison with other non-metropolitan Iowa counties, but it is relatively low compared to the state of Iowa as a whole. In 2010, Tama County had one forcible rape and 35 aggravated assaults to make up a total of 36 violent crimes (Federal Bureau of Investigation, 2014). Property crimes including burglary, larceny theft, motor vehicle theft, and arson totaled 140 in 2010. If we consider violent crimes and property crimes throughout the state of Iowa as a whole, Tama County accounted for 0.4% of violent crimes and 0.2% of property crimes. If each of Iowa's 99 counties had an equal share of crime, their percentage would each be 1.01%.

Regarding the educational system in Tama County, there are six community school districts, the Meskwaki Settlement School, and several community colleges located in and near the county. In addition, Iowa's three major universities, Iowa State University, University of Iowa, and Iowa Northern University, are all located 30 minutes to an hour from the county seat of Toledo. Regarding school enrollment, a total of 4,479 children were enrolled in the six Tama County Community School Districts in 2010 (US Census Bureau 2014). Of the Tama County population that is 25 years or older, 40.6% have a high school degree or its equivalent, 21.4% attended college, 12.2% received a bachelor's degree, and 4.4% have a graduate or professional degree (US Census Bureau 2014).

Economy

There are several corporations and enterprises that have contributed significant capital investments to Tama County and its economy. According to Tama County Economic Development Commission, Iowa Premium Beef contributed the largest capital investment with \$48.6 million. Other establishments with a large capital investment in the county include Mid-Iowa Cooperative, Meskwaki Bingo, Casino, and Hotel, Deimco, and the Tama Benton Coop (investment occurred in 2012). Refer to Table 3.1.8 for the county's largest establishments and their capital investment.

Table 3.1.8: Tama County Establishment Activity in 2014

Establishment	Capital Investment	Establishment Type
Iowa Premium Beef	\$48.6 million	Agriculture
Mid-Iowa Cooperative	\$7.675 million	Agriculture
Meskwaki Bingo, Casino, Hotel	\$6 million	Tourism
Deimco	\$1.5 million	Manufacturing
Tama Benton Coop (2012)	\$1.5 million	Agriculture
Toledo Water Plant	\$3 million	Government
Gladbrook Fire Station	\$1.1 million	Government
Dysart Community Center	\$880,000	Government

Data Source: Tama County Economic Development Commission, 2015

Retail trade yields the largest source of revenue in Tama County. According to Iowa State University's Department of Economics Retail Trade Analysis Report, in 2013, Tama County had total taxable sales of just over \$75 million (a decrease of 7.4% from the previous year). Among the 512 reporting firms in the county, on average, retail sales per business were \$146,778 per firm (Iowa State University Department of Economics 2015).

According to Tama County Economic Development Commission, the major government employer in Tama County is the South Tama County Community School District with 226 employees, and the largest non-government employer in the county is the Meskwaki Bingo, Casino, and Hotel with 1,100 employees. Refer to Table 3.1.9 for all major employers in the county.

Table 3.1.9: Major Employers in Tama County

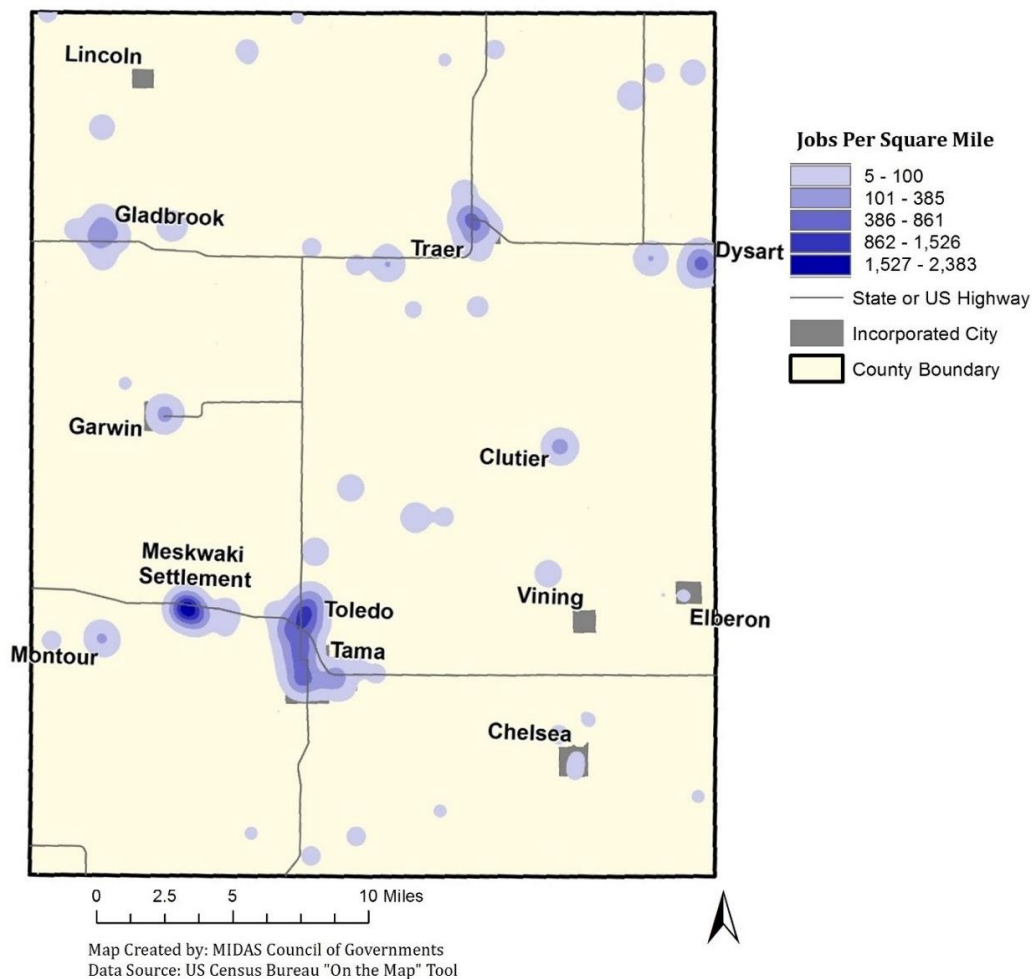
Major Government Employers	Employees
South Tama County Community School District	226
Tama County	150
North Tama County Community School District	100
Major Employers	Employees
Meskwaki Bingo, Casino, and Hotel	1,100
Iowa Premium Beef	400
Sac and Fox Tribe	220
Caraustar (Tama Paperboard)	103

Data Source: Tama County Economic Development Commission, 2015

In Tama County, non-governmental organizations provide the most jobs. The Meskwaki Settlement located along U.S. Highway 30 in Tama County is a major center for employment. The bingo, casino, and hotel are located on the settlement and employ 1,100 people, Iowa Premium Beef employs 400 people, and Tama Paperboard employs approximately 2013 people. Refer to Figure 3.1.14 for a visual distribution of jobs in Tama County.

It should be mentioned that employment in Tama County is not limited to county residents; a recent labor shed study (2013) by Tama County Economic Development Commission found that Tama County attracts employees from outside the county as far north as Waterloo and as far south as Montezuma. The study also found that those who are willing to change employment in the Tama County labor shed area are willing to commute an average of 25 miles one way for employment. The results of this study show that the number of employees for the county's major employers may not include just Tama County residents, but also people from neighboring counties.

Figure 3.1.14: Job Distribution in Tama County in 2010



Data Source: US Census Bureau "On the Map" Tool, 2014

Job distribution in Tama County is driven by several large employers, including Meskwaki Casino and Hotel in the Meskwaki Settlement and Iowa Premium Beef and Tama Paperboard in the City of Tama. Additional industries listed in Table 3.1.10 contribute to the spatial job distribution in the region.

Table 3.1.10: Tama County Jobs by Economic Sector 2010

	Count	Percent		Count	Percent
Accommodation and Food Services	1,115	23.8%	Finance and Insurance	122	2.6%
Public Administration	628	13.4%	Other Services (excluding Public Administration)	77	1.6%
Educational Services	510	10.9%	Professional, Scientific, and Technical Services	62	1.3%
Health Care and Social Assistance	501	10.7%	Administration & Support, Waste Management and Remediation	47	1.0%
Retail Trade	464	9.9%	Utilities	28	.6%
Manufacturing	322	6.9%	Real Estate and Rental and Leasing	30	.6%
Wholesale Trade	215	4.6%	Arts, Entertainment, and Recreation	29	.56%
Transportation and Warehousing	199	4.3%	Information	24	.5%
Agriculture, Forestry, Fishing and Hunting	163	3.5%	Management of Companies and Enterprises	1	.0%
Construction	144	3.1%	Mining, Quarrying, and Oil and Gas Extraction	0	.0%

Data Source: US Census Bureau "On the Map" Tool 2014

Economic Development

Tama County is fortunate to have an organization devoted strictly to the county's economic development success. Tama County Economic Development Commission's mission is to strive to coordinate the cultivation and development of Tama County's business environment by aiding business, agriculture, industry and residents in maximizing their full economic potential within the county and beyond. Other economic development organizations devoted to specific communities in Tama County are working to support and expand the county's economy.

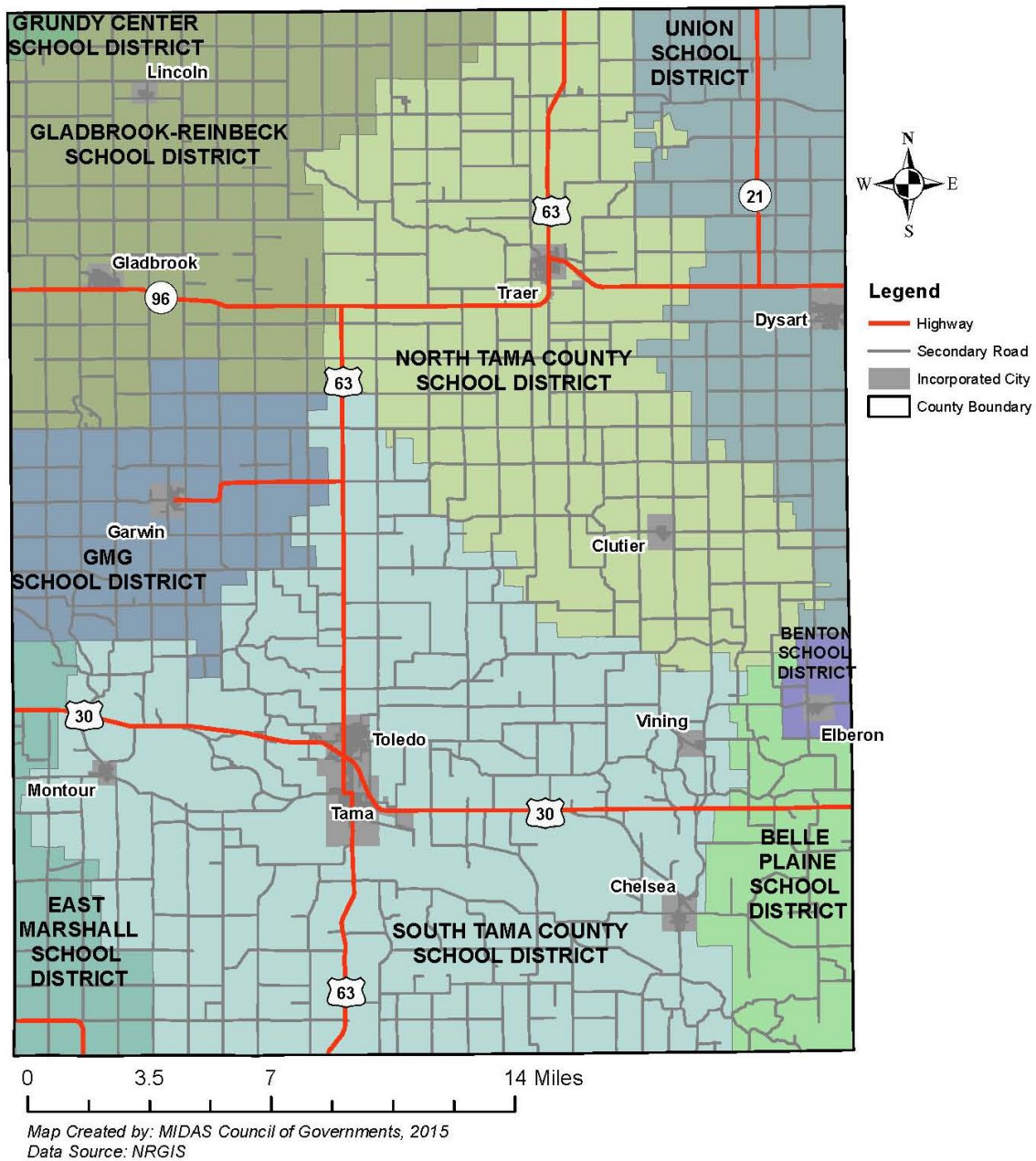
Another economic development effort in Tama County is spearheaded by the Region 6 Planning Commission. The Comprehensive Economic Development Strategy (CEDS Plan), which includes Tama, Hardin, Marshall, and Poweshiek counties, is written and maintained by Region 6 along with several programs for assisting 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 nine public school districts in Tama County and illustrated on the map in Figure 3.1.15. Not all school districts chose to participate in this hazard mitigation plan. A complete list of participants is included in the Planning Process section of this plan.

Figure 3.1.15: Tama County School Districts



Along with general education, college level and continuing education courses can be taken through Iowa Valley Community College in Marshalltown. Online classes are also available from any college or university. Iowa's major universities are relatively close to Tama County. Many Tama County communities have local learning opportunities like book clubs and gardening groups.

Cultural Resources

Outdoor Public Recreation

Many parks have been established throughout the county. The long, narrow, deep valleys and the side slopes and flood plains of the valleys are excellent sites for large earthen dams that form lakes. The largest dam is 4 miles south of Gladbrook at Union Grove State Park.

Rivers and creeks in rural areas of the county provide opportunities for outdoor recreational activities, such as hunting, fishing, and fur trapping. The county is known for its large number of upland game birds such as pheasant and the Hungarian partridge. Many areas along the creeks and upland waterways provide birds with nests, food, and winter shelter. Numerous small ponds are stocked with smallmouth bass and other game fish. Several other kinds of wildlife in the county provide hunting opportunities. White-tailed deer are plentiful, and hunting them is a popular recreational activity in the forested, steep and very steep areas along the Iowa River (Soil Survey of Tama County, Iowa, 1989).

Tama County also has many public outdoor recreation areas maintained by the Tama County Conservation Department and the Iowa DNR. Hickory Hills Park is one recreation area within Tama County that is maintained by Black Hawk County, which is located directly northeast of Tama County. The County's recreation areas and basic information are listed in Table 3.1.11.

Table 3.1.11: Outdoor Recreation Areas in Tama County

Area and Location	Camping	Picnicking	Trails	Beach	Fishing	Boating	Hunting	Shooting
Columbia Wildlife Area			x				x	
Duffus Landing					S	x		
Hickory Hills Park	x	x	x	x	L	x	x	
Hladik Roadside Park		x						
Iowa River Natural Area					S		x	
Iowa River Corridor							x	
Izaak Walton Shooting Facility								x
Lohberger Memorial Park								
Longpoint Landing					S	x		
Manatt's Landing					S	x		
McCoy Landing					S	x		
Otter Creek Lake and Park	x	x	x	x	L	x		
Otter Creek State Marsh			x		M	x	x	
Reinig Wildlife Refuge and Nature Study Area								
Salt Creek Wildlife Area (East)							x	
Salt Creek Wildlife Area (West)							x	
T.F. Clark Park	x	x			S			
Unnamed Wildlife Area							x	
Union Grove Lake State Park	x	x		x	L	x		
Union Grove Wildlife Area							x	
Wolf Creek Trail			x					

Fishing – L: lake, M: marsh, and S: stream

Data Source: Tama County Conservation, 2015

It should be noted that all outdoor recreation areas are considered in this plan regardless of what institution maintains the area because they are located within the boundaries of Tama County and emergency response from the County may be needed should a disaster occur. Two major issues in outdoor recreation areas are the park's ability to provide shelter during hazard events and how to prevent damage to property within the park as well as the park's natural assets.

The most important issue in outdoor recreation areas throughout Tama 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, otherwise there are none. 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.

Other outdoor facilities include trails. A regional trail plan that was completed by Region 6 Planning for Hardin, Marshall, Tama, and Poweshiek Counties includes a major extension of the existing recreational trails in Marshalltown that will run from the northeast corner of Marshalltown to the southeast corner of Tama County. The trail will run through the south edge of both Tama and Chelsea before it reaches the County's southeast corner. Notable portions of the trail in Tama County include the section in Tama and section in Dysart.

The City of Tama has the South Tama Recreation Trail, which is a multi-use trail linking the adjacent communities of Tama and Toledo. A one-mile portion of the trail along the abandoned Northern Iowa Railroad on the west side of Tama and Toledo opened in 2003, an additional 0.7-mile segment in Tama was completed in 2005, and another 0.25-mile spur to the new STC Elementary was opened in November 2006. Additional spurs have been proposed to extend the trail north under U.S. Highway 30 toward Toledo's city park and baseball/soccer/disc golf facilities in 2009.

Outdoor Private Recreation

Several privately owned and maintained outdoor recreation facilities exist in Tama County and have been identified by the Tama County Economic Development Commission. A major facility is the Pilgrim Heights Church Camp in Montour, which is a 120 acre camp and retreat center surrounding an 80 acre recreational lake. The facility is open to church groups and work organizations, as well as day-use visitors and over-night campers. Activities range from water sports to faith study. For more information on Pilgrim Heights' facilities, events, camps, and how to get involved, visit their website at <http://www.pilgrimheights.org/>.

Located in Chelsea, the Rainbow Lake Little Lodge is a log cabin overlooking the 10 acre Rainbow Lake where guests can fish, hike, and hunt. The space can be used for meetings, retreats, family reunions, receptions, out-of-town guests, weekend getaways, family vacations, and hunting trips. For more information, visit the Tama County Economic Development Commission website at <http://www.tamacountyiowa.org/rainbowlakelittlelodge>. There is also Czech Adventures, located in Clutier, which is a recreational hunting and fishing preserve. For more information contact their facilities at (319) 479-2205.

Dreesman Buffalo Ranch, located in Tama, has the unique recreational offerings associated solely with buffalo. This ranch offers hunting and riding services as well as the opportunity to purchase meat quantities up to an entire Bison. In regards to hunting, the ranch claims, "The area is very hilly and heavily wooded, making a stalk for a close bow shot possible." Hunting excursions may last two to three days and include a personal guide, meals and lodging. For avid horseback riders, this 400 acre ranch has heavy timber and hills offering a challenging ride. Other services available at Dreesman Buffalo Ranch include camping, deer hunts and turkey hunting. For more information, check out their website at <http://www.dreesmanbuffaloranch.com/default.php>.

Historic Sites

Besides outdoor recreation, Tama County has many more cultural offerings in the form of historic sites. Several sites have been listed in Tama County on the National Register of Historic Places. These include:

- Brooks and Moore Bank Building in Traer, added 1998. This building was significant between 1850 and 1874 as a financial institution functioning in commerce and trade.
- Chambers Ford Bridge in Chelsea, added 1998. This was a significant engineering structure between 1875 and 1899.

- Conant's Cabin and Park, aka Rural Wayside Rest and Recreation Site, east of Gladbrook, added 2000. This building was significant in the time periods of 1900-1924, 1925-1949, and 1950-1974 as an outdoor recreation facility emphasizing recreation and culture.
- Hope Fire Company Engine House, aka Toledo Fire Station, located in Toledo, added 1983. This building was significant in the period of 1875-1899 as a fire station.
- Le Grand Bridge in Tama added 1998. This was a significant engineering structure between 1875 and 1899.
- Lincoln Highway Bridge, added 1978. This was a significant transportation structure between 1900 and 1924. The bridge is located on East 5th Street in Tama.
- Round Barn in Buckingham Township, added 1986. This building was significant between 1900 and 1924 as an animal facility emphasizing agriculture and subsistence.
- Star-Clipper-Canfield Building and Winding Stairway in Traer added 1975. This building was significant between 1875 and 1899 as a business emphasizing commerce and trade.
- Tama County Courthouse in Toledo added 1981. This building was significant between 1850 and 1874 as a government courthouse and continues as such in the present.
- Tama County Jail, aka Tama County Historical Museum, in Toledo, added 1981. This building was significant between 1850 and 1874 as a government correctional facility and has since become a recreation and culture museum.
- The old Tama Public Library in Tama added 1983.
- Toledo Bridge, which is on Ross Street, crossing over Deer Circle, in Toledo, added 1998. This was a significant transportation structure between 1900 and 1924.
- Traer Public Library in Traer added 1983. This building continues to be the public library in the Traer jurisdiction.
- Wieting Theater in Toledo, added 1986. This building was significant between 1900 and 1924 as a theatre for recreation and culture and continues as such today.
- Young, John W., Round Barn in Traer, added 1986. This building was significant between 1900 and 1924 as an animal facility emphasizing agriculture and subsistence.

The Wieting Theatre in Toledo



Image by Alicia Rosman, March 2010

Historic Toledo Fire Station



Image by Alicia Rosman, March 2010

Winding Staircase in Traer



Image from Tama County Economic Development Commission, March 2010

Courthouse in Toledo



Image by Alicia Rosman, March 2010

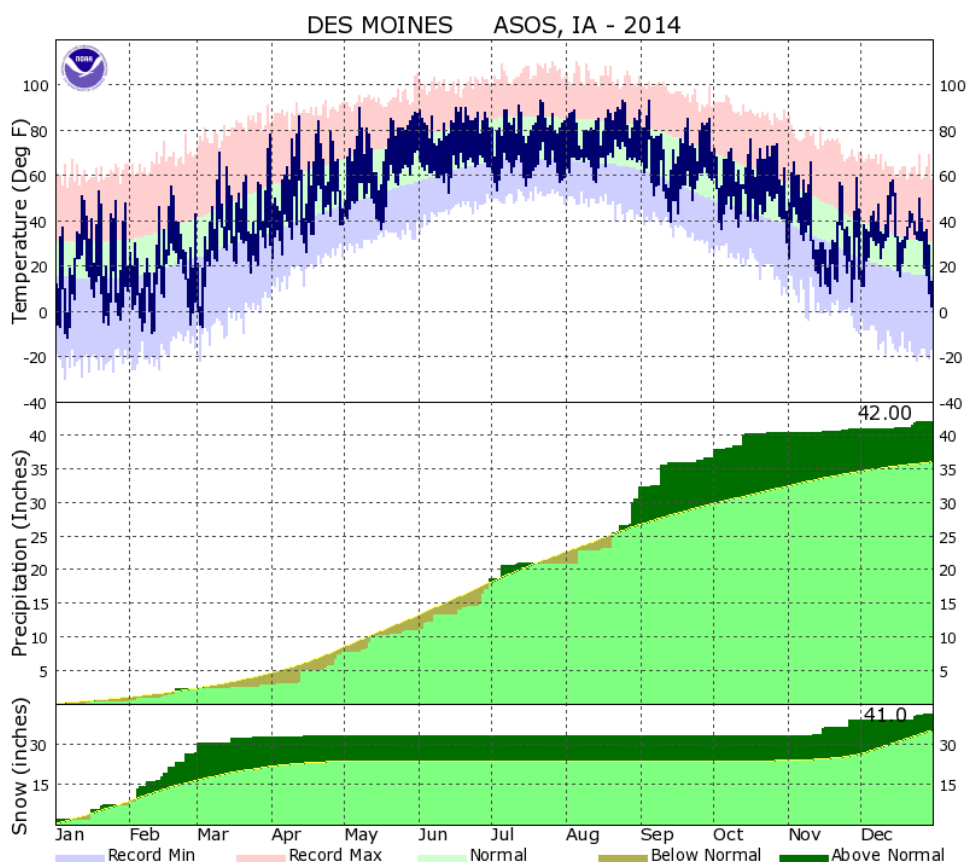
Climate

Tama County is cold in the winter months and quite hot with occasional cool spells in the summer months. Precipitation in the winter frequently occurs in the form of snow. Throughout the warm months, precipitation occurs mostly as rain, especially when warm, moist air moves in from the south. The total annual rainfall is normally adequate for corn, soybeans, and small grain.

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

In 2014, the highest temperatures for the area occurred in July and August. No new record temperatures were recorded for this year (2014). The most precipitation 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 42 inches.

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



Data Source: National Oceanic and Atmospheric Association, 2015

Tama County frequently experiences severe weather events throughout all seasons. In the winter, the county experiences severe winter storms, while the spring and summer months can bring severe thunderstorms, hail, lightning, and tornadoes. In the summer, 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. Tama County had 1,132 farms which use approximately 402,701 acres of land. This is one percent of the 88,637 farms in the State of Iowa. The median farm size in Tama County was 158 acres with 68% of farms in the county ranging in size between 10 and 499 acres. On average, farms in Tama County produce \$50,000-\$99,000 in sales per year. Hogs and pigs are the most common livestock produced in Tama County with 324,580 hogs and pigs sold across 50 farms. Corn is the most common crop grown in Tama County with 28,079,377 bushels that were produced on 172,126 acres from 639 farms. According to Iowa State University's Iowa Community Indicators Program, in 2013, Tama County's average price of farmland per acre was \$9,145. This is slightly higher than the state average of \$8,716 per acre.

Agricultural Land Near Vining



Image from Tama County Economic Development Commission, April 2010

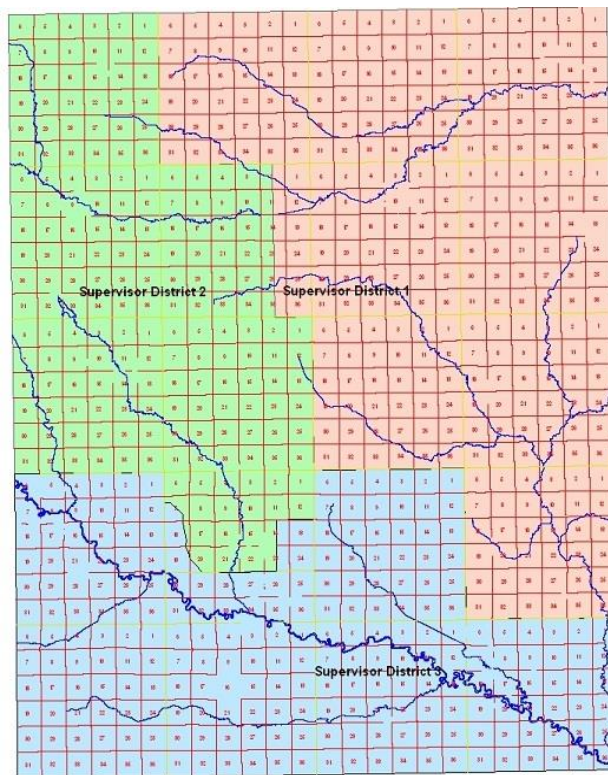
3.2: Jurisdiction Descriptions and Capabilities

Unincorporated Tama County

Government

The county seat for Tama County is the City of Toledo, which is located in the south central portion of the county. The county is split into three districts, and each district has a representative who serves on the Tama County Board of Supervisors. Among the Board of Supervisors, there is a chairman, vice-chairman, and member. Refer to Figure 3.2.1 for the supervisor districts. Regular Board of Supervisors meeting are held every Monday morning in Toledo.

Figure 3.2.1: Tama County Supervisor District



Map provided by Tama County GIS, August 2010

The county government comprises several individual positions, departments, and organizations. These include both elected and appointed positions. Elected positions in the county include: the Board of Supervisors, Sheriff, County Attorney, Auditor, Treasurer, and Recorder. All other department directors and staff are by appointment including central point of coordination, conservation board, emergency management, engineer, general relief, planning and zoning, public health and home care, sanitarian and environmental health, and veteran's affairs. The Tama County

website—www.tamacounty.org—lists the current individuals filling positions as well as important notifications, events, and meeting minutes.

Land Use and Planning

In 1986, a land use plan was written and adopted by the Land Preservation and Use Commission of Tama County. The Plan presents thirteen major considerations for land use decision-making. Most of these considerations are meant to protect the agricultural interests of the county. The main recommendation is that development should not be allowed on prime agricultural land and should not cause soil degradation, erosion, or loss.

The only considerations related to hazard mitigation include the protection of ditches and culverts and discouraging the practice of stream straightening. This mainly is for the protection of agricultural interests, though. Historical areas were also indicated as important to the county. The Plan states that these areas “should be protected from destruction and encouraged to be preserved.”

As for general planning in Tama County, much of the planning work is contracted out to the Region 6 Planning Commission or other organizations. This particular plan was contracted between Tama County Emergency Management and the Region 6 Planning Commission.

Zoning

Tama County first implemented countywide zoning in the 1970s and amended the zoning ordinance in 1997. The county is divided into agricultural, residential, commercial, and other unclassified zoning districts. The county is given this power by the State of Iowa as stated in Iowa Code Chapter 335. With regards to hazard mitigation, important sections of Chapter 335 to note are 335.2, 335.3, and 335.5. These sections establish in what areas county zoning can be applied and promote the mitigation of hazards in county 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, though, 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. In a previous hazard mitigation plan for Tama County, this issued was cited.

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.

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>.

Land use and zoning in Tama County are managed by the Tama County Planning Administrator, who is located in the Tama County Public Health Building. Other duties include issuing zoning certificates (building permits) and monitoring construction by requiring a notice of construction after building is approved. Planning and zoning information is available on the Tama County website at <http://www.tamacounty.org/>.

Subdivision Regulation

Another land use regulation tool in Tama County is the Land Subdivision Regulation, which is an ordinance that provides rules, regulations, and standards to guide land subdivision in the County’s unincorporated areas. Considerations for hazard mitigation in this ordinance relate to flooding. The following statement can be found in Tama County’s subdivision design standards:

No land shall be approved for subdivision which is subject to periodic flooding or which contains extremely poor drainage facilities unless the subdivider agrees to make improvements that will, in the opinion of the County Engineer, make the area completely safe for occupancy and provide adequate drainage. Land located within a flood hazard area or a floodway may be included with a plat, subject to the approval of the Board of Supervisors, if it is reserved for open space or recreation use and maintained by all owners of lots in the subdivision through an agreement, or if it is dedicated to the County as public open space for recreation or for flood control purposes.

The ordinance does not completely prevent the subdivision of land that is subject to flooding, but improvements to prevent flooding are at least required before subdivision is allowed.

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](#). 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 state requirement (passed March 1, 2009) for electrical permits, there will be more oversight in building quality in Tama County. A permit is required in unincorporated areas for new electrical installations in residential, commercial, and industrial properties. This requirement was cited by the county planning administrator as a major step in enforcing and maintaining building quality in Tama County.

Floodplain Management

Tama County maintains a special-purpose zoning ordinance for floodplain management. The Flood Plain Management Ordinance is designed to meet the minimum requirement for the National Flood Insurance Program for counties with a Flood Insurance Rate Map (FIRM) issued by FEMA. The ordinance regulates development only in the established Flood Plain District, which is Zone A or the shaded area of the community FIRM. The Flood Plain District was established as an overlay district within the existing county zoning. The standards for floodplain development are in addition to the requirements of the primary or underlying zoning district.

The ordinance establishes a development permit system that requires a permit for all development within the Flood Plain District. Most floodplain construction must also be approved by the Department of Natural Resources. Permitted uses in the floodplain include: certain agricultural uses, recreation, stables, transient and portable amusement enterprises, shooting range, and extraction of minerals. Restricted uses include: no structure, dam, obstruction, deposit, or excavation without written approval from the Iowa Department of Natural Resources. Also, no building or structure can be erected, constructed, reconstructed, altered, moved, or maintained for residential purposes.

In Tama County's unincorporated areas, there is at least some regulation that deters future residential development away from floodplains. Special use permits can be granted to allow any type of development. At least the uses that are allowed by right are those that can usually withstand some flooding or relocate. The main issue is that areas with a flooding potential may be more extensive than what a FIRM may indicate. Increases in development and agricultural drainage can have a small or large effect on the potential for flooding.

Tama County Planning and Zoning maintains and enforces floodplain regulation in the county. The Tama County Emergency Management Coordinator is technically the county's floodplain manager because this department keeps and maintains up-to-date FIRMs and floodplain information for the county. The Tama County Engineer is also involved in floodplain management because regulations require that the county engineer deem flood improvements suitable in order for land subdivision to take place.

Since the county maintains a floodplain management ordinance, county residents can participate in the National Flood Insurance Program (NFIP). There are a total of twelve flood insurance policies in unincorporated Tama County.

Other Mitigation Activities

Other hazard mitigation activities include the Alert Iowa system, which is a high-speed emergency notification system that sends warning messages to certain areas in Tama County or the entire county through telephone. This system is being used by Tama County officials to deliver hazard warnings or public safety messages. Tama County residents can choose to participate in this system by registering their land line or cell phone through the link provided on Tama County's website.

Utilities and Services in Unincorporated Tama County

All essential and basic services are available to those who live in unincorporated Tama 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, Traer Municipal Utilities, Consumers Energy Cooperative, Grundy County Rural Electric Cooperative, and TIP Rural Electric Cooperative
- **Natural Gas:** Alliant Energy, Northern Natural Gas, Consumers Energy Cooperative, Parks Gas Company, Ferrell Gas, New Century Farm Service, AgVantage Farm Service, Bob's Farm Center, Inc., Heartland Cooperative, Koch LP Gas, and Traer Oil Company
- **Water:** Poweshiek Rural Water Association and Central Iowa Water Association
- **Phone Service:** Iowa Telecom, Heart of Iowa Communications Cooperative, Mediacom Communications, Farmers Cooperative Telephone Company, Keystone Communications, and Partner Communications Cooperative
- **Cable/Internet Provider:** Mediacom Communications, DIRECTV, Partner Communications, Dish Network, Iowa Telecom, Mike Gilchrist, Farmers Cooperative Telephone Company, and Keystone Communications
- **Emergency Medical Service:** Depending on where the medical emergency occurs, a predetermined emergency medical response department will response to the emergency.
- **Law Enforcement:** Tama County Sherriff's Department
- **Fire Protection:** Belle Plaine Fire Department, Chelsea Fire Department, Clutier Fire Department, Elberon Fire Department, Garwin Fire Department, Gladbrook Fire Department, Montour Fire Department, Tama Fire Department, Toledo Fire Department, Traer Fire Department, and Vining Fire Department
- **Hazardous Materials Assistance:** Depending on where the incident occurs, a predetermined city fire department is sent to the incident site. If the incident is beyond the training of the assigned fire department, the Incident Commander will contact the Waterloo Fire Department.
- **Fuel:** Jiffy in Tama, Caseys in Tama, Jiffy in Toledo, Caseys in Toledo, Kwik Star in Toledo, New Century FS in Toledo, Pronto in Garwin, Caseys in Gladbrook, Cenex in Gladbrook,

Meskwaki Trading Post, Sinclair Kitchen in Traer, Traer Short Stop, Caseys in Dysart, Heartland Cooperative in Gladbrook, John's Qwik Stop in Dysart, Cenex in Dysart

- **Grocery Store:** Fareway in Toledo, Country Food Pride in Belle Plaine, El Gallito in Tama, Hometown Foods in Gladbrook, Traer Supermarket, Vining Grocery, Burrells Grocery and Deli in Clutier, Terry's Food Center in Dysart
- **Solid Waste Removal:** K & M Sanitation, Sanitary Refuse, Le Grand Sanitation, Steelsmith Disposal, and City of Dysart
- **Landfill:** Tama County Landfill
- **Recycling:** Tama County
- **Public Transit:** Peoplerides

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 Chelsea

Overview

The City of Chelsea is located in southeast Tama County at the intersection of county road V18 and county road E66. Chelsea is also located just 3 miles south of U.S. Highway 30 and 12 miles east of U.S. Highway 63.

Less than a mile east of where the present Chelsea is located, the Otter Creek Station railroad station once existed. By the end of 1861, the Chicago Northwestern railroad line had extended westward into Iowa, and the Otter Creek Station was one of its stops. When Otter Creek Station was moved about three-quarters of a mile west to the present location of Chelsea, the name was changed. One story is that S.G. Breese, one of the original owners of land near the site, named it for Chelsea, Massachusetts. Another story is that John I. Blair named it for Chelsea, England.

Chelsea lies along the original Lincoln Highway route, which was America's first coast-to-coast highway. The original steel bridge on the Lincoln Highway in Chelsea was replaced in 1928-29 with the Otter Creek Bridge, which in turn had to be replaced in 2007. Citizens of Chelsea encouraged the preservation of the lamp posts, which graced the old bridge railings. (Tama County, Iowa Economic Development, 2009)

The make-up of Chelsea's population has changed over the years. Historically, the city has a very strong Czech heritage so the majority of the community's population is of European descent. According to the State Data Center of Iowa, Chelsea's Hispanic or Latino population accounted for almost 4% of the total population. In 2000, though, the Hispanic or Latino population group grew to over 30% of the community's total population. No current estimates are available, but in recent years, the Hispanic and Latino population has obviously grown while the other segments of the population have declined.

The major businesses located in Chelsea include a bar and restaurant called the Silver Dollar, bank, post office, and farm cooperative. The Chelsea community is also located near several recreational areas. One structure in the City of Chelsea is listed on the National Historic Register. The Chambers Ford Bridge was added to the Register in 1998. This bridge is significant to the field of engineering between the years 1875 and 1899. It is no longer in use because it is considered unsafe, but it still remains for viewing. Unfortunately, the South Tama School District elementary school that is located in Chelsea was closed in 2008. The elementary school was one of the major institutions that drew people into the community.

Utilities and Services in Chelsea

Most basic services except a grocery store and medical clinic are available in Chelsea. Fire protection and a library are provided by the City while all others are contracted to private companies or nearby communities. Services and providers are listed below in Table 3.2.1.

Table 3.2.1: Chelsea Utilities and Services

Service	Provider
Electricity	Alliant Energy
Gas	Alliant Energy
Water	Poweshiek Water Association
Phone Services	Iowa Telecom
Cable/Internet Provider	No cable/Iowa Telecom
Emergency Medical Service	Belle Plaine Ambulance
Law Enforcement	Tama County Sheriff
Fire Protection	Chelsea Volunteer Fire Department
Warning System	Siren (poor coverage, no backup) operated by Fire Department, Alert Iowa
HazMat Assistance	Waterloo Fire Department
Fuel Station	None
Grocery/Convenience Store	None
Solid Waste Removal	Wally's Refuse
Landfill	Tama County Landfill
Library	City of Chelsea (in City Hall)
Recycling	Central Dumpsters
Public Transit	Peoplerides
Medical Clinic	None

There are no fire departments in Tama County with the capability of dealing with major hazardous materials incidents. This service is provided by the Waterloo Fire Department, because their City's

fire department has the needed training and equipment. The local fire department must decide whether or not to contact Waterloo'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.

As for hazard mitigation related regulation, to attract development, 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.

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). Currently, there are 27 policies in this community according to the NFIP Community Status Book (NFIP Bureau Net 2015). The floodplain management ordinance applies to the areas identified in city's floodplain map as having a 1% chance of flooding each year.

Technical and Fiscal Resources

The City of Chelsea 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 Chelsea is a member of the Commission and uses their services and expertise regularly.

There are multiple ways the City of Chelsea could finance a hazard mitigation project. This city in particular does not maintain its own utilities or water system so fees for these services are not available to finance projects. The resources available to the City of Chelsea 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 Chelsea, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

Chelsea completed a Hazard Mitigation Grant Program project that involves acquiring and demolishing three structures that were badly damaged by flood waters in 2008. Chelsea also participates in Tama County's Alert Iowa system. With participation in the system, Chelsea residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined and issued by Tama County officials.

City of Clutier

Overview

Clutier is located at the intersection of county road V18 and county road E36. Clutier is 9 miles north of U.S. Highway 30 and 12 miles east of U.S. Highway 63. The entire area contained within the city corporate limit is $\frac{3}{4}$ square mile.

Clutier, the youngest incorporated town in Tama County, was originally the 80-acre farm of Frank A. Parizek. In 1899 a railroad promoter, W.E. Brice, bought it for \$65 an acre and town lots were laid out in the spring of 1900. Brice chose the name to honor his sister, Mrs. Bert Clutier. The primary heritage of the Clutier community is Czech (Tama County, Iowa Economic Development, 2009). Although Clutier may be one of the smaller communities in Tama County, a variety of businesses are supported by the community. Businesses include a grocery store, antique shop, bank, and beauty shop. There are also agricultural businesses and a manufacturing facility. Social and religious venues including several churches, the Legion Hall, tavern, Social Center, ZCBJ Lodge, park, band concerts, and the annual Fun Day. Despite these assets, certain aspects of the community are lacking. Clutier residents must travel to other communities for retail, restaurants, and a gas station or convenience store.

Utilities and Services

Overall, all basic services are available in the City of Clutier except natural gas and fuel for personal automobiles. Water, fire protection, and library services are provided by the city while all others are provided by either the County or private companies.

Table 3.2.2: Clutier Utilities and Services

Service	Provider
Electricity	Alliant
Gas	No natural gas, individual use of LP-gas
Water	City of Clutier
Phone Services	Farmers Cooperative Telephone Company

Cable/Internet Provider	Farmers Cooperative Telephone Company
Emergency Medical Service	City of Clutier First Responders
Law Enforcement	Tama County Sheriff's Department
Fire Protection	Volunteer Fire Department
Warning System	Siren (poor coverage, no backup) operated by Fire Department (County also has capabilities to set off outdoor warning siren), Alert Iowa
HazMat Assistance	Waterloo Fire Department
Fuel Station	None
Grocery/Convenience	Burrells
Solid Waste Removal	B & D Disposal
Landfill	Tama County Landfill
Library	City of Clutier
Recycling	Sanitary Refuse & Recycling
Public Transit	Peoplerides
Medical Clinic	None

There are no fire departments in Tama County with the capability of dealing with major hazardous materials incidents. This service is provided by the Waterloo Fire Department, because their City's fire department has the needed training and equipment. The local fire department must decide whether or not to contact Waterloo's Fire Department for assistance.

City Government and Regulation

The City of Clutier is governed by a mayor and five-member city council that holds regular meetings on the first Monday of the month. The city maintains and enforces a code of ordinances, which includes a floodplain management ordinance so the City can participate in the National Flood Insurance Program (NFIP). According to the NFIP Community Status Book, there is no one currently taking advantage of the NFIP in Clutier (NFIP Bureau Net 2015). Aside from floodplain management, the city uses no other formal land use control like zoning or land use planning. They also do not have city building codes. In the past, zoning has been discussed but was not received well by the community.

Technical and Fiscal Resources

The City of Clutier 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 City is a member and uses their services and expertise regularly. There are multiple ways the City of Clutier could finance a hazard mitigation project. This city in particular does not maintain its own energy utilities so fees for these services are not available to

finance projects, but the City does maintain the city's water system. The financing resources available to the City of Clutier 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 Clutier, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

Clutier participates in Tama County's Alert Iowa system. With participation in the system, Clutier residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined and issued by Tama County officials.

City of Dysart

Overview

Dysart is located at the intersection of Iowa Highway 21 and 8. Dysart is 15 miles north of U.S. Highway 30, 9 miles east of U.S. Highway 63, and 5 miles west of U.S. Highway 218.

The founder of the City, Joseph Dysart, came to the town in 1855, but it was not until 1863 that he made the area an actual settlement. By the close of the Civil War, Joseph Dysart had his location approved by railroad officials and laid out the town in the fall of 1872. Dysart grew rapidly and by 1879, the first school had been, and the population had reached 600. In 1881, the town was incorporated. (Tama County, Iowa Economic Development, 2009)

Dysart is a very diverse and active community in northeast Tama County. The Dysart downtown is made up of several businesses that include a tea room, boutiques, quilt shop, newspaper, and restaurant. The city is the base for two trucking companies and has an adult care center. The city also has many cultural and recreational opportunities like the local museum, original country school, rose garden, theater, recreational trail, and golf course. The City and businesses host several events each year like Old Iron Days, Christmas on Main, Wine Fest, and Soiree in the City. The Union School District Middle School is located in Dysart, too. Tours of the community are given by the local H.A.T. (Hospitality and Tour) Team.

Utilities and Services

All basic services are available in Dysart except a full grocery store. Dysart is one of few cities in Tama County that purchases electricity and distributes to the city. Overall, most basic services are provided by the City, which is not the case in many Tama County cities.

Table 3.2.3: Dysart Utilities and Services

Service	Provider
Electricity	City purchases wholesale & distributes
Gas	Alliant Energy
Water	City of Dysart & Poweshiek Water Association
Phone Services	Dysart Telephone and Iowa Telecom
Cable/Internet Provider	Dysart Telephone
Emergency Medical Service	City of Dysart
Law Enforcement	Dysart Police Department
Fire Protection	Dysart Volunteer Fire Department
Warning System	2 sirens (with backup) operated by Fire Department (County also has capabilities to set off outdoor warning siren), Alert Iowa
HazMat Assistance	Waterloo Fire Department
Fuel Station	Casey's, John's Quick Shop
Grocery/Convenience	John's Quick Shop
Solid Waste Removal	City of Dysart
Landfill	Tama County Landfill
Library	City of Dysart
Recycling	Bi-monthly drop off and pick up by County
Public Transit	Peoplerides

There are no fire departments in Tama County with the capability of dealing with major hazardous materials incidents. This service is provided by the Waterloo Fire Department, because their City's fire department has the needed training and equipment.

City Government and Regulation

The City of Dysart is governed by a mayor and five-member city council that hold regular meetings the second Wednesday of each month. The City maintains and enforces a code of ordinances that had a major update in the early 1990s and an annual supplement each year since. The Code of Ordinances also includes a subdivision ordinance. The City controls land use through zoning, which was last updated in 1983. The City also has a floodplain ordinance that the community administers in order to participate in the National Flood Insurance Program. The zoning districts and

requirements in Dysart are traditional and regulate use, location, density, site development, and appearance.

Technical and Fiscal Resources

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

There are multiple ways the City of Dysart could finance a hazard mitigation project. This city in particular provides all utilities except natural gas so they have more fees to backup bonds than other cities. The financing resources available to the City of Dysart 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 Dysart, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

Dysart participates in Tama County's Alert Iowa system. With participation in the system, Dysart residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered.

City of Elberon

Overview

Elberon is located in east central Tama County. It is six miles north of U.S. Highway 30, 15 miles east of Highway 63, and about one mile west of Highway 21.

Elberon's economy is based around agriculture with two farm cooperatives located in the city. Other businesses include an auto repair shop with a gas station and bake shop that also caters events. Elberon has a well-used community building, public park, and library. The city also has several active community organizations and church. Elberon is part of the Benton Community School District located in neighboring Benton County.

Utilities and Services

All utilities and most basic services are available in Elberon. The City does not maintain its own utilities so they are provided by private companies. The City does have the local Elberon Public Library and volunteer fire department. The major services that are not available in the community are a medical clinic and full grocery store. Residents must travel outside the community for these services.

Table 3.2.4: Elberon Utilities and Services

Service	Provider
Electricity	Alliant Energy
Gas	Individual LP tanks from private companies
Water	Poweshiek Rural Water
Phone Services	Keystone Communications
Cable/Internet Provider	Keystone Communications
Emergency Medical Service	Elberon Rescue
Law Enforcement	Tama County Sheriff
Fire Protection	Elberon Volunteer Fire Department
Warning System	Warning siren controlled by the City both remotely and manually
HazMat Assistance	Waterloo Fire Department
Fuel Station	Kaloupek's Garage
Grocery/Convenience	Keystone MiniMart, Elberon General Store
Solid Waste Removal	B&D Disposal
Landfill	Tama County Landfill
Library	City of Elberon
Recycling	Bi-monthly drop off and pick up by County
Public Transit	Peoplerides
Medical Clinic	None

There are no fire departments in Tama County with the capability of dealing with major hazardous materials incidents. This service is provided by the Cedar Rapids Fire Department, because their City's fire department has the needed training and equipment. The local fire department must decide whether or not to contact Waterloo's Fire Department for assistance.

City Government and Regulation

Elberon is governed by a mayor and five-member city council that holds regular meetings on the first Monday of the month. The City of Elberon maintains a city code that includes a traditional zoning ordinance. The City does not enforce City-specific building codes and does not have a

floodplain management ordinance. According to the NFIP Community Status Book and the City of Elberon, the City does not participate in the National Flood Insurance Program because it has been suspended (NFIP Bureau Net 2015).

Technical and Fiscal Resources

The City of Elberon operates like many small cities in Iowa. The mayor, council and city clerk handle the city's daily and long-term operations. The City of Elberon is a member of the Region 6 Planning Commission and uses their services and expertise for certain planning efforts.

There are multiple ways the City of Elberon could finance a hazard mitigation project. This city in particular does not maintain its own utilities or water system so fees for these services are not available to finance projects. The resources available to the City of Elberon 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 Elberon, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

Elberon participates in Tama County's Alert Iowa system. With participation in the system, Elberon residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined and issued by Tama County officials.

City of Garwin

Overview

The City of Garwin is located at the intersection of county road T47 and county road E27. Garwin is 6 miles west of U.S. Highway 63 and 7 miles north of U.S. Highway 30.

Garwin owes its existence to the fact that in 1879 the Toledo and Northwestern Railroad was sold to the Chicago and Northwestern Railroad. After the sale, the line was extended northwestward from Toledo. Other towns sprang up along the tracks, but Garwin was the first station beyond Toledo.

Once developed, there was definite difficulty in giving the town a name. The first name chosen was Maple, or some say, Myrcle. Neither was an overwhelming favorite. The next choice was Marvin in honor of Marvin Hewitt, an official of the Northwestern Railroad, but another town bore that name. When the site was being considered, several landowners were interested in selling their land for that purpose, among them being George Rider and John Galvizer. After much name controversy, the two men won out and a message was sent to Toledo: "G (for Galvizer) and R (for Rider) win." This was construed to be Garwin and the town had its name. (Tama County, Iowa Economic Development, 2009)

Currently, Garwin is a small rural community with most business centered on agriculture and education. Two farm cooperatives and the Green Mountain-Garwin Secondary School and sports facilities are located within the city. Garwin also has a strong social network with several community organizations including a group dedicated to revitalizing the city and three churches. Other social opportunities include a community center and public park maintained by the City.

Utilities and Services

All utilities and most basic services are available in Garwin. Utilities are not provided by the City, but safety services including fire protection and emergency response are provided. All other services are provided by private companies or Tama County. For a full grocery store or medical clinic, residents must travel to larger communities with these services.

Table 3.2.5: Garwin Utilities and Services

Service	Provider
Electricity	Alliant Energy
Gas	Alliant Energy
Water	Central Iowa Water Association
Phone Services	Iowa Telecom
Cable/Internet Provider	Mediacom and Iowa Telecom
Emergency Medical Service	City of Garwin
Law Enforcement	Tama County Sheriff
Fire Protection	Volunteer Fire Department
Warning System	Warning siren (poor coverage, no backup), Alert Iowa. County also has capabilities to set off outdoor warning siren.
HazMat Assistance	Waterloo Fire Department
Fuel Station	Pronto
Grocery/Convenience	Pronto
Solid Waste Removal	Privately contracted companies
Landfill	Tama County Landfill
Library	City of Garwin

Recycling	Bi-monthly drop off and pick up by County
Public Transit	Peoplerides
Medical Clinic	None

There are no fire departments in Tama County with the capability of dealing with major hazardous materials incidents. This service is provided by the Waterloo Fire Department, because their City's fire department has the needed training and equipment.

Government and Regulation

Garwin is governed by a mayor and five-member city council that holds regular meetings on the first Monday of the month. The city maintains and enforces a code of ordinances, which includes a floodplain management ordinance so the City can participate in the National Flood Insurance Program (NFIP). According to NFIP Community Status Book, there are no current flood insurance policies in Garwin (NFIP Bureau Net 2015). The City does not use any formal land use control like zoning or have city building codes or subdivision ordinance.

Technical and Fiscal Resources

The City of Garwin 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 government, the Region 6 Planning Commission. The City of Garwin is a member of the Commission and uses their services and expertise.

There are multiple ways the City of Garwin could finance a hazard mitigation project. This city in particular does not maintain its own utilities or water system so fees for these services are not available to finance projects. The resources available to the City of Garwin 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 Garwin, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

Garwin participates in Tama County's Alert Iowa system. With participation in the system, Garwin residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined and issued by Tama County officials.

City Gladbrook

Overview

The City of Gladbrook is located at the intersection of county road T47 and state highway 96. Gladbrook is also 7 miles west of U.S. Highway 63 and 14 miles north U.S. Highway 30.

When the two founders of Gladbrook went to Chicago to complete the paperwork for the location, they were given the privilege of naming the town to be located on their land. After discussion, a gentleman asked what was worthwhile in Iowa. The men answered they had a nice brook and were glad they had it. (Tama County, Iowa Economic Development, 2009)

A wide variety of businesses and services are available in this community. Recent improvements include building the Gladbrook City Center, which houses Pat Acton's Matchstick Marvels Tourist Center, the Gladbrook Theater, and Gladbrook City Hall. A new housing addition was recently built, as well as new condominiums and townhouses. In the past two years, four speculation homes have been built. The Gladbrook Family Market recently expanded services and inventory. Gladbrook Bowl has been upgraded to using automated scoring machines.

The Memorial Building was built by the community and is a popular community center. Gladbrook is also known for having a strong social network with several community organizations, churches, school activities, and volunteers. Schools are a very important part of the Gladbrook community. The Gladbrook-Reinbeck combined Elementary and Middle school is located in Gladbrook. The community fitness and wellness center is located just on the south side of the school. The rest of the Gladbrook-Reinbeck School District schools are located in Reinbeck, which is in southern Grundy County. ([Gladbrook Community Website](#))

It should be noted that the Gladbrook is the home of the annual Corn Carnival and Tama County Fair. During both events, which are held in the summer, the number of people in the community increases by the thousands. Protecting this many people during a hazard presents a major challenge to City of Gladbrook and Tama County.

Utilities and Services

Since Gladbrook is one of the larger cities in Tama County, all services including full grocery store are available to residents. Only water utilities are maintained by the City while all other utilities are through private companies. Safety services are provided by the City and Tama County.

Table 3.2.6: Gladbrook Utilities and Services

Service	Provider
Electricity	Alliant Energy
Gas	Alliant Energy
Water	City of Gladbrook
Phone Services	Iowa Telecom
Cable/Internet Provider	Mediacom/Iowa Telecom & Mediacom
Emergency Medical Service	Gladbrook-Lincoln Ambulance
Law Enforcement	Tama County Sherriff
Fire Protection	Volunteer Fire Department
Warning System	Siren controlled by Fire Department, Alert Iowa
HazMat Assistance	Waterloo Fire Department
Fuel Station	Casey's
Grocery/Convenience	Home Town Foods
Solid Waste Removal	Privately contracted providers
Landfill	Tama County Landfill
Library	City of Gladbrook
Recycling	Drop-off site in town
Public Transit	Peoplerides
Medical Clinic	Gladbrook Family Health Center

There are no fire departments in Tama County with the capability of dealing with major hazardous materials incidents. This service is provided by the Waterloo Fire Department, because their City's fire department has the needed training and equipment. The local fire department must decide whether or not to contact Waterloo's Fire Department for assistance.

City Government and Regulation

Gladbrook is governed by a mayor and five-member city council that holds meetings on the second Monday of the month. The City maintains and enforces the Code of Ordinances that does not include city building codes or a subdivision ordinance. The Code of Ordinances was just updated in 2009. The City does maintain a floodplain ordinance in order to participate in the National Flood

Insurance Program. According to the NFIP Community Status Book, there is just one flood insurance policy in Gladbrook (NFIP Bureau Net 2015).

Technical and Fiscal Resources

The City of Gladbrook 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 Gladbrook is a member of the Region 6 Planning Commission and sometimes uses their services and expertise for various planning efforts.

There are multiple ways the City of Gladbrook could finance a hazard mitigation project. This city in particular does not maintain its own energy utilities so fees for these services are not available to finance projects, but the City does maintain the city's water system. The financing resources available to the City of Gladbrook 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 Gladbrook, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

Gladbrook participates in Tama County's Alert Iowa system. With participation in the system, Gladbrook residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined and issued by Tama County officials.

City of Lincoln

Overview

Lincoln is located along county road D65. Lincoln is one mile west of county road T47, 12 miles west of U.S. Highway 63, and 19 miles north of U.S. Highway 30.

With the coming of the railroad, a new town was born. Mr. Charles Spencer was the first to locate in the town as he owned most of the land. The town was in need of a name and Mr. Spencer decided to name the new town for himself, but a short time later found out there was already a Spencer so he

picked the name “Augusta” in honor of his wife. Again he learned that his choice had been used for another town. Finally it was decided to call the new town “Bellin” for a town in Scotland which his wife loved. The word was misinterpreted and appeared as “Berlin” on the official maps and document. Because it was a German community, the name was accepted and became official. The 1892 plat map shows a number of businesses which were in operation at that time. In 1913, Berlin was incorporated.

Life continued smoothly for people in this little town until the outbreak of World War I. Soon those of German birth or descent were subject to verbal and physical abuse by those who questioned their loyalties. To demonstrate their support of the United States and to indicate that the majority of the people were loyal to the United States, the council decided to select another name for the town. It was suggested that “Lincoln” be chosen, and on June 12, 1918, the name was approved.

Utilities and Services

All utilities in Lincoln are provided by private companies while safety services are provided by the City and Tama County. Lincoln and Gladbrook are unique in that they share an emergency medical response department. Most other Tama County communities maintain their own emergency response department. This is a good example of sharing resources in the county. Generally, all basic services are available to Lincoln residents except a grocery/convenience store, library, and medical clinic. Most residents travel to Gladbrook for these services.

Table 3.2.7: Lincoln Utilities and Services

Service	Provider
Electricity	Alliant Energy
Gas	LP – Heartland Coop, Mid-Iowa Coop, Kock LP
Water	Central Iowa Rural Water Association
Phone Services	Iowa Telecom
Cable/Internet Provider	Iowa Telecom and DISH Network
Emergency Medical Service	Gladbrook-Lincoln Ambulance (housed in Gladbrook)
Law Enforcement	Tama County Sheriff
Fire Protection	Volunteer Fire Department
Warning System	Siren controlled by Fire Department, Alert Iowa
HazMat Assistance	Waterloo Fire Department
Fuel Station	Heartland Coop fuel 24
Grocery/Convenience	None
Solid Waste Removal	Sanitary Refuse & Recycling or B&D Sanitation
Landfill	Tama County Landfill
Library	None
Recycling	Sanitary Refuse & Recycling
Public Transit	Peoplerides

There are no fire departments in Tama County with the capability of dealing with major hazardous materials incidents. This service is provided by the Waterloo Fire Department, because their City's fire department has the needed training and equipment.

City Government and Regulation

Lincoln 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 first Tuesday of the month. The City does use any formal land use controls like zoning. Also, Lincoln's Code does not include a floodplain management ordinance. According to the NFIP Community Status Book, the City does not currently participate in the National Flood Insurance Program (NFIP Bureau Net 2015).

Technical and Fiscal Resources

The City of Lincoln 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 Lincoln 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 Lincoln could finance a hazard mitigation project. This city in particular does not maintain its own energy or water utilities so fees for these services are not available to finance projects. The financing resources available to the City of Lincoln 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 Lincoln, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

Lincoln participates in Tama County's Alert Iowa system. With participation in the system, Lincoln residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined and issued by Tama County officials.

City of Montour

Overview

Montour is located in western Tama County less than two miles south of U.S. Highway 30. It is approximately 10 miles west of Toledo, the Tama County seat, and less than 15 miles east of Marshalltown in neighboring Marshall County.

As indicated by the signs on U.S. Highway 30, Montour is most well-known for Rube's Steakhouse. Their cuts of meat and grill-your-own restaurant style are well-known throughout central Iowa and beyond. Aside from the steakhouse, Montour is a small community with connections to nature. Primitive riverside camping, landscaping, and scenic bypass are community assets along with a city park. Montour also has community organizations and church.

Utilities and Services

The City of Montour provides both electricity and water utilities to Montour residents. Safety services are also provided by the City except law enforcement, which is provided by Tama County. As for other services, Montour does not have a fuel station, grocery/convenience store, or a medical clinic. Residents must travel to Tama, Toledo, or Marshalltown for these services.

Table 3.2.8: Montour Utilities and Services

Service	Provider
Electricity	Alliant Energy
Gas	Alliant Energy
Water	City of Montour
Phone Services	Iowa Telecom
Cable/Internet Provider	Partners Communication/Iowa Telecom
Emergency Medical Service	City of Montour First Responders
Law Enforcement	Tama County Sherriff
Fire Protection	Volunteer Fire Department
Warning System	Siren controlled by Fire Department, Alert Iowa
HazMat Assistance	Waterloo Fire Department
Fuel Station	None
Grocery/Convenience	None
Solid Waste Removal	Sanitary Refuse and Recycling
Landfill	Tama County Landfill
Library	None
Recycling	Sanitary Refuse and Recycling

Public Transit	Peoplerides
Medical Clinic	None

There are no fire departments in Tama County with the capability of dealing with major hazardous materials incidents. This service is provided by the Waterloo Fire Department, because their City's fire department has the needed training and equipment. The local fire department must decide whether or not to contact Waterloo's Fire Department for assistance.

City Government and Regulation

Montour is governed by a mayor and 5-member city council that maintains and enforces the City's Code of Ordinances. Montour's Code does not include building codes, zoning, or a subdivision ordinance. The City does maintain a floodplain management ordinance so the City does participate in the National Flood Insurance Program. This is extremely important since flooding is a persistent issue in Montour. There are a total of eight policies in the community according to information from Iowa Homeland Security. Each month, the mayor and council hold a meeting every first Monday.

Technical and Fiscal Resources

The City of Montour 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 Montour is a member of the Commission and uses their services and expertise.

There are multiple ways the City of Montour could finance a hazard mitigation project. Montour purchases electricity wholesale and distributes to residents along with maintain the city's water system so fees from utilities can be used toward debt incurred for projects. The financing resources available to the City of Montour 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 Montour, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

Montour participates in Tama County's Alert Iowa system. With participation in the system, Montour residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined and issued by Tama County officials.

In 2009, Montour was awarded a Supplemental CDBG Disaster Recovery Funding Public Infrastructure Grant to help finance sewer improvements within the city. The project involves replacing and lining several thousand feet of sewer lines, replacing and rehabilitating manholes, grouting, installing a new lift station pump, constructing a new outfall line to the lagoon, purchasing a backup generator for the lift station, and flood proofing the lift station. The improvements alone cost over \$900,000 and the grant award amount is almost \$822,000.

The impetus for this project is the frequent backups in the city wastewater system that causes substantial flooding in several Montour residents' homes. System backups also cause bypasses of raw sewage into Indian Creek, which is an Iowa River tributary. The poor condition of the wastewater system is mainly due to age and overloading during the 2008 flood.

City of Tama

Overview

Tama is located at the junction of U.S. Highway 30 and Iowa 63 in the south central part of the County. The City is about sixty-five miles northeast of Des Moines, the state capital. Tama also shares its northern border with Toledo, the county seat.

Tama shares a heritage common to many central Iowa cities along the Union Pacific Railway. In 1862, James H. Hollen sold thirty-five acres along the Iowa River to John I. Blair, a New Jersey millionaire and railroad magnate who founded the Chicago & Northwestern Railway (C&NWRR). Four homes occupied the site that now comprises Tama's central business district. The land was platted and named Iuka, in honor of the Tama County soldiers who fought in the battle of Iuka, Mississippi in the Civil War. Building was spurred from the commerce generated by the C&NWRR as it built its way westward across Iowa.

In 1866, the U.S. Postal Service changed the city's name to Tama City. By 1887, though, it was shortened to Tama. In 1869, a petition in support of incorporation for municipal purposes was presented to the Judge of Tama County, and on July 29 of that year incorporation was approved.

One structure in Tama has been listed on the National Register of Historic Places. The Lincoln Highway Bridge on East 5th Street is an original feature of the Lincoln Highway. Each May, the city holds a community-wide celebration, Lincoln Bridge Days, featuring the historic bridge. The

Carnegie Library, although not listed on the National Register of Historic Places, is also a historic structure that is important to the community.

Tama has several recreational amenities like the aquatic center that is shared with Toledo, recreational trail, city parks, Cherry Lake, the Iowa River, and a golf course. The city has a variety of housing that includes low-income assisted living and new housing development. The King Tower Café, which is a local and visitor's favorite, is located along the current U.S. Highway 30 route through the city. There are also several community organizations and churches in Tama along with South Tama Community School District facilities including the High School, Partnership Center, Administration Building, and bus barn.

Utilities and Services

All services are available to Tama residents. There may not be a grocery store located within the city boundaries, but Toledo borders the north side of Tama, and this community has a Fareway that is within just a few minutes of anywhere in Tama. The traditional water, safety, and library services are provided by the City of Tama while all others are provided by either the County or private businesses. In most cities, law enforcement is provided by the Tama County Sheriff's Department, but the City actually provides this service in Tama.

Table 3.2.9: Tama Utilities and Services

Service	Provider
Electricity	Alliant Energy
Gas	Alliant Energy
Water	City of Tama
Phone Services	Iowa Telecom
Cable/Internet Provider	Mediacom/Iowa Telecom
Emergency Medical Service	City of Tama
Law Enforcement	Tama Police Department
Fire Protection	Volunteer Fire Department
Warning System	Siren (issues with coverage and backup) operated by Fire Department, Alert Iowa
HazMat Assistance	Waterloo Fire Department
Fuel Station	Pronto, Casey's
Grocery/Convenience	None
Solid Waste Removal	Privately contracted - Sanitary Refuse and K & M Sanitation
Landfill	Tama County Landfill
Library	City of Tama
Recycling	Tama County Landfill
Public Transit	Peoplerides
Medical Clinic	Mercy Care

There are no fire departments in Tama County with the capability of dealing with major hazardous materials incidents. This service is provided by the Waterloo Fire Department, because their City's fire department has the needed training and equipment. The local fire department must decide whether or not to contact Waterloo's Fire Department for assistance.

Government and Regulation

Tama has a mayor and a five-member city council that is elected for five-year terms. City departments include: Administration, Building and Zoning, Culture and Recreation, Public Safety, and Public Works. Council meetings are held on the first and third Monday of the month.

The City of Tama controls land development and use through a zoning ordinance that was last updated about ten years ago. The City's zoning map is in paper form and needs to be updated to reflect current land use. The community expressed interest in updating zoning and incorporating economic development zoning. Currently, the City does not have a comprehensive land use plan.

The City also uses its Code of Ordinances along with subdivision, building, and rental housing codes to ensure proper land development and use. The Code of Ordinances was last updated in 2005. Enforcement of the Code of Ordinances has been a persistent issue, but a Building Official has recently been hired by the City to update and enforce the building and rental housing codes. Overall, housing is the most challenging in terms of code enforcement for the city.

The City also maintains a floodplain management ordinance and maintains compliance with the National Flood Insurance Program so residents can participate if they chose. According to information from Iowa Homeland Security, there are currently two flood insurance policies in Tama.

Technical and Fiscal Resources

The mayor, council, city clerk, building official, and departmental and maintenance staff handle the city's daily and long-term operations. The City of Tama is a member of the Region 6 Planning Commission and often uses their services and expertise for various planning efforts like grant and plan writing.

There are multiple ways the City of Tama could finance a hazard mitigation project. This city in particular does not maintain its own energy utilities so fees for these services are not available to finance projects, but the City does maintain the city's water system. The financing resources available to the City of Tama 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 Tama, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

The Iowa River runs through the southern part of Tama where major flooding is historically a problem. In 1993-1994, a levy was built to prevent flooding in southern Tama. According to information from Iowa Homeland Security, the levy is believed to be certifiable to a 100-year flood level protection. In the 2008 flood, the levy prevented major flooding in the city, and the only major issue was debris that had to be removed from wells.

Also, Tama participates in Tama County's Alert Iowa system. With participation in the system, Tama residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined and issued by Tama County officials.

City of Toledo

Overview

The City of Toledo is located at the intersection of U.S. Highways 30 and Iowa Highway 63. Refer to Figure 3.2.11 below. Toledo is centrally located between three of Iowa's largest cities—Cedar Rapids, Waterloo, and Des Moines. Interstate 80 is just 20 miles south while Interstate 35 is 55 miles west, and Interstate 380 is 50 miles east of Toledo.

The City of Toledo was chosen as the county seat of Tama County in 1853. The Toledo downtown county government area is full of landmarks on the National Register of Historic Places. A major landmark is the Tama County Courthouse clock, which is original and has been completely restored; inner workings of the clock are on display on the second floor of the courthouse.

Another landmark is the Wieting Theater that was built in 1912 and given to the people of Toledo by Mrs. Philip Wieting in memory of her husband. Also, the former Toledo fire station is a historic structure that was built in 1875. This fire station has been completely renovated into a private residence and features a swimming pool and elevator. Finally, Hotel Toledo was built in 1901 and still serves travelers and permanent guests; its lobby has a marble floor, elegant beamed ceiling and grand fireplace.

Historic Wieting Theater and Hotel Toledo



Photos by Alicia Rosman, March 2010

Another notable structure is the Tama County Historical Museum and Genealogical Library, which is housed in the former county jail that was built in 1870. A restored log cabin is on site. Also, Toledo is home to the original “Butter Cow Lady,” Norma (Duffy) Lyon. A bronze cow and calf sculpture was erected on the hilltop at the intersection of Highways 30 and 63 in her honor. The Toledo Library also has a display case dedicated to her achievements. (Tama County, Iowa Economic Development, 2009)

Toledo has a diverse mix of business and industry that ensures the needs of residents and people from neighboring communities are met. Many people travel to Toledo for a full grocery store, medical clinic, and school. The South Tama Community Middle School is located in Toledo while the other two schools, elementary and high school, are located in Tama.

Toledo offers a variety of recreational and cultural opportunities. The city has parks, a new library, recreational trail, and aquatic center that is shared with Tama. The Tama County Historical Society and historic Wieting Theater, which features live shows and films, are located in downtown Toledo. Also, along the U.S. Highway 30 corridor, travel-oriented businesses were built to accommodate the needs of Toledo’s visitors and people who are traveling. Motels, restaurants, gas stations, and convenience stores are located right next to the highway. Another important building in Toledo is the Reinig Community Center where public and private events are held.

Utilities and Services

All basic services are available in the City of Toledo. Several services like law enforcement and fire protection are provided by the City. In most cities, law enforcement is provided by the Tama County

Sherriff's Department. Since Toledo is a larger community with two major highways, there are several fuel stations, convenience stores, and a grocery store.

Table 3.2.10: Toledo Services

Service	Provider
Electricity	Alliant Energy
Gas	Alliant Energy
Water	City of Toledo
Phone Services	Iowa Telecom
Cable/Internet Provider	Mediacom/Iowa Telecom
Emergency Medical Service	City of Toledo
Law Enforcement	Toledo Police Department
Fire Protection	Volunteer Fire Department
Warning System	3 sirens controlled by Fire Department (County also has capabilities to set off outdoor warning siren)
HazMat Assistance	Waterloo Fire Department
Fuel Station	Casey's, Pronto, Kwik Star
Grocery/Convenience	Fareway
Solid Waste Removal	Privately contracted - Sanitary Refuse and K & M Removal
Landfill	Tama County Landfill
Library	City of Toledo
Recycling	Tama County Landfill
Public Transit	Peoplerides
Medical Clinic	Deer Creek Medical Center, MMSC

There are no fire departments in Tama County with the capability of dealing with major hazardous materials incidents. This service is provided by the Waterloo Fire Department, because their City's fire department has the needed training and equipment. The local fire department must decide whether or not to contact Waterloo's Fire Department for assistance.

Government and Regulation

The city is governed by a mayor and five-member council that holds regular meetings on the second and fourth Monday of each month. The City comprises six departments: Clerk's Office, Police Department, Public Works, Fire Department, Library, and Emergency Services.

The City maintains the Toledo Code of Ordinances that includes building and rental codes, subdivision ordinance, zoning, and floodplain ordinance along with the other traditional city ordinances. Toledo maintains compliance with the National Flood Insurance Program (NFIP) so

residents can participate if they chose. According to the NFIP Community Status Book, however, there are actually no NFIP policies in the city (NFIP Bureau Net 2015).

Technical and Fiscal Resources

There are multiple ways the City of Toledo could finance a hazard mitigation project. This city in particular does not maintain its own energy utilities so fees for these services are not available to finance projects, but the City does maintain the city's water system. The financing resources available to the City of Toledo 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 Toledo, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

Toledo participates in Tama County's Alert Iowa system. With participation in the system, Toledo residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined and issued by Tama County officials. The City of Toledo was awarded approximately \$800,000 in I-Jobs funding to move the Public Works Building. During the 2008 flood, the building was inundated with thirty inches of flood water. In the past thirty years, this building has flooded six times so the problem is definitely recurring. The equipment and supplies located in this building are extremely important for day-to-day and even disaster-related city services. The City's trucks, tractors, barricades, signs, and other supplies are at risk for damage. Fortunately, this is the only building in Toledo that receives regular flooding. The Public Works Facility is going to be relocated to city land by the city's wastewater treatment facility.

City of Traer

Overview

Traer is located in northeast Tama County about 21 miles south of the Cedar Valley at the intersection of Highways 63 and 8.

The City of Traer is most well-known for its winding staircase located on 2nd Street. The staircase was originally constructed for the purpose of creating more floor space in the Traer Clipper Newspaper office building when it was rebuilt after a fire in 1894. Over time a few modifications have been made, but the winding staircase still remains today. Traer also is the home of the Salt and Pepper Shaker Museum. The community received the Iowa Great Places designation in 2009.

Winding Staircase



Photo from www.traer.com, April 2010

Traer's downtown has a diverse mix of businesses from a cookie shop to furniture to insurance. The city also has several recreation and cultural amenities including parks, recreational trail, activity center, museum, and theater. Traer has strong social networks with several community organizations, churches, and youth group that are very active. Also, all North Tama Community School District students attend school in Traer because the facilities for all grades from preschool and kindergarten to 12th grade are located in the city.

Recent development in Traer includes the North Tama Athletic Complex, Clearline Cutlery, Pied Piper Preschool and Child Care, the North Tama Activity Center and the Traer Historical Museum. On August 1, 2004, Traer celebrated the addition and renovation of the town's Andrew Carnegie Library. In 2006, Traer celebrated the renovation of the Traer Theatre, featuring \$1 movies. (www.traer.com)

Utilities and Services

Traer is one of the larger communities in Tama County so all basic utilities and services are available to residents. The City is actually unique in the fact that it has the capability of generating power and distributing to residents, but it is currently more cost effective to buy wholesale rather than generate. In addition to electric utilities, the City maintains the city water system. Safety services are provided by both the City and Tama County.

Table 3.2.11: Traer Utilities and Services

Service	Provider
Electricity	City purchases wholesale & distributes, has generation capabilities
Gas	Alliant Energy
Water	Traer Municipal Utilities
Phone Services	Iowa Telecom
Cable/Internet Provider	Mediacom
Emergency Medical Service	City of Traer
Law Enforcement	Tama County Sherriff
Fire Protection	Volunteer Fire Department
Warning System	3 sirens controlled by Fire Department (County also has capabilities to set off outdoor warning siren), Alert Iowa
HazMat Assistance	Waterloo Fire Department
Fuel Station	Gas N Grub, New Century FS
Grocery/Convenience	Traer Supermarket
Solid Waste Removal	City of Dysart
Landfill	Tama County Landfill
Library	City of Traer
Recycling	Bi-monthly drop off and pick up by County
Public Transit	Peoplerides
Medical Clinic	Covenant Clinic

There are no fire departments in Tama County with the capability of dealing with major hazardous materials incidents. This service is provided by the Waterloo Fire Department, because their City's fire department has the needed training and equipment. The local fire department must decide whether or not to contact Waterloo's Fire Department for assistance.

Government and Regulation

Traer is governed by a mayor and five-member city council that holds regular meetings on the first Monday of every month. The City government comprises the following departments: Fire, Ambulance Service, Park and Recreation, Traer Public Library, Planning and Zoning, and Traer Municipal Utilities. The City maintains the Traer Code of Ordinances that includes a zoning and subdivision ordinance. The City does not enforce any city buildings codes but uses the Iowa building codes to ensure quality structures.

The city code also includes a floodplain ordinance that is in compliance with the National Flood Insurance Program. The City of Traer maintains compliance with this program so residents can

participate if they chose. Currently, according to the NFIP Community Status Book, there are four NFIP policies in Traer (NFIP Bureau Net 2015).

Technical and Fiscal Resources

In Traer, the mayor, council, city clerk (also runs Traer Municipal), and maintenance staff handle the city's daily and long-term operations. The City of Traer is also a member of the Region 6 Planning Commission and uses their services and expertise for certain planning activities.

There are multiple ways the City of Traer could finance a hazard mitigation project. Traer purchases electricity wholesale and distributes to residents. Along with electric utilities, the City maintains the water system so fees from electric and water utilities can be used toward debt incurred for projects. The financing resources available to the City of Traer 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 Traer, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

Traer participates in Tama County's Alert Iowa system. With participation in the system, Traer residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined and issued by Tama County officials.

City of Vining

Overview

The City of Vining is located at the intersection of county road V18 and county road E44. Vining is 2 miles north of U.S. Highway 30 and 12 miles east of U.S. Highway 63.

Vining is Tama County's smallest incorporated town. Vining first appeared on the map in 1881 with building of the Chicago, Milwaukee and St. Paul Railroad, which crossed Tama County from east to west. Vining became known as "The biggest little town in Tama County" because of the large area within its incorporation. It is also known as "The little Town in the Bohemian Alps." Like many

other areas in the rural Midwest, the Vining community was first settled almost exclusively by immigrants from Europe—in this case all or nearly all from Bohemia. (Tama County, Iowa Economic Development, 2009)

Utilities and Services

The only service provided by the City of Vining is fire protection through a volunteer fire department. All other services are either provided by Tama County or private companies. The only exception is emergency medical response, and this is provided by the City of Elberon's Ambulance Service.

Table 3.2.12: Vining Utilities and Services

Service	Provider
Electricity	Alliant Energy
Gas	Personal propane tanks from various providers
Water	Rural Water Poweshiek Water Association
Phone Services	Iowa Telecom
Cable/Internet Provider	Iowa Telecom/no high speed service
Emergency Medical Service	Elberon Ambulance Service
Law Enforcement	Tama County Sheriff
Fire Protection	Volunteer Fire Department
Warning System	Siren controlled by Fire Department
HazMat Assistance	Waterloo Fire Department
Fuel Station	None
Grocery/Convenience	Vining Grocery
Solid Waste Removal	K & M Sanitation
Landfill	Tama County Landfill
Library	None
Recycling	Bi-monthly drop off and pick up by County
Public Transit	Peoplerides
Medical Clinic	None

There are no fire departments in Tama County with the capability of dealing with major hazardous materials incidents. This service is provided by the Waterloo Fire Department, because their City's fire department has the needed training and equipment. The local fire department must decide whether or not to contact Waterloo's Fire Department for assistance.

Government and Regulation

Vining is governed by a mayor and five-member city council that holds meetings on the first Monday of the month. The City maintains the Vining Code of Ordinances. There are no formal land use controls like zoning or floodplain ordinance, and the City does not enforce city buildings codes. Currently, Vining is not participating in the National Flood Insurance Program.

Technical and Fiscal Resources

The City of Vining 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 government, the Region 6 Planning Commission. The City of Vining is a member of the Commission and uses their services and expertise.

There are multiple ways the City of Vining could finance a hazard mitigation project. This city in particular does not maintain its own utilities or water system so fees for these services are not available to finance projects. The resources available to the City of Vining 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 Vining, grants would need to be the main funding source in order for the project to be feasible.

Other Mitigation Activities

Vining participates in Tama County's Alert Iowa system. With participation in the system, Vining residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined and issued by Tama County officials.

School Districts Participating in the Tama 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 Tama 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 Tama County school district can be extremely influential in the effectuation of hazard mitigation projects.

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

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

Technical and Fiscal Resources

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

Other Mitigation Activities

Each school district has plans and procedures for handling many hazards already like fire, tornado, severe weather, etc. The established procedures for these hazards are practiced on a regular basis through planned drills at school facilities. Also, the South Tama County Community School District participates in the Safe Routes to School Program. 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.

Participation in the National Flood Insurance Program

Most communities in Tama County participate in the National Flood Insurance Program (NFIP). As of 2015, the cities of Elberon and Lincoln are the only cities that are not NFIP participants (NFIP Community Status Book 2015). According to information from the community status book and the City of Elberon, the city does not participate in the NFIP because it has been suspended. The city of Lincoln 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 Lincoln as a flood-prone community. For floodplain maps of each jurisdiction, see Appendix E. Table 3.2.13 contains NFIP participation for communities in Tama 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 Tama 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 the City of Chelsea and portions of the City of Tama have 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 Tama County have taken on mitigation actions such as: acquiring and demolishing structures prone to flooding; elevating structures out of the floodplain; floodproofing infrastructure such as water treatment plants that are prone to flooding; elevating roads, and; monitoring, repairing, and constructing new culverts to aid in water drainage. These and other mitigation actions are described in more detail in the Mitigation Strategies section of this plan.

Table 3.2.13. NFIP Participation

Community ID #	Community Name	NFIP Participant?	Current Effective Map Date	Regular-Emergency Program Entry Date
190261	Chelsea	Yes	01/19/06	12/16/80
190514	Clutier	Yes	01/19/06	08/19/85
190569	Dysart	Yes	01/19/06	03/10/11
190728	Elberon	No	N/A	N/A
190515	Garwin	Yes	01/19/06(M)	08/19/85
190516	Gladbrook	Yes	01/19/06	09/04/85
N/A	Lincoln	No	N/A	N/A
190782	Montour	Yes	11/18/09(M)	03/22/06
190262	Tama	Yes	11/18/09	01/17/90
190667	Toledo	Yes	11/18/09	05/28/09
190668	Traer	Yes	01/19/06	09/04/85
190956	Vining	Yes	01/19/06	02/08/13
190908	Tama County Uninc.	Yes	11/18/09	05/04/06

Source: NFIP Community Status Book 3/10/2015 BureauNet, <https://www.fema.gov/cis/1A.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 3.2.14. City Governance – Departments, Boards, and Commissions

Departments, Boards, and Commissions	Chelsea	Clutier	Dysart	Elberon	Garwin	Gladbrook	Lincoln	Montour	Tama	Toledo	Traer	Vining	Tama County
City Hall (City Clerk)	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	X	X
Police Department			X						X	X			X
Public Works Department	X	X	X	X	X	X		X	X	X	X		X
Planning and Zoning Commission			X		X				X	X	X		X
Board of Adjustments			X		X				X	X	X		X
Library Board of Trustees	X	X	X	X	X	X			X	X	X		
Electric Board of Trustees	X										X		
Community Center Board	X										X		

Table 3.2.15. Mitigation Capabilities

Jurisdictional Capabilities	Chelsea	Clutier	Dysart	Elberon	Garwin	Gladbrook	Lincoln	Montour	Tama	Toledo	Traer	Vining	Tama County
Comprehensive/Land Use Plan						X							X
Capital Improvement Plan						X							X
Local Mitigation Plan		X			X	X							
Flood Mitigation Assistance (FMA) Plan	X												
Watershed Plan						X							
Critical Facilities Plan (Mitigation/Response/Recovery)					X	X							
Local/County Emergency Plan	Tama County Emergency Management Agency has Emergency Support Functions (ESF) 1-15 in place for jurisdictions and the county at large.												
Economic Development Plan	Region 6 Planning Commission authored a regional Comprehensive Economic Development Strategy Plan for a 4-county region that includes Tama County. Vining also has their own economic development plan.												
Transportation Plan	Region 6 Planning Commission authored a regional Passenger Transportation Plan for a 4-county region that includes Tama 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. The Cities of Gladbrook and Lincoln in Tama County have fire mitigation plans in place.												

Table 3.2.16. Policies/Ordinances

Policies/Ordinances	Chelsea	Clutier	Dysart	Elberon	Garwin	Gladbrook	Lincoln	Montour	Tama	Toledo	Traer	Vining	Tama County
Zoning Ordinance			X		X	X	X		X	X	X		X
Restricted Residential District						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	X		X
Floodplain Ordinance	X	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		
Storm Water Ordinance					X					X			
Drainage Ordinance		X			X								
Landscape Ordinance				X									
Debris Management Plan							X						

Table 3.2.17. Programs

Programs	Chelsea	Clutier	Dysart	Elberon	Garwin	Gladbrook	Lincoln	Montour	Tama	Toledo	Traer	Vining	Tama County
National Flood Insurance Program (NFIP) Participant	X	X	X		X	X		X	X	X	X	X	X
NFIP Community Rating System (CRS) Participant	No communities in Tama County participate in the CRS												
Hazard Awareness Program		X											
Planning/Zoning Boards			X		X				X		X		X
Tree Trimming Program		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, Tama County is not recognized as a Storm Ready community. No individual communities in Tama County have received Storm Ready status. Some communities have put additional storm safety measures in place such as Lincoln, which has trained storm spotters.												
Mutual Aid Agreements	Mutual Aid agreements, in various capacities, are used throughout Tama County among fire department, emergency responder, etc. All jurisdictions have a mutual aid agreement with the Waterloo Fire Department in the event of a hazardous materials event. All jurisdictions specified that they had mutual aid agreements in various forms.												

Table 3.2.18. Staff/Department

Staff/Department	Chelsea	Clutier	Dysart	Elberon	Garwin	Gladbrook	Lincoln	Montour	Tama	Toledo	Traer	Vining	Tama County
Building Code Official						X					X		X
Building Inspector			X										
Mapping Specialist (GIS)									X				X
Engineer									X				X
Public Works Official	X	X		X	X	X		X	X	X			X
Emergency Response Team		X		X	X	X			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 (Elberon and Lincoln) 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 Tama 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 3.2.19. Non-Governmental Organizations

Non-Governmental Organizations	Chelsea	Clutier	Dysart	Elberon	Garwin	Gladbrook	Lincoln	Montour	Tama	Toledo	Traer	Vining	Tama County
Veterans Groups		X		X	X	X	X		X	X	X		
Environmental Groups									X				
Chamber of Commerce									X	X	X		
Community Organizations (Lions, Kiwanis, etc.		X	X	X	X	X	X		X	X	X		
<p>These cities listed the following community organizations:</p> <p>Tama: Kiwanis, Lions, Oak Hill Cemetery • Clutier: Lions • Dysart: Lions, Club Dysart, Dysart Development • Elberon: Methodist Church, Elberon Area Women's Club • Garwin: Revit Community • Lincoln: Commercial Club • Traer: Lions</p>													

Table 3.2.20. Local Funding Availability

Local Funding Availability	Chelsea	Clutier	Dysart	Elberon	Garwin	Gladbrook	Lincoln	Montour	Tama	Toledo	Traer	Vining	Tama County
Ability to fund projects through Capital Improvements funding	All incorporated cities in Tama County area capable of funding mitigation projects through Capital Improvements funding.												
Ability to incur debt through general obligation bonds	All incorporated cities in Tama County area capable of funding mitigation projects through general obligation bonds.												
Ability to incur debt through special tax bonds	All incorporated cities in Tama County area capable of funding mitigation projects through special tax bonds.												
Ability to incur debt through private activities	All incorporated cities in Tama County area capable of funding mitigation projects through private activities.												
Ability to withhold spending in hazard prone areas	All incorporated cities in Tama 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		
	Water: Chelsea, Clutier, Gladbrook; Sewer: Chelsea, Clutier, Gladbrook; Garbage: Clutier												
Ability to apply for Community Development Block Grants	Tama County communities can access CDBG funds for water/sewer projects, public facilities, housing, etc. through a competitive bidding process. Clutier, Elberon, Garwin, Gladbrook, Lincoln, Tama, and Toledo stated that they can or would consider using CDBG funding for mitigation projects.												
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. Chelsea, Elberon, and Montour stated that they would prefer not to choose this funding source for mitigation projects.												
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, Tama County was included in 10 of the 39 disaster declarations since 1990. Disaster declarations involving Tama County included severe storms (10), flooding (9), tornadoes (5), and wind (2). 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 Tama 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. **Earthquake.** No earthquake damage has ever been reported in Tama County. The nearest fault line is located in New Madrid, Missouri. According to Figure 4.1.1, Tama County

straddles the lowest Earthquake Hazard Zone for risk from the New Madrid fault line. If an earthquake were to occur on this fault line, the earthquake would not be felt, or would be very minimally felt. Damage from this hazard would be unlikely. While earthquakes were included in the previous plan, the Task Force decided to remove the hazard from the plan after viewing the data.

Figure 4.1.1: 6.5 Magnitude Earthquake Hazard Zone for the New Madrid Fault Line

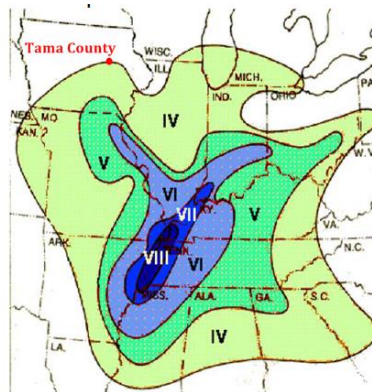


Image Obtained from: <http://www.iuhr.uiowa.edu/igs/browse/quakes/quakes.htm>

2. **Expansive Soils.** Tama 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 Tama 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 4.1.2 for more information.

Figure 4.1.2: USGS Map of Percentage of Swelling Clay in Iowa

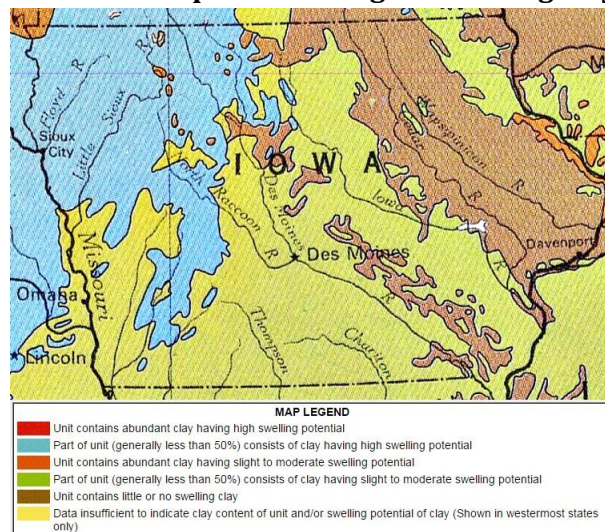
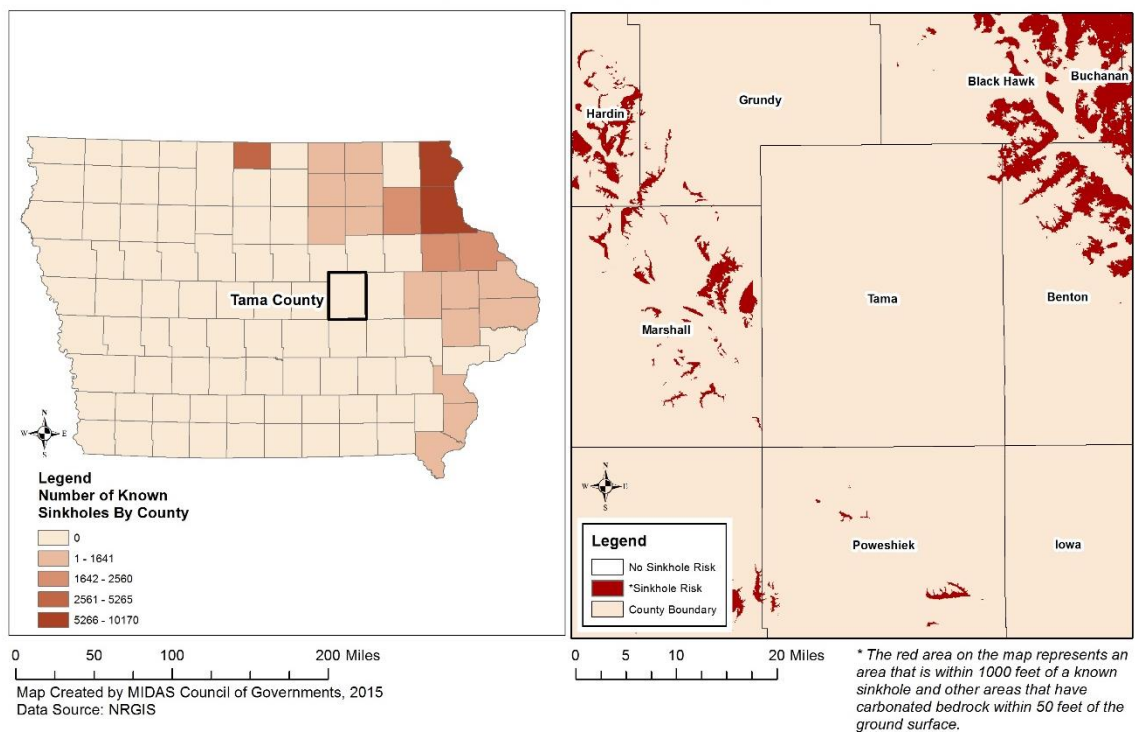


Image Obtained from: http://www.surevoid.com/soil_maps/ia.php

3. **Landslide.** Tama County does not have significant slopes that could play a role in a landslide event. Tama County's elevation varies from between 810-1080 feet, a difference of 270 feet (NRGIS 2015). The Task Force did not recall any landslide events that had ever occurred in Tama County. The hazard was removed based on all of the information available. Landslides were also removed from the previous plan.
4. **Sinkholes.** There are no known sinkholes in Tama County. This risk of sinkholes is remote, as no area of Tama County is within 1000 feet of a known sinkhole or other areas 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.

Figure 4.1.3: Sinkhole Risk in Tama County



Some hazards were analyzed at the county level due to the similar and widespread effect that they have on individual jurisdictions within Tama 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. Drought
2. Extreme Heat
3. Radiological
4. Severe Winter Storm

5. Thunderstorm, Lightning, and Hail
6. Tornado
7. Wind Storm

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

Table 4.1.3: Final List of Tama County Area Hazards

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

Tama 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 or 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

	Temperature (°F)																		
	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Wind (mph)	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>

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), tornadoes, 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 Tama County, the risk of different hazards varies by jurisdiction. Refer to Table 4.1.9 for the hazards identified by each jurisdiction in Tama 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. Tama County Emergency Management also contributed information when possible.

Table 4.1.9: Tama County Hazard Boundaries

Hazard	Jurisdictions	Source(s) of Identification*	Data Frame
Animal/Plant/Crop Disease	County-wide All jurisdictions except school districts	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 Tama County according to data sources
Drought	County-wide	NCDC Data	8/2000 – 8/2013 (13 years)
Extreme Heat	County-wide	NCDC Data	7/1980 – 8/2013 (33.1 years)
Flash Flooding	All jurisdictions except Vining	NCDC Data Tama County Emergency Management Local knowledge	7/2000 – 5/2013 (12.8 years)
Grass or Wildland Fire	County-wide	Tama 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	5/1995 – 10/2013 (18.4 years)
Human Disease Epidemic	All jurisdictions except Clutier and	Iowa Department of Public Health, Center for Acute Disease Epidemiology	2007 – 2013 (6 years)

	Toledo		
Infrastructure Failure	All jurisdictions	Local knowledge	10 Years
Radiological	County-wide	Iowa 2013 Hazard Mitigation Plan Iowa Emergency Management Association	No events in the history of Tama 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	NCDC Data	1/1996 – 12/2013 (17.9 years)
Terrorism	All jurisdictions except Clutier and North Tama School District	Tama 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	3/1953 – 5/2011 (58.2 years)
Transportation Incident	All jurisdictions except Clutier	Iowa Department of Transportation National Transportation Safety Board Accident Reports	10 Years
Wind Storms	County-wide	NCDC Data	1/1996 – 3/2012 (16.2 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 Tama 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, many communities experienced the hazard more than NCDC data portrayed. Communities described flood events in which short periods of heavy rainfall flooded streets, basements, and backed up sewer systems. Many of the communities in Tama County have old sewer systems and infrastructure that are susceptible to even short periods of heavy rainfall. NCDC data did not capture the frequency of these events for many areas of Tama County. Communities

that experienced more frequent flash flooding events were asked to describe how often, where, and to what extent flash flooding occurred in their community. For any community that experienced flash flooding, Task Force members indicated where flash flooding occurred in their city on a map. 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, the City of Chelsea, Iowa was affected by severe river flooding in 1993, 2008, 2013, and 2014, yet NCDC data does not list the City of Chelsea as ever experiencing a river flooding event. See Appendix F for news articles involving Chelsea, Iowa and river flooding. To better represent the flood risk of Iowa River communities in Tama County, county-wide flood events that affected the “Iowa River Basin” as described in the storm events database event details were counted. 11 of the total 16 county-wide river flooding events affected the Iowa River Basin. Four Iowa River communities – Chelsea, Montour, Tama, and Toledo – were given the option to add part or all of the county-wide Iowa River Basin flood events to their jurisdictional river flooding counts. Chelsea chose to add all 11 events. Montour, Tama, and Toledo chose to add 10. These numbers are represented in each jurisdiction’s risk assessment scoring in the Risk Assessment section of this plan. Allowing these communities to add these flood events from the NCDC data better reflects flood risks in the community.

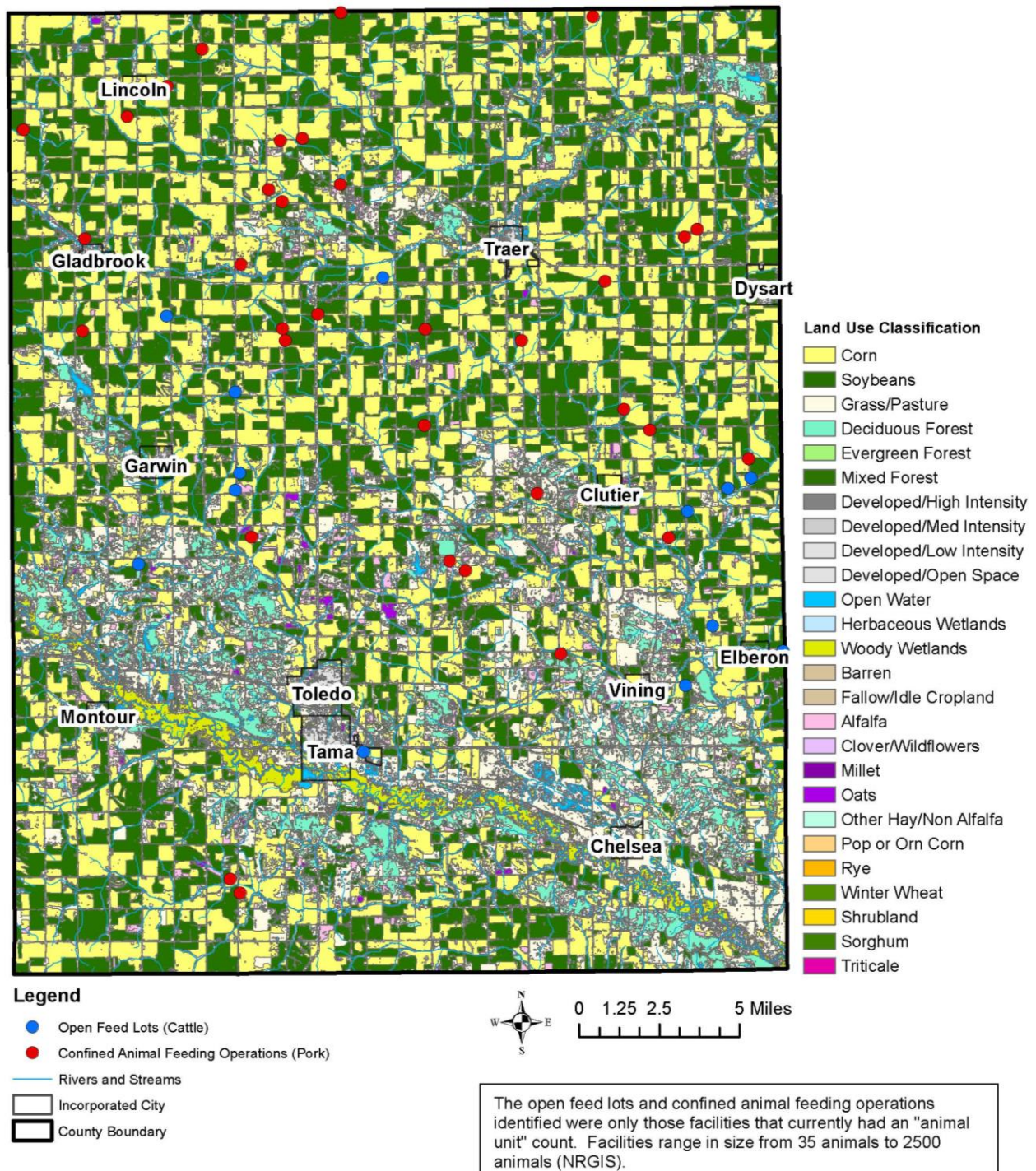
Data frames vary for each hazard. For most hazards with established data sets (ie: NCDC, IDNR hazardous spills summary reports, Iowa Department of Public Health, etc.), the data frame begins with the earliest year in which data was available and ends with 2013. The year 2013 was used as an ending date for data to allow for a complete year of data as data collection began in 2014. 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 Tama 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 Tama County’s large amount of cropland, the county is vulnerable to an animal/plant/crop disease outbreak. According to the 2012 Census of Agriculture, Tama County has 1,132 farms which use approximately 402,701 acres of land in the county. These farms primarily grow corn and soybeans, which account for approximately \$183 million and \$94 million in sales per year, respectively (National Agricultural Statistics Service 2015). Tama County also farms cattle and pigs.

Figure 4.1.4: Animal/Plant/Crop Disease in Tama County



Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, National Agricultural Statistics Service
Cropscape Tool - 2014 Land Cover

The National Agriculture and Statistics Service (2012) reports that Tama County also has farms that contain goats, sheep, and chickens. GIS data was not available for these facilities.

Special Flood Hazard Areas are prevalent throughout Tama 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 Lincoln, every Tama 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 4.1.5 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 Tama County to depict the probability of river flooding, many jurisdictions in Tama 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.

Tama County has a total of 30 dams. 28 of these dams are Low Hazard Dams and two are Moderate Hazard Dams. The majority of dams (21) in the county were built for the purposes of fire protection, stock or small fish ponds. Eight dams were built for the purposes of recreation, and one was built for the purposes for debris control. There are an additional 12 dams within five miles of Tama County boundaries. Two of those dams are moderate classification dams but pose a minimal risk to downstream communities in Tama County. See Figure 4.1.6 for the location of these dams in the county.

Figure 4.1.5: Special Flood Hazard Areas in Tama County

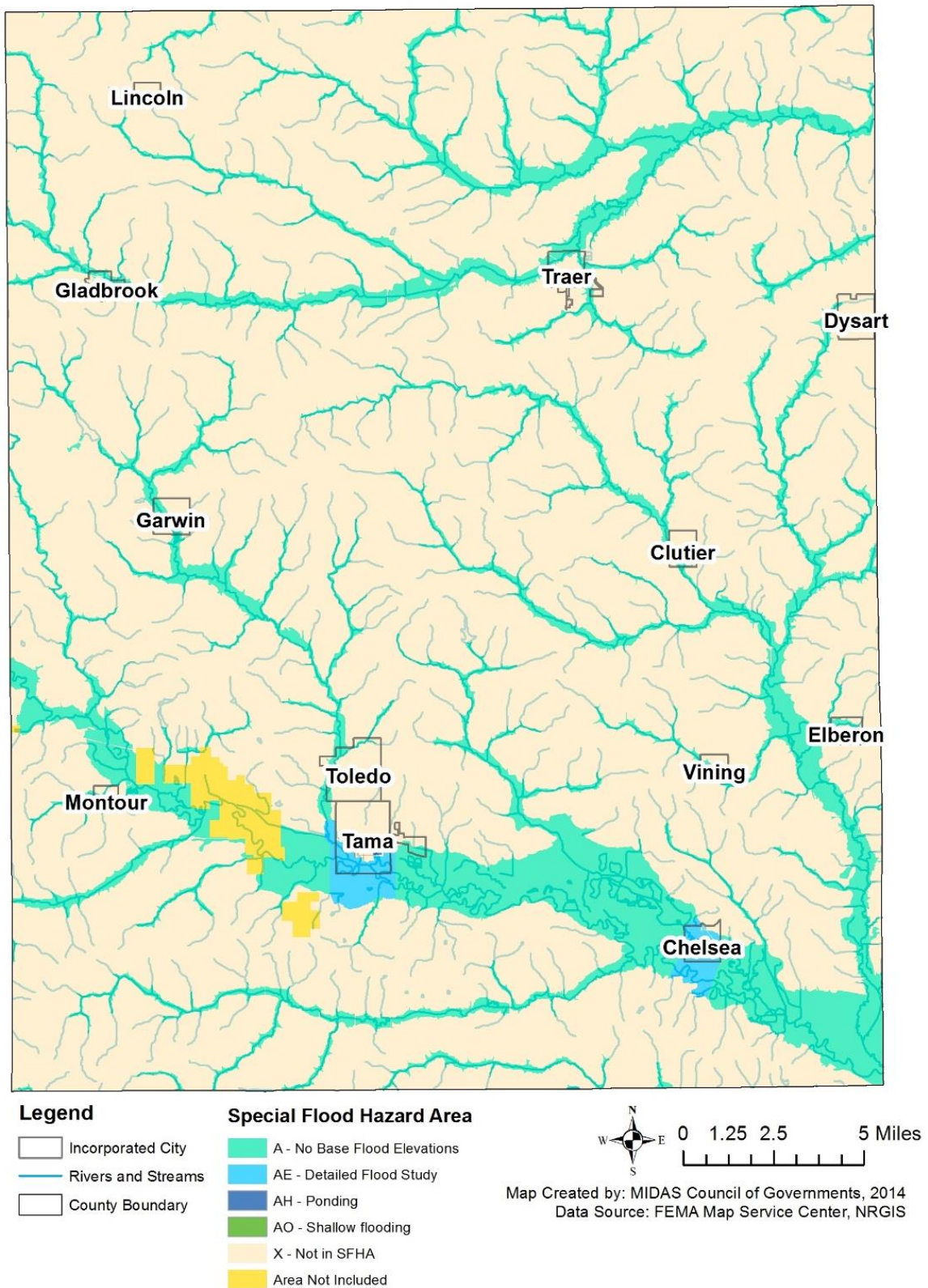
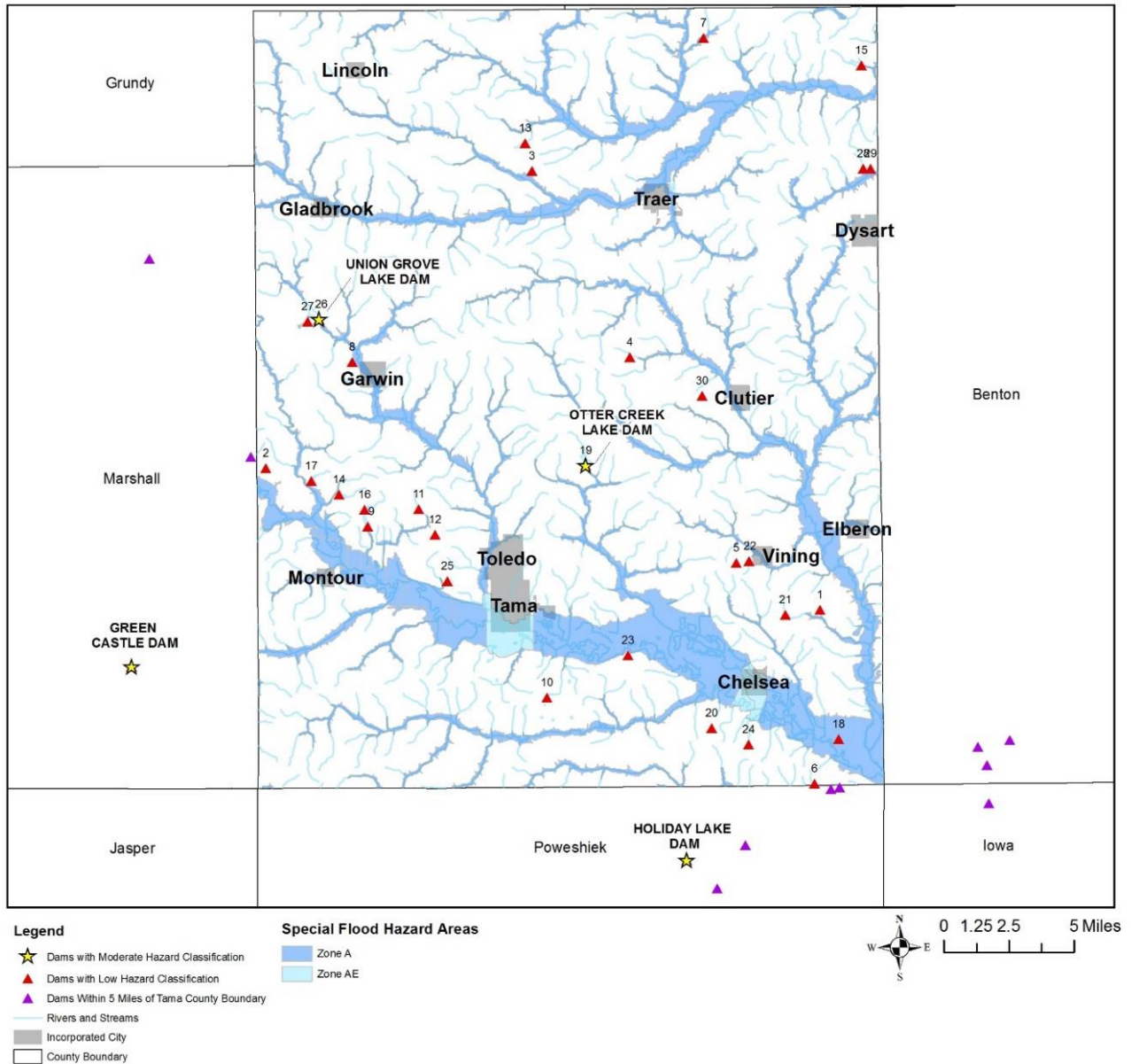


Figure 4.1.6: Location of Dams in Tama County



Dams of Tama County

- | | |
|------------------------------------|--|
| 1 BAZAL DAM | 16 HINEGARDNER LAKE DAM |
| 2 BEANE DAM | 17 JUDGE DAM |
| 3 BRECKENBRIDGE FARMS DAM | 18 OGDEN WETLAND DAM |
| 4 CHIZEK DAM | 19 OTTER CREEK LAKE DAM |
| 5 CIBULA DAM | 20 RAINBOW LAKE DAM |
| 6 COFFMAN DAM | 21 RICHARDT DAM |
| 7 CRAWFORD CREEK SUBWATERSHED SITE | 22 ROEDER DAM |
| 8 DESCHAMP DAM | 23 RUBENBAUER DAM |
| 9 FELLOWSHIP LAKE DAM | 24 SEVCIK DAM |
| 10 GOOS DAM | 25 STUMP DAM |
| 11 GRAY DAM | 26 UNION GROVE LAKE DAM |
| 12 GRAY DAM | 27 UNION GROVE LAKE SILT CONTAINMENT DAM |
| 13 GREINER DAM | 28 VAUBEL DAM |
| 14 HEMPYS LAKE DAM | 29 VAUBEL DAM |
| 15 HICKORY HILLS RECREATION DAM | 30 VELKY DAM |

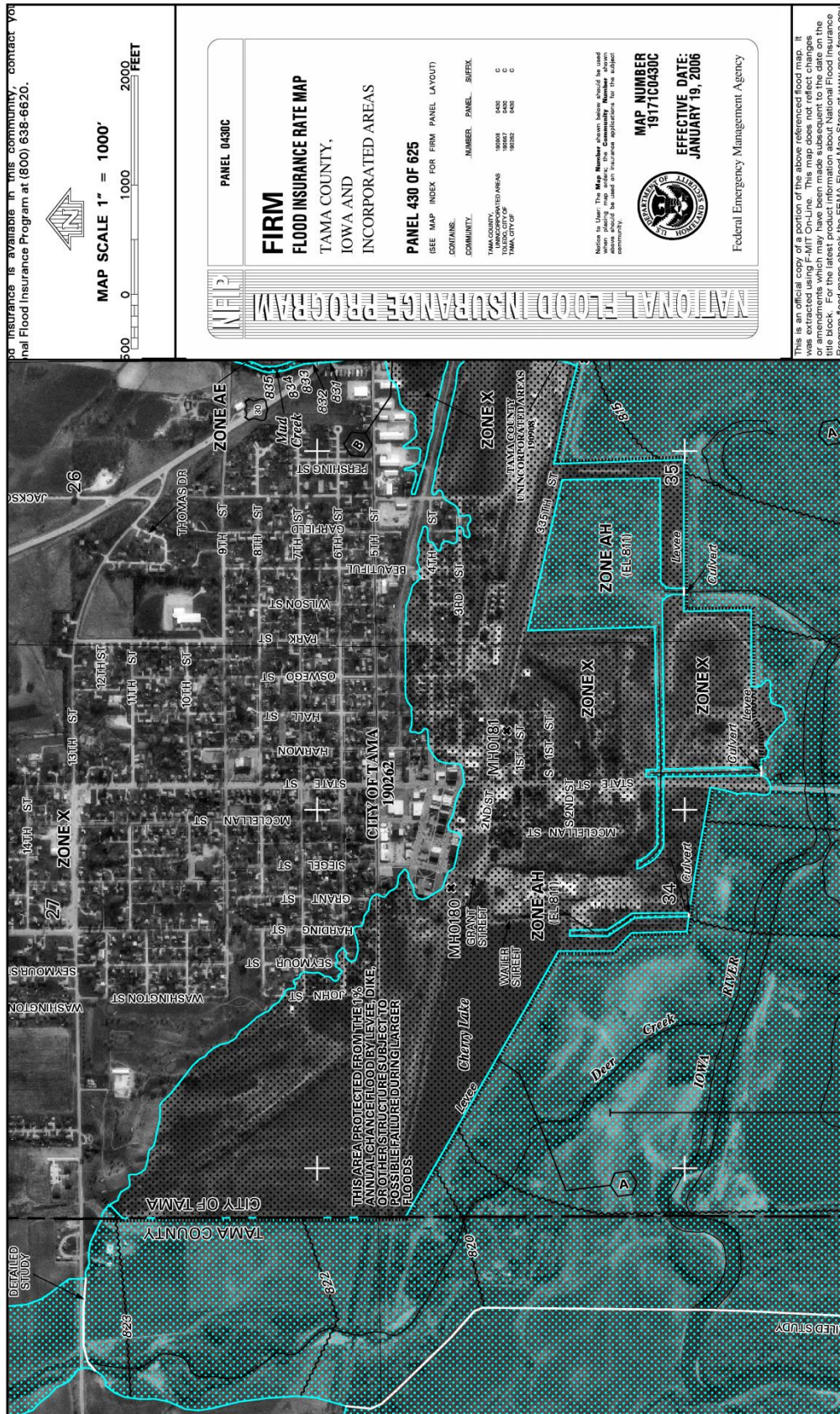
Tama County has a total of 30 dams. 28 of these dams are Low Hazard Dams and 2 are Moderate Hazard Dams.

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, industrial or 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

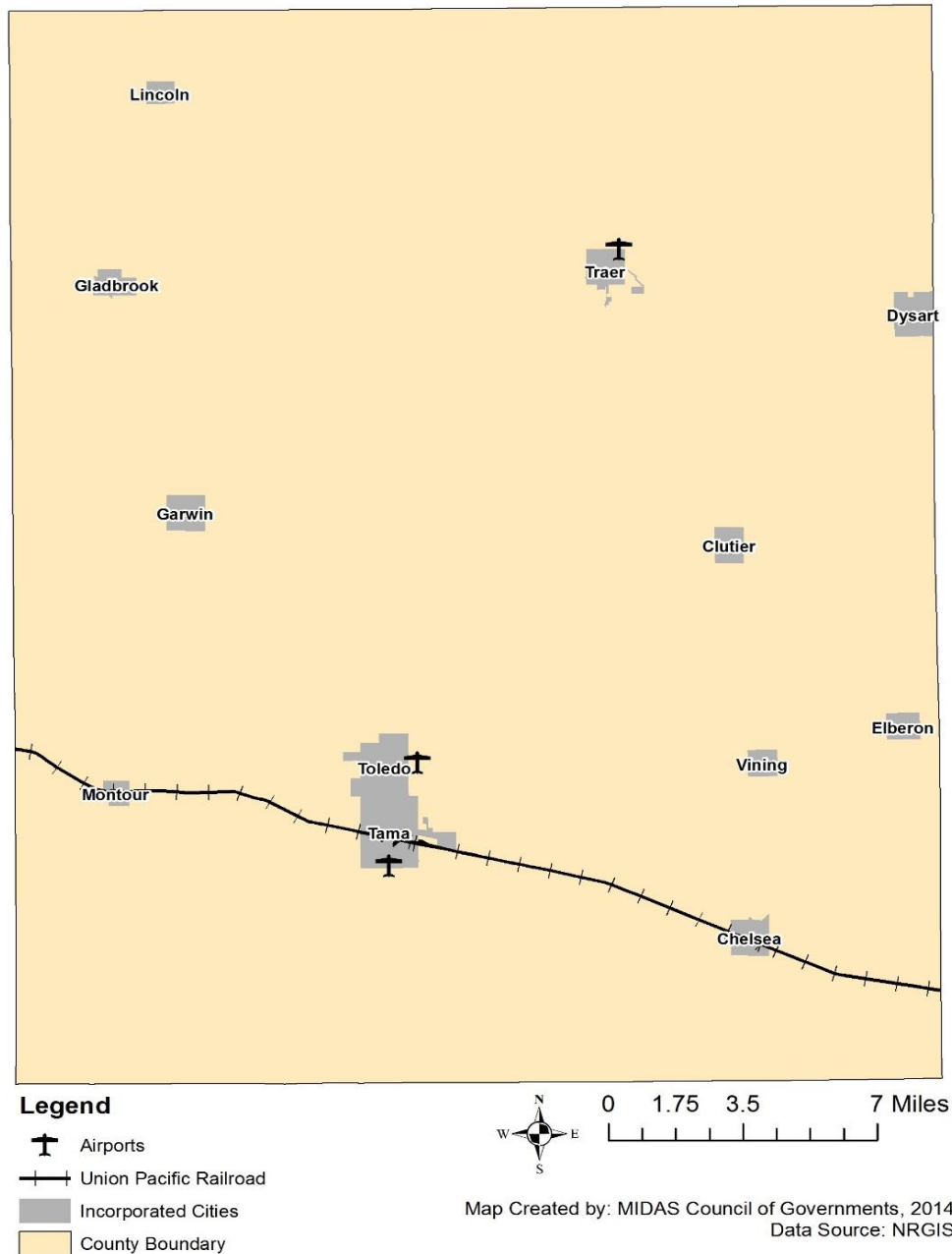
Figure 4.1.7: Levee Failure Risk



The only jurisdiction at risk for levee failure is Tama, but just the southern portion of the city located near Deer Creek will likely be affected by this hazard. A levee was built in 1993-1994 to protect southern Tama from the severe and frequent flooding of the nearby creek, which is a tributary of the Iowa River. In the FEMA FIRMette image to the left, the location of the levee, culverts, and the area being protected are indicated by black stippling. This area is believed to be protected for up to a 1% annual chance flood. If the levee and culvert system were to fail during a flood event, the southern portion of the city would be inundated with flood waters.

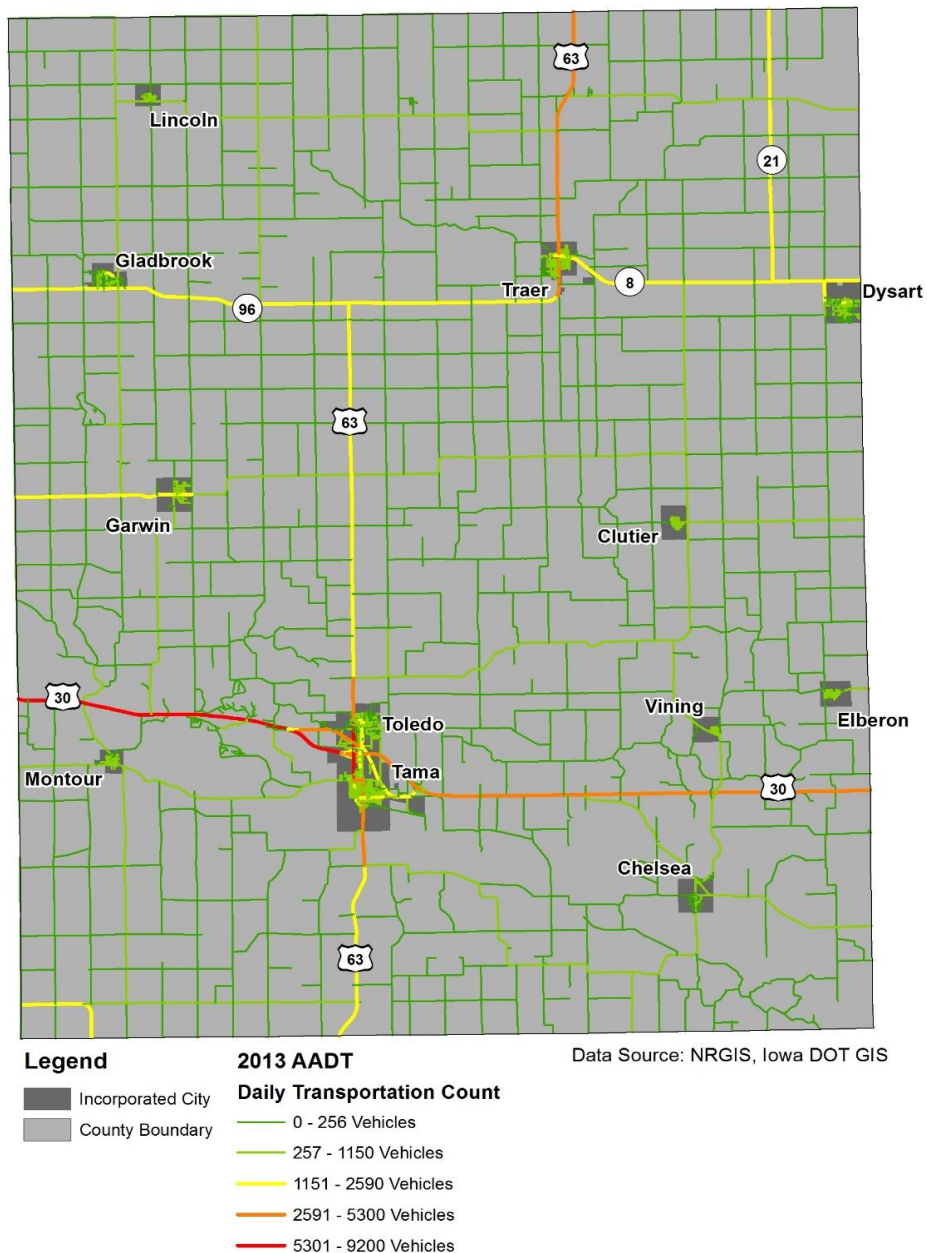
Regarding the risk of a transportation incident in Tama County, a Union Pacific Railroad freight line runs through the southern portion of Tama County. Only the jurisdictions along the rail line (Montour, Tama, and Chelsea) and Unincorporated Tama County are at risk for a rail transportation incident. Tama County has a total of three airports located in Tama, Toledo, and Traer. Historically, no air traffic incidents have occurred at any of these airports, and probability of air traffic accidents is low.

Figure 4.1.8: Tama County Air and Rail Transportation



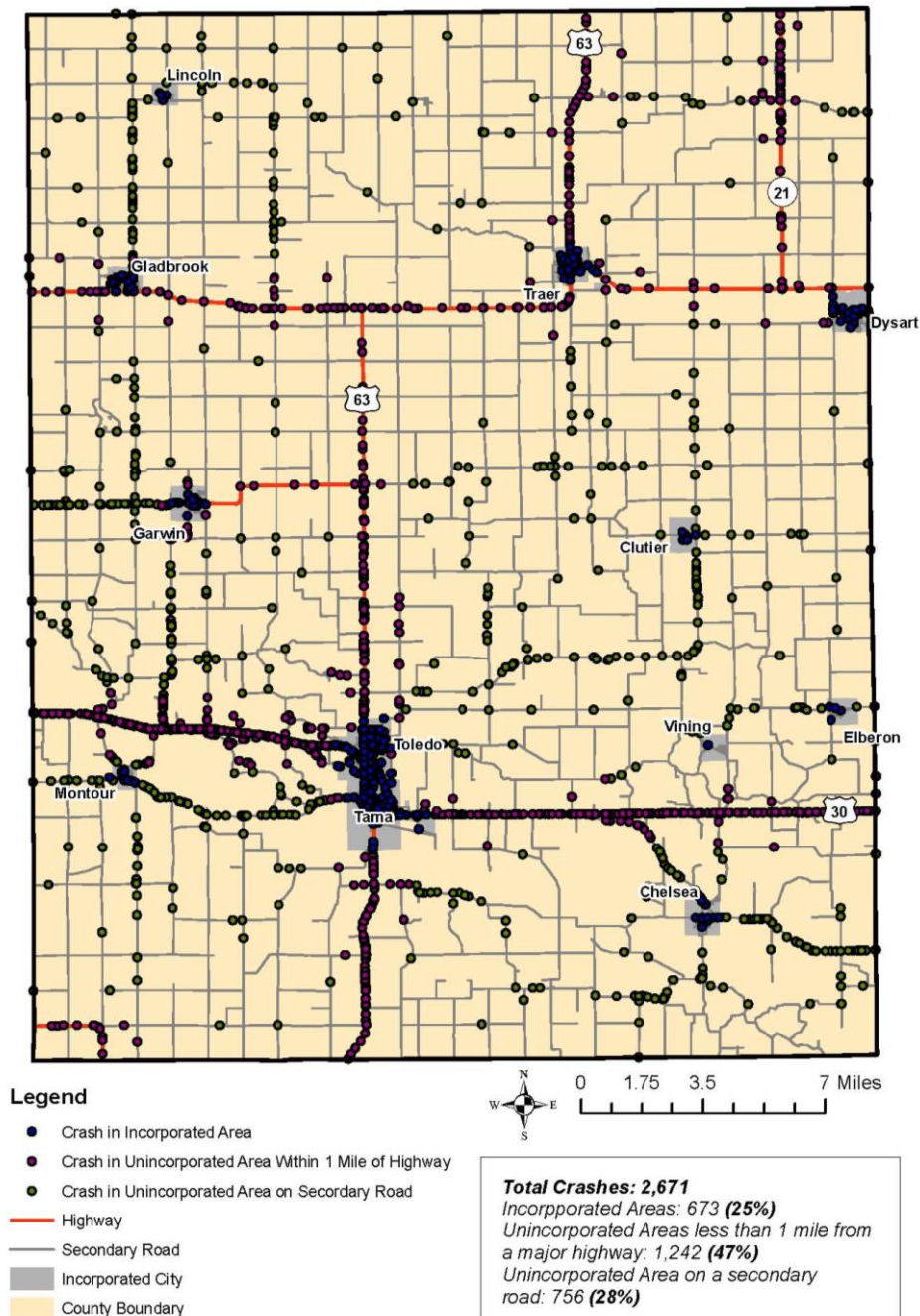
Tama County has two US highways that run through it: US Highway 30 and US Highway 63. The county also has several state highways, including 146, 21, 229, 8 and 96. US Highways generate the highest average annual daily transportation (AADT) counts, which uses historic data to determine average traffic 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 Tama County.

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



Crashes in Tama County were most likely to occur near highways. While this data does not show us the severity of these accidents, it does show us that communities in close proximity to highways in Tama County have an elevated vulnerability to highway transportation incidents.

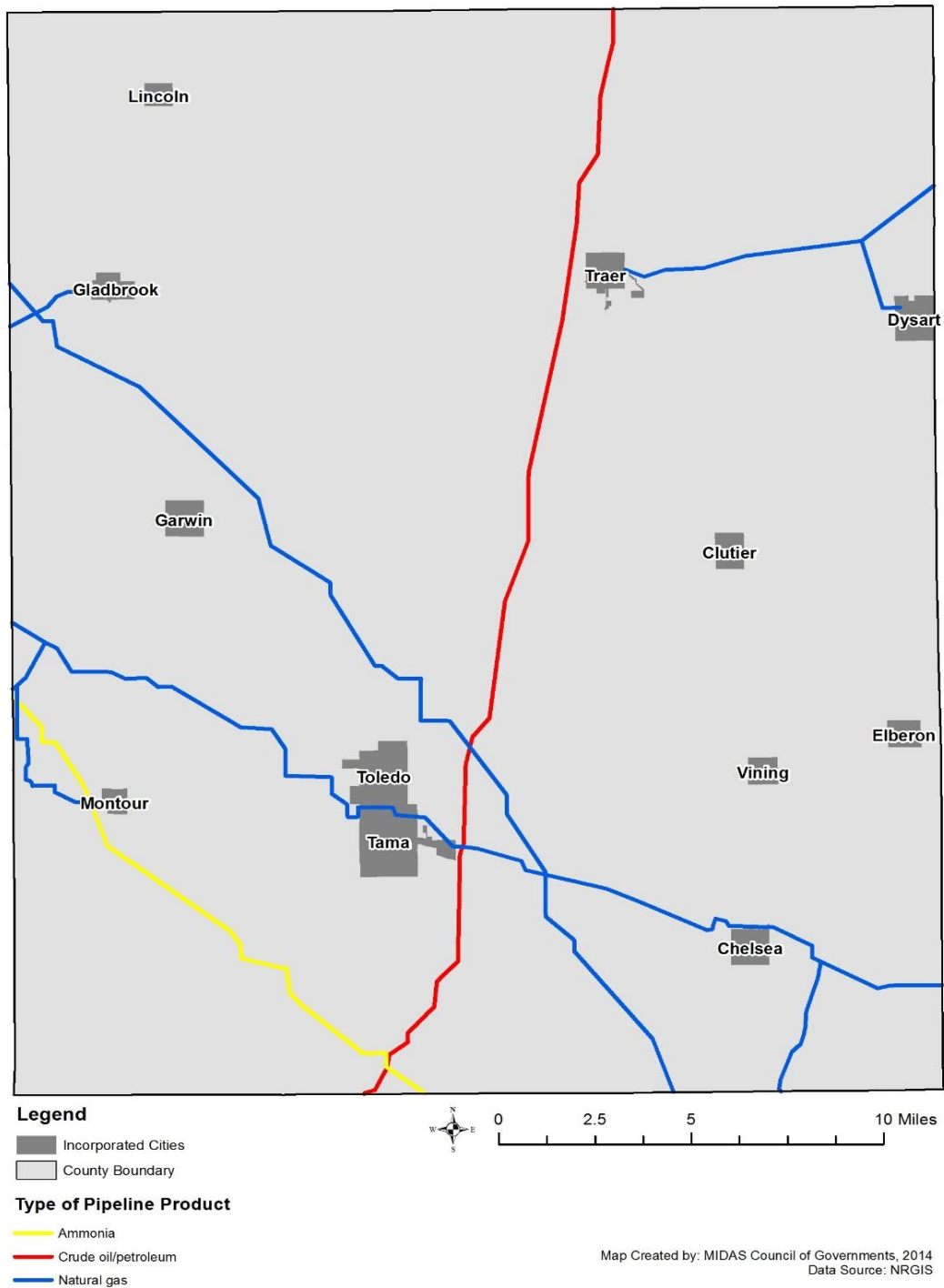
Figure 4.1.10: Tama County Vehicle Crashes from 2004 to 2013



Map Created by MIDAS Council of Governments, 2014
 Data Source: NRGIS, Iowa Department of Transportation

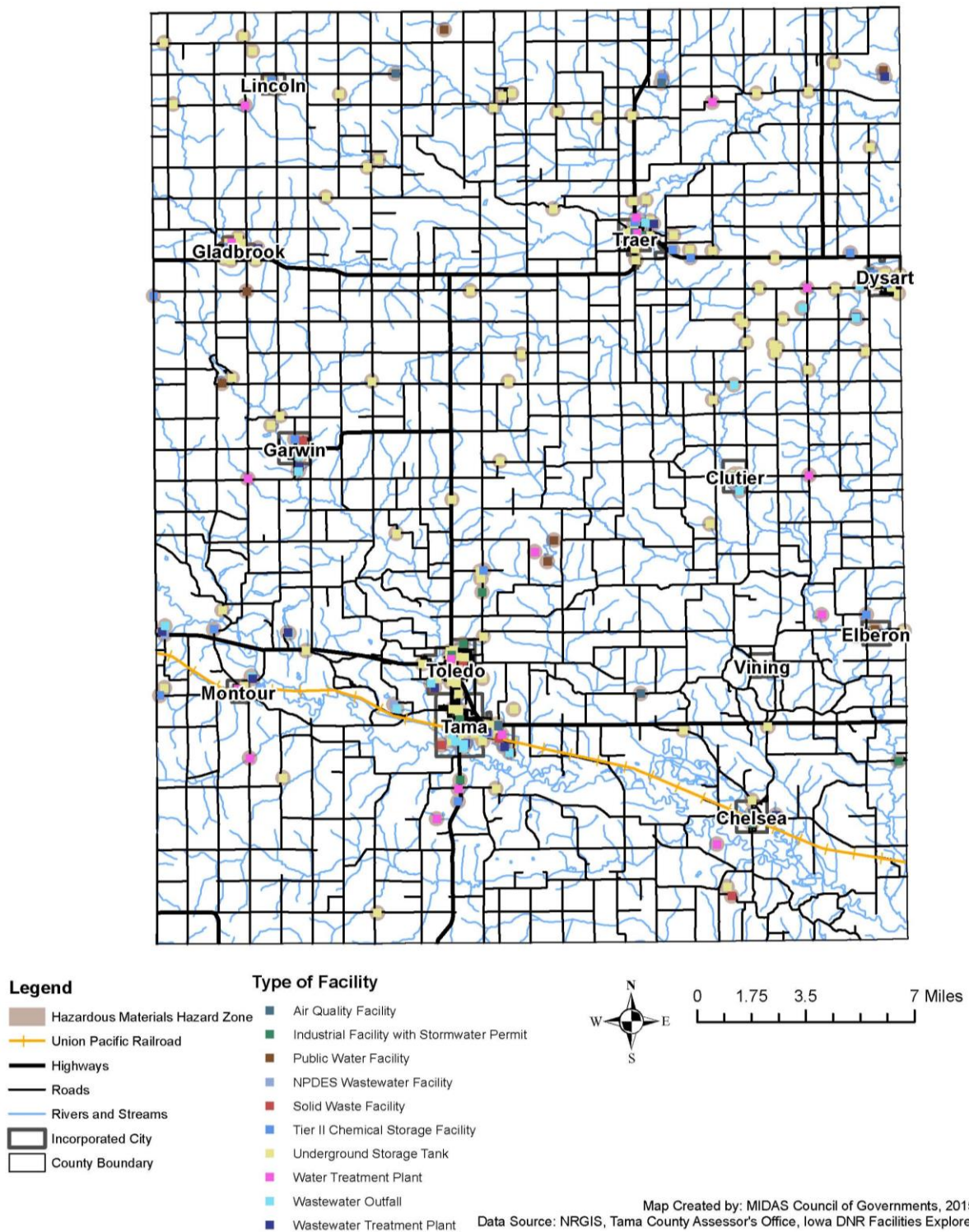
Tama County has three different pipeline products that run through the county: ammonia, natural gas, and crude oil/petroleum. Not all jurisdictions are at risk from a pipeline transportation incident. Seven jurisdictions (Chelsea, Dysart, Gladbrook, Garwin, Montour, Tama, Toledo, and Traer) are within five miles of a pipeline.

Figure 4.1.11: Location of Pipelines in Tama County



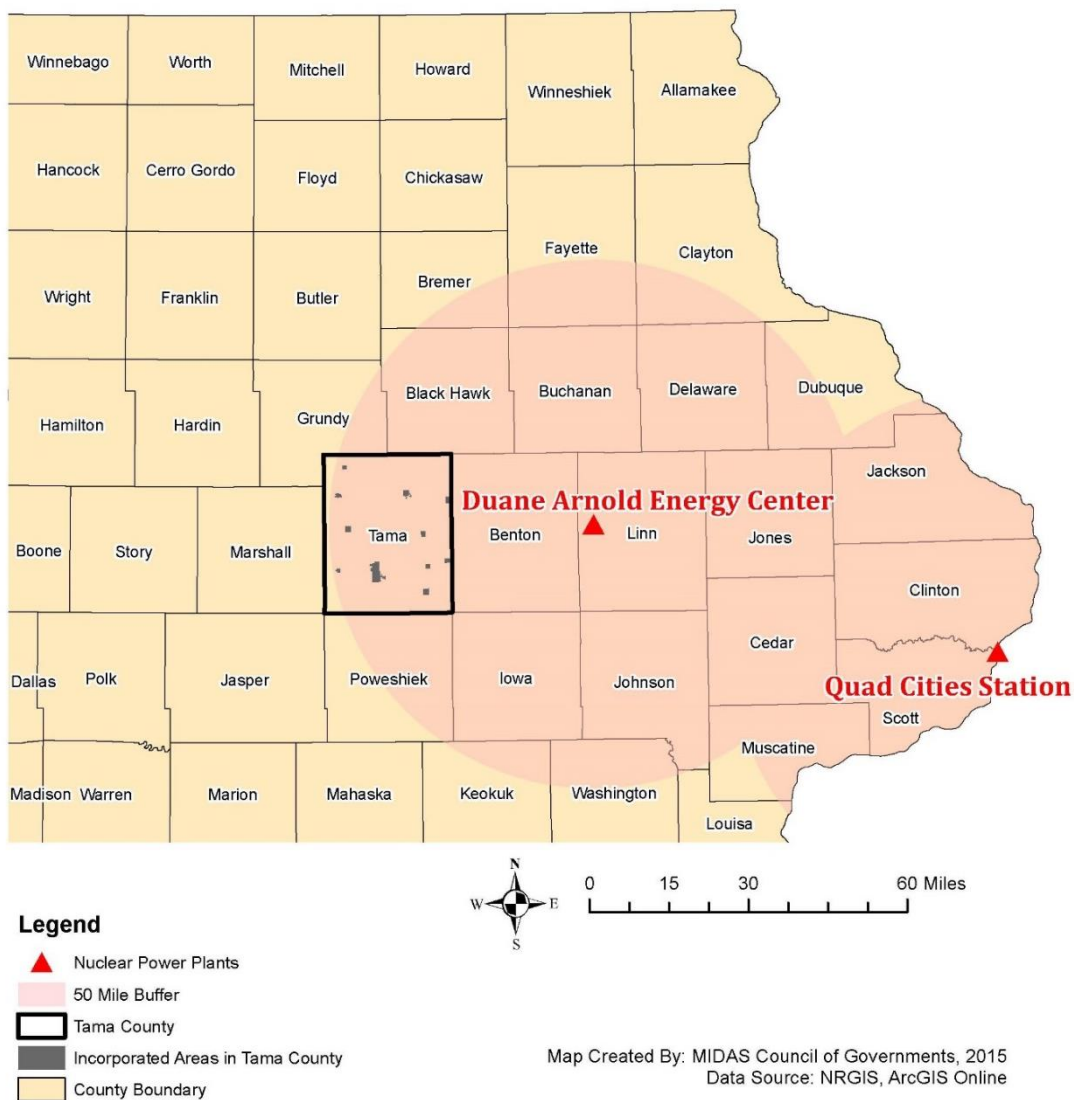
All jurisdictions in Tama County have fixed hazardous materials within their jurisdictional boundaries except for the City of Vining. All jurisdictions considered this risk in the plan.

Figure 4.1.12: Location of Fixed Hazardous Materials in Tama County



Tama County is within 50 miles of Duane Arnold Energy Center in Linn County and therefore must consider radiological hazards in this plan. All jurisdictions within Tama County are included within a 50-mile buffer of the Duane Arnold Energy Center, and the risks associated with the radiological hazard are similar across jurisdictions. Regarding transportation of radiological waste, none of the highways in Tama 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 the southern portion of Tama 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.

Figure 4.1.13: Fixed Radiological Hazards That Affect Tama 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 Tama County were profiled. This was done through review of the 2013 Iowa Hazard Mitigation Plan, past events and declared disasters, and reviewing data from Tama 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 Tama 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 poverty. 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, many communities experienced the hazard more than NCDC data portrayed, and communities were asked to describe how often, where, and to what extent the hazard occurred in their community. Task Force members also drew on a map of their city where flash flooding occurred. 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, the City of Chelsea, Iowa was affected by severe river flooding in 1993, 2008, 2013, and 2014, yet NCDC data does not list the City of Chelsea as having ever experienced a river flooding event. See Appendix F for news articles involving Chelsea, Iowa and river flooding. In fact, the current NCDC data available at the time of this plan update only lists river flood events that take place from 1996 to 2008. To better represent the flood risk of Iowa River communities in Tama County, county-wide flood events that affected the “Iowa River Basin” as described in the NCDC storm events database event details were counted. 11 of the total 16 county-wide river flooding events affected the Iowa River Basin. Four Iowa River communities of Chelsea, Montour, Tama, and Toledo were given the option to add part or all of the county-wide Iowa River Basin flood events to their jurisdictional river flooding counts. Chelsea chose to add all 11 events. Montour, Tama, and Toledo chose to add 10. These numbers are represented in each jurisdiction’s risk assessment scoring. To view this river flooding data, see Appendix G. Specific county-wide river flooding events that involved Iowa River communities are marked.

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 E 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 4.3.2.19-24. 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 2010 Tama 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. These new data sets had an impact on scores.

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, Extreme Heat, Radiological, Severe Winter Storms, Thunderstorms/Lightning/Hail, Tornadoes, and Wind Storms. It should be noted that Animal/Plant/Crop Disease was initially not considered a county-wide hazard, but all jurisdictions scores this hazard the same, and the risk of an animal/plant/crop disease is very similar among jurisdictions. Therefore, Animal/Plant/Crop disease was considered a county-wide hazard. Thunderstorms/Lightning/Hail and Tornadoes were also not initially considered a county-wide hazard, but they were added to this section during the plan review period. 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	1	1	5

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 Tama 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 neurologic 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. Tama County has had two reported cases of West Nile Virus that occurred in 2012 (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 Tama County alone is not clear, but it has affected the hog market at large.

In Tama County, according to a local veterinarian, there was a pseudo rabies outbreak in swine livestock in the 1990s. There was also an outbreak of pulmonary, respiratory, reproduction syndrome in the early 2000s. One disease that may affect Tama County in the future is the Emerald Ash Borer. While the disease has not yet been identified in Tama County, the adjacent counties of Black Hawk and Jasper 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 June 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 Tama County. According to the last Ag Census in 2012, Tama County only had 530 poultry that were sold, which gives the county a low risk for the disease to widely affect the agricultural economy in the county (National Agricultural Statistics Service 2015). According to the

map in Figure 4.1.4 (data obtained from NRGIS), Tama 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 Tama County, the previous historical occurrence is rare, especially on a scale that has significantly affected the region's economy or public safety. Tama 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 Tama County had a less than 10% chance of a significant animal/plant/crop disease occurring.

Vulnerability

Unincorporated Tama was identified as the jurisdiction most at risk for this hazard, as most domestic animals are located outside city corporate limits in Tama 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, Tama 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, Tama 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. The severity of impact would be low if a disease outbreak were to occur due to the safeguards currently in place. An outbreak would cause few, if any, injuries and some property damage. Critical facilities would not be impacted.

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	2	2	1	10

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: meteorologic 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, Tama 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, Tama County maintains between 26 and 60% 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 impact 25-50% of people and property in Tama 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.

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.

Extreme Heat

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

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 69 extreme heat events impacted Tama County from 1980 to 2013. 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 Tama 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 Tama County are affected when this type of hazard occurs.

Severity of Impact

Extreme heat has broad impacts for Tama County. On the whole, many communities in Tama 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 Tama County low, as long as people have access to a cool place. 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, however, can usually be resolved in less than four hours.

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	3	4	13

Definition

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

Description

Tama County is located within 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 Tama County is nearly 50 miles away from the facility, communities in Tama 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 Tama County. Effects would include increased vehicle traffic, as the portion of Highway 30 that runs through Tama 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 Tama County could also be affected.

Severity of Impact

The Task Force determined that a radiological event could cause serious injury and illness, major or long-term property damage, a shutdown of critical facilities for 24 to 72 hours, and a minor short-term environmental impact.

Speed of Onset

Radiological events cannot be predicted. Tama 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	3	2	17

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 well as disrupting emergency and medical services. Loose snow begins to drift when the wind speed reaches 9 to 10 mph under freezing conditions. The potential for some drifting is substantially higher in open country than in urban areas where buildings, trees, and other features obstruct the wind.

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 2013, Tama County experienced a total of 63 incidents of severe winter storms including: heavy snow (17), winter storms (16), ice storms (12), blizzards (10), cold/wind chill (7), 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 \$1.7 million in property damages and \$2.8 million in crop damages.

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, Tama 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 as 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 Tama 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 $\frac{1}{4}$ 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 up to a day in advance. Several notifications made by the National Weather Service include winter storm warning, blizzard warning, winter weather advisory, and a frost/freeze advisory.

Thunderstorms, Lightning, and Hail

Thunderstorms, Lightning, and Hail – 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 $\frac{3}{4}$ inch in diameter, wind 58 mph or higher, or tornadoes. High straight-line winds, which can often exceed 60 mph, are common occurrences and are often mistaken for tornadoes. 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, Tama County has experienced 188 thunderstorm winds, hail, lightning, or heavy rain events from 1961 to 2013 (the time frame for which data was available), which gives the county as a whole a score of 4 for historical occurrence. In total, these events have caused \$4.8 million in property damages and \$2.6 million in crop damages. The high winds during these events ranged from speeds of zero miles per hour (speed of wind was not captured) to 110 miles per hour. On the whole, the county occurrence is high; however, there are variations among jurisdictions.

A jurisdictional breakdown of historical occurrence is included in Table 4.2.4. Elberon and Vining had no recorded events according to NCDC data. Lincoln experienced five events. Chelsea, Clutier,

Dysart, Montour and Union Community School District experience between 8 and 12 events. Garwin, Gladbrook, Tama, Toledo, Traer, Tama County, GMG SD, North Tama School District, and South Tama Community School experienced more than 12 events according to NCDC data. It is probable that jurisdictions experience thunderstorms, lightning, and hail much more often than NCDC data has recorded, but communities were not given the opportunity to add additional historic events. NCDC data was used as the basis for historical occurrence and probability.

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

<u>Jurisdiction</u>	<u>Time Period</u>	<u># of Events</u>	<u>Total Damages</u>
Chelsea	6/1961 – 9/2013 (52.2 years)	10	\$30,000 (Property) \$20,000 (Crop)
Clutier		8	\$69,000 (Property) \$210,000 (Crop)
Dysart		9	\$462,000 (Property) \$303,000 (Crop)
Elberon		--	--
Garwin		14	\$826,000 (Property) \$268,000 (Crop)
Gladbrook		14	\$265,000 (Property) \$276,000 (Crop)
Lincoln		5	\$19,000 (Property) \$31,000 (Crop)
Montour		9	\$137,000 (Property) \$131,000 (Crop)
Tama		28	\$980,000 (Property) \$163,500 (Crop)
Toledo		20	\$1,781,000 (Property) \$1,172,000 (Crop)
Traer		23	\$234,000 (Property) \$44,000 (Crop)
Vining		--	--
Tama County Uninc.		48	\$60,000 (Property)

Data Source: NCDC Storm Events Database 2014

Probability

Based on the historical occurrences of the county, the county has a greater than 60% chance of a thunderstorm, lightning, or hail event 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 Tama 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 that affects a large portion of a jurisdictions. In addition to routine damage, South Tama Community School District and North Tama School District do not have a safe room in which to house their school population. Dysart, Traer, and Tama currently have mobile home communities that do not have access to a safe shelter in the event of inclement weather. These factors could affect each community's 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.

Tama County scored severity of 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 to 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	4	3	2	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, Tama County has experienced a total of 37 tornadoes from 1953 to 2011 (the earliest data available to the cutoff of 2013 for the purposes of data collection before the planning process began). These events caused a total of \$30.55 million in property damage and \$9,000 in crop damage. The intensity of these tornadic events ranged from an EF 0 to an EF 4 (May of 1989 in Unincorporated Tama County 7 miles west of Traer). For a summary of tornadic events in Tama County according to NCDC data, see Table 4.2.5.

Table 4.2.5. Historical Occurrence of Tornadoes in Tama County

<u>Jurisdiction</u>	<u>Time Period</u>	<u># of Events</u>	<u>Total Damages</u>
Chelsea	3/1953 – 5/2011 (58.2 years)	1	---
Clutier		2	\$75,000 (Property) \$5,000 (Crop)
Dysart		2	\$275,000 (Property)
Elberon		1	---
Garwin		3	\$10,000 (Property) \$2,000 (Crop)
Gladbrook		1	\$35,000 (Property)
Lincoln		0	---
Montour		1	\$250,000 (Property)
Tama		3	\$1,000 (Property) \$2,000 (Crop)
Toledo		3	\$25,250 (Property)
Traer		2	\$25,001,000 (Property)
Vining		0	---
Tama County Uninc.		18	\$4,882,500 (Property)

Data Source: NCDC Storm Events Database 2014

It should be noted that there were an additional three tornado events in Tama County that affected Traer (EF2), Lincoln (EF0), and Buckingham (EF1) in the summer of 2014. These events are not included in the NCDC data that is displayed in Table 4.2.5, nor are they included when scoring historical occurrence and probability for the affected jurisdictions. The events were excluded because they occurred after data collection began for the planning process. All hazard data collection sources available data from the earliest possible period (in this case, 1953) and imposes a cutoff date of December 2013 to ensure consistency. Including these events in the scoring would not change the scores that these communities received regarding historical occurrence and probability. These events are mentioned because they provide a more complete picture of tornado activity in the county.

As a whole, county-wide tornadic events in Tama 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 experienced less than four tornado events from 1953 to

2011. The exception for tornadoes is Tama County (unincorporated area), which experienced 18 tornado events between 1953 and 2011. 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 Tama County. As many events as possible were counted as within the appropriate location in which they occurred; the locations are reflected in Table 4.2.5 and Appendix G.

Probability

Based on NCDC data, Tama County has a greater than 60% chance of a tornadic event occurring in any given year, which results in a score of 4. 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, Tama County had a total of 369 mobile homes. There were mobile home units in Chelsea (4), Dysart (46), Elberon (7), Garwin (12), Gladbrook (2), Lincoln (4), Montour (14), Tama (57), Toledo (70), Traer (27), and Vining (6). The remaining mobile homes were located in unincorporated areas of the county. Communities in Tama County have various access to safe rooms, shelters, basements, and public areas that can serve as shelters.

As a whole, Tama County scored vulnerability to tornadoes as a 3, meaning that between 51-75% of people and property might be affected. Communities in Tama 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, Tama County has the highest probability of experiencing an F0 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 are also 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. Communities in Tama County scored the severity of impact from a tornado as a 2, meaning that more common, less severe damages from tornadoes such as broken tree branches and windows would be the most likely to occur. These jurisdictions considered the potential for catastrophic effects due to a tornado.

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.

Wind Storm

Wind Storm – Hazard Score Calculation					
Historical Occurrence	Probability	Vulnerability	Severity of Impact	Speed of Onset	Total Score
4	4	2	2	4	16

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 Tama 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, Tama County has counted 25 high wind events that occurred between 1996 and 2012. Wind speeds during these windstorms ranged from zero miles per hour to 71 miles per hour. No deaths or injuries were reported during these windstorm events. These events caused \$795,110 in property damage and \$30,100 in crop damage.

Probability

Based on historical data, Tama 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 between 25-50% of the population in Tama County are vulnerable to adverse effects from wind storms.

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 Tama 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 up to 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 Failure – Hazard Score Calculation						
Jurisdiction	Historical Occurrence	Probability	Vulnerability	Severity of Impact	Speed of Onset	Total Score
Chelsea	1	1	1	1	4	8
Clutier	1	1	1	1	4	8
Dysart	1	1	1	1	4	8
Elberon	1	1	1	1	4	8
Garwin	1	1	1	2	4	9
Gladbrook	1	1	1	1	4	8
Lincoln	1	1	1	1	4	8
Montour	1	1	2	2	4	10
Tama	1	1	2	3	4	11
Toledo	1	1	1	1	4	8
Traer	1	1	1	1	4	8
Vining	1	1	1	1	4	8
Tama County	1	1	1	1	4	8
GMG Community SD	1	1	1	1	4	8
North Tama Community SD	1	1	1	1	4	8
South Tama Community SD	1	1	1	1	4	8
Union 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. Tama County has a total of 30 dams. 28 of these dams are Low Hazard Dams and two 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 (21) in the county were built for the purposes of fire protection, stock or small fish ponds. Eight dams were built for the purposes of recreation, and one was built for the purposes for debris control. There are an additional 12 dams within five miles of Tama County boundaries. Two of those dams are moderate classification dams but pose a minimal risk to downstream communities in Tama County. See Figure 4.1.6 in this plan for a map of dams in Tama County and adjacent counties.

According to the National Levee Database, Tama County has one levee which is located in the City of Tama on the north bank of the Iowa River near river mile 188.5 (US Army Corps of Engineers 2015). The levee's length is 2.71 miles, and it protects less than one square mile of the community. The levee was completed in January of 1995 in response to significant flood damages for the City of Tama in the floods of 1993. The most recent periodic inspection of the levee in 2013 resulted in a rating of "Minimally Acceptable," 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 one levee in Tama 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 28 other levees within 75 miles of Tama County; however, none of these levees pose a risk to Tama County communities. Many of the levees are not located on the same rivers as those in Tama County (ie: levees in Black Hawk, Dallas, Fayette, Polk, Wapello Counties). There are three levees in the City of Marshalltown in Marshall County, which is downstream from Tama County. If a levee breach occurred, damage would still be minimal. Any displaced water would have to travel at least 20 river miles before reaching the nearest Tama County communities located on the Iowa River, which is the City of Tama. This city is also protected by a levee system. For a list of levees within 75 miles of Tama County, see Appendix H.

Historical Occurrence

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

Probability

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

Vulnerability

A failure of a low hazard dam, which includes the majority of dams in Tama 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.

Most 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. Garwin is located four miles downstream from one of the two “Moderate Hazard” dams in Tama County. This dam, the Union Grove Lake Dam, has the capacity to hold 2120 acre feet of water; however, if a dam failure were to occur, limited damage would be expected. Only 9% of Garwin’s total parcels are located in the floodplain. 70% of those parcels in the floodplain are classified as agricultural. These factors limit Garwin’s vulnerability to a dam failure. Garwin determined that less than 25% of people and property would be impacted if dam failure occurred. The second Moderate Hazard dam in the county, Otter Creek Lake Dam, is not located near any incorporated areas.

The City of Montour scored vulnerability as a 2 because so many dams are upstream and within close proximity. Multiple dam failures, while unlikely, could impact the city to a greater extent. The City of Tama scored vulnerability as a 2 because it has the county’s only levee within its

jurisdictional boundaries. The levee currently protects 17% of the total parcels in the city, many of which are classified as residential or commercial. The Task Force members from Montour and Tama determined that a worse-case scenario could result in 26-50% of people and property might be affected through property damage, closed roads, or other inconveniences.

Severity of Impact

Most jurisdictions in Tama 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. Garwin and Montour determined their severity of impact to be a 2. Impacts could cause minor or short-term property damage or environmental impacts. The City of Tama 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.

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. All 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
Chelsea	1	2	4	3	4	14
Clutier	1	1	1	1	4	8
Dysart	1	1	1	1	4	8
Elberon	1	1	1	1	4	8
Garwin	1	1	2	2	4	10
Gladbrook	1	2	1	2	4	10
Lincoln	1	1	1	1	4	8
Montour	4	4	3	3	4	18
Tama	2	3	1	1	4	11
Toledo	1	1	3	2	4	11
Traer	1	1	2	1	4	9
Vining	-	-	-	-	-	-
Tama County	4	4	1	1	4	14
GMG Community SD	1	1	2	2	4	10
North Tama Community SD	1	1	1	1	4	8
South Tama Community SD	2	3	2	2	4	13
Union Community SD	1	1	1	1	4	8

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, 11 flash flooding events have occurred in the county from 2000 to 2013. A summary of NCDC data on flash flooding by jurisdiction is included in Table 4.2.1. These events have caused a total of \$1,010,000 in property damage and \$460,000 in crop damage. Some communities identified flash flooding as a much more common problem than NCDC data supported. Because flash flooding appeared to be a larger issue in certain communities, communities were given the opportunity to add flash flooding occurrences to their total jurisdictional count. See the methodology details included earlier in this chapter of the plan for more information. The Cities of Chelsea, Montour, and Tama chose to add flash flooding events to their historical occurrence counts in addition to the data from NCDC. Flood events could go unrecorded for several reasons. Either they do not cause substantial damage to houses or structures, or they may occur around the same time of a larger, more publicized event. Nevertheless, the events do 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. The City of Vining chose to remove flash flooding from their risk assessment because the city is on a hill and has no areas that have ever experienced the hazard. The Cities of Clutier, Dysart, Elberon, Garwin, Gladbrook, Lincoln, Toledo, and Traer all had less than four flash flood events according to NCDC data and did not state that flash flooding was an issue that occurred with any regularity beyond what the data portrayed. These jurisdictions received a 1 for historical occurrence. GMG Community School District, North Tama Community School District, and Union Community School District also received a score of 1 for historical occurrence.

NCDC data shows that the City of Chelsea had one flash flood event, but the Task Force recalled that flash flooding affected the city roughly once every 5 years, resulting in a historical occurrence count

of two events but still a score of 1. Flash flooding mainly occurred in the southern portion of the city near the Iowa River. The city did not complete a flash flood map but noted that it had occurred at least twice between 2000 and 2013 (the time frame used by jurisdictions for which NCDC data was available).

The City of Tama similarly chose to add flash flooding events in addition to the NCDC data. According to the NCDC, the City of Tama experienced 1 flash flood event, but the Task Force recalled at least 7 events, which resulted in a score of 2 for historic occurrence. The city experienced some flash flooding problems near the levee during major rain events and prolonged wet weather. The city has two pumps in the dike that they use to pump water and bypass sewers if this flooding occurs. This flooding impacts residential basements. Major flash flooding events have also occurred downtown where water has collected to a depth that was over the curbs after torrential downpours. This type of flooding has occurred roughly three times in the last three years. South Tama Community School District also received a score of 2 for historical occurrence.

The City of Montour stated that flash flooding occurred as regularly as once every year, and they could recall more than 12 different flood events, resulting in a historical occurrence score of 4. In the western part of town, a creek can quickly rise due to field runoff. In past years, flash flooding has surrounded the lift station and the lagoon. Even during short periods of heavy rainfall, residents have reported sewer backups in their homes.

According to the NCDC, Tama County experienced 2 flash flood events, but flash flooding was reported as frequently as every year to every other year. The Task Force recalled flash flooding instances at least 10 times in addition to the events reported through NCDC. Flash flooding occurs in areas that are in the identified Special Flood Hazard Area.

Specific jurisdictions in Tama County that identified areas of their city that are prone to flash flooding include Dysart, Garwin, Montour, Tama, Toledo, and Traer. See Appendix D for flash flooding maps that identify areas in each of these jurisdiction that are prone to flash flooding.

Table 4.2.1. NCDC Data on Flash Flooding in Tama County

<u>Jurisdiction</u>	<u>Time Period</u>	<u># of Events</u>	<u>Total Damages</u>
Chelsea	7/2000 – 5/2013 (12.8 years)	1	\$100,000 (Property) \$250,000 (Crop)
Clutier		1	\$10,000 (Property)
Dysart		0	---
Elberon		0	---
Garwin		1	\$50,000 (Property) \$10,000 (Crop)
Gladbrook		1	\$10,000 (Property)
Lincoln		0	---
Montour		1	\$50,000 (Property)
Tama		1	\$10,000 (Property)

Toledo		1	\$10,000 (Property)
Traer		2	\$470,000 (Property)
Vining		0	---
Tama County Uninc.		2	\$300,000 (Property) \$200,000 (Crop)

Probability

The probability of flash flooding is varied across jurisdictions. Probability is dependent on historic occurrences. Clutier, Dysart, Elberon, Garwin, Lincoln, Toledo, Traer, GMG Community School District, North Tama Community School District, and Union Community School District had a probability of less than 10%, which resulted in a score of 1. Chelsea and Gladbrook had a probability of 10-25%, which resulted in a score of 2. The City of Tama and South Tama Community School District had a probability of 26-60%, which resulted in a score of 3. The City of Montour and Tama County had a probability of more than 60%, which resulted in a score of 4.

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 Tama County communities are prone to flash flooding. Clutier, Dysart, Elberon, Gladbrook, Lincoln, Tama, Tama County, North Tama Community School District, and Union Community School District all determined that less than 25% of people and property might be affected, resulting in a vulnerability score of 1. Most of these communities do not have widespread flash flooding issues that affect a large amount of people. Garwin, Traer, GMG Community School District, and South Tama Community School District determined that 26 to 50% of people and property might be affected by flash flooding, which resulted in a score of 2. Traer is surrounded by waterways on the west, north, and east which could impact many people if flash flooding occurs. Garwin can experience flash flooding near the Deer Creek floodplain and it can affect a large portion of people in town. Montour and Toledo determined that 51 to 75% of people and property might be affected by flash flooding, resulting in a score of 3. Many Montour residents experience flooding in their basements from backed up sewer systems. Toledo cited Wolf Creek as a significant vulnerability for the city that may cause future flash flooding events. Lastly, Chelsea determined that more than 76% of the city's people and property would be affected by flash flooding events. A vast majority of the city is located in the Iowa River floodplain. Many cities in Tama County are affected by flash flooding due to their current sewer systems, which cannot handle large amounts of water in a short period of time.

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. In Iowa, there have been 643 flash flood events since 1993, and there have been four deaths and eight injuries.

Clutier, Dysart, Elberon, Lincoln, Tama, Traer, Tama County, North Tama Community School District, and Union Community School District rated 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. Garwin, Gladbrook, Toledo, GMG Community School District, and South Tama Community School District rated severity of impact as a 2; mainly, there may be short term property damage. Chelsea and Montour rated severity of impact as a 3. When flash flooding occurs in these cities, 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 Tama 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
Chelsea	1	1	1	1	4	8
Clutier	1	1	1	1	4	8
Dysart	1	1	1	1	4	8
Elberon	1	1	1	1	4	8
Garwin	1	1	1	1	4	8
Gladbrook	1	1	1	1	4	8
Lincoln	1	1	1	1	4	8
Montour	1	1	1	1	4	8
Tama	1	1	1	1	4	8
Toledo	1	1	1	1	4	8
Traer	1	1	1	1	4	8
Vining	1	1	1	1	4	8
Tama County	4	4	1	1	4	14
GMG Community SD	1	1	1	1	4	8
North Tama Community SD	1	1	1	1	4	8
South Tama Community SD	1	1	1	1	4	8
Union 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 Tama County are completely surrounded by agricultural land. Parcels located on the outskirts of incorporated areas and parcels in Unincorporated Tama 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 Tama County. This does not account for small or contained grass fires that may not have been reported. Tama 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 is minimal (one or less). In addition, many communities in Tama County have adequate fire gear to respond to most grassland fires and do not consider small grassland fires significant hazard events.

The only area in Tama County with an elevated level of risk is the unincorporated area. There have been well over 12 incidences of grass and wildland fires over the last ten years, which results in a score of 4 for historical occurrence.

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. The unincorporated area of Tama County has a high probability (a score of 4) 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 Tama 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. Less than 25% of people and property would be affected by any grass or wildland fire occurring in any Tama County community. All jurisdictions in Tama County scored vulnerability as a 1.

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. All jurisdictions in Tama County scored severity of impact as a 1.

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 Tama 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
Chelsea	2	3	2	2	4	13
Clutier	2	2	1	1	4	10
Dysart	2	3	3	4	4	16
Elberon	1	1	1	1	4	8
Garwin	1	2	1	2	4	10
Gladbrook	2	3	1	2	4	12
Lincoln	2	2	1	1	4	10
Montour	1	2	4	4	4	15
Tama	4	4	3	4	4	19
Toledo	3	4	4	4	4	19
Traer	2	3	1	1	4	11
Vining	1	1	1	1	4	8
Tama County	1	1	4	3	4	13
GMG Community SD	1	2	1	2	4	10
North Tama Community SD	2	3	1	1	4	11
South Tama Community SD	4	4	2	1	4	15
Union Community SD	2	3	1	2	4	12

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 Tama County are fairly common. From 1995 to 2013, the county experienced a total of 80 hazardous spills. 60% of these events

involved fixed incidents and 25% 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.

Elberon, Garwin, Montour, Vining, and GMG Community School District received a score of 1 for historical occurrences because each jurisdiction had less than 4 hazardous material spill events. Chelsea, Clutier, Dysart, Gladbrook, Lincoln, Traer, North Tama Community School District, and Union Community School District received a score of 2 with occurrences ranging from 4 to 7. Toledo received a score of 3 with occurrences of 12, and Tama and South Tama Community School District received a score of 4 with 27 hazardous materials spills.

Maps illustrating each jurisdiction's vulnerability to specific types of hazardous materials facilities are included in the Appendix I. 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 Tama County

<u>Jurisdiction</u>	<u>Time Period</u>	<u># of Events</u>	<u>Incident Type</u>				
			<u>Fixed</u>	<u>Trans.</u>	<u>RR</u>	<u>Manure</u>	<u>Unknown</u>
Chelsea	5/1995 – 10/2013 (18.4 years)	6	3	2	0	1	0
Clutier		4	4	0	0	0	0
Dysart		5	4	1	0	0	0
Elberon		1	0	0	0	1	0
Garwin		3	2	1	0	0	0
Gladbrook		7	5	1	0	0	1
Lincoln		4	2	2	0	0	0
Montour		3	3	0	0	0	0
Tama		27	17	6	3	1	0
Toledo		12	7	3	0	2	0
Traer		7	1	3	0	1	2
Vining		0	0	0	0	0	0
Tama County Uninc.		1	0	1	0	0	0

Data Source: Iowa DNR Hazardous Spill Summary Report 2014

According to the USDOT Pipeline and Hazardous Materials Safety Administration (2014), Tama County experienced one pipeline incident in the last 20 years. It was not specified where in the county the incident occurred, but excavation damage occurred to the Northern Natural Gas Pipeline in October of 1998 causing \$52,000 in damages but not resulting in any injuries or significant spills.

Other than this incident, the county has had no pipeline incidents. 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. Oil, natural gas, and ammonia pipelines exist in Tama 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. Elberon, Vining, and Tama County received a score of 1, meaning that there is less than 10% chance of a hazardous materials spill occurring in any given year. Clutier, Garwin, Lincoln, Montour, 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. Chelsea, Dysart, Gladbrook, Traer, North Tama Community School District, and Union Community School District received a score of 3, meaning that there is a 26-60% chance of a hazardous materials spill occurring in any given year. Tama, Toledo, and South Tama 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 Clutier, Elberon, Garwin, Gladbrook, Lincoln, Traer, Vining, North Tama Community School District, and Union Community School District estimated that their jurisdiction's vulnerability to a hazardous spill is low with a score of 1. Many of these jurisdictions

have very few hazardous materials facilities within their jurisdictional boundaries or few facilities that pose significant risk to a large amount of people (ie: underground storage tanks, water treatment facilities, etc.). These jurisdictions estimated that less than 25% of people or property would be affected in the event of a hazardous materials event. While Gladbrook and Traer do have pipelines, they have natural gas pipelines that do not pass through the incorporated area of the city; rather, the pipeline boundary stops before the corporate line (according to GIS data). Traer also has a crude oil pipeline that passes within one mile of its incorporated boundaries, but the pipeline has had no history of spills and members of the Task Force did not feel that the location of the pipeline required a higher score than 1, meaning that less than 25% of people or property would be affected in the event of a spill.

The Task Force members of Chelsea and South Tama 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. Chelsea is a relatively small community in Tama County with the Union Pacific rail line running through the center of town. Although the town does not have a large number of high impact hazardous materials facilities, half of the people in the city might potentially be impacted in the event of a spill related to a railroad incident since the city is so small. Chelsea also has a natural gas pipeline that runs through the northeast corner of town. An event related to this pipeline would likely not affect a large amount of people, but its location contributes to Chelsea's vulnerability, especially considering the small size of the town. While South Tama Community School District is in the Tama and Toledo area 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 Dysart and Tama 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. While Tama has a large amount of hazardous materials facilities, many of these facilities are underground storage tanks that would not affect a large amount of people in singular spill events. Tama does, however, have the Union Pacific Rail line that runs through the southern portion of town. If an accident involving hazardous materials were to occur, it could affect more than 50% of the population either through derailment, fumes, or through road closures. In addition, Tama has two pipelines – a natural gas pipeline and a crude oil pipeline – that are located within one mile of the incorporated city. The natural gas pipeline runs through the northern portion of the city, and the crude oil pipeline is located just east of the city. The location of these pipelines increase Tama's vulnerability to hazardous materials events.

Dysart has one Tier II chemical storage facility (East Central Iowa Co-op) and an air quality facility (Tama Benton Co-op) in the city that increases its vulnerability to the amount of people who could be exposed to hazardous spills. If one of these facilities were part of a significant spill event, 51-75% of people or property might be affected. Dysart also has a natural gas pipeline that is located

in the northwestern corner of the city. A spill from the pipeline is unlikely and would not affect a significant amount of people, but its location in the city does increase the city's vulnerability.

The Task Force members of Montour, Toledo, and Tama 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. Montour has the Union Pacific rail line that runs through the center of the town. If an incident related to the railroad were to occur, more than 75% of people and property might be affected through derailed rail cars, fumes, or closed roads. The city also has a natural gas pipeline and an ammonia pipeline located within one mile of its jurisdictional boundaries. 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 city.

Toledo has two industrial facilities (Z Line Limited and Zimmerman Trucking) and many underground storage tanks. The industrial facilities especially add to the city's vulnerability; more than 75% of people and property could be affected or inconvenienced in the event of a spill. Toledo is also located at the intersection of two major state highways, Highways 30 and 63. Hazardous spills could result from high volumes of hazardous materials that are transported on these highways and through the city. In regard to pipelines, the city has natural gas pipelines that run to the northeast and the southwest. The pipelines are both located outside of the incorporated area, but their location adds to the vulnerability of the city to be affected by pipeline events.

Finally, Tama County has significant vulnerability to hazardous spills. While the unincorporated areas of the county do not have a significant history of hazardous materials spills, these areas have increased vulnerability due to several factors. First, Tama County has a large amount of hazardous materials facilities. Unincorporated Tama County actually contains nearly the same amount of hazardous materials facilities than all on the incorporated areas of the county combined. Out of a total of 326 facilities in all of Tama County, unincorporated areas contain 48% of those facilities (NRGIS 2015). For the location of these facilities, see maps in Figure 4.1.12 and Appendix I in this plan.

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. Overall, the Unincorporated Tama County Task Force members scored vulnerability at 4, meaning that more than 75% of people or property could be affected in some way in the event of a spill. Tama County also has five major pipelines that run through the county and carry natural gas, ammonia, and crude oil. A pipeline incident could occur in a rural area of the county and still affect a large amount of people through damage to rivers, drinking water supply, or road and rail closures. More than 75% of people in the county could be affected by a pipeline incident.

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. Tama County depends on the Waterloo or Cedar Rapids Fire Department for these incidents because their firemen are trained for hazardous materials incidents. Other jurisdictions are working with Tama 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. Clutier, Elberon, Lincoln, Traer, Vining, North Tama Community School District, and South Tama 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. Elberon, Lincoln, and Vining have six or fewer facilities in their entire incorporated area and have their own fire departments. The risk in these jurisdictions for significant impacts is low. In Clutier (10 facilities) and Traer (more than 20 facilities), many facilities are underground storage tanks rather than larger-scale industrial facilities. Both cities have their own fire departments that can respond quickly to a hazardous materials situations and call for reinforcements from Waterloo if needed. None of the jurisdictions that score severity of impact as a 1 have railroads passing through their cities. Traer is the only city with a score of 1 that is in close proximity to a pipeline; however, no pipelines go within or through the incorporated area, and the city anticipate that any impacts from a pipeline leak could likely be detected quickly and would not cause property damage.

Chelsea, Garwin, Gladbrook, GMG Community School District, and Union 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, Chelsea is the only city to have a train or a pipeline in or near the jurisdiction. Gladbrook is the only jurisdiction to have a major highway in their corporate limits, State Highway 96. Hazardous materials incidents involving a highway, train, or pipeline could cause minor property damage. Regarding hazardous materials facilities, Chelsea has 9 facilities, one of which is an industrial facility (Iowa Oat Processors) and one of which is an air quality facility (Heartland Co-Op). Garwin has 8 facilities, and only one is a Tier II chemical storage facility (New Century Farm Services). Gladbrook has 17 facilities, and only one is a Tier II chemical storage facility (again, a New Century Farm Services). An incident involving these types of facilities may cause minor property damage or minor injuries. Overall, the three jurisdictions have a relatively small severity of impact.

Dysart, Montour, Tama, and Toledo scored severity of impact as a 4, meaning that property damage, multiple injuries, or even death could be possible. Dysart has a natural gas pipeline that runs through the northwestern side of town. Dysart also has four different Co-op locations in town (3 Tama-Benton and 1 East Central Iowa). Two of these facilities are considered Tier II chemical storage facilities and another two are considered air quality facilities. Montour has a railroad running through the city in addition to two pipelines (natural gas and ammonia) that are located on the outskirts of the corporate limits to the west. Tama has a railroad, a natural gas pipeline, a crude oil pipeline, and various hazardous materials facilities that could cause serious injuries. Toledo has a natural gas pipeline and 27 individual hazardous materials facilities, 3 of which are classified as Tier II facilities or Industrial Facilities that require a storm water permit. In extreme circumstances, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the product contaminates the municipal water supply or water system such as a river, lake, or aquifer.

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
Chelsea	1	1	1	1	1	5
Clutier	-	-	-	-	-	-
Dysart	1	1	1	1	1	5
Elberon	1	1	1	2	1	6
Garwin	1	1	1	1	1	5
Gladbrook	1	1	1	1	1	5
Lincoln	1	1	1	3	1	7
Montour	1	1	1	1	1	5
Tama	1	1	1	1	1	5
Toledo	-	-	-	-	-	-
Traer	1	1	1	1	1	5
Vining	1	1	1	1	1	5
Tama County	1	1	2	2	1	7
GMG Community SD	1	1	1	1	1	5
North Tama Community SD	1	1	1	1	1	5
South Tama Community SD	1	1	1	1	1	5
Union Community SD	1	1	1	1	1	5

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). Not all jurisdictions in Tama County considered Human Disease Epidemic hazards to be a threat; the Cities of Clutier and Toledo decided to remove this hazard from their portion of the plan and risk assessment. Both cities have relatively low populations when compared to other areas of Iowa. Neither city has experienced any historical occurrence of a human disease epidemic. Both cities also have fire departments and emergency responders who can respond to cases on the rare chance that they occur and seek out assistance from state entities. While other jurisdictions elected to consider the threat of a human disease epidemic, all jurisdictions scored this hazard with low scores. Historical occurrence and likelihood of a human disease epidemic occurring in Tama County is extremely low.

Historical Occurrence

According to the Iowa Department of Public Health, Center for Acute Disease Epidemiology, Tama 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 2013 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 15 times in the county include *Cryptospora*, *Pertussis*, *Giardia*, and *E. Coli*. Not all of the diseases previously described, however, are considered epidemics, plagues, or infestations, according to the definition of a human disease epidemic. The county did have two reported cases of the West Nile Virus in 2012, but these diagnoses did not extend beyond the two affected individuals. There have been no incidences of human disease during the studies time frame that could be considered an epidemic in Tama County. Historical occurrence was scored as a 1.

Probability

It is highly likely that human diseases will occur in Tama 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 anywhere in Tama County is extremely low in any given year (less than 10%).

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 Tama County are vulnerable to a pandemic human disease, which resulted in a score of 1 for vulnerability. Tama County estimated their vulnerability with a score of 2, meaning that 25-50% of people or property might be affected. A human disease epidemic occurring anywhere in Tama 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.

Most jurisdictions in Tama County ranked severity of impact as a 1, meaning that there would likely be few, if any, 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 Tama County that can prevent disease outbreaks, and in the worst case, monitor these events so that they do not reach epidemic proportions. Elberon and Tama County ranked severity of impact as a 2, meaning that there could be some minor injuries. Lincoln ranked severity of impact as a 3, meaning that the jurisdiction might expect more serious injuries or illness in the event of an epidemic. 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 Tama 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
Chelsea	1	1	1	3	4	10
Clutier	1	1	1	1	4	8
Dysart	1	1	2	2	4	10
Elberon	1	1	2	2	4	10
Garwin	1	2	2	2	4	11
Gladbrook	1	2	3	3	4	13
Lincoln	1	1	4	3	4	16
Montour	2	4	4	3	4	17
Tama	1	1	1	1	4	8
Toledo	2	2	4	4	4	16
Traer	1	1	1	1	4	8
Vining	1	1	1	1	4	8
Tama County	1	2	1	2	4	10
GMG Community SD	1	2	2	2	4	11
North Tama Community SD	1	1	1	1	4	8
South Tama Community SD	1	1	1	1	4	8
Union Community SD	1	1	3	3	4	12

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 Tama County. Sewer system failure, power failure, bridge failure, and infrastructure damaged by flooding are just a few of these issues. One of the most common causes of infrastructure failure in Tama County is related to sewer and water systems. Most of the municipalities in Tama 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. Dysart, Gladbrook, Montour, Tama, Toledo, and Traer described issues with the sewer system overflowing and causing system overloads. Some cities are able to pump the system in order to relieve pressure and not cause flooding into residential homes; not all cities currently have the capacity to pump. Vining does not have a centralized sewage collection and treatment service. Many lots in the city are too small for compliant on-site sewage treatment systems.

Montour has experienced a significant amount of infrastructure failure related to sewer system overloading. The city had their sewer system replaced roughly two years ago, but they still need to replace their water treatment plant, which was built in 1947. Some lines in the treatment plant are only $\frac{3}{4}$ of an inch, which creates water sludge buildup in pipes. The city has to flush their hydrant at least once a year because of this. Toledo's water and sewer system dates back to the 1800s, according to Mark Zmolek, the Superintendent of Public Works for Toledo.

In Garwin, the city is vulnerable to infrastructure failure due to their old transmission lines for power delivery. Tama 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. The county recalled one particular instance in 2014 when the Abbott Ave. Bridge failed near the Marshall County/Tama County line. The City of Chelsea has several bridges in need of repair, but the city also experiences infrastructure failure due to flooding. Chelsea must perform road, sewer, and water system maintenance more often because the city is extremely vulnerable to river flooding from the Iowa River.

Some cities in Tama 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. Montour and Toledo scored historic occurrence as a 2, meaning that 4 to 7 infrastructure failure events have occurred in the last 10 years. Both of these cities have issues with their sewer and water systems (although Montour just replaced their sewer system two years ago). 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. Chelsea, Clutier, Dysart, Elberon, Lincoln, Tama, Traer, and Vining received scores of 1, meaning that each jurisdiction had a less than 10% probability of occurring in any given year. North Tama Community School District, South Tama Community School District, and Union 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.

Garwin, Gladbrook, Toledo, and Tama County received a probability score of 2, meaning that an infrastructure failure had a 10-25% chance of occurring. GMG Community School district also received a score of 2. These jurisdictions had one to two events that they could remember occurring and that were significant.

Montour received a probability score of 4, meaning that a chance of an infrastructure failure occurring was greater than 60%. Montour recalled at least 7 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

Chelsea, Clutier, Tama, Traer, Vining, and Tama County 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. North Tama Community School District, Union Community School District also scored vulnerability as a 1.

Dysart, Elberon, and Garwin scored vulnerability as a 2, meaning that 25-50% of people and property might be affected. These cities' sewer and water system issues could affect a larger amount of people. Garwin also cited aging power lines as a concern for power outages that could

affect portions of the city. GMG Community School District also scored vulnerability as a 2, citing the potential for water main breaks and downed power lines near school district facilities.

Gladbrook and Union Community School District scored vulnerability as a 3, meaning that 51-75% of people and property could be affected by an event. Lincoln, Montour, and Toledo scored vulnerability as a 4, meaning that more than 75% of people and property could be affected by an event. Many of the communities with a score of 3 or 4 considered significant flood events and power outages to be possible.

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.

Clutier, Tama, Traer, and Vining scored severity of impact as a 1, meaning that injuries and property damage would be very insignificant, if they would occur at all. North Tama Community School District and South Tama Community School District also scored severity of impact as a 1.

Dysart, Elberon, Garwin, and Tama County scored severity of impact as a 2, meaning that some property damage or injuries could occur in an event, but these occurrences would be limited. Any property damage would not threaten the structural stability of buildings. GMG Community School District also scored severity of impact as a 2.

Chelsea, Gladbrook, Lincoln, and Montour scored severity of impact as a 3, meaning that major property damage could occur from infrastructure failure events. These communities were worried less about injuries and estimated that injuries would still be minimal or minor. Union Community School District also scored severity of impact as a 3.

Toledo scored severity of impact as a 4, meaning that property could be damaged or destroyed beyond repair in the event of infrastructure failure. The city had such a high score because of its old water and sewer systems. 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
Chelsea	3	4	4	3	2	16
Clutier	1	1	1	1	2	6
Dysart	1	1	1	1	2	6
Elberon	1	1	1	1	2	6
Garwin	1	2	2	2	2	9
Gladbrook	1	2	1	2	2	8
Lincoln	1	1	1	1	2	6
Montour	3	4	4	4	2	17
Tama	4	4	1	1	2	12
Toledo	3	4	2	1	2	12
Traer	1	1	1	1	2	6
Vining	1	1	1	1	2	6
Tama County	4	4	2	3	2	15
GMG Community SD	1	2	2	2	2	9
North Tama Community SD	1	1	1	1	2	6
South Tama Community SD	4	4	2	2	2	13
Union 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, Tama County experienced 30 flood events from 1996 – 2008 (the time frame for which data was available). These events caused a total of over \$1.3 million in property damage and nearly \$20.5 million in crop damage. 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 Tama County (NCDC Data)

Jurisdiction	Time Period	# of Events	Total Damages
Chelsea	2/1996 – 5/2008 (12.2 years)	0	---
Clutier		1	\$10,000 (Property)
Dysart		1	\$10,000 (Property)
Elberon		1	\$10,000 (Property)
Garwin		0	---
Gladbrook		3	\$65,000 (Property)
Lincoln		1	\$20,000,000 (Crop)
Montour		1	\$10,000 (Property)
Tama		3	\$120,000 (Property) \$10,000 (Crop)
Toledo		1	\$100,000 (Property) \$10,000 (Crop)
Traer		0	---
Vining		0	---
Tama County Uninc.		16	\$954,070 (Property) \$458,040 (Crop)

Data Source: NCDC Storm Events Database 2014

As was described in the beginning of this chapter, NCDC data appeared to under-report the number of flood events that affected each jurisdiction. To better represent the flood risk of Iowa River communities (Chelsea, Montour, Tama, and Toledo) in Tama County, those communities were given the option to add a maximum of 11 river flooding events to their jurisdictional flood counts. These events were described by NCDC as county-wide events that affected the Iowa River Basin. Chelsea chose to add all 11 events. Montour, Tama, and Toledo chose to add 10. These numbers are represented in each jurisdiction's risk assessment of historical occurrence and probability. River flooding data is included in Appendix G. Specific county-wide river flooding events that involved Iowa River communities are marked.

As an additional justification for allowing some communities to increase the count of river flooding events, it should be noted that during the previous planning process, NCDC data was available as far back as 1950 for river flooding events. According to the previous plan, since 1950, Tama County experienced 47 river flooding events with total property damages at nearly \$165.5 million and total crop damages at nearly \$47.3 million. This data more than doubles the number of river flooding events for the county and provides a broader picture of the extent to which flooding is an issue for some communities in Tama County. This data is meant to serve as background information, but it was not included as part of the risk assessment scoring because it is not broken down by jurisdiction.

Each community has its own specific issues pertaining to flooding. There is significant variability among communities in Tama 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. Clutier, Dysart, Elberon, Garwin, Gladbrook, Lincoln, Traer, and Vining 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. Dysart and Vining noted that flooding has almost never been an issue. Vining is located on a hill and flooding generally does not damage homes or businesses. There is a low-lying floodplain on the southwest side of the city that is predominantly farm land. Clutier has also not had historic issues with river flooding, although it was noted that Salt Creek on the southwestern side of the city does flood occasionally. Elberon, Garwin, Gladbrook, Lincoln, and Traer have all had fewer than 4 occurrences but did describe any areas in the city as particularly vulnerable. GMG Community School District, North Tama Community School District, and Union Community School District also received scores of 1 for historical occurrence.

Chelsea, Montour, and Toledo received a score of 3 for historical occurrence, meaning that these cities experienced 8 to 12 river flooding events. Since the last plan, Chelsea has experienced flooding in 2008, 2013, and 2014. 2014 was a record level flood along the Iowa River. In 2014, five to six homes in Chelsea had water on the first floor; the amount of water was 12 inches or less. Flooding affects many aspects of the city, including several local businesses that routinely flood (the tavern and antique store) and many basements in homes that fill up with water. The majority of residents have removed their utilities (furnace, hot water heater) from the basement to protect from future damage. Montour is susceptible to some river flooding from the Indian Creek that runs through the western and northern part of town. Larger rain events may cause issues to some agricultural, residential, and commercial properties located in the floodplain. The west and north side of Toledo is affected by river flooding due to Deer Creek and Minnow Creek. 1993 and 2008 were significant years in which flooding affected the city.

Tama, Tama County, and South Tama Community School District (located within Tama and Toledo) received a score of 4 for historical occurrence, meaning that these cities experienced more than 12

river flooding events. The City of Tama is fortunate to have a levee that was built in 1995 to protect the community from a 1% annual chance flood event in the Iowa River and Deer Creek. Although the eastern and southern areas of the City are within the 1% annual chance floodplain, the only difficulty incurred by the river flooding in 2008 was the debris that was deposited in the City's wells by the flood waters. Since the levee has been constructed, no homes sustain flood damage in the city. Tama County experiences flooding in much of the designation SFHA. In addition, flooding closes many roads in the county. Specific locations will be discussed shortly.

Regardless of historical occurrence according to NCDC, jurisdictions throughout Tama County experience flooding problems including homes inundated by water, wastewater backups in homes, flooded roads, and flooded agricultural land due to river flooding.

Probability

Based on historical occurrence according to NCDC data, jurisdictions received the following scores for probability of flooding occurring in any given year. Clutier, Dysart, Elberon, Lincoln, Traer, Vining, North Tama Community School District, and Union Community School District received a score of 1, meaning that there is a less than 10% chance flooding will occur in any given year. Garwin, Gladbrook, and GMG Community School District received a score of 2, meaning that there is between a 10-25% chance of flooding. Chelsea, Montour, Tama, Toledo, Tama County, and South Tama Community School District received a score of 4, meaning that there is more than a 60% chance of flooding.

Vulnerability

The vulnerability from river flooding is quite varied. Work in the area of flood hazard mapping has allowed many communities to restrict development in hazardous areas, but development still exists in areas susceptible to flooding. This being said, structures in or located near the floodplain, and the people who live and work therein, are at risk.

As mentioned in previous sections, certain jurisdictions have less flood vulnerability than others. Clutier, Dysart, Gladbrook, Lincoln, Traer, Vining, North Tama Community School District, and Union Community School District scored vulnerability as a 1, meaning that less than 25% of all people and property might be affected during a flood event. Many of these jurisdictions are located on a hill or do not have a large amount of SFHAs within the city. In Gladbrook, some flooding can occur around the wastewater treatment facility, but flooding has never breached the dikes for the holding cells. The treatment facility is not technically in the 100-year floodplain, although it is vulnerable. The city has floodproofed the facility.

Garwin, Toledo, Tama County, GMG Community School District, and South Tama Community School District scored vulnerability as a 2, meaning that 25-50% of all people and property might be affected during a flood event. Garwin has experienced some flood events after larger rains, but few homes have historically been impacted. The wastewater treatment facility is near the creek, but the dikes of the facility have not been impacted by any previous flood events. Toledo has experienced

flooding during 1993 and 2008, but it hasn't been widespread and has typically affected only some commercial residential, and industrial areas.

Tama County experiences river flooding in many areas that are already designated in the SFHA. In addition, river flooding closes roads throughout the county. The following are transportation concerns due to river flooding.

- Highway 8 East of Traer floods. In 2014, Wolf Creek flooded and the bridge that crosses the creek on the east end of Traer had to be closed.
- Road closures have occurred along Highway 63 south of Tama due to the Iowa River.
- Road closures have occurred along Highway 63 north of Traer. This area flooded as recently as 2014. The flooding of Wolf and Coon Creek caused the closure.
- A road closure occurred for County Road E66 by the City of Chelsea.
- In 2014, the Iowa Department of Transportation had to build a temporary rock levee and keep pumps operating 24 hours a day for about a week to keep water from covering and closing Highway 30.
- The Union Pacific Railroad through the county closes with major flood events.
- Highway V18 through Chelsea was closed in 2014.

Chelsea and Montour scored vulnerability as a 4, meaning that more than 75% of all people and property might be affected during a flood event. In Chelsea, flooding affects nearby all homes in the city. For those residents whose homes are flooded during a flood event, they go live with friends, relatives, or stay in hotel. Roughly seven days is the typical amount of time that residents are pushed out of Chelsea. Flood events take a toll on the city's residents. The city has reported some families moving out of the city because of flooding. Community beautification has become a priority for the city, including installing benches, planters, and replacing sidewalks. During floods, the fire station in Chelsea is the main operational place for the city. After flood events, the Red Cross and the Methodist Church provide flood cleanup kits. While not all structures flood during every flood event, river flooding closes county road E66 to the south of Chelsea. Short term road flooding may also occur in the southern part of the city, but water generally disperses quickly in many flood events. Road maintenance is a challenge due to flooding.

Historically, river flooding events have had a tendency to flood out the sewer and water system in Chelsea, making the system unusable until flood waters recede and the system can be flushed. After the 2008 floods, the city upgraded its sewer system, elevated lift stations and corresponding controls, and sealed water collection systems. Since that time, the system has not flooded during flood events and the sewers have not required any special cleanup work.

In Montour, the city is susceptible to some river flooding from the Indian Creek that runs through the western and northern part of town. Larger rain events or dam failures may cause issues to some agricultural, residential, and commercial properties located in the floodplain. The wastewater treatment facility for the city is located near the Iowa River, but it is outside of the

floodplain. Flood waters have a tendency to pool near the facility and in nearby ditches to the facility. The city recently installed backup power for one of the lift stations in the northern part of town that is near the floodplain. This facility is outside of the floodplain but did have flood incidents in 2008 and 2013.

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. Clutier, Dysart, Elberon, Tama, Traer, Vining, North Tama Community School District, and Union Community School District scored severity of impact as a 1, meaning that injuries, property damage, and environmental impacts would be minimal or would not occur.

Garwin, Gladbrook, GMG Community School District, and South Tama 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.

Chelsea and Tama 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 Tama County has not experienced a river flooding-related death according to NCDC data, but the possibility still exists.

Montour scored severity of impact as a 4, meaning that property could be destroyed beyond repair. The city has experienced significant property damage due to sewer and water systems backing up during flood events.

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 Tama 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
Chelsea	1	1	1	3	4	10
Clutier	-	-	-	-	-	-
Dysart	1	1	1	1	4	8
Elberon	1	1	1	2	4	9
Garwin	1	1	3	2	4	11
Gladbrook	1	1	4	4	4	14
Lincoln	1	1	4	3	4	13
Montour	1	1	1	1	4	8
Tama	1	1	1	1	4	8
Toledo	1	1	1	1	4	8
Traer	1	1	1	1	4	8
Vining	1	1	1	1	4	8
Tama County	1	1	1	2	4	9
GMG Community SD	1	1	3	2	4	11
North Tama Community SD	-	-	-	-	-	-
South Tama Community SD	1	1	1	1	4	8
Union Community SD	1	1	1	1	4	8

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.

It should be noted that the City of Clutier and North Tama Community School District chose to remove terrorism from its risk assessment. Clutier is a city of 213 people as of the 2010 census and has never had any historical occurrence or threat of a terroristic event. North Tama Community School District is a small district with a small student population that has also never had any historical occurrences. The school district has emergency plans in place that could address terrorism in the unlikely event of such an event occurring.

Historical Occurrence

There have been no known incidences of terrorism in Tama County.

Probability

Based on historical occurrence, the probability for a terroristic event in Tama County is low in any given year (less than 10%).

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 Tama County have a small population and have never experienced unrest or terroristic threats.

Garwin, Gladbrook, Lincoln, 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. Elberon, Lincoln, Tama, and Union Community School District scored vulnerability as a 4, meaning that more than 75% of people or property might be affected. Communities with a score of 3 and 4 considered the worst-case scenario of a terroristic event, such as a large explosion or other action that may cause property damage, destroy buildings, or close roads and other facilities for an extended period of time.

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 Tama County would experience would involve little to no injuries, illness, or property damage, or minor injuries, illness, or property damage.

Jurisdictions that ranked severity of impact as a 1 include Dysart, Montour, Tama, Toledo, Traer, Vining, South Tama Community School District, and Union Community School District, Jurisdictions that ranked this category as a 2 include Elberon, Garwin, Tama County, and GMG Community School District. The majority of these cities mentioned public disorder or threats against persons or property as potential terrorism events. These events would likely not causes more than minor property damage or minor injuries.

Several jurisdictions ranked severity of impact higher, including Chelsea (3), Lincoln (3), and Gladbrook (4). These cities 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 Tama 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
Chelsea	1	2	2	2	4	11
Clutier	-	-	-	-	-	-
Dysart	1	1	1	1	4	8
Elberon	1	1	1	1	4	8
Garwin	1	1	2	2	4	10
Gladbrook	1	1	1	1	4	8
Lincoln	1	1	2	2	4	10
Montour	1	1	3	3	4	12
Tama	4	4	1	2	4	15
Toledo	1	1	3	2	4	11
Traer	1	1	1	1	4	8
Vining	1	1	2	2	4	9
Tama County	2	3	2	2	4	13
GMG Community SD	1	1	2	2	4	10
North Tama Community SD	1	1	1	2	4	9
South Tama Community SD	1	1	1	1	4	8
Union Community SD	1	1	1	1	4	8

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 whole; airplanes, helicopters, and other modes of air transportation are used to transport passengers for business and recreation as well as thousands of tons of cargo. A variety of circumstances can result in an air transportation incident; mechanical failure, pilot error, enemy attack, terrorism, weather conditions, and on-board fire can all lead to an incident at or near the airport.

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 (2004 to 2014) to match this data frame. Three airports exist in Tama County near or in the cities of Traer, Toledo, and Tama. 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 Tama County. This includes incidents involving these airports or any other flights that have included Tama County on the flight path.

Tama County has one main rail line (the Union Pacific Railroad) that runs through the southern portion of the county. The line runs directly through the communities of Montour, Tama, and Chelsea. 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, five train-vehicle accidents occurred in the county in the last 10

years: four in Tama (two in 2004 and two in 2006) and one in Chelsea (2008). These incidents are represented in each jurisdiction's 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. According to vehicle crash data from the Iowa Department of Transportation, between 2004 and 2013, Tama County experienced a total of 2,671 crashes. Of these crashes, 673 (25%) occurred in incorporated areas, 1,242 (47%) occurred in unincorporated areas less than one mile away from a major highway, and 756 (28%) 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. Tama County recalled approximately four events in the last 10 years. The City of Tama recalled at least 10 incidences; 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. Tama County reported approximately 4 (all highway transportation incidents), and the City of Tama reported 14 (4 railway transportation incidents and approximately 10 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. Tama County scored 3, meaning that there is between a 25-60% probability, and the City of Tama scored 4, meaning that there is a greater than 60% chance of a transportation event occurring in any given year.

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 Tama 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 25 railroad crossings in Tama County. The miles of railroad track in the county combined with the large number of street and highway crossings make Tama County vulnerable to a potential highway/rail collision. Derailments are also possible, while a major derailment would occur less frequently.

Dysart, Elberon, Gladbrook, Tama, Traer, Vining, North Tama Community School District, South Tama Community School District, and Union Community School District scored vulnerability as a 1, meaning that less than 25% 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.

Chelsea, Garwin, Lincoln, Tama County, and GMG Community School District scored vulnerability as a 2, meaning that 25-50% of people and property would be affected in the event of a transportation incident. Chelsea anticipated at least 25% of people would be affected in the event of a railway transportation event. Lincoln and Garwin 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. Tama County considered the proximity of Highways 63 and 30 within the county. If an incident occurred on these highways, it could affect at least 25% of people in the county who use these highways to travel for work, school, or leisure.

Montour and Toledo scored vulnerability as a 3, meaning that 51-75% of people and property would be affected in the event of a transportation incident. In Toledo, Highways 30 and 63 intersect. This intersection increases the vulnerability of the community to more highway accidents. A significant accident could affect more than 50% of people in the city through closed roads, detours, or hazardous materials. Montour has the Union Pacific rail line running through town. In addition, Montour's City Hall and Fire Station are within one block of the tracks. A transportation incident involving a derailment near these facilities could significantly impact the jurisdiction's ability to respond to such an event.

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.

Dysart, Elberon, Gladbrook, Traer, South Tama Community School District, and Union 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, and they are not located near railroad tracks.

Chelsea, Garwin, Lincoln, Tama, Toledo, Vining, Tama County, GMG Community School District, and North Tama 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 Chelsea could cause injuries. Tama and Toledo could experience a highway car accident that causes multiple injuries and a shutdown of critical facilities or roads. Garwin, Lincoln, or Vining could experience a car crash that causes injuries and ties up their emergency responders indefinitely.

Montour 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. These impacts are particularly possible since Montour is one of three cities in Tama County through which the Union Pacific rail line runs. This rail line is located near City Hall and the Fire Station.

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 Tama 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. Tama 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.*

Tama 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 Tama 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 a 17, while the lowest score a hazard received was a 5. These scores were used to assign a vulnerability rating of high, medium, or low. Hazards that scored 14 to 17 are considered high priority. Hazards that scored 9 to 13 are medium, and hazards 12 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 will be 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
Tornado	County-wide	17	High
Thunderstorms, Lightning, and Hail	County-wide	17	High
Severe Winter Storm	County-wide	17	High
Wind Storms	County-wide	16	High
Extreme Heat	County-wide	14	High
Radiological	County-wide	13	Medium
Hazardous Materials	All jurisdictions	12	Medium
Flash Flood	All jurisdictions except Vining	11	Medium
Infrastructure Failure	All jurisdictions	11	Medium
Drought	County-wide	10	Medium
Transportation Incident	All jurisdictions except Clutier	10	Medium
River Flooding	All jurisdictions	9	Medium
Terrorism	All jurisdictions except Clutier and North Tama CSD	9	Medium
Dam/Levee Failure	All jurisdictions	8	Low
Grass or Wildland Fire	All jurisdictions	8	Low
Human Disease	All jurisdictions except Clutier and Toledo	5	Low
Animal/Plant/Crop Disease	County-wide	5	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. It is important to note that one data limitation of the GIS data was that the number of structures was not available. Therefore, the potential property losses are broken down by number of parcels with value and total value of structures in the 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 and 2014 Assessed Building Values

		Agricultural	Residential	Commercial	Industrial	Military	Un classified	Total
Chelsea	# Parcels with Value	9	112	15	1	-	103	240
	Value of Structure	\$375,160	\$3,376,980	\$901,120	\$17,380	-	-	\$4,670,640
Clutier	# Parcels with Value	4	116	19	-	-	16	155
	Value of Structure	\$359,050	\$4,469,590	\$910,020	-	-	-	\$5,738,660
Dysart	# Parcels with Value	1	530	80	1	7	43	662
	Value of Structure	\$2,530	\$44,653,970	\$6,630,720	\$74,640	-	-	\$51,361,860
Elberon	# Parcels with Value	4	92	10	-	-	11	117
	Value of Structure	\$167,270	\$3,814,260	\$2,194,640	-	-	-	\$6,176,170
Garwin	# Parcels with Value	3	217	29	1	2	27	279
	Value of Structure	\$144,770	\$11,017,150	\$1,224,760	\$194,920	-	-	\$12,581,600
Gladbrook	# Parcels with Value	2	396	55	1	4	53	511
	Value of Structure	\$153,230	\$25,449,000	\$3,118,990	\$146,270	-	-	\$28,867,490
Lincoln	# Parcels with Value	2	80	16	-	2	12	112
	Value of Structure	\$114,990	\$4,271,620	\$2,225,410	-	-	-	\$6,612,020
Montour	# Parcels with Value	9	131	8	-	-	18	166
	Value of Structure	\$186,990	\$4,999,790	\$344,160	-	-	-	\$5,530,940
Tama	# Parcels with Value	6	1,019	117	7	14	123	1,286
	Value of Structure	\$272,100	\$62,590,870	\$8,307,370	\$2,770,610	-	-	\$73,940,950
Toledo	# Parcels with Value	14	781	115	6	19	117	1,052
	Value of Structure	\$655,100	\$51,922,530	\$15,137,290	\$11,359,230	-	-	\$79,074,150
Traer	# Parcels with Value	4	653	81	1	10	86	835
	Value of Structure	\$307,060	\$51,807,180	\$5,811,380	\$292,430	-	-	\$58,218,050
Vining	# Parcels with Value	3	30	2	-	-	8	43
	Value of Structure	\$131,850	\$965,950	\$10,560	-	-	-	\$1,108,360
Tama County Uninc.	# Parcels with Value	1,904	1,112 (RR)	38	8	1	833	2,784
	Value of Structure	\$157,033,940	\$108,962,280 (RR)	\$1,810,310	\$9,052,710	-	-	\$276,859,240

Source: Tama County Assessor's Office 2014

High Priority Hazards

Hazard: Tornado

Jurisdictions: All jurisdictions

Score: 17

Since 1953, Tama County has experienced a total of 38 tornado events that caused a total of over \$30.5 million in property damage (NCDC 2015). Tornadoes in the county have ranged from an F0 tornado in June of 2011 to an F4 tornado in May of 1989. According to historical NCDC data, on average, the county has the highest probability of experiencing an F0, F1, or F2 tornado.

Table 4.3.1.6. History of Tornadoes in Tama County

Hazard	Time Period Earliest event on record to 12/2013	Type of Event	# of Events	Probability
Tornado	3/1953 – 6/2011 (58.2 years)	F0	16	27%
		F1	10	17%
		F2	7	12%
		F3	4	7%
		F4	1	2%

It should be noted that there were an additional three tornado events in Tama County that affected Traer (EF2), Lincoln (EF0), and Buckingham (EF1) in the summer of 2014. These events are not included in the NCDC data that is displayed in Table 4.3.1.6 above, nor are they included when scoring historical occurrence and probability for the affected jurisdictions. The events were excluded because they occurred after data collection began for the planning process.

According to NCDC data, Tama County experienced 38 tornado events from 1953 – 2011. These events caused a total of \$30,555,750 in property damage and \$9,000 in crop damage. Using this data, an average annual countywide loss estimate was calculated as follows:

Total Tornado Damage History (\$30,564,750) / Number of Years of Record (58.2 years) = Average Annual Countywide Loss Estimate (\$525,012.89). Based on previous data, Tama County may experience \$525,012.89 in damages related to tornadoes in any given year.

If a tornado were to occur in Tama 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 Tama 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 Tama County Assessor's office; however, building footprint data was not available to use directly in ArcGIS. Therefore, the analysis used the building and dwelling values based on individual parcels. In addition, the Assessor's office keeps parcel recorded for taxing purposes. Some parcels may have structures that could be damaged in the event of a tornado that are 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 Tama County. Three locations in Tama County were chosen for this analysis based on their varied populations, densities, and total parcels with value:

- The City of Garwin (pop: 527, total parcels with value: 250)
- The City of Tama (pop: 2,877, total parcels with value: 1,149)
- Unincorporated Tama County north of the City of Traer (pop: 6,858, total parcels with value: 3,062)

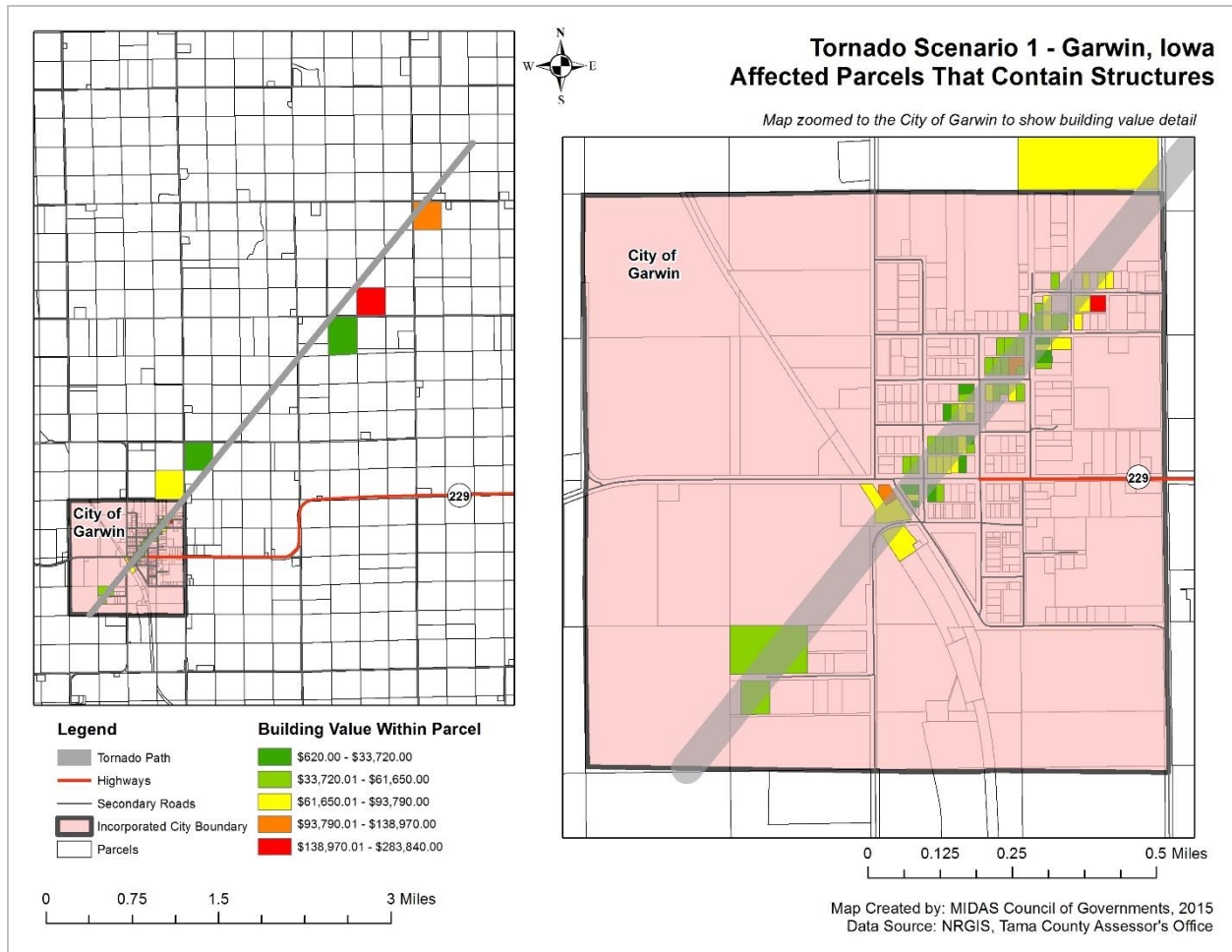
F2 Tornado Scenario 1: Garwin, IA

The F2 tornado touches down near the southwest corner of incorporated Garwin, affecting a few agricultural parcels (most of which do not have any dwellings or buildings) as it moves northeast over State Highway 47 into the heart of Garwin. The tornado hits the Pronto Market, the US Post Office, and then continues northeast through a predominantly residential section of the town. After exiting Garwin city limits, it continues on the ground into agricultural parcels of unincorporated Tama County. The tornado was on the ground for approximately 5 miles. A total of 72 parcels with value 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 \$1,199,016 in damages if 30% damage were incurred.

Tornado Potential Property Loss Estimates Scenario 1

Occupancy	Parcels With Value Affected Within Scenario 1	Building Exposure	30% Damage
Agriculture	10	\$133,050 (farm buildings) \$268,070 (residential dwellings)	\$39,915 (farm buildings) \$80,421 (residential)
Residential	59	\$3,300,250	\$990,075
Commercial	3	\$295,350	\$88,650
Industrial	--	--	--
Total	72	\$3,996,720	\$1,199,016

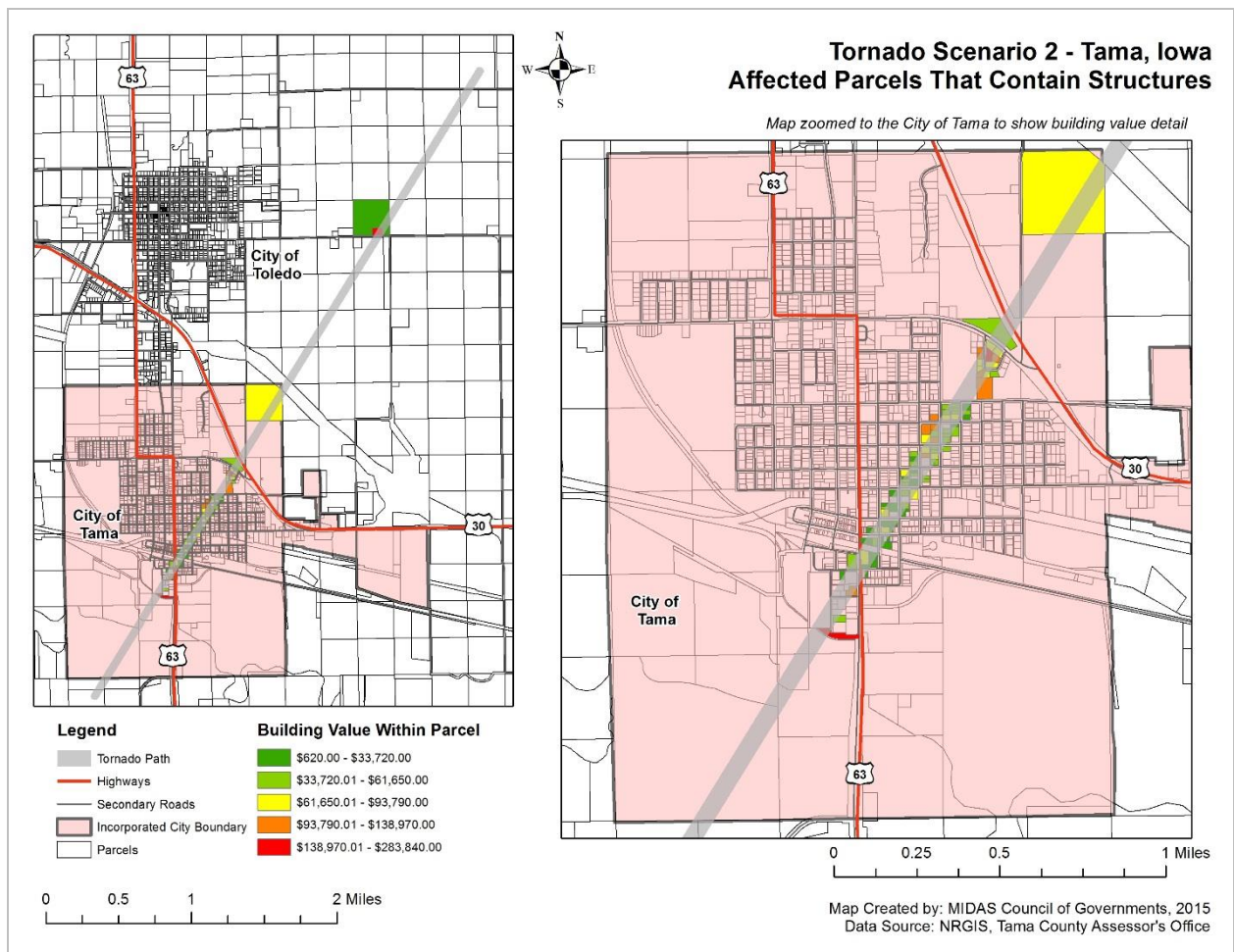


F2 Tornado Scenario 2: Tama, IA

The F2 tornado touches down near the southwest corner of town just outside of the incorporated city limits. At first, it affects a few agricultural parcels (none of which have any dwellings or buildings) but then hits Tama Paperboard and Spahn and Rose Lumber Company. The tornado continues northeast over US Highway 63 into a residential area of town. It crosses over US Highway 30 before passing over several more agricultural parcels and then out of the incorporated city limits. The tornado stayed on the ground for approximately 5 miles. A total of 97 parcels with 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 \$1,601,838 in damages if 30% damage were incurred.

Tornado Potential Property Loss Estimates Scenario 2

Occupancy	Parcels with Value Affected Within Scenario 2	Building Exposure	30% Damage
Agriculture	4	\$4,780 (farm buildings) \$276,450 (residential dwellings)	\$1,434 (farm buildings) \$82,935 (residential dwellings)
Residential	79	\$4,334,680	\$1,300,404
Commercial	11	\$500,390	\$150,117
Industrial	1	\$120,600	\$36,180
Military	2	\$102,560	\$30,768
Total	97	\$5,339,460	\$1,601,838



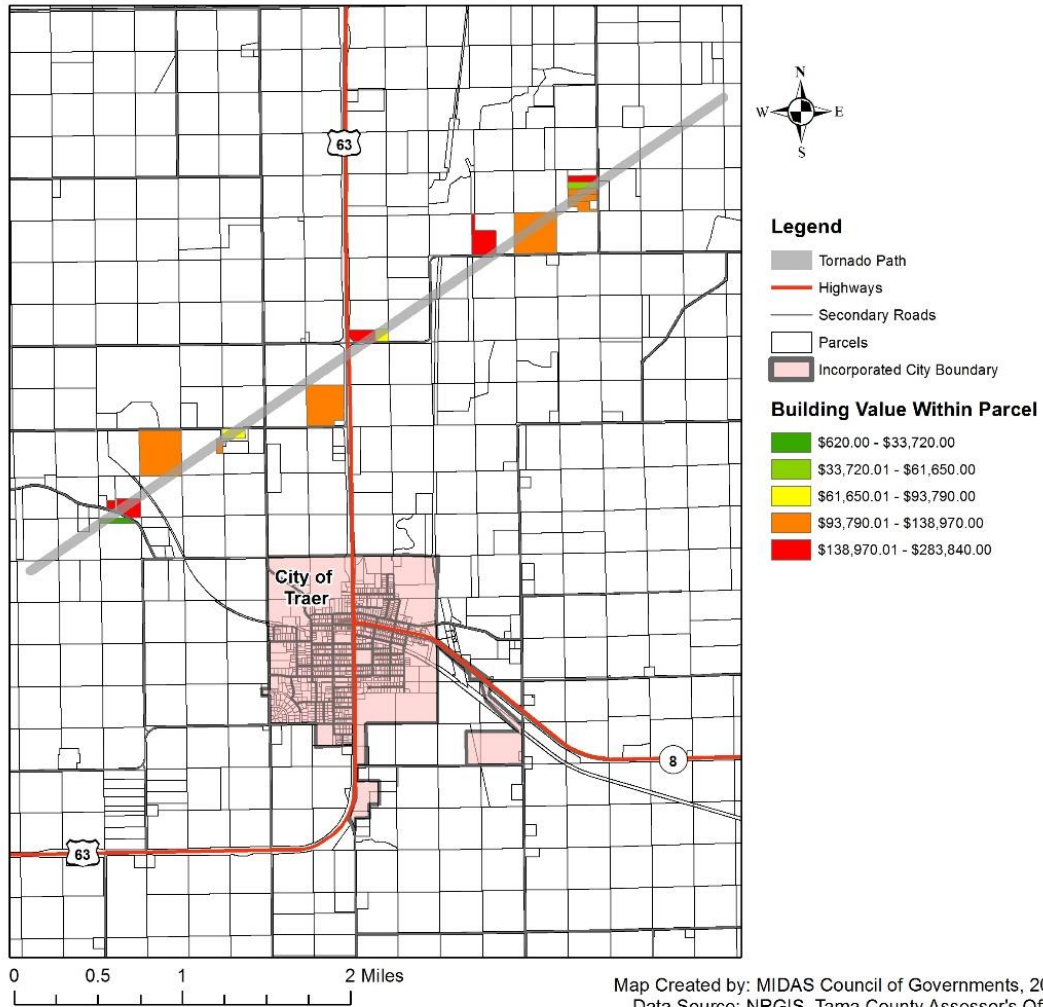
F2 Tornado Scenario 3: Unincorporated Tama County, IA

The F2 tornado touches down approximately 1.5 miles northwest of Traer near the intersection of Ridge Road and O Avenue. It moves on a northeast path, affecting a few agricultural parcels (with residential dwellings) and then also moves through several rural residential areas. One of these areas is off of Ridge Road and another is near the intersection of 160th Street and P Avenue. The tornado then crosses over Highway US 63 continuing northeast and affecting more agricultural and rural residential parcels. The tornado stays on the ground for approximately 5 miles. A total of 21 parcels with value would be in the path of the tornado with rural residential occupancy being most at risk. Buildings in the path of the tornado would sustain a total of \$594,636 in damages if 30% damage were incurred.

Tornado Potential Property Loss Estimates Scenario 3

Occupancy	Parcels With Value Affected Within Scenario 3	Building Exposure	30% Damage
Agriculture	10	\$64,850 (farm buildings) \$717,170 (residential dwellings)	\$19,455 (farm buildings) \$215,151 (residential dwellings)
Residential	11	\$1,200,100	\$360,030
Commercial	--	--	--
Industrial	--	--	--
Total	21	\$1,982,120	\$594,636

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



Hazard: Thunderstorms, Lightning, and Hail
Jurisdictions: All jurisdictions
Score: 17

According to NCDC data, Tama County experienced a total of 188 thunderstorm, lightning, or hail events from 1961 – 2013 (the time frame for which data was available). These events caused a total of \$4,863,000 in property damage and \$2,618,500 in crop damage. Using this data, an average annual countywide loss estimate was calculated as follows:

Total Wind Storm Damage History (\$7,481,500) / Number of Years of Record (52.2 years) =
 Average Annual Countywide Loss Estimate (\$143,323.75)

Based on previous data, Tama County may experience \$143,323.75 in damages related severe winter storms 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

<u>Hazard</u>	<u>Time Period</u>	<u># of Events</u>	<u>Total Damages</u>	<u>Average Annual Loss Estimate</u>
Chelsea	6/1961 – 9/2013 (52.2 years)	10	\$50,000	\$957.85
Clutier		8	\$279,000	\$5,344.83
Dysart		9	\$765,000	\$14,665.17
Elberon		--	--	--
Garwin		14	\$1,094,000	\$20,957.85
Gladbrook		14	\$541,000	\$10,363.98
Lincoln		5	\$50,000	\$957.85
Montour		9	\$268,000	\$5,134.10
Tama		28	\$1,143,500	\$21,906.13
Toledo		20	\$2,953,000	\$56,570.88
Traer		23	\$278,000	\$5,325.67
Vining		--	--	--
Tama County Uninc.		48	\$60,000	\$1,149.43

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 Tama County during a thunderstorm, lightning, or hail event. It is not likely that 75% of structures in Tama 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: Severe Winter Storm
Jurisdictions: County-wide
Score: 17

According to NCDC data, Tama County experienced 63 severe winter storm events from 1996 – 2008 (the time frame for which data was available). These events caused a total of \$1,731,180 in property damage and \$2,894,120 in crop damage. Using this data, an average annual countywide loss estimate was calculated as follows:

Total Severe Winter Storm Damage History (\$4,625,300) / Number of Years of Record (17.9 years)
= Average Annual Countywide Loss Estimate (\$258,396.65)

Based on previous data, Tama County may experience \$258,396.65 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 Tama County during a severe winter storm event; however, it's not likely that 100% of structures in Tama 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 Tama County can shut down as a result of severe winter weather. Cultural facilities include restaurants, parks, community centers, museums, and businesses.

Hazard: Wind Storm
Jurisdictions: County-wide
Score: 16

According to NCDC data, Tama County experienced 25 wind storm events from 1996 – 2012 (the time frame for which data was available). These events caused a total of \$795,110 in property damage and \$30,100 in crop damage. Using this data, an average annual countywide loss estimate was calculated as follows:

Total Wind Storm Damage History (\$825,210) / Number of Years of Record (17.9 years) =
Average Annual Countywide Loss Estimate (\$46,101.12)

Based on previous data, Tama County may experience \$46,101.12 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 25-50% of people and property might be affected in Tama County during a wind storm event; however, it's not likely that 50% of structures in Tama County would face significant or total damage from a wind storm. Effects of a severe winter 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 Tama 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: Extreme Heat

Jurisdictions: County-wide

Score: 14

According to NCDC Climate Data, Tama County experienced 69 instances of extreme heat from 1980-2013. 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 Tama County during an extreme heat event; however, it's not likely that this amount of structures in Tama 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 Tama 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: 13

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 Tama 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. Tama 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, Tama County may experience people traveling through the county who have been exposed to radiation. Damage or contamination to 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 Tama 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. Again, the potential for an event to occur is rare. Other counties would experience more significant effects before Tama County.

Hazard: Hazardous Materials
Jurisdictions: All jurisdictions
Score: 12

Fixed Hazardous Materials

According to the Iowa DNR, hazardous materials spills throughout Tama County are fairly common. From 1995 to 2013, the county experienced a total of 80 hazardous spills. 60% of these events involved fixed incidents and 25% 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 $\frac{1}{4}$ mile that is drawn around all hazardous materials facilities as defined by the NRGIS GIS data set provided by the Iowa DNR. This hazard area is the area of primary impact if a spill were to occur. The affected area will vary depending on the size of each facility, type of material involved, and extent of the accident.

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

- Chelsea (all critical facilities in hazard area except for water tower)
- Clutier (all critical facilities in hazard area)
- Dysart (all critical facilities in hazard area)
- Elberon (all critical facilities in hazard area except bridges on NE side of city)
- Garwin (all critical facilities in hazard area)
- Gladbrook (all critical facilities in hazard area)
- Lincoln (all critical facilities in hazard area)
- Montour (all critical facilities in hazard area)
- Tama (all critical facilities in hazard area)
- Toledo (all critical facilities in hazard area)
- Traer (all critical facilities in hazard area)
- Vining (all critical facilities in hazard area)

Cultural facilities could also be impacted by a hazardous materials incident. Outdoor recreational events such as July 4th celebrations, Wine Fest in Dysart, and Old Iron Days in Dysart could be affected. Everyday recreation activities that exist throughout the county such as a bike trails, recreation trails, city park recreation areas, and aquatic centers 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 ¼ mile buffer was drawn around each hazardous facility to identify the primary areas of impact that may be affected by a fixed hazardous materials incident. The Tama County Assessor's office provided parcel level assessor data, and parcels were overlaid with fixed hazardous materials data to analyze how many parcels in each jurisdiction might be affected by this type of hazard.

Finally, only jurisdictions that had a fixed hazardous materials risk within their jurisdiction were included in the vulnerability analysis. The only jurisdiction that did not have fixed hazardous materials risk was Elberon. 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

Chelsea

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	9	7	78%	\$361,140	\$288,990	80%	267	15%	40
Residential	112	97	87%	\$3,376,980	\$2,441,150	72%			
Commercial	15	15	100%	\$901,120	\$901,120	100%			
Industrial	1	1	100%	\$17,380	\$17,380	100%			

Clutier

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	4	4	100%	\$201,720	\$201,720	100%	213	26%	55
Residential	116	116	100%	\$4,469,590	\$4,469,590	100%			
Commercial	19	19	100%	\$910,020	\$910,020	100%			
Industrial	--	--	--	--	--	--			

Dysart

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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%	\$2,530	\$2,530	100%	1,379	27%	372
Residential	530	488	92%	\$44,653,970	\$38,324,450	100%			
Commercial	80	80	100%	\$6,630,720	\$6,630,720	100%			
Industrial	1	1	100%	\$74,640	\$74,640	100%			

Elberon

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	4	4	100%	\$167,270	\$167,270	100%	196	30%	60
Residential	92	92	100%	\$3,814,260	\$3,814,260	100%			
Commercial	10	10	100%	\$2,194,640	\$2,194,640	100%			
Industrial	--	--	--	--	--	--			

Garwin

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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%	\$144,770	0	0%	527	17%	90
Residential	217	215	99%	\$11,017,150	\$10,936,360	99%			
Commercial	29	29	100%	\$1,208,120	\$1,208,120	100%			
Industrial	1	1	100%	\$194,920	\$194,920	100%			

Gladbrook

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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%	\$153,230	\$153,230	100%	945	16%	151
Residential	396	373	94%	\$25,449,000	\$23,684,060	93%			
Commercial	55	52	95%	\$3,118,990	\$3,001,510	96%			
Industrial	1	1	100%	\$146,270	\$146,270	100%			

Lincoln

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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%	\$107,050	\$107,050	100%	162	25%	41
Residential	80	80	100%	\$4,271,620	\$4,271,620	100%			
Commercial	16	16	100%	\$2,225,410	\$2,225,410	100%			
Industrial	--	--	--	--	--	--			

Montour

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	9	8	89%	\$198,690	\$195,320	98%	249	30%	75
Residential	131	124	95%	\$4,999,790	\$4,650,330	93%			
Commercial	8	8	100%	\$344,160	\$344,160	100%			
Industrial	--	--	--	--	--	--			

Tama

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	6	1	17%	\$272,100	\$12,030	4%	2,877	22%	633
Residential	1019	857	84%	\$62,590,870	\$47,572,230	76%			
Commercial	117	114	97%	\$8,307,370	\$8,198,010	99%			
Industrial	7	7	100%	\$2,770,610	\$2,770,610	100%			

Toledo

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	14	14	100%	\$655,100	\$655,100	100%	2,341	35%	819
Residential	781	673	86%	\$51,922,530	\$42,310,480	81%			
Commercial	115	115	100%	\$15,137,290	\$15,137,290	100%			
Industrial	6	6	100%	\$11,359,230	\$11,359,230	100%			

Traer

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	4	3	75%	\$307,060	\$214,740	70%	1,703	36%	613
Residential	653	593	91%	\$51,807,180	\$42,488,320	82%			
Commercial	81	81	100%	\$5,811,380	\$5,811,380	100%			
Industrial	1	1	100%	\$292,430	\$292,430	100%			

Tama County Unincorporated Area

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	1,904	166	9%	\$158,207,030	\$15,884,660	10%	6,858	1%	69
Residential	1,112	190	17%	\$108,962,280	\$17,755,470	16%			
Commercial	38	25	66%	\$8,241,360	\$6,404,350	78%			
Industrial	7	7	100%	\$9,273,100	\$9,273,100	100%			

Vining

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	1	33%	\$131,850	\$99,110	75%	50	5%	3
Residential	33	33	100%	\$965,950	\$965,950	100%			
Commercial	2	2	100%	\$10,560	\$10,560	100%			
Industrial	--	--	--	--	--	--			

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), Tama County experienced one pipeline incident in the last 20 years. It was not specified where in the county the incident occurred, but excavation damage occurred to the Northern Natural Gas Pipeline in October of 1998 causing \$52,000 in damages but not resulting in any injuries or significant spills. Other than this incident, the county has had no additional pipeline incidents. An average annual countywide loss estimate was not calculated due to limited data.

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: Chelsea (natural gas), Dysart (natural gas), Gladbrook (natural gas), Montour (natural gas, ammonia), Tama (natural gas, crude

oil/petroleum), Toledo (natural gas), Traer (natural gas, crude oil/petroleum), and Tama County Unincorporated (natural gas, ammonia, crude oil/petroleum). Clutier, Elberon, Garwin, Lincoln, and Vining are not affected by a pipeline hazard.

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

- Chelsea (all critical facilities in hazard area)
- Dysart (all critical facilities in hazard area)
- Gladbrook (all critical facilities except lagoon in hazard area)
- Montour Dysart (all critical facilities in hazard area)
- Tama (all critical facilities in hazard area)
- Toledo (wastewater plant, medical center, community center, gas station, and grocery store in hazard area)
- Traer (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 Tama 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 Tama County (ammonia, crude oil, 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: Clutier, Elberon, Garwin, Lincoln, and Vining. 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

Chelsea

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	9	9	100%	\$361,140	\$361,140	100%	267	21%	56
Residential	112	112	100%	\$3,376,980	\$3,376,980	100%			
Commercial	15	15	100%	\$901,120	\$901,120	100%			
Industrial	1	1	100%	\$17,380	\$17,380	100%			

Dysart

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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%	\$2,530	\$2,530	100%	1,379	29%	400
Residential	530	518	97%	\$45,111,700	\$43,706,480	97%			
Commercial	80	68	85%	\$6,630,720	\$5,766,360	87%			
Industrial	1	1	100%	\$74,640	\$74,640	100%			

Gladbrook

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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%	\$151,410	\$151,410	100%	945	41%	387
Residential	394	394	100%	\$25,396,100	\$25,396,100	100%			
Commercial	55	55	100%	\$3,061,560	\$3,061,560	100%			
Industrial	1	1	100%	\$146,270	\$146,270	100%			

Montour

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	9	9	100%	\$198,690	\$198,690	100%	249	43%	107
Residential	131	131	100%	\$4,999,790	\$4,999,790	100%			
Commercial	8	8	100%	\$344,160	\$344,160	100%			
Industrial	--	--	--	--	--	--			

Tama

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	6	6	100%	\$272,100	\$272,100	100%	2,877	29%	834
Residential	1019	1017	100%	\$62,590,870	\$ 62,547,310	100%			
Commercial	117	113	97%	\$8,307,370	\$ 7,890,260	95%			
Industrial	7	4	57%	\$2,770,610	\$ 1,988,860	72%			

Toledo

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	14	5	36%	\$655,100	\$263,100	40%	2,341	24%	562
Residential	781	289	37%	\$51,922,530	\$20,988,890	40%			
Commercial	115	53	46%	\$ 15,121,740	\$ 11,968,710	79%			
Industrial	6	5	83%	\$11,359,230	\$ 10,905,770	96%			

Traer

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	4	4	100%	\$307,060	\$307,060	100%	1,703	44%	749
Residential	653	653	100%	\$51,807,180	\$51,807,180	100%			
Commercial	81	81	100%	\$5,811,380	\$5,811,380	100%			
Industrial	1	0	0%	\$292,430	\$0	0%			

Tama County Unincorporated Area

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	1904	678	36%	\$ 158,027,030	\$ 58,644,410	37%	6,858	4%	274
Residential	1112	380	34%	\$ 108,962,280	\$ 34,920,360	32%			
Commercial	38	23	61%	\$ 8,244,560	\$ 6,040,840	73%			
Industrial	8	7	88%	\$ 9,310,340	\$ 9,273,100	100%			

Hazard: Flash Flood

Jurisdictions: All jurisdictions except Vining

Score: 11

NCDC data indicates that flash flooding has historically caused a total of \$1,010,000 in property damage and \$460,000 in crop damage from 2000 to 2013 (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 (\$1,470,000) / Number of Years of Record (12.8 years) =
Average Annual Countywide Flood Loss Estimate (\$114,843.75)

Based on previous data, Tama County may experience \$114,843.75 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. This calculation does *not* include any additional events that were included for the risk assessment scoring of historical occurrence and probability.

Table 4.3.1.5. Average Annual Loss Estimate for Flash Flooding

<u>Hazard</u>	<u>Time Period</u>	<u># of Events</u>	<u>Total Damages</u>	<u>Average Annual Loss Estimate</u>
Chelsea	7/2000 – 5/2013 (12.8 years)	1	\$350,000	\$27,343.75
Clutier		1	\$10,000	\$781.25
Dysart		0	--	---
Elberon		0	---	---
Garwin		1	\$60,000	\$4,687.50
Gladbrook		1	\$10,000	\$781.25
Lincoln		0	---	---
Montour		1	\$50,000	\$3,906.25
Tama		1	\$10,000	\$781.25
Toledo		1	\$10,000	\$781.25
Traer		2	\$470,000	\$36,718.75
Vining		0	--	---
Tama County Uninc.		2	\$500,000	\$39,062.50

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

- Dysart (no critical facilities in hazard area)
- Garwin (power generator, community center, fire department, and city hall within blocks of hazard area)
- Montour (fire stations, community center, and city hall in hazard area)
- Tama (no critical facilities in hazard area)
- Toledo (no critical facilities in hazard area)
- Traer (sewer and lift station in hazard area)

No flash flood in Tama County has resulted in any reported deaths or injuries. According to Tama County Emergency Management, there was one case where a vehicle was swept away during a flash flood event. 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 Tama County Assessor's office provided parcel level assessor data, and parcels were overlaid with areas that the Task Force marked as being prone to flash flooding to analyze how many parcels with value 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. Structural damage may or may not occur with each flood event.

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 Tama 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. Vining was the only jurisdiction to remove flash flooding from their risk assessment; therefore, a vulnerability assessment was not completed for Vining.

Flash Flooding Potential Property Loss Estimates by Jurisdiction

Dysart

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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%	\$2,530	0	0%	1,379	0%	0
Residential	530	0	0%	\$44,653,970	0	0%			
Commercial	81	0	0%	\$6,630,720	0	0%			
Industrial	1	0	0%	\$74,640	0	0%			

Garwin

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	1	33%	\$144,770	\$41,030	28%	527	6%	32
Residential	217	10	22%	\$11,017,150	\$361,590	3%			
Commercial	29	5	17%	\$1,208,120	\$550,310	46%			
Industrial	1	0	0%	\$194,920	0	0%			

Montour

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	9	1	11%	\$198,690	\$4,120	2%	249	5%	12
Residential	131	22	17%	\$4,999,790	\$640,340	13%			
Commercial	8	4	50%	\$344,160	\$183,870	53%			
Industrial	--	--	--	--	--	--			

Tama

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	6	0	0%	\$272,100	0	0%	2,877	1%	29
Residential	1019	41	4%	\$62,590,870	\$1,655,830	3%			
Commercial	117	2	2%	\$8,307,370	\$20,760	.2%			
Industrial	7	0	0%	\$2,770,610	0	0%			

Toledo

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	14	8	57%	\$655,100	\$459,920	70%	2,341	5%	117
Residential	781	13	2%	\$51,922,530	\$626,860	1%			
Commercial	115	6	5%	\$15,137,290	\$701,870	5%			
Industrial	6	1	17%	\$11,359,230	\$118,230	1%			

Traer

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	4	1	25%	\$307,060	\$101,240	33%	1,703	5%	85
Residential	653	23	4%	\$51,807,180	\$1,701,060	3%			
Commercial	81	4	5%	\$5,811,380	\$296,470	5%			
Industrial	1	0	0%	\$292,430	0	0%			

Tama County Unincorporated Area*

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	1,904	348	18%	\$158,207,030	\$25,266,330	16%	6,858	2%	137
Residential	1,112	85	8%	\$108,962,280	\$6,748,750	6%			
Commercial	38	9	24%	\$8,241,360	\$1,168,660	14%			
Industrial	8	2	25%	\$9,052,710	\$3,247,430	36%			

*Tama County identified areas that were prone to flash flooding as areas that were already identified as a Special Flood Hazard Area. For this reason, Tama County's vulnerability assessment for flash flooding used the same assessment that was used for river flooding.

Jurisdictions that had their vulnerability analysis calculated based on a more approximate method that was described earlier include: Chelsea, Clutier, Elberon, Gladbrook, and Lincoln. 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.

Chelsea: Total value of structures in city (\$4,656,620) x flash flooding risk assessment maximum vulnerability for score of 4 (100%) = Total vulnerability of \$4,656,620

Clutier: Total value of structures in city (\$5,581,330) x flash flooding risk assessment maximum vulnerability for score of 1 (24%) = Total vulnerability of \$1,339,519.20

Elberon: Total value of structures in city (\$6,176,170) x flash flooding risk assessment maximum vulnerability for score of 1 (24%) = Total vulnerability of \$1,482,280.80

Gladbrook: Total value of structures in city (\$28,867,490) x flash flooding risk assessment maximum vulnerability for score of 1 (24%) = Total vulnerability of \$6,928,197.60

Lincoln: Total value of structures in city (\$6,604,080) x flash flooding risk assessment maximum vulnerability for score of 1 (24%) = Total vulnerability of \$1,584,979.20

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 Tama 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 Tama County. Sewer system failure, power failure, bridge failure, and infrastructure damaged by flooding are just a few of these issues. One of the most common causes of infrastructure failure in Tama County is related to sewer and water systems. Most of the municipalities in Tama County have older sewer systems that are prone to failure during high volume rain events. 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 Tama County are also vulnerable to infrastructure failures. Power losses and sewer backups can affect businesses and recreational facilities.

Hazard: Drought
Jurisdictions: County-wide
Score: 10

NCDC data indicates that Tama County has suffered five 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.

Table 4.3.1.4. Tama County Drought Events From 2000-2013

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

The data shows that Tama 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, Tama County may experience \$11,593,846.15 in damages related to drought in any given year. Negative impacts of drought are primarily environmental and economic. According to the 2012 Agriculture Census, Tama County has 1,132 farms which use approximately 402,701 acres of land in the county. Agricultural land accounts for approximately 87% 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 Tama 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: Transportation Incident
Jurisdictions: All jurisdictions except Clutier
Score: 10

Air Transportation Incident

Three airports exist in Tama County near or in the cities of Traer, Toledo, and Tama. 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 Tama County. This includes incidents involving these airports or any other flights that have included Tama 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 Tama 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 Tama 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: Chelsea (through the center of the city), Montour (through the center of the city), Tama (through the southern portion of the city), and Tama County (through the southern portion of 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 Tama 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 Tama County Assessor's office provided parcel level assessor data, and parcels were overlaid with the one mile buffer area to analyze how many parcels 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: Chelsea, Montour, Tama, and unincorporated areas of Tama County. See Appendix K for maps of jurisdictions that are vulnerable to this hazard.

Rail Transportation Incident Potential Property Loss Estimates by Jurisdiction

Chelsea (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	9	9	100%	\$361,140	\$361,140	100%	267	21%	56
Residential	112	112	100%	\$3,376,980	\$3,376,980	100%			
Commercial	15	15	100%	\$901,120	\$901,120	100%			
Industrial	1	1	100%	\$17,380	\$17,380	100%			

Montour (100% of city within hazard area)

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	9	9	100%	\$198,690	\$198,690	100%	249	43%	107
Residential	131	131	100%	\$4,999,790	\$4,999,790	100%			
Commercial	8	8	100%	\$344,160	\$344,160	100%			
Industrial	--	--	--	--	--	--			

Tama

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	6	4	67%	\$272,100	\$195,000	72%	2,877	28%	806
Residential	1019	1009	99%	\$62,590,870	\$61,440,520	98%			
Commercial	117	117	100%	\$8,307,370	\$8,307,370	100%			
Industrial	7	7	100%	\$2,770,610	\$2,770,610	100%			

Tama County Unincorporated Area

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	1,904	91	5%	\$158,207,030	\$7,167,440	5%	6,858	.5%	34
Residential	1,112	61	5%	\$108,962,280	\$5,000,670	5%			
Commercial	38	6	16%	\$8,241,360	\$562,100	7%			
Industrial	8	1	13%	\$9,052,710	\$3,244,970	36%			

Chelsea's City Hall and Fire Station are located next to the tracks; an incident occurring within city limits could limit the city's ability to respond to the situation. Cultural facilities could also be impacted by a rail transportation event.

Highway Transportation Incident

Data was collected on accidents that occurred in Tama County from 2004 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 2004 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: River Flooding
Jurisdictions: All jurisdictions
Score: 9

According to NCDC data, Tama County experienced 30 flood events from 1996 – 2008 (the time frame for which data was available). These events caused a total of \$1,319,070 in property damage and \$20,543,040 in crop damage. Using this data, an average annual countywide flood loss estimate was calculated as follows:

Total Flood Damage History (\$21,862,110) / Number of Years of Record (12.2 years) =
Average Annual Countywide Flood Loss Estimate (\$1,791,976.23)

Based on previous data, Tama County may experience \$1,791,976.23 in damages related to river flooding in any given year.

Jurisdictions in Tama 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:

- Chelsea (Post office, bank, fire station, city hall, telephone building, and community center in hazard area. Water tower is not in hazard area)
- Clutier (No facilities in hazard area. Lagoon is nearby but not located within hazard area)
- Dysart (no critical facilities in hazard area)
- Elberon (bridges located in hazard area)
- Garwin (power generator in hazard area)
- Gladbrook (lagoon in hazard area. Lift station near hazard area)
- Lincoln (no critical facilities in hazard area)
- Montour (No critical facilities in hazard area. Fire station, lift station, and wastewater treatment facility near but not located within hazard area)
- Tama (no critical facilities in hazard area. Wastewater plant near but not located within hazard area)
- Toledo (no critical facilities in hazard area)
- Traer (sewer lift station in hazard area. Sewer lagoons near but not located within hazard area)
- Vining (no critical facilities in 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 Tama 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 Tama 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

Chelsea

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	9	8	88%	\$361,140	\$326,310	90%	267	20%	53
Residential	112	93	83%	\$3,376,980	\$2,356,790	70%			
Commercial	15	15	100%	\$901,120	\$901,120	100%			
Industrial	1	1	100%	\$17,380	\$17,380	100%			

Clutier

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	4	2	50%	\$201,720	\$96,330	48%	213	1%	2
Residential	116	0	0%	\$4,469,590	0	0%			
Commercial	19	0	0%	\$910,020	0	0%			
Industrial	--	--	--	--	--	--			

Dysart

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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%	\$2,530	0	0%	1,379	0%	0
Residential	530	0	0%	\$44,653,970	0	0%			
Commercial	80	0	0%	\$6,630,720	0	0%			
Industrial	1	0	0%	\$74,640	0	0%			

Elberon

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	4	3	75%	\$167,270	\$130,540	78%	196	14%	27
Residential	92	1	1%	\$3,814,260	\$29,680	.7%			
Commercial	10	4	40%	\$2,194,640	\$1,912,920	87%			
Industrial	--	--	--	--	--	--			

Garwin

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	1	33%	\$144,770	\$41,030	28%	527	5%	26
Residential	217	4	2%	\$11,017,150	\$117,540	1%			
Commercial	29	3	10%	\$1,208,120	\$258,410	21%			
Industrial	1	0	0%	\$194,920	0	0%			

Gladbrook

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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%	\$153,230	\$153,230	100%	945	9%	85
Residential	396	4	1%	\$25,449,000	\$163,890	.6%			
Commercial	55	4	7%	\$3,118,990	\$97,000	3%			
Industrial	1	1	100%	\$146,270	\$146,270	100%			

Lincoln

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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%	\$107,050	0	0%	162	0%	0
Residential	80	0	0%	\$4,271,620	0	0%			
Commercial	16	0	0%	\$2,225,410	0	0%			
Industrial	--	--	--	--	--	--			

Montour

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	9	5	56%	\$198,690	\$141,500	71%	249	16%	40
Residential	131	27	21%	\$4,999,790	\$750,110	15%			
Commercial	8	1	13%	\$344,160	\$33,750	10%			
Industrial	--	--	--	--	--	--			

Tama

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	6	0	0%	\$272,100	0	0%	2,877	4%	115
Residential	1019	1	0%	\$62,590,870	\$33,430	0%			
Commercial	117	3	3%	\$8,307,370	\$546,530	7%			
Industrial	7	3	43%	\$2,770,610	\$1,743,180	63%			

Toledo

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	14	6	43%	\$655,100	\$478,620	73%	2,341	6%	140
Residential	781	2	0%	\$51,922,530	\$106,440	.2%			
Commercial	115	2	2%	\$15,137,290	\$410,220	3%			
Industrial	6	1	17%	\$11,359,230	\$118,230	1%			

Traer

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	4	2	50%	\$307,060	\$193,560	63%	1,703	10%	170
Residential	653	10	65%	\$51,807,180	\$1,230,630	2%			
Commercial	81	4	5%	\$5,811,380	\$351,590	6%			
Industrial	1	0	0%	\$292,430	0	0%			

Vining

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	1	33%	\$131,850	\$32,740	25%	50	3%	2
Residential	30	0	0%	\$965,950	0	0%			
Commercial	2	0	0%	\$10,560	0	0%			
Industrial	--	--	--	--	--	--			

Tama County Unincorporated Area

Type of Structure	Number of Parcels With Value			Value of Structures			Number of People		
	# 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	1,904	348	18%	\$158,207,030	\$25,266,330	16%	6,858	2%	137
Residential	1,112	85	8%	\$108,962,280	\$6,748,750	6%			
Commercial	38	9	24%	\$8,241,360	\$1,168,660	14%			
Industrial	8	2	25%	\$9,052,710	\$3,247,430	36%			

Hazard: Terrorism

Jurisdictions: All jurisdictions except Clutier and North Tama CSD

Score: 9

There is no historical data for previous structural losses due to terrorism in Tama 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 Tama 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 to 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.

Low Priority Hazards

Hazard: Dam/Levee Failure

Jurisdictions: All jurisdictions

Score: 8

Dam Failure

Tama County has a total of 30 dams. 28 of these dams are Low Hazard Dams and two are Moderate Hazard Dams. According to the Iowa Department of Natural Resources, the majority of dams (21) in the county were built for the purposes of fire protection, stock or small fish ponds. Eight dams were built for the purposes of recreation, and one was built for the purposes for debris control. There are an additional 12 dams within five miles of Tama County boundaries. Two of those dams are moderate classification dams but pose a minimal risk to downstream communities in Tama County. See Figure 4.1.6 in this plan for a map of dams in Tama County and adjacent counties.

No dam in Tama County has ever experienced a failure, therefore an average annual countywide loss estimate was not able to be calculated. There are no critical facilities located within the dam failure hazard area. 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 Tama 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 Tama County. All parcels with value within dam hazard areas were considered in the vulnerability assessment.

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 Tama County.

As noted in other sections of this plan, the vast majority of Tama County's dams are classified as low risk by National Inventory of Dams. This vulnerability analysis likely represents a worse-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 Tama 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	1975	115	6%	\$161,322,860	\$8,564,880	5.3%	6858	.7%	48
Residential	5280	115	2%	\$379,584,040	\$10,148,590	2.6%			
Commercial	589	3	.5%	\$55,573,340	\$706,100	1%			
Industrial	28	0	0%	\$24,343,460	0	0%			

Levee Failure

According to the National Levee Database, Tama County has one levee which is located in the City of Tama on the north bank of the Iowa River near river mile 188.5 (US Army Corps of Engineers 2015). The levee's length is 2.71 miles, and it protects less than one square mile of the community. The levee was completed in January of 1995 in response to significant flood damages for the City of Tama in the floods of 1993. No levee in Tama County has ever experienced a failure, therefore an average annual countywide loss estimate was not able to be calculated. The Civic Center and the Lincoln Savings Bank are the only critical facilities located within the levee failure hazard area.

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 Tama was obtained from the National Flood Hazard Layer obtained from the FEMA Map Service Center. The Tama 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.

Finally, only the City of Tama was included in the vulnerability analysis of levee failure because only one levee exists in Tama County. The map in Appendix H shows the areas of the City of Tama 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. There are no critical facilities located within the levee failure hazard area in Tama.

Levee Failure Potential Property Loss Estimates – City of Tama

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 Parcels in SFHA	Total People Affected
Agricultural	6	0	0%	\$272,100	0	0%	2,877	6%	173
Residential	1019	114	11%	\$62,590,870	\$3,364,010	5%			
Commercial	117	31	26%	\$8,307,370	\$2,866,530	35%			
Industrial	7	4	57%	\$2,770,610	\$1,112,160	40%			

Hazard: Grass or Wildland Fire
Jurisdictions: All jurisdictions
Score: 8

Tama 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 Tama County are more vulnerable to grass or wildland fires than 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:

- Chelsea (post office, bank, and water tower in hazard area)
- Clutier (water tower in hazard area)
- Dysart (no critical facilities in hazard area)
- Elberon (bridges in hazard area)
- Garwin (power generator, farm service, fire station, and water tower in hazard area)
- Gladbrook (fire/ambulance station and lift station in hazard area)

- Lincoln (water supply, fire station, city hall, and pump station in hazard area)
- Montour (lift station in hazard area)
- Tama (no critical facilities in hazard area)
- Toledo (wastewater plant and cell tower in hazard area)
- Traer (lift station in hazard area)
- Vining (no critical facilities in hazard area)

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 Tama 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.

Vulnerability to Grass and Wildland Fires was assessed using ArcGIS spatial analysis software. Parcel-level data from the Tama 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 Tama 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.

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

Chelsea

Type of Structure	Number of Parcels			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	9	9	100%	\$361,140	\$361,140	100%	267	18%	48
Residential	112	56	50%	\$3,376,980	\$1,783,190	53%			
Commercial	15	3	20%	\$901,120	\$340,010	38%			
Industrial	1	0	0%	\$17,380	0	0%			

Clutier

Type of Structure	Number of Parcels			Value of Structures			Number of People		
	# 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	4	4	100%	\$201,720	\$201,720	100%	213	21%	45
Residential	116	31	27%	\$4,469,590	\$1,289,070	29%			
Commercial	19	2	11%	\$910,020	\$589,010	65%			
Industrial	--	--	--	--	--	--			

Dysart

Type of Structure	Number of Parcels			Value of Structures			Number of People		
	# 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%	\$2,530	\$2,530	100%	1,379	10%	138
Residential	530	56	11%	\$44,653,970	\$7,006,490	16%			
Commercial	80	18	23%	\$6,630,720	\$1,674,520	25%			
Industrial	1	0	0%	\$74,640	0	0%			

Elberon

Type of Structure	Number of Parcels			Value of Structures			Number of People		
	# 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	4	4	100%	\$167,270	\$167,270	100%	196	26%	51
Residential	92	27	29%	\$3,814,260	\$1,258,720	33%			
Commercial	10	5	50%	\$2,194,640	\$2,069,180	94%			
Industrial	--	--	--	--	--	--			

Garwin

Type of Structure	Number of Parcels			Value of Structures			Number of People		
	# 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%	\$144,770	\$144,770	100%	527	17%	90
Residential	217	75	35%	\$11,017,150	\$4,107,270	37%			
Commercial	29	5	17%	\$1,208,120	\$598,270	50%			
Industrial	1	1	100%	\$194,920	\$194,920	100%			

Gladbrook

Type of Structure	Number of Parcels			Value of Structures			Number of People		
	# 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%	\$153,230	\$153,230		945	15%	142
Residential	396	41	10%	\$25,449,000	\$3,576,320				
Commercial	55	13	24%	\$3,118,990	\$499,370				
Industrial	1	1	100%	\$146,270	\$146,270				

Lincoln

Type of Structure	Number of Parcels			Value of Structures			Number of People		
	# 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%	\$107,050	\$107,050	100%	162	20%	32
Residential	80	37	46%	\$4,271,620	\$2,167,320	51%			
Commercial	16	5	31%	\$2,225,410	\$1,888,080	85%			
Industrial	--	--	--	--	--	--			

Montour

Type of Structure	Number of Parcels			Value of Structures			Number of People		
	# 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	9	9	100%	\$198,690	\$198,690	100%	249	30%	75
Residential	131	38	29%	\$4,999,790	\$1,451,620	29%			
Commercial	8	1	13%	\$344,160	\$2,080	.6%			
Industrial	--	--	--	--	--	--			

Tama

Type of Structure	Number of Parcels			Value of Structures			Number of People		
	# 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	6	6	100%	\$272,100	\$272,100	100%	2,877	15%	432
Residential	1019	46	5%	\$62,590,870	\$4,828,260	8%			
Commercial	117	18	15%	\$8,307,370	\$1,840,140	22%			
Industrial	7	5	71%	\$2,770,610	\$2,319,490	84%			

Toledo

Type of Structure	Number of Parcels			Value of Structures			Number of People		
	# 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	14	14	100%	\$655,100	\$655,100	100%	2,341	15%	351
Residential	781	79	10%	\$51,922,530	\$5,947,000	11%			
Commercial	115	18	16%	\$15,137,290	\$3,006,790	20%			
Industrial	6	3	50%	\$11,359,230	\$5,956,660	52%			

Traer

Type of Structure	Number of Parcels			Value of Structures			Number of People		
	# 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	4	4	100%	\$307,060	\$307,060	100%	1,703	21%	358
Residential	653	78	12%	\$51,807,180	\$8,575,390	17%			
Commercial	81	5	6%	\$5,811,380	\$942,340	16%			
Industrial	1	1	100%	\$292,430	\$292,430	100%			

Vining

Type of Structure	Number of Parcels			Value of Structures			Number of People		
	# 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%	\$131,850	\$131,850	100%	50	6%	3
Residential	30	16	53%	\$965,950	\$523,450	54%			
Commercial	2	0	0%	\$10,560	0	0%			
Industrial	--	--	--	--	--	--			

Tama County Unincorporated Area

Type of Structure	Number of Parcels			Value of Structures			Number of People		
	# 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	1,904	1,904	100%	\$158,207,030	\$158,207,030	100%	6,858	12%	823
Residential	1,112	996	90%	\$108,962,280	\$98,669,880	91%			
Commercial	38	36	95%	\$8,241,360	\$8,223,720	100%			
Industrial	8	8	100%	\$9,052,710	\$9,052,710	100%			

Hazard: Human Disease

Jurisdictions: All jurisdictions except Clutier and Toledo

Score: 5

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 most jurisdictions estimated that fewer than 25% of the people in Tama County are vulnerable to a pandemic human disease.

Hazard: Animal/Plant/Crop Disease

Jurisdictions: County-wide

Score: 5

Tama 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 Tama 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
- Extreme Heat
- Grass or Wildland Fire
- Radiological
- Severe Winter Storm
- Thunderstorms, Lightning, and Hail
- Tornadoes
- Wind Storms

The hazards that only affect certain jurisdictions and require more specific analysis include—in no particular order:

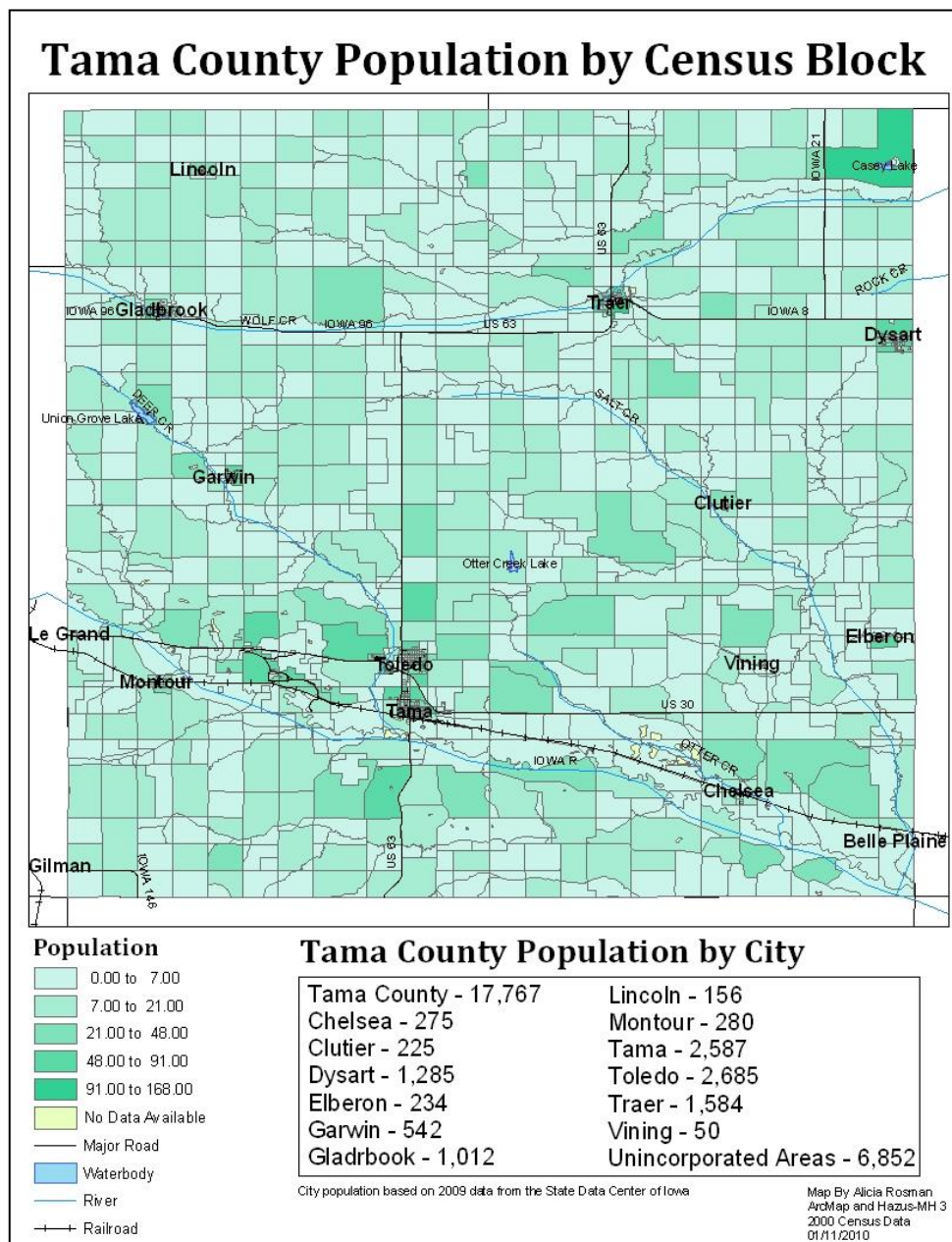
- Dam/Levee Failure – All jurisdictions
- Flash Flooding – All jurisdictions except Vining
- Hazardous Materials Incident – All jurisdictions
- Human Disease Epidemic – All jurisdictions except Clutier and Toledo
- Infrastructure Failure – All jurisdictions
- River Flooding – All jurisdictions
- Terrorism – All jurisdictions except Clutier and North Tama School District
- Transportation Incident – All jurisdictions except Clutier

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 Tama 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. Nearly 18,000 people live in Tama County and thousands more visit and travel through the county regularly. Refer to Figure 4.3.2.1 below for the population distribution across Tama County.

Figure 4.3.2.1: Tama County Population by Jurisdiction and Census Block

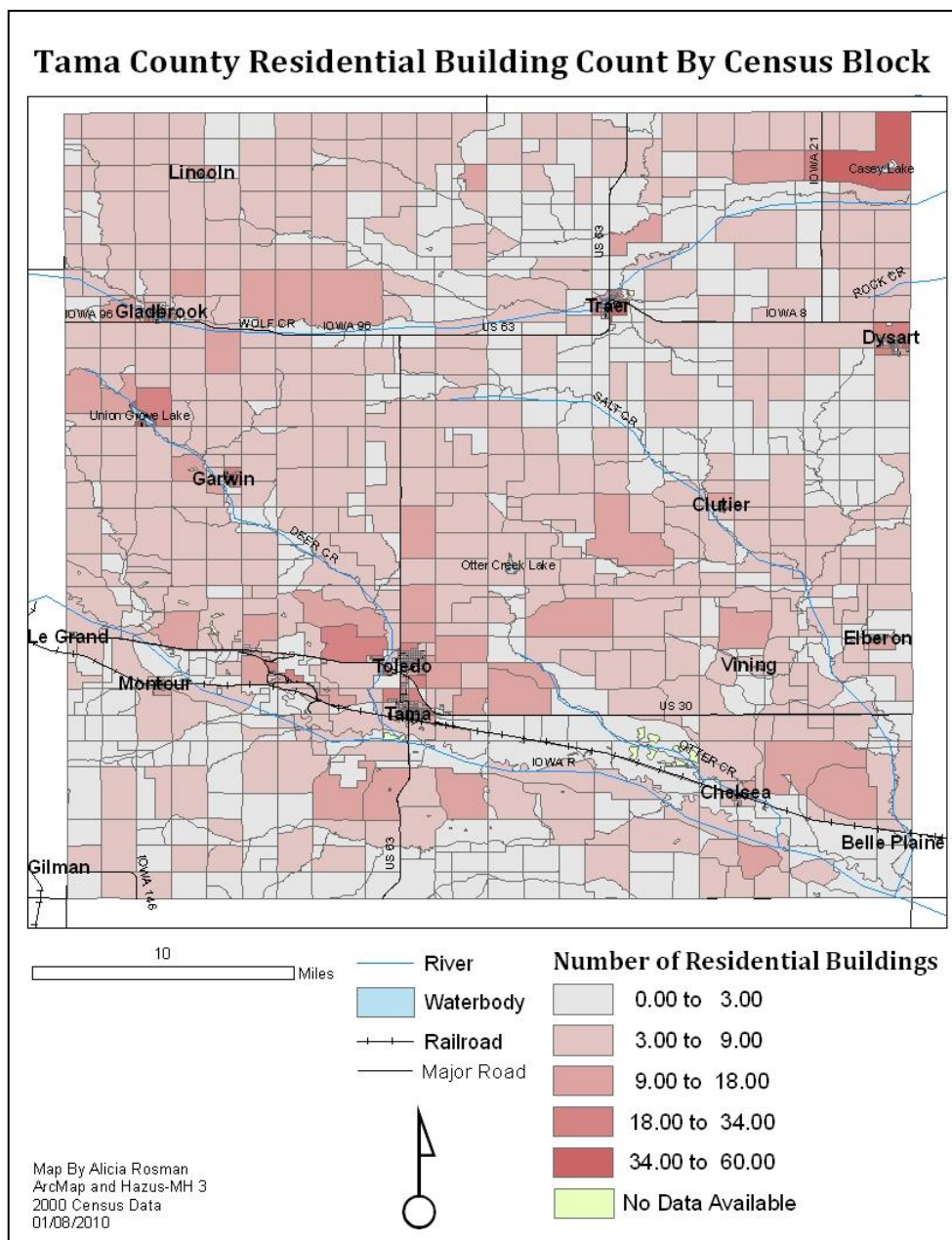


The largest concentration of people in Tama County is in its incorporated cities. Tama and Toledo have the highest populations followed by Traer and Dysart. There is also a higher concentration of people living in the northeast corner of the county. Otherwise, the rest of the population is evenly spread 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, Tama County's structural assets were divided into six different use categories: residential, commercial, industrial, agricultural, religious, and historic. Figure 4.3.2.2 below features residential structures.

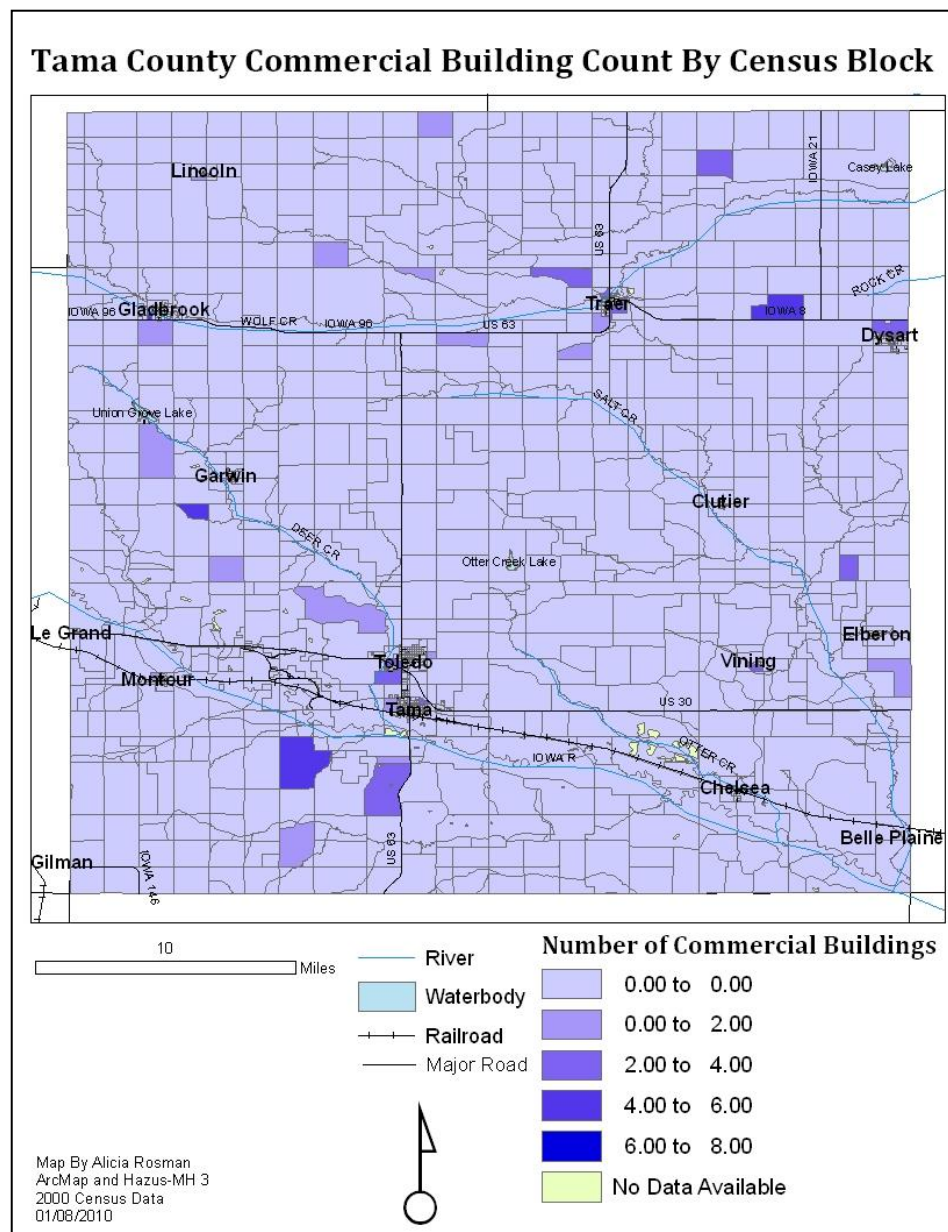
Figure 4.3.2.2. Tama County Residential Building Count by Census Block



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 Tama County and throughout the unincorporated areas. Again, in the northeast corner of the county, there is a high concentration of residential structures. Overall, the majority of the structures in Tama County are for residential use. Refer to Figure 4.3.2.2.

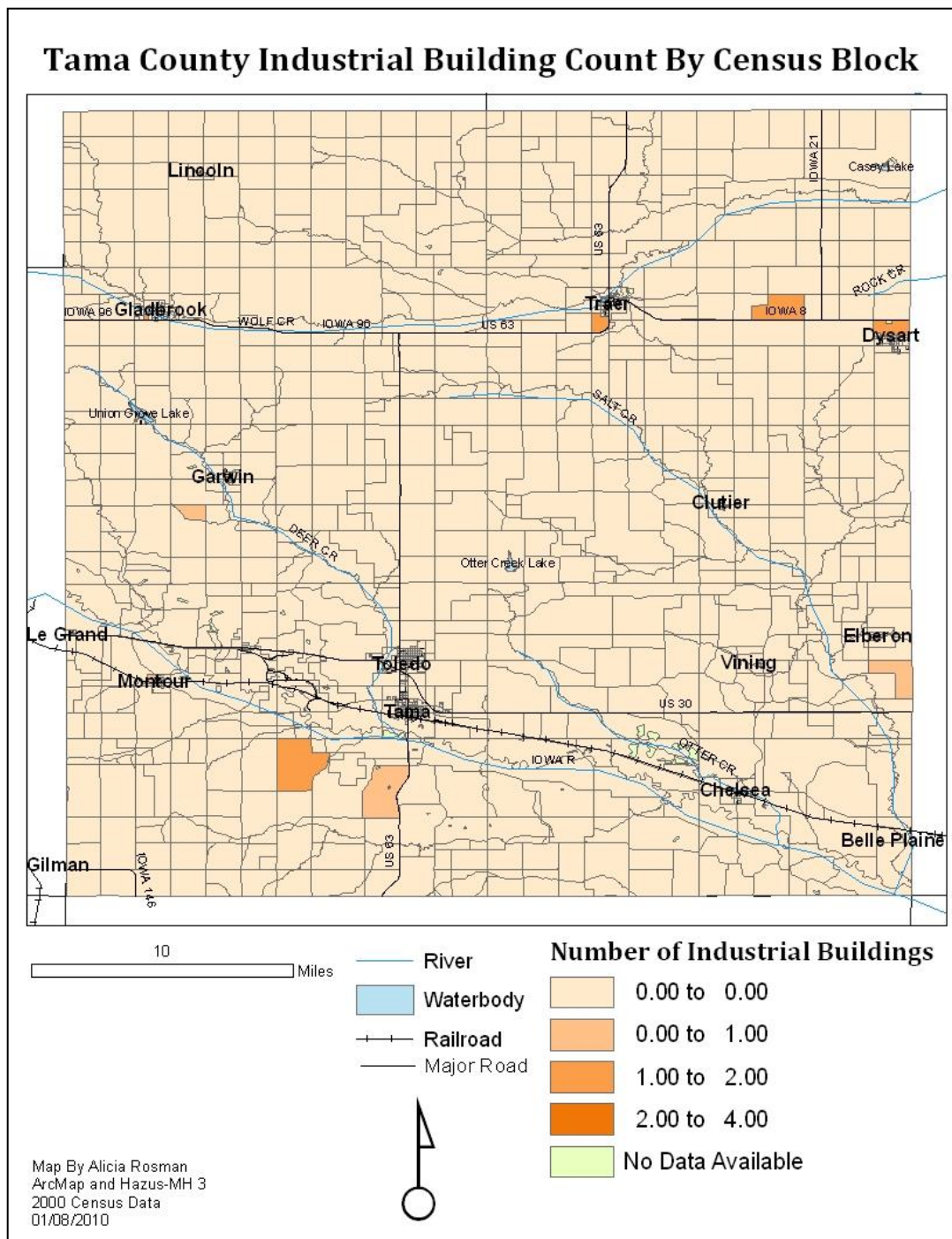
The second structure type, commercial, does not closely resemble the patterns of residential development. Most commercial buildings are located in the north and western portions of the county. The highest concentrations of buildings in one census block, though, is just six to eight so there are no extremely dense areas of commercial buildings. Generally, Tama County's largest cities have higher concentrations but there are also denser areas in the unincorporated, city periphery.

Figure 4.3.2.3: Tama County Commercial Building Count by Census Block



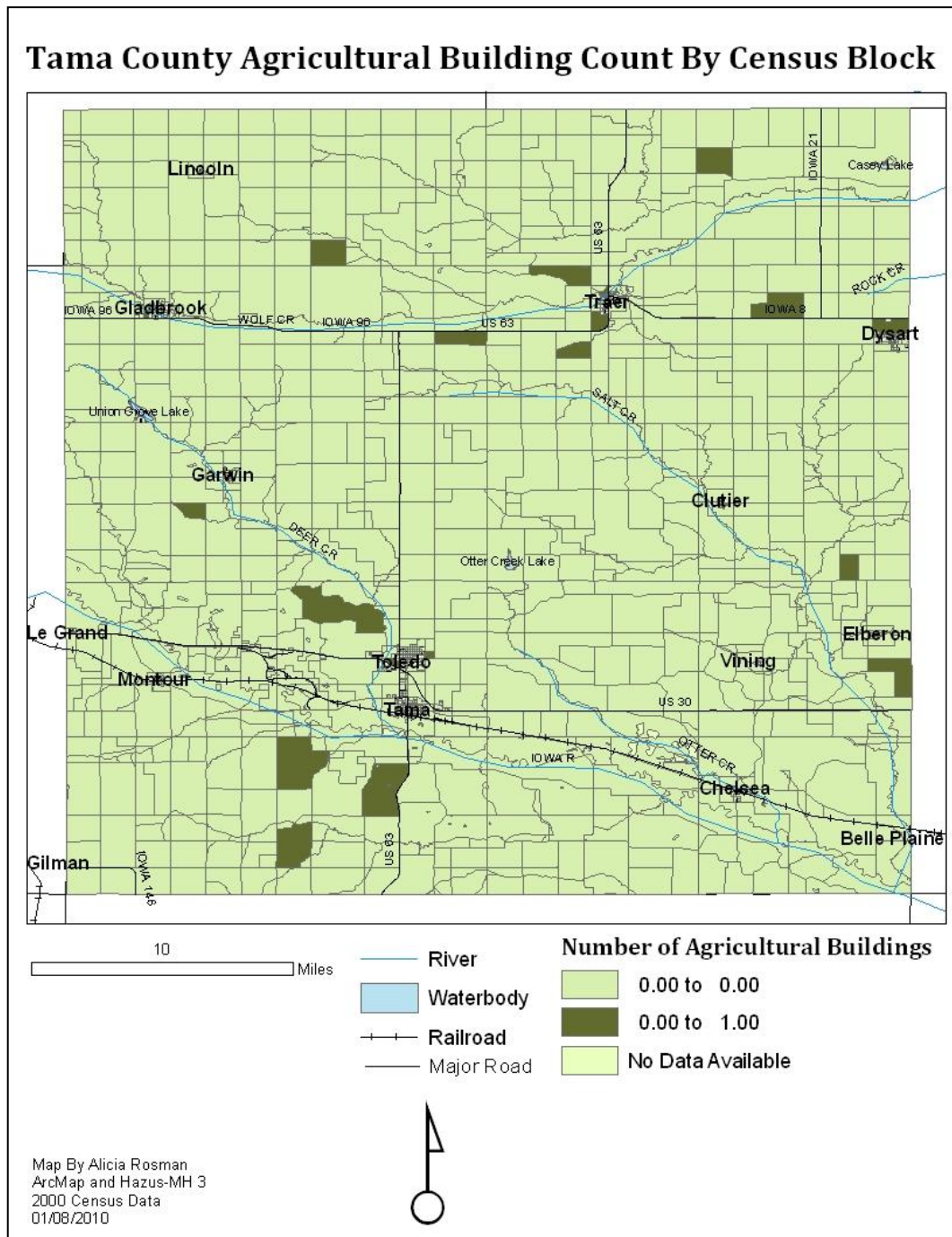
The concentration of industrial buildings is also not very dense with the highest concentration ranging from just two to four buildings. Refer to Figure 4.3.2.4. There are four areas that stand out as the densest industrial areas with two to four buildings. There are also three areas with just one industrial building. Overall, Tama 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: Tama County Industrial Building Count by Census Block



The distribution of Tama County's agricultural buildings is quite similar to the distribution of industrial buildings with some slight variations. None of the areas are extremely dense because the highest range in number of buildings per census block is just one building. All 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 Tama County.

Figure 4.3.2.5: Tama County Agricultural Building Count by Census Block



Historic Assets

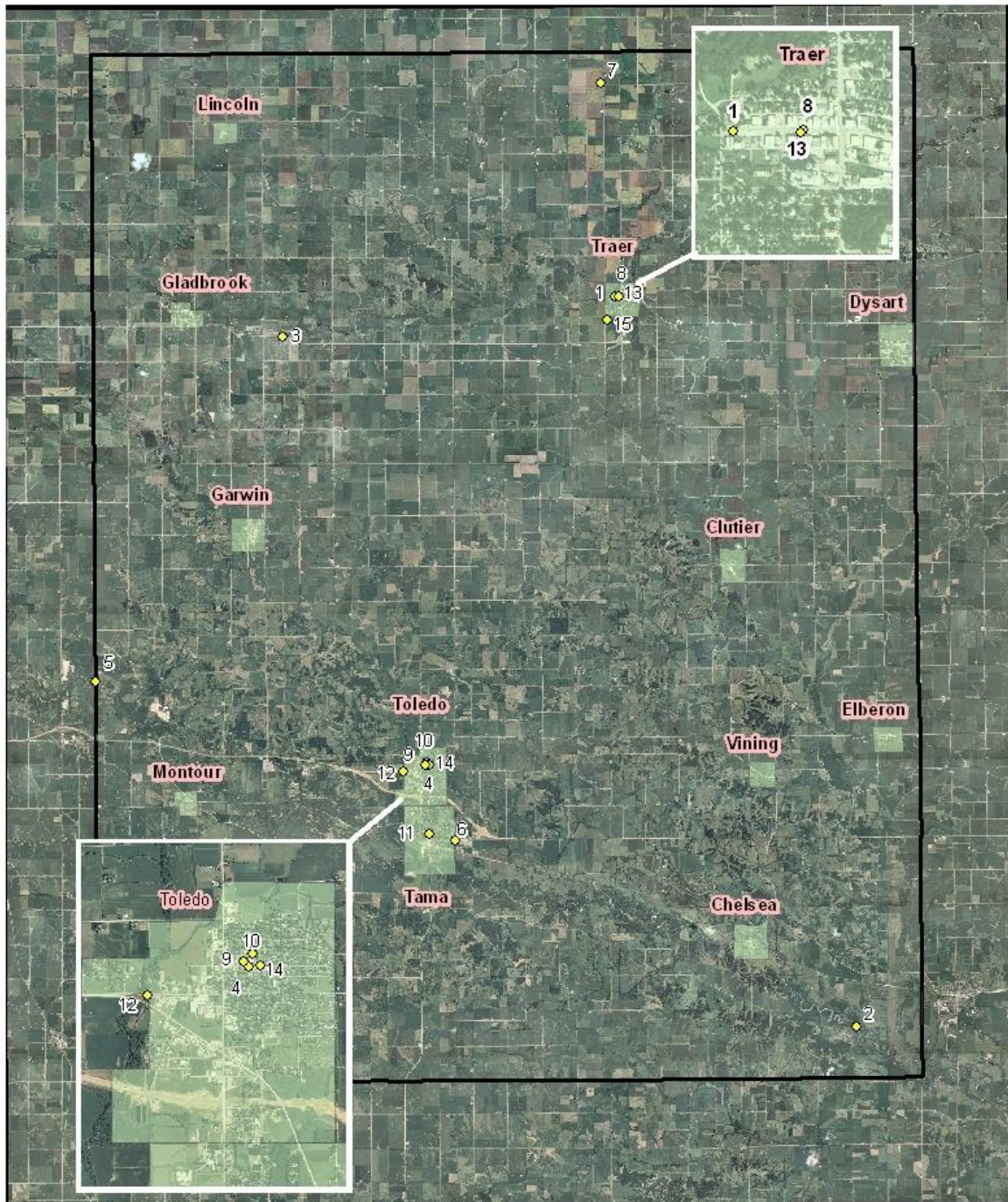
The fifteen historic sites are well spread across the entirety of Tama County. There are two major clusters of historic sites in the cities of Traer and Toledo, which can be seen in the call outs in Figure 4.3.2.6 on the next page. These clusters contain three or more sites each, which is just over half of all 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 government facilities and therefore, maintain a high importance to the cities as historic sites as well as functioning pieces of local government.

In order to identify the locations of fifteen registered historic sites in Tama 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 Tama County's historic sites is below:

1. Brooks and Moore Bank Building
2. Chambers Ford Bridge
3. Conant's Cabin and Park
4. Hope Fire Company Engine House
5. Le Grand Bridge
6. Lincoln Highway Bridge
7. Round Barn in Buckingham Township
8. Star-Clipper-Canfield Building and Winding Stairway
9. Tama County Courthouse
10. Tama County Jail aka Tama County Historical Museum
11. Tama Public Library
12. Toledo Bridge
13. Traer Public Library
14. Wieting Theater
15. John W. Young Round Barn

Refer to Figure 4.3.2.6 on the following page. 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: Tama County Historic Sites



Legend

- ◆ Historic Sites
- Incorporated Cities
- Tama County

Created by: Alyson Lutz, 5/26/10

Shapefile Source: National Resources Geographic Information Systems Library,
Iowa Department of Natural Resources,
& State Historic Society

Jurisdiction Identified Assets, Critical Facilities, and Vulnerable Populations

In the previous planning process, a community asset diagram was completed for each individual jurisdiction and the unincorporated areas of Tama 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.

The previous planning process had jurisdictions identify critical facilities and vulnerable populations. 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 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 Tama County jurisdiction is unique so the critical facilities identified for one jurisdiction may be very different from others. Critical facilities from other jurisdictions can also be identified. 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.

During the plan update, all jurisdictions were asked to update the information about community assets, critical facilities, and vulnerable populations in their communities that had been identified in the previous plan. The updates have been incorporated into each jurisdiction's profile. Most updates involved: adding or removing businesses that had started up or gone out of business in the last five years; adding or removing critical facilities based on location changes and project completions; and updating names and locations of assets and critical facilities as needed.

In addition to schools being included in the asset mapping from the previous plan, the plan update provides maps of school district facilities for participating school districts. These maps are included at the end of this chapter. Community assets, critical facilities, and vulnerable populations of each jurisdiction are discussed on the following pages.

Chelsea

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 Chelsea are below:

1. Hunting and fishing
2. Boating
3. Iowa River
4. Silver Dollar (restaurant)
5. Bank
6. Farm Coop
7. Poweshiek Rural Water Association
8. Open lots for development
9. Location on major county road (V18)
10. Ball field

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 Chelsea community. The critical facilities identified for Chelsea are below:

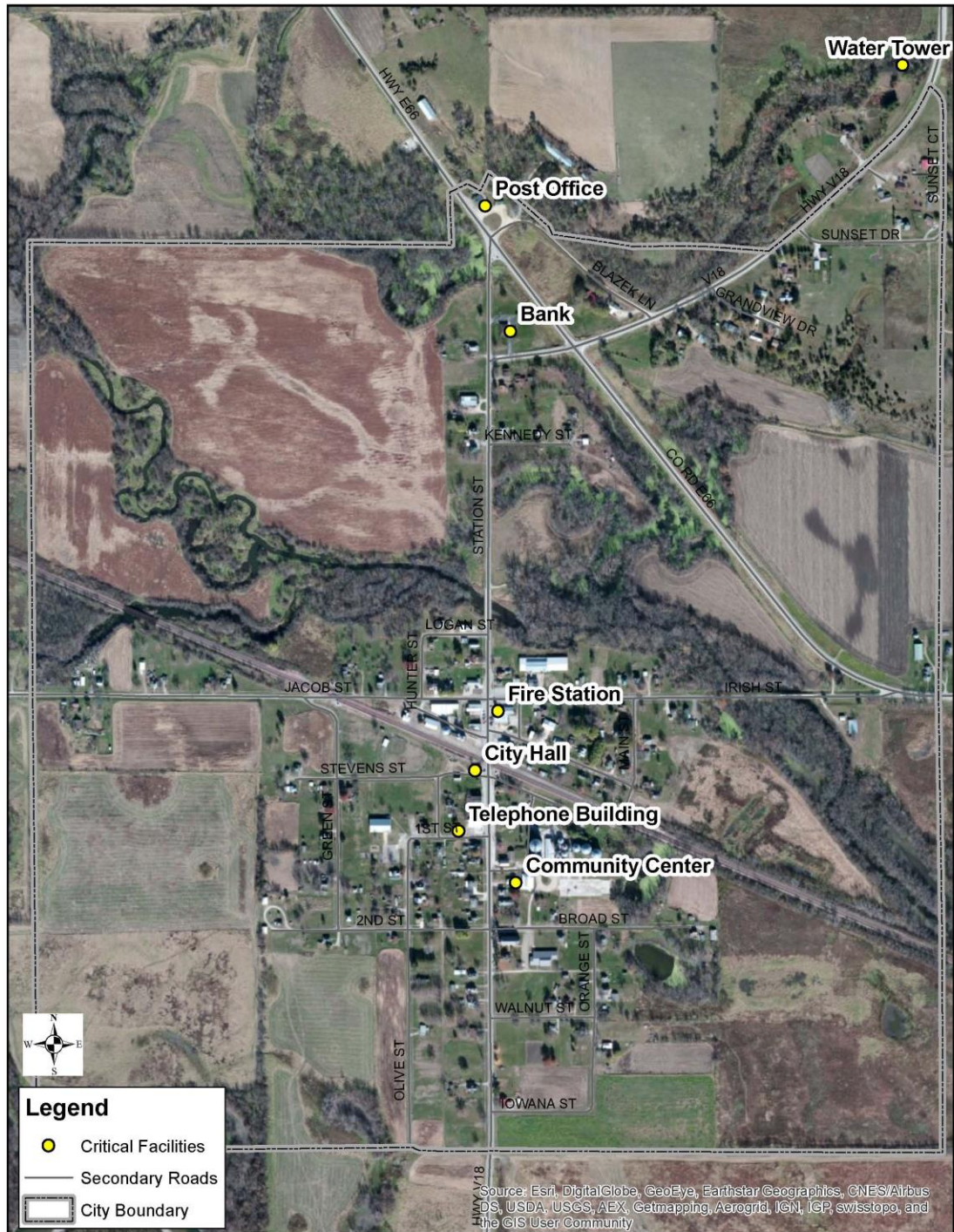
1. Fire Station
2. City Hall
3. Bank
4. Food and hardware stores in neighboring communities
5. Poweshiek Rural Water Association
6. Telephone service and infrastructure
7. Electrical service and infrastructure
8. Post Office
9. Community Center
10. Water Tower

These ten facilities were identified for several reasons. The Chelsea Fire Station serves as the city command post during disaster events, and the city's warning siren is located here. Refer to Figure 4.3.2.7 for each facility's location in Chelsea. Critical facilities for the community were also identified outside the city's boundaries. Since Chelsea is a small community, it cannot support a full grocery or hardware store so certain businesses located in neighboring communities are extremely important to Chelsea residents.

The vulnerable populations living in Chelsea 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 Chelsea are identified below.

1. Elderly and disabled persons in their homes
2. Residents who do not speak English

Figure 4.3.2.7: Chelsea's Critical Facilities



0 0.075 0.15 0.3 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Tama County Task Force, ESRI Imagery

Clutier

Clutier's assets were identified by the Task Force members who volunteered to represent the city and updated in the plan update. 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. Clutier's assets are listed below.

- | | |
|-------------------------------------|-----------------------------|
| 1. Museum | 14. ZCJB Hall |
| 2. Garbage service | 15. Clutier House |
| 3. Library | 16. Town jail |
| 4. Mark's One Stop | 17. Park |
| 5. Pearson Auto | 18. Fun Day |
| 6. Bank | 19. Band concerts |
| 7. Cizek Manufacturing | 20. Church/Community Center |
| 8. Tama Benton Coop Elevator (fuel) | 21. Legion Hall |
| 9. Czech Point Restaurant | 22. Fire Station |
| 10. Antique store | 23. City Hall |
| 11. Alert Iowa | 24. Palace Roofing |
| 12. Rural water | 25. Hydro Excavating |
| 13. Sewer infrastructure | 26. Butch's Pit Stop |

The city's critical facilities were also identified at this meeting and updated during the plan update. 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. Fire Station
2. City Hall
3. Bank
4. Water tower
5. Lagoons
6. Czech Point Restaurant
7. Legion Hall
8. Tama Benton Coop Elevator (fuel)
9. Community Center/Church

All of these facilities are extremely important to Clutier 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 a command post for City operations and protect important equipment that will most likely be needed immediately following a hazard event. The Legion Hall is a potential shelter space, and the grain elevator is a source of fuel and supplies. For the location of Clutier's critical facilities, refer to Figure 4.3.2.8. Clutier's representatives 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 Clutier are listed below.

1. Elderly residents in their homes
2. Disabled residents in their homes

Clutier representatives expressed concern for the elderly and disabled who live alone in their own homes. These people may not have the mobility needed to respond quickly to hazard events whether it be going to the basement during a tornado or finding supplies to board up windows.

Figure 4.3.2.8: Clutier's Critical Facilities



Dysart

Dysart's assets were identified by the Task Force members who volunteered to represent the city and updated during the plan update. 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. Dysart's assets are listed below.

- | | |
|------------------------------|--------------------------------------|
| 1. Dysart Community Building | 17. City government |
| 2. Modern, thriving stores | 18. Pioneer |
| 3. Poweshiek Rural Water | 19. Elliot Bros Trucking |
| 4. Modern sewage treatment | 20. Service organizations |
| 5. Peoplerides | 21. Museum |
| 6. Bike/nature trail | 22. July 4 th celebration |
| 7. Modern city streets | 23. Wine Fest |
| 8. Local police protection | 24. Soiree in the City |
| 9. Favorable Tama tax rates | 25. Old Iron Days |
| 10. Housing addition | 26. Christmas on Main |
| 11. School system | 27. Wolf Creek Theater |
| 12. Pre-school | 28. Norma Anders Library |
| 13. Daycare | 29. Hickory Hills |
| 14. Rowan Equipment | 30. Country Club Golf Course |
| 15. Aquatic Center | 31. City Park |
| 16. Dysart Trucking | 32. Affordable housing |
| | 33. Sunny Crest Care Center |

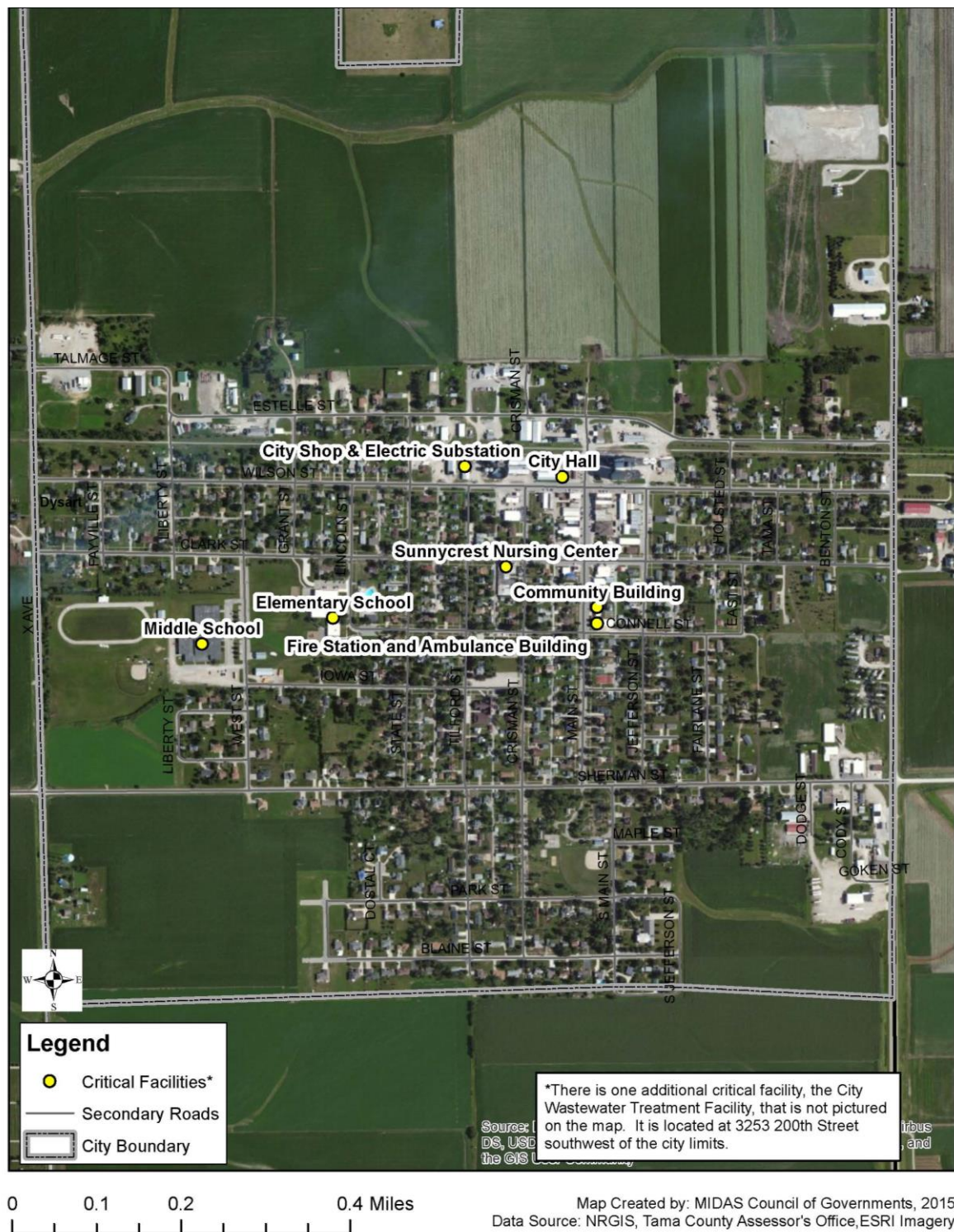
The critical facilities for the community were also identified. These are the facilities in the community that are important to maintain the health, safety, and welfare of the residents and visitors of the Dysart community. The critical facilities identified for Dysart are below.

1. Dysart Fire Station & Ambulance Building
2. Dysart City Hall
3. Dysart Community Building/Police Dept.
4. Dysart City Shop & Electric Substation
5. Union Schools – Middle & Elementary
6. Wastewater Treatment Facility
7. Sunnycrest Nursing Center

For the most part, these are critical facilities that can be found in many other jurisdictions in the county. The wastewater treatment facility is prominent as a critical facility that is very important after such events as flash flooding and river flooding. The locations of Dysart's critical facilities can be viewed in Figure 4.3.2.9. Vulnerable populations have also been identified for Dysart and are similar to other jurisdictions in Tama County, save for Sunnycrest Nursing Center residents. Not all cities in the county have such a facility. The vulnerable populations living in the City of Dysart are identified below.

1. Elderly in their homes
2. Nursing Center residents

Figure 4.3.2.9: Dysart's Critical Facilities



Elberon

Elberon's representatives identified 21 major assets in the community. Some assets include infrastructure, natural features, and social groups such as the Boy Scouts. Representatives identified social assets in addition to physical assets in this community. The complete list of assets from the asset mapping activity is below.

- | | |
|-------------------------------------|---------------------------------|
| 1. Tama County Sheriff's Department | 12. Lagoons |
| 2. Post Office | 13. Water tower |
| 3. Fire and Ambulance Department | 14. Poweshiek Water Association |
| 4. Heartland Cooperative | 15. Hydrants |
| 5. Legion groups | 11. Elberon Library |
| 6. Methodist Church | 12. Kaloupek Garage |
| 7. Homemakers | 13. Elberon General Store |
| 8. Elberon Community Building | 14. Mama Hoyt's |
| 9. Boy Scouts | 15. Farmland |
| 10. Park | 16. Creek |
| 11. School buses | |

The critical facilities that were identified for Elberon can be found both within and outside the city boundaries. Since Elberon is one of the smaller communities in Tama County, all basic services like a grocery store and bank are not located in the city. The Fareway grocery store in Tama, the bank in Keystone, and Benton Community Schools are all critical facilities for Elberon even though they are miles away. All of Elberon's critical facilities are listed below. Refer to Figure 4.3.2.10 for the location of each critical facility in Elberon.

1. Fire/Rescue Station
2. Community Building and Library (w/generator)
3. Transportation facilities (bridges)
4. Water tower and lagoon
5. Kaloupek's Garage
6. Fareway in Tama
7. Keystone Savings Bank in Keystone
8. Benton Community Schools
9. Heartland Co-op

The critical facilities that may be needed the quickest after a hazard event are located in Elberon. Fire and medical rescue are much more time sensitive than grocery or banking needs. Transportation facilities are also extremely important because a bridge is located on the west and east side of the city on County Road E44, which is the main road in and out of the city.

The vulnerable population identified in Elberon is the elderly residents who are living in their home. This is a commonly identified group of people in Tama County. Most cities have older residents who live alone and may not have the mobility to respond quickly during a hazard event.

Figure 4.3.2.10: Elberon's Critical Facilities



Garwin

Thirteen major assets were identified in Garwin. These assets include both structural and social assets. In addition to buildings, service groups like the Lions Club and the city's revitalization group are extremely important in this community. The full list of identified assets is below:

1. Farm Service Cooperative
2. Mid-Iowa Cooperative
3. Three churches
4. Revitalization group
5. Lions Club
6. School addition (Green Mountain Garwin Community School District)
7. City Park
8. Communication Center
9. Public restroom
10. New concession stand (Green Mountain Garwin Community School District)
11. Updated sewer system
12. Rural water
13. Electrical service

All of the critical facilities identified for Garwin are located within the actual city. Several common critical facilities, however, are located outside of Garwin. Businesses like a grocery or hardware store are not located in Garwin but in nearby cities. Although these facilities were not directly identified, they are still extremely important. All of the critical facilities that were identified by Garwin Task Force representatives are below. Refer to Figure 4.3.2.11 for facility locations in Garwin.

1. Water tower
2. School (Green Mountain-Garwin Community School District)
3. Gas station
4. Bank
5. City Hall
6. Fire Department
7. Ambulance Facility
8. Community Center
9. Power Generator
10. Farm Service Cooperative

The vulnerable populations living in Garwin 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 Garwin are the elderly living in their homes and children attending school during the day.

Figure 4.3.2.11: Garwin's Critical Facilities



0 0.05 0.1 0.2 Miles

Map Created by: MIDAS Council of Governments, 2015
Data Source: NRGIS, Tama County Task Force, ESRI Imagery

Gladbrook

A large number of assets were identified in the Gladbrook jurisdiction. Assets include mostly infrastructure and buildings, but they also include very unique attractions like the Matchstix Marvels and Corn Carnival. Gladbrook also hosts the annual Tama County Fair.

- | | |
|---------------------------|--------------------------------------|
| 1. Matchstix Marvels | 12. Eastbrook and Westbrook |
| 2. Corn Carnival | 13. Assisted living facility |
| 3. Tama County Fair | 14. New construction in city |
| 4. HVAC | 15. Gladbrook Investment Cooperative |
| 5. Electrical service | 16. Library |
| 6. Auto Sales and Repair | 17. Gladbrook Museum |
| 7. Petty Livestock | 18. Bowling alley |
| 8. Farm cooperative | 19. Wellness Center |
| 9. Hometown Foods | 20. Bike trail |
| 10. Casey's General Store | 21. Union Grove State Park |
| 11. Deb Serendipity | |

Other assets include critical facilities. In Gladbrook, critical facilities are primarily water infrastructure, emergency response facilities, and structures that can function as shelter. A full list of Gladbrook's critical facilities is below:

1. Memorial Building
2. Lift station
3. Lagoon
4. Water treatment plant
5. Fire and Ambulance Building
6. Medical clinic
7. School
8. Water tower
9. Grocery store
10. Casey's and Cooperative

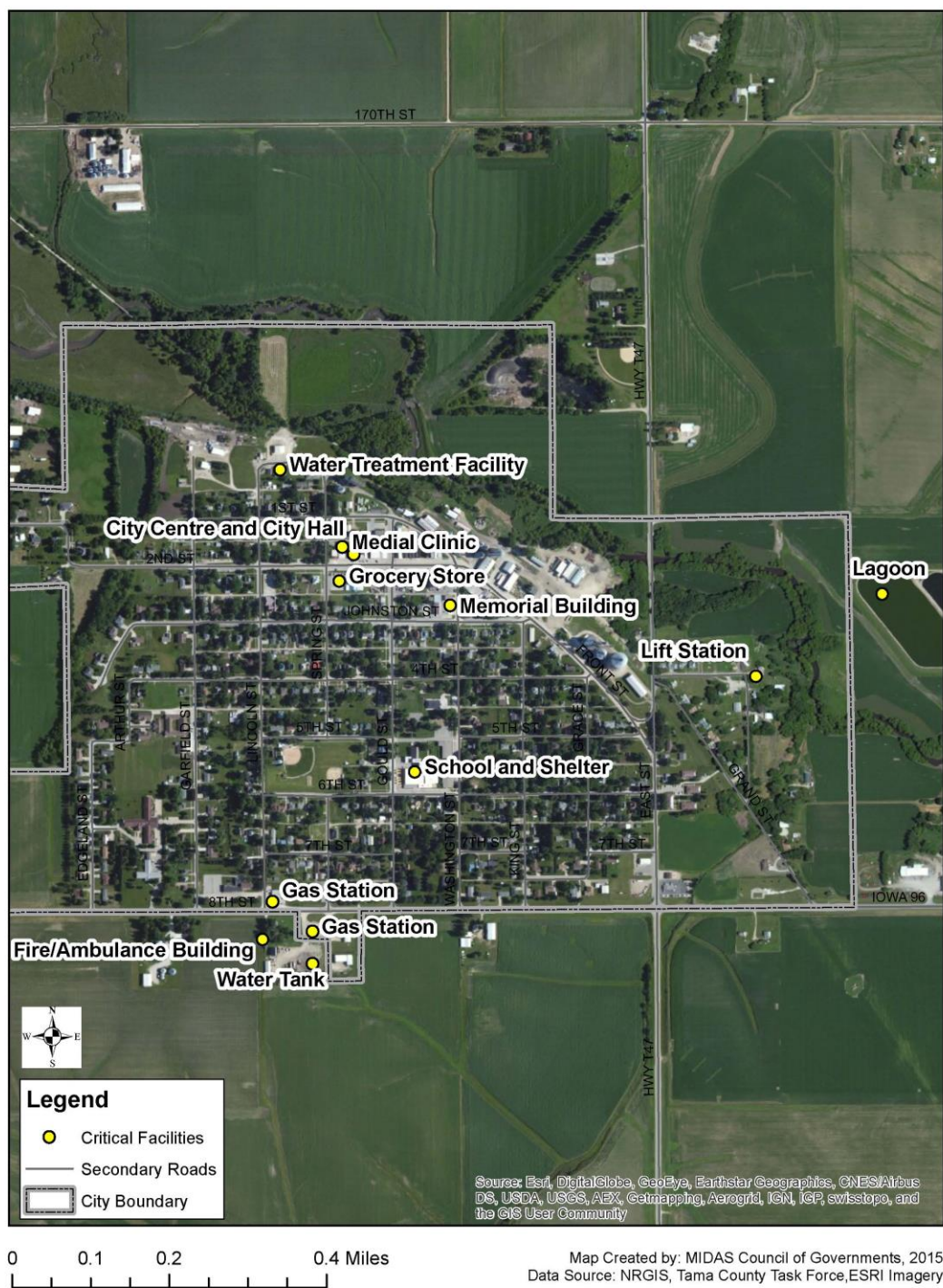
Since Gladbrook is a larger jurisdiction, its population is able to support basic services like a grocery store, gas station, and medical. These were identified as critical facilities for Gladbrook but they also serve surrounding communities that do not have these services.

The vulnerable populations living in Gladbrook were also identified. These populations are identified so their needs can be made a priority in the event of a disaster. The vulnerable populations living in Gladbrook are below.

1. Westbrook Acres Nursing Home and condominiums
2. School and daycare
3. Churches

The Westbrook Acres Nursing is especially vulnerable due to the limited mobility and special medical needs of its residents. The school and daycare are also vulnerable because large groups of young children may be difficult to manage. Churches were identified because several times a week there are large gatherings of people at these facilities, which may be an issue during a hazard event.

Figure 4.3.2.12: Gladbrook's Critical Facilities



Lincoln

Lincoln's assets were identified by the Task Force members who volunteered to represent the city and updated during the plan update. 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. Lincoln's assets are listed below.

1. Cooperative
2. Bank
3. Post Office
4. Town Tap
5. Fire Department
6. Hardware Store
7. Salem Church
8. Commercial Club
9. Firemen fundraiser breakfasts
10. City Park
11. Amvets Community Hall
12. School system bus exchange
13. Central Iowa Water Association
14. Storm shelter in Amvets Hall
15. Storage units
16. Lincoln Redemption Center

Quite a few of the commonly identified critical facilities are located in Lincoln even though it is a very small jurisdiction. Their critical facilities include a hardware store, bank, and fuel, but there is no ambulance service or a grocery store in the city. The full list of critical facilities is below.

1. Fire Station
2. City Hall
3. Amvet Hall (shelter)
4. Coop Station (fuel)
5. Lincoln State Bank
6. Wentzien's Hardware
7. Central Iowa Water Association pump station
8. Ambulance, grocery store, and school in Gladbrook
9. Highway 65 (for emergency vehicles from Gladbrook)
10. Church

A grocery store is located in Gladbrook, and ambulance service is also provided by Gladbrook. This is a case where critical facilities are located in a neighboring jurisdiction. Refer to Figure 4.3.2.13 for the location of critical facilities actually located in Lincoln.

Like most jurisdictions in Tama County, the disabled and elderly living in their private residence were identified as the jurisdiction's vulnerable population. These individuals may require priority assistance during and immediately following a hazard event.

Figure 4.3.2.13: Lincoln's Critical Facilities



Montour

Several assets were identified in the Montour community by city representatives. All of the identified assets for Montour are identified below.

1. Fire department and EMS rig
2. Rube's Steakhouse
3. Living Faith United Ministries
4. City park

Quite a few services like a grocery store, medical clinic, and gas station are not available in Montour so these facilities were not identified. However, these services are located in neighboring jurisdictions and access to these services is extremely important when a hazard event occurs. All of the critical facilities located in Montour are below. Refer to Figure 4.3.2.14 for location.

1. Community Center and City Hall
2. Fire Station and water pump
3. City Shed
4. Lift station (new, has own generator)
5. Rube's Steakhouse
6. Shelter

The Community Center and City Hall can be used as shelter immediately following a hazard event; there is also another building in town that can be used for shelter. The Fire Station and City Shed are extremely important because they protect rescue vehicles, pumps, wells, and power supplies. The City's water pump is also located in the Fire Station.

The vulnerable populations living in Montour 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. In Montour, the daycares were identified as the location of vulnerable populations if a hazard event were to occur.

Figure 4.3.2.14: Montour's Critical Facilities



Tama

Tama's assets were identified by the Task Force members who volunteered to represent the city and updated during the plan update. 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. Tama's assets are listed below.

- | | |
|---|-----------------------------|
| 1. Coffee shop | 10. City park |
| 2. Furniture store | 11. Aquatic Center |
| 3. Paper mill | 5. Recreational trail |
| 4. Low-income assisted living | 6. Water treatment facility |
| 5. Meskwaki Casino | 7. Cherry Mansion |
| 6. Library | 8. Lincoln Bridge |
| 7. Service clubs | 9. Housing development |
| 8. STC Elementary School (South Tama Community School District) | 10. Dike |
| 9. Country Club | |

Several South Tama Community School District buildings are included in Tama's critical facilities since the majority of this school district's operations are located in Tama. Almost all basic services are available in Tama except a grocery store, but Fareway is just minutes from anywhere in Tama because it is located in neighboring city of Toledo. The full list of Tama's critical facilities is below. Refer to Figure 4.3.2.15 for the location of facilities in Tama.

- | | |
|---------------------------|----------------------------------|
| 1. STC High School | 6. Sunny Hill Care Center |
| 2. STC Partnership Center | 7. Lincoln Savings Bank |
| 3. STC Bus Barn | 8. Fuel stations |
| 4. Civic Center/City Hall | 9. Alliant Energy infrastructure |
| 5. Mercy Medical Center | |

Tama has several potential shelter options following a hazard event including schools, the Civic Center, and church facilities. Keeping these buildings safe from damage and shelter-ready should be a high priority. Tama has a major advantage over other jurisdictions since it has several shelter options.

Locations where elderly Tama residents live were identified as vulnerable during a hazard event. A long-term care facility and elderly apartments are located in Tama along with an elementary school that was also identified as vulnerable. A large group of either elderly or young people may be difficult to maneuver and protect so these facilities are considered a priority when providing assistance during and immediately following a hazard event. Tama's vulnerable populations include:

1. Sunny Hill Care Center
2. Prairie Village Apartments
3. STC Elementary School

A major concern associated with facilities that support or care for elderly people is the special medical care that may be needed by residents. A hazard event could severely damage one of these facilities and the immediate medical needs of residents may not be able to be fulfilled, which could endanger lives. These facilities should be a major priority during and immediately following a hazard event.

Figure 4.3.2.15: Tama's Critical Facilities



Toledo

During the hazard mitigation planning process, the representatives for the City of Toledo helped identify the assets of the Toledo community. The assets identified for Toledo are below.

- | | |
|---|--|
| 1. Meskwaki Casino | 12. U.S. Highway 30 Corridor |
| 2. Step and Tank | 13. Pioneer facility |
| 3. Winery | 14. Downtown area |
| 4. Elderly housing | 15. Daycare Center |
| 5. South Tama Schools (Middle School in Toledo) | 16. Wieting Theatre |
| 6. Recreational trail | 17. Aquatic Center |
| 7. New U.S. Highway 30 construction | 18. Major highway intersection (30 and 63) |
| 8. Reinig Center | 19. Library |
| 9. Historic Stoplight | 20. Cart House |
| 10. Fire Station | 21. Housing additions |
| 11. Toledo Heights Park | 22. Fire Department |
| 12. Emergency Medical Services | |

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 Toledo community. Since Toledo is the county seat, most of the county's operations are located in downtown Toledo. For that reason, this area is extremely important for county functioning during and after a hazard event. The critical facilities identified for Toledo are below. Refer to Figure 4.3.2.16 for the location of Toledo's critical facilities.

1. Fire Station/Emergency Medical Services
2. Courthouse, jail, Sheriff's Office, communication center, emergency operations
3. Community Building/Police Station
4. STC Middle School
5. Fareway grocery store
6. Fuel/convenience stores
7. Cell towers
8. Iowa Telecom
9. Water/sewer infrastructure
10. Juvenile home
11. Deer Creek Medical Center

The Toledo community is fortunate to be larger and contain all or most of the resources needed in a disaster situation like local emergency medical services, a grocery store, fuel, and a medical clinic. Some Tama County communities do not have these resources locally. All of the critical facilities listed for Toledo were chosen for obvious reasons. City services like medical response, fire and police protection, water, sewer, and communications are extremely important during and after a hazard event. The county's emergency operations center is an extremely important facility, too.

The vulnerable populations living in Toledo 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 Toledo are identified below.

1. Nursing home
2. Mobile home park
3. Juvenile home
4. Elderly throughout community (especially Willow Apartments)
5. Daycare Center

Figure 4.3.2.16: Toledo's Critical Facilities



Traer

Traer identified their critical facilities in the plan update process. Critical facilities are the facilities in the community that are important to maintain the health, safety, and welfare of the residents and visitors of the Traer community. The critical facilities identified for Traer are below. Refer to Figure 4.3.2.17 for the location of Traer's critical facilities.

1. Community building
2. Library
3. Sewer lift station
4. Sewer lagoons
5. Fire Department / City Hall / Ambulance area
6. Electric generation (backup)
7. Well
8. Water Tower
9. School

The Traer community is fortunate to be larger and contain all or most of the resources needed in a disaster situation such as grocery stores, gas stations, and pharmacies. Some Tama County communities do not have these resources locally. All of the critical facilities listed for Toledo were chosen for obvious reasons. City services like medical response and fire protection, water, sewer, and power generation backup are extremely important during and after a hazard event.

The vulnerable populations living in Traer 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 Traer are identified below.

1. Nursing home (Sunrise Hill)
2. Mobile home park
3. Daycare center

Figure 4.3.2.17: Traer's Critical Facilities



Vining

Vining's assets were identified by the Task Force 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. Vining's assets are listed below.

1. Flea market
2. National cemetery
3. Fire Department
4. Benda Agriculture Services
5. Vining Grocery
6. Becks Auto Body
7. Christian Fellowship Church/Emergency shelter
8. City park
9. Boy Scout Camp
10. Wildlife area
11. CSA Hall
12. Poweshiek Water Association

Vining is the smallest jurisdiction in Tama County so it does not have a large enough population to support basic services like fuel and emergency medical services. Vining is one of several jurisdictions that have critical facilities located in other communities. The full list of Vining's critical facilities is below.

1. Emergency shelter
2. Fire department
3. Benda Agriculture Services
4. Vining Grocery
5. Fareway in Toledo
6. CSA Hall
7. Gas stations in Belle Plaine, Tama, and Toledo
8. Poweshiek Water Association infrastructure
9. Alliant Energy infrastructure
10. Emergency medical services in Elberon
11. Iowa Telecom service and infrastructure

Vining is unique because it already has a shelter that is prepared for emergency use. This facility is not just a critical facility but also a major asset. Refer to Figure 4.3.2.18 for the location of the critical facilities located in Vining. Three types of populations were identified as vulnerable in Vining. The overall concern in Vining is for disabled and elderly people living on their own. Refer to the list below.

1. People outside of town who depend on medical equipment
2. Individuals who depend on a wheel chair
3. Elderly who live outside of the community

Figure 4.3.2.18: Vining's Critical Facilities



Unincorporated Tama County

The representatives for Tama County identified almost thirty assets in the county, and there are more than likely dozens more. In 2010, Tama County was designated as an Iowa Great Place by the Department of Cultural Affairs. Several specific attractions earned the county this designation including the Meskwaki Cultural Center and Museum plan, Wieting Opera House restoration project in Toledo, the Traer Salt and Pepper Shaker Museum, Dysart Historical Center, and Otter Creek Lake and Park expansion project. Refer to the list below for the assets identified in Tama County.

- | | |
|---------------------------------|----------------------------------|
| 2. Vineyard | 16. Road system |
| 3. Casino (Meskwaki Settlement) | 17. Rural water system |
| 4. Locally owned services | 18. Round barns |
| 5. Contractors | 19. Courthouse |
| 6. Quarry | 20. Bridges |
| 7. Coops and grain elevators | 21. Historic homes |
| 8. Pioneer Family Farms | 22. Cemeteries |
| 9. County School Districts | 23. Residential homes |
| 10. Meskwaki Settlement | 24. Right-of-way on county roads |
| 11. Otter Creek | 25. Iowa River Corridor |
| 12. State marsh | 26. Timber |
| 13. Lake facilities (x3) | 27. Agricultural land |
| 14. Wolfe Creek Trail | 28. Iowa River |
| 15. Communication towers | 29. Public parks |
| 16. Rail transportation | |

Tama County has an extensive network of critical facilities that include 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 Tama County so they are especially important during and immediately following a hazard event. A list of Tama 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

These facilities are located throughout Tama 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 Tama County include most groups that were identified in the incorporated cities. The elderly and disabled individuals who live in their private homes are especially vulnerable when a hazard event occurs. Also, individuals with special medical needs are vulnerable because they might have equipment that depends on electricity or medication from a pharmacy, inaccessible due to unsafe travel conditions.

GMG Community School District

GMG Community School District has facilities in the City of Garwin in Tama County. Other school district facilities are located in Marshall County, Iowa. School district assets in Tama County include the GMG Secondary School building, the school bus parking area, and a school athletic field. The school district did not participate in the previous Multi-Jurisdictional Hazard Mitigation Plan for Tama County but is participating in the plan update. See Figure 4.3.2.19 for the locations of school district facilities.

North Tama Community School District

North Tama Community School District has facilities in the City of Traer in Tama County. School district assets include the North Tama Elementary School, North Tama Secondary School, and the school bus parking area. The school district participated in the previous Multi-Jurisdictional Hazard Mitigation Plan for Tama County. See Figure 4.3.2.20 for the locations of school district facilities. Unlabeled school district land is, according to the Tama County Assessor's Office, owned by the school district but the school district did not list this as a specific asset.

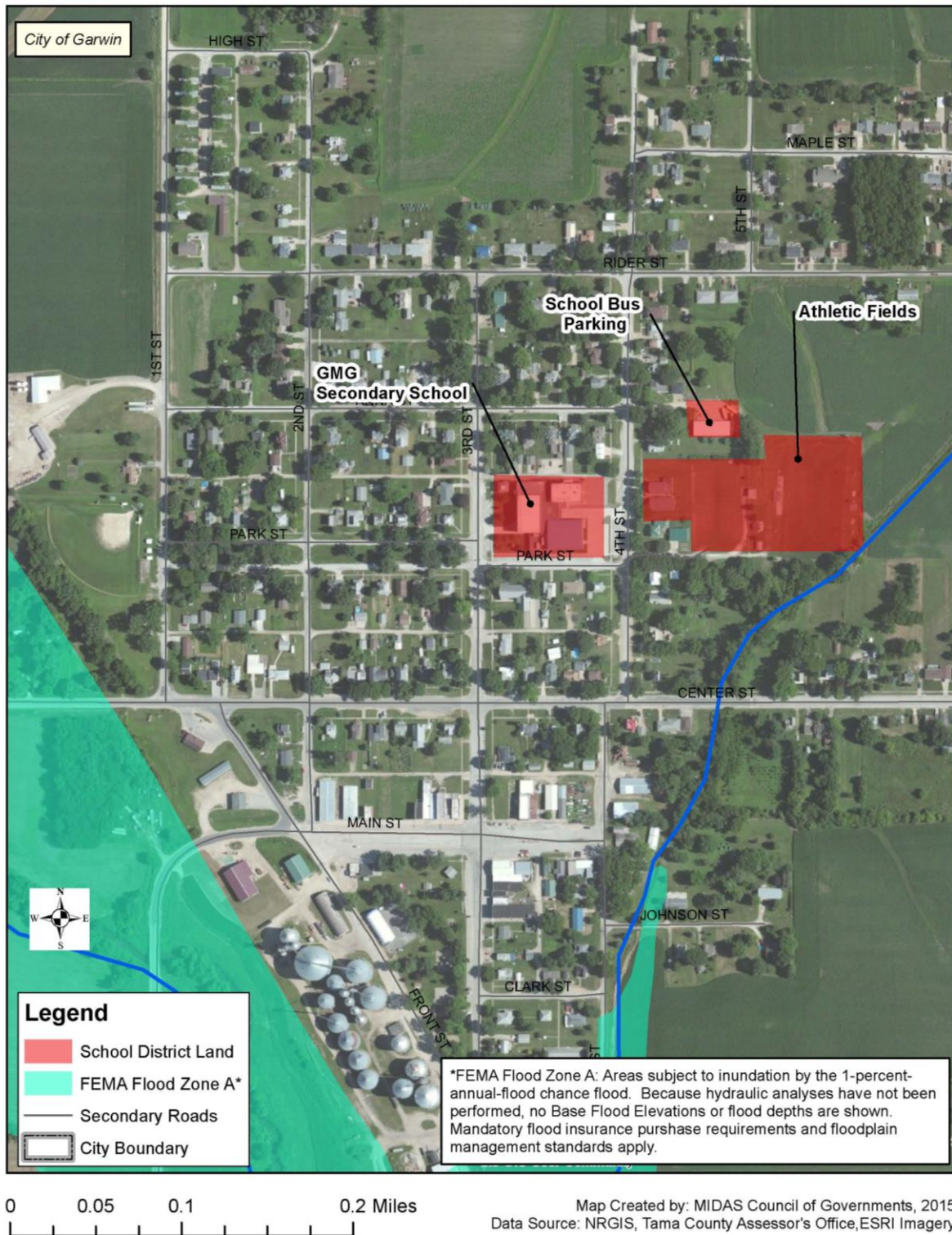
South Tama Community School District

South Tama Community School District has facilities in the Cities of Tama and Toledo in Tama County. School district assets include the South Tama High School, South Tama Administration Building, Tama Intermediate School, South Tama Partnership Center, South Tama bus parking area, and South Tama Middle School. All of these facilities are represented in three maps of the district in Figures 4.3.2.21, 4.3.2.22, and 4.3.2.23. The school district participated in the previous Multi-Jurisdictional Hazard Mitigation Plan for Tama County. Unlabeled school district land is, according to the Tama County Assessor's Office, owned by the school district but the school district did not list this as a specific asset.

Union Community School District

Union Community School District has facilities in the City of Dysart in Tama County. School district assets include Union Middle School and Dysart-Genesea Elementary School. The school district participated in the previous Multi-Jurisdictional Hazard Mitigation Plan for Tama County. See Figure 4.3.2.24 for the locations of school district facilities.

**Figure 4.3.2.19: GMG Community School District
Location of Buildings and FEMA Flood Zone Boundaries**



**Figure 4.3.2.20: North Tama Community School District
Location of Buildings and FEMA Flood Zone Boundaries**

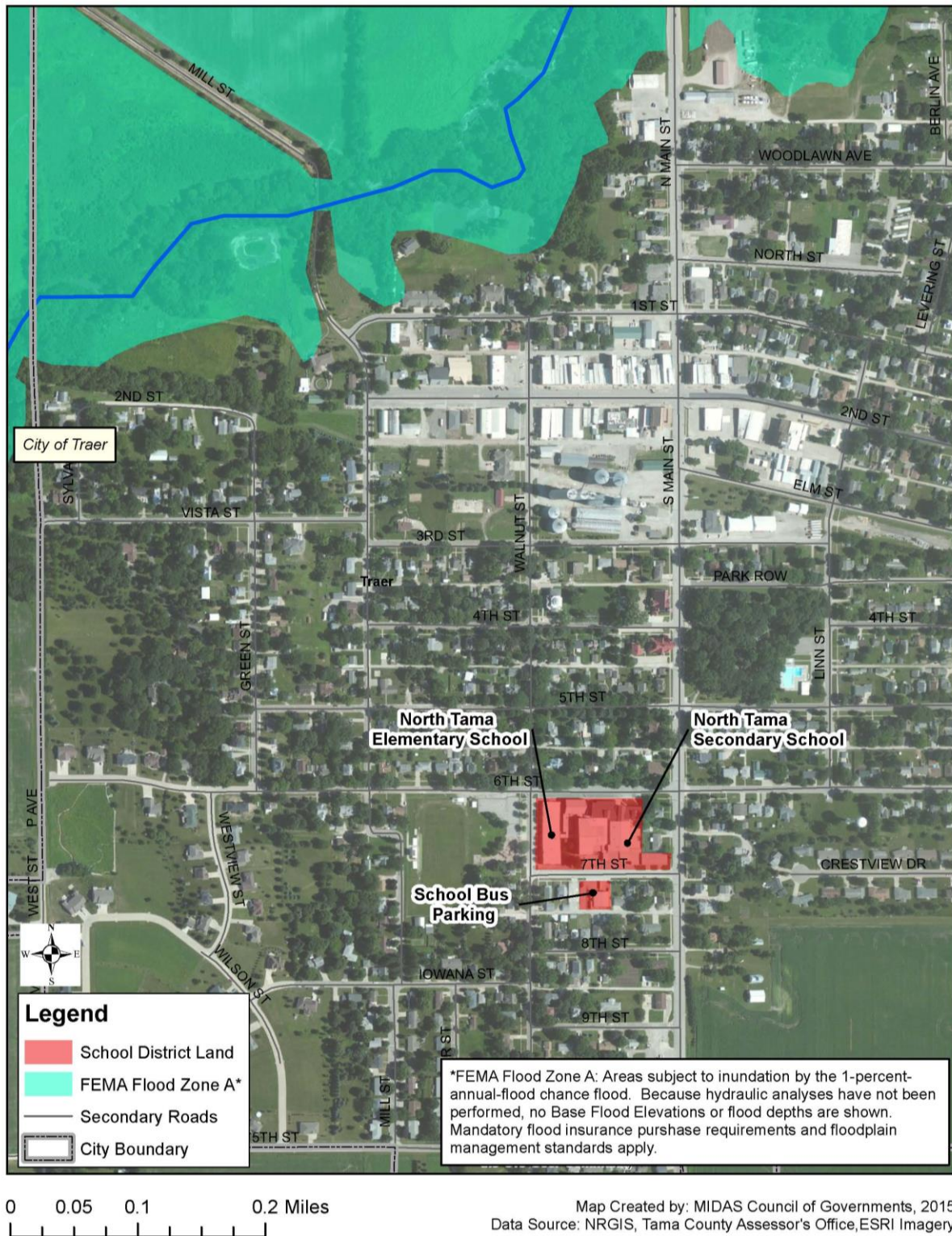
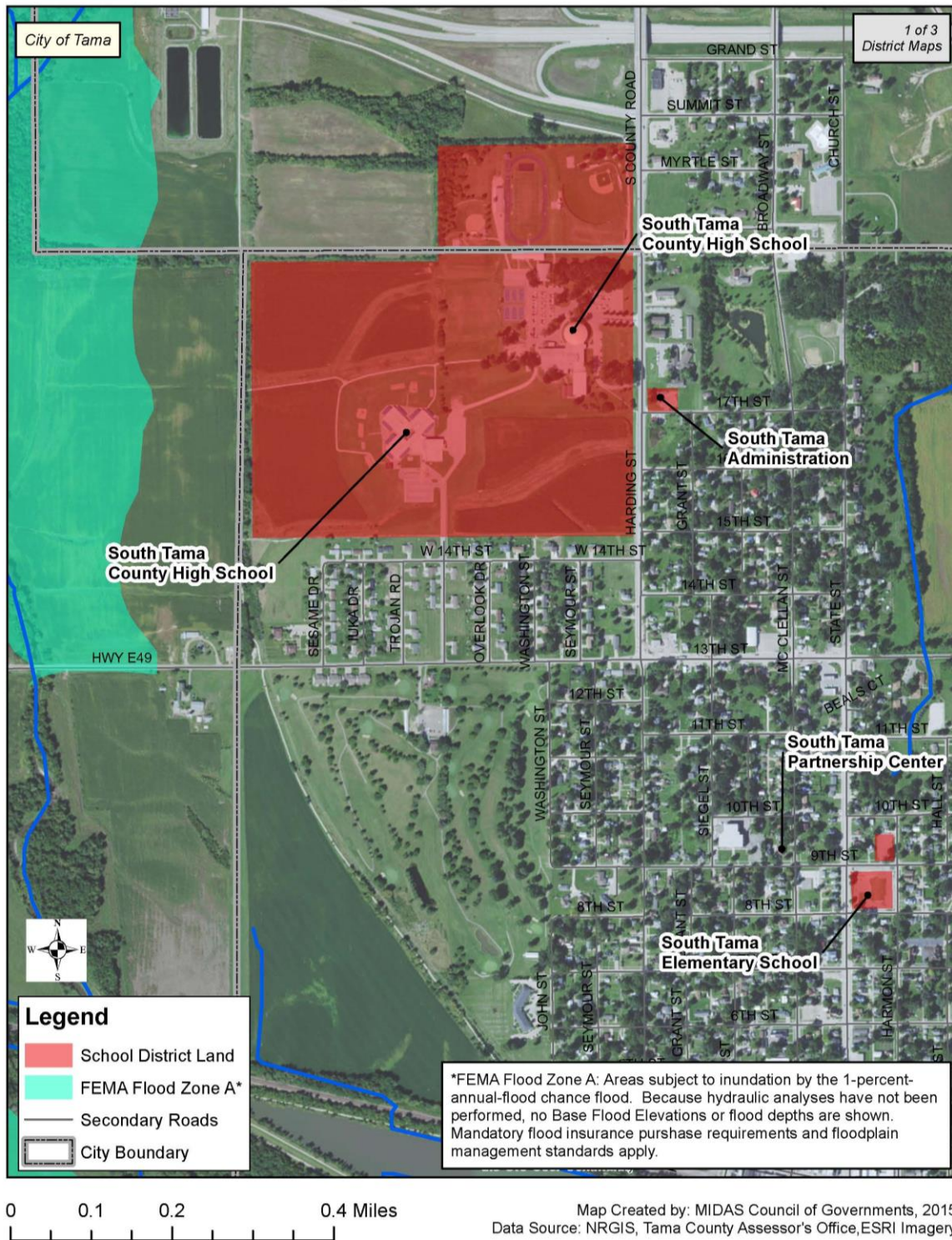
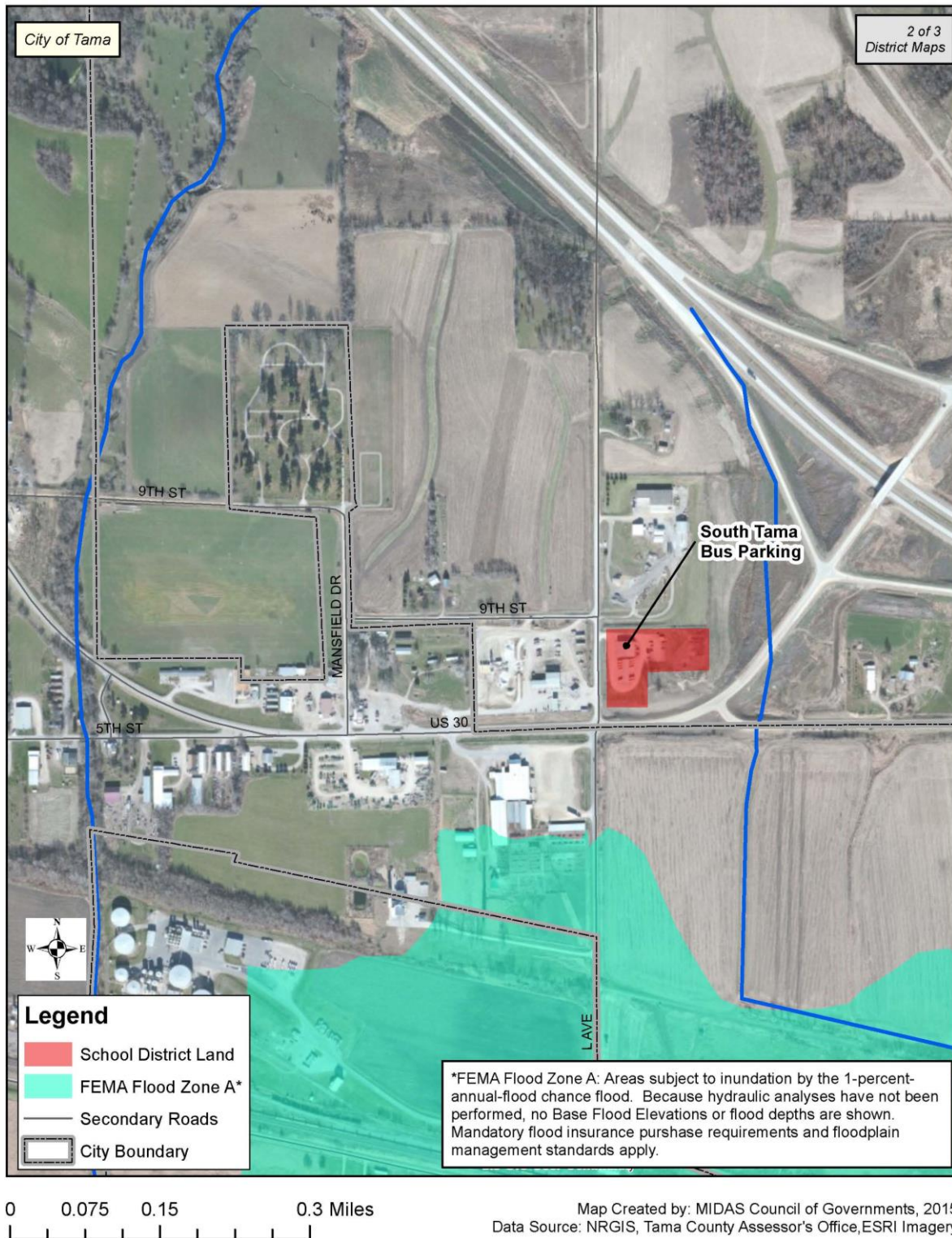


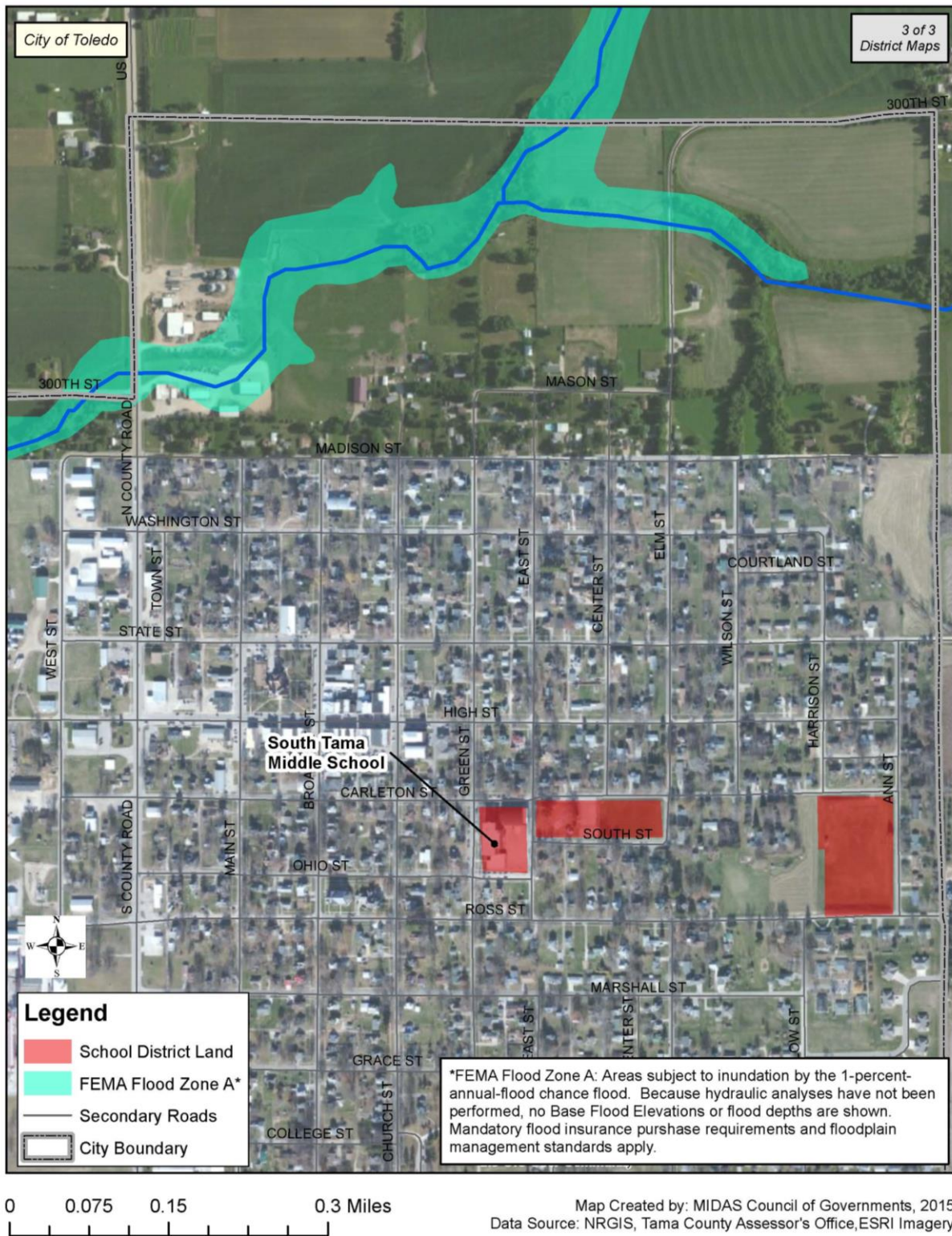
Figure 4.3.2.21: South Tama Community School District Map 1 of 3
Location of Buildings and FEMA Flood Zone Boundaries



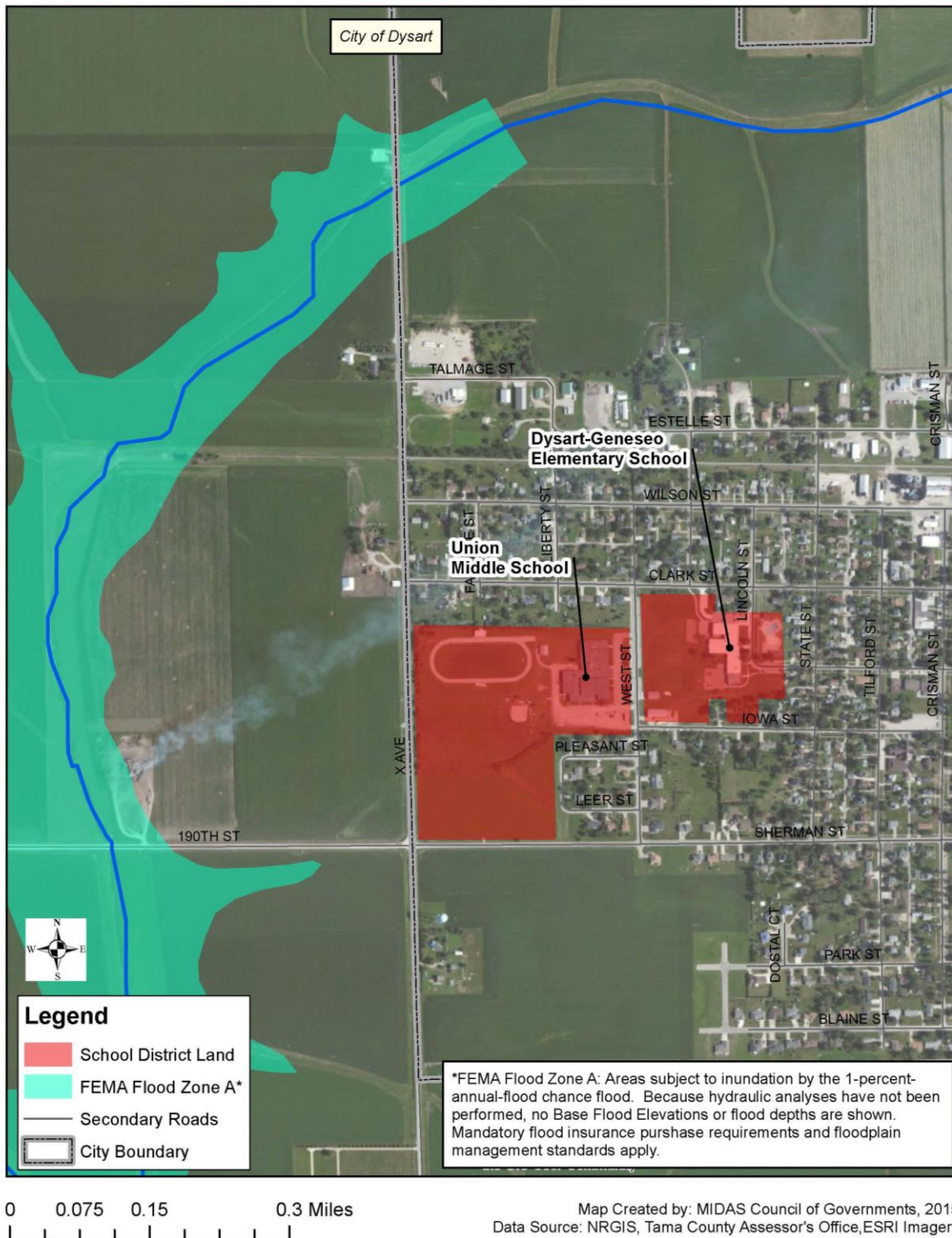
**Figure 4.3.2.22: South Tama Community School District Map 2 of 3
Location of Buildings and FEMA Flood Zone Boundaries**



**Figure 4.3.2.23: South Tama Community School District Map 3 of 3
Location of Buildings and FEMA Flood Zone Boundaries**



**Figure 4.3.2.24: Union Community School District Map
Location of Buildings and FEMA Flood Zone Boundaries**



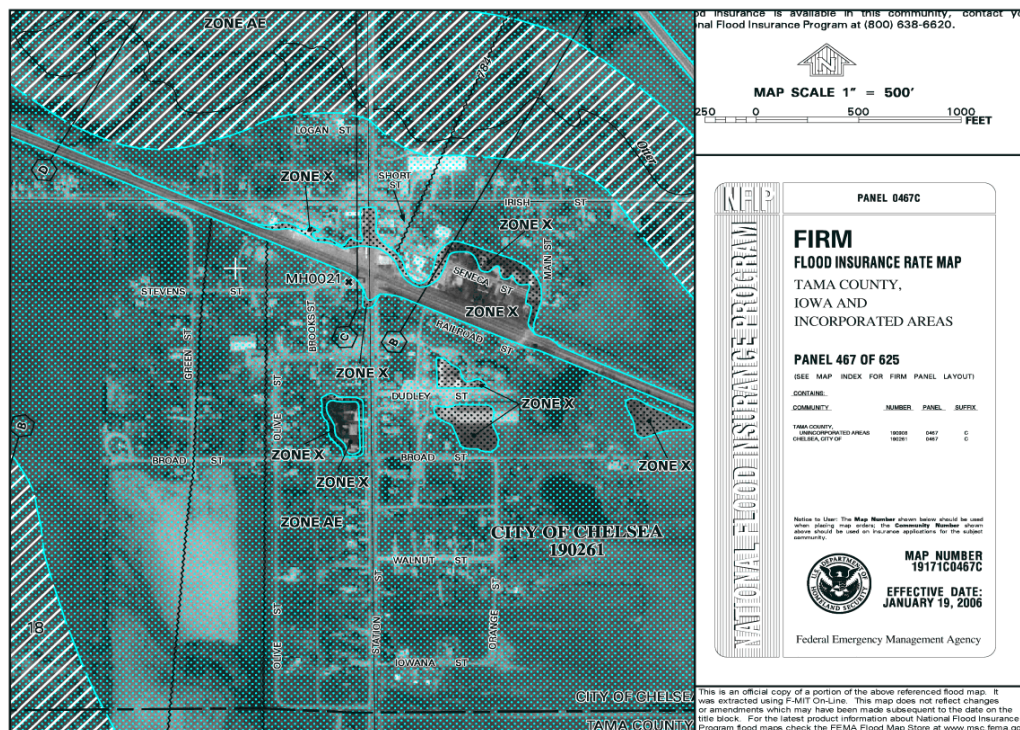
4.3.3: Repetitive Loss Properties

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.*

Flooding is a special concern in the City of Chelsea because it is the jurisdiction that is affected the most often and most severely by river flooding in Tama County. A major area with repetitive loss structures due to flooding is in the Chelsea floodplain. After the floods in 1993, the City of Chelsea acquired 50 properties which resulted in \$7,768,958 in loss avoidance in future flood events (HSEMD 2008). The City has continued to remove structures from the floodplain through both elevation of structures and acquisition and demolition of structures. Since the last Hazard Mitigation Plan in 2010, the City of Chelsea has decreased the number of repetitive loss properties from 25 to the current 15 repetitive loss properties that are all classified as residential land use. Three of these structures were bought out, demolished, and turned into green space. Five structures were elevated.

As of December 2014, the City of Chelsea has 27 policies in force that insure a total dollar amount of \$957,500 (NFIP Bureau Net 2015). Refer to the FIRMette map below of the City of Chelsea.

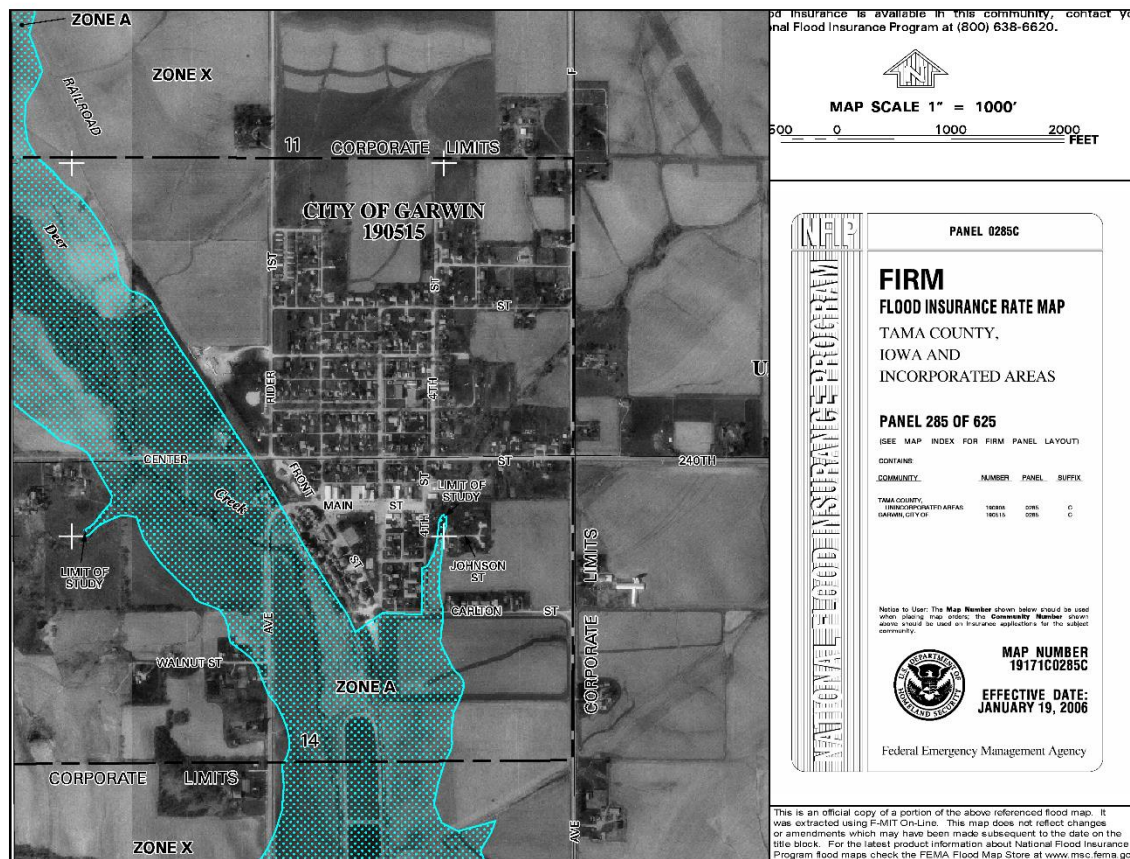
Figure 4.3.3.1: Chelsea Floodplain



Source: FEMA Map Service Center 2015

Another concern for repetitive loss properties in Tama County is in the City of Garwin. There is one residential repetitive loss property in the City. See the FIRMette map below of the City of Garwin.

Figure 4.3.3.2: Garwin Floodplain



Source: FEMA Map Service Center 2015

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 Tama 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 Tama County residents and visitors.
3. Educate Tama 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 Tama County.

The Task Force was given the opportunity to change these goals but ultimately chose not to do so, with the exception of removing from the first goal “Critical facilities and identified assets are high priority structures” because Task Force members felt that this part of the goal was already assumed. 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 5.1.3 on 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 P. 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 2010 Tama 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 Elberon decided to delete the building of a safe room from the plan because it didn't have the match money. Instead, the city still plans to build a new fire station and could incorporate a safe room in the new structure. For other cities like Lincoln, updating their siren became the lowest priority since the old siren still works and more people have multiple ways to access pertinent weather information (personal computers, smart phones, TV). Instead, the city plans to prioritize other actions. Details on these changes are included in the following chapter's action plans and in Appendix B with the Action Updates.

Goal 1: Minimize losses to existing and future structures within hazard areas.

Mitigation Action 1.1: Acquisition and elevation of structures (8)

Plan for implementation and administration:	The city will continue to acquire or elevate structures that are damaged by flooding. Since the last plan, the city completed three owner-occupied buyouts on properties in Chelsea and elevated an additional five houses using a combination of NFIP and private funds. During flooding on the Iowa River in 2014, five homes had flood waters on the first floors. These properties and other repetitive loss properties may be targeted for elevation or acquisition.
Hazards Addressed:	River Flooding
Responsible Party/ Dept.:	City of Chelsea City Council, City Clerk, Mayor
Partners:	Region 6 Planning Commission, FEMA, State
Potential Funding Source:	FEMA HMPG, State
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Reduce flood damage
Mitigation Measure Category:	Property Protection
Estimated Start Date:	2 -4 years from plan adoption
Target Completion Date:	Ongoing

Mitigation Action 1.2: Maintain existing culverts and add new culverts (5)

Plan for implementation and administration:	Keep existing culverts in good condition and add new culverts where they are needed in the city.
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/ Dept.:	City of Chelsea
Partners:	Engineering firm, others to be identified
Potential Funding Source:	City General Funds, County, State
Estimated cost:	\$10,000 to \$99,999
Benefits (loss avoided):	Reduces potential damages due to flash or river flooding
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	2 -4 years from plan adoption
Target Completion Date:	Ongoing

Mitigation Action 1.3: Construct a levee to protect the community from flood waters (7)

Plan for implementation and administration:	Construct levee protection for the community
Hazards Addressed:	River Flooding
Responsible Party/ Dept.:	City of Chelsea City Council, City Clerk, Mayor
Partners:	Region 6 Planning Commission, FEMA, State, Army Corps of Engineers
Potential Funding Source:	FEMA HMGP, USACE, City of Chelsea Local Options Sales Tax
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Protect city structures, infrastructure, and residents' homes and businesses
Mitigation Measure	Structural Mitigation

Category:	
Estimated Start Date:	5 years or more from plan adoption
Target Completion Date:	2022

Chelsea Mitigation Action Prioritization

1. **Mitigation Action 1.1:** Acquisition and elevation of structures (8)
2. **Mitigation Action 1.3:** Construct a levee to protect the community from flood waters (7)
3. **Mitigation Action 1.2:** Maintain existing culverts and add new culverts (5)

Clutier

Goal 1: Minimize losses to existing and future structures within hazard areas.

Mitigation Action 1.1: Add lift station (2)

Plan for implementation and administration:	Add a lift station to the City's sanitary sewer when and where it is needed.
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	City of Clutier Sewer Department
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, City of Clutier General Fund, and others to be identified
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Eliminate potential sanitary sewer backups into structures
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Mitigation Action 1.2: Add culverts (1)

Plan for implementation and administration:	Add culverts where needed in Clutier
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	City of Clutier Sewer Department
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, City of Clutier General Funds, and others to be identified
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Reduces potential damages due to flash or river flooding
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Mitigation Action 1.3: Elevate roads (1)

Plan for implementation and administration:	Elevate all City roads or those that are identified as problematic or critical during and immediately following flood events
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	City of Clutier Street Department
Partners:	Iowa Department of Transportation, Tama County Engineer, others to be identified
Potential Funding Source:	FEMA HMGP, City of Clutier General Fund, and others to be identified
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Prevent road and vehicle damage and preserve the mobility of Clutier residents during and immediately following a flood event
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Mitigation Action 1.4: Construct City Shed (10)

Plan for implementation and administration:	Construct a large shed for the City to store equipment and materials. The city plans to allocate funds from its budget and research additional grant funding. It will also establish a location for the shed that has quick and efficient access and will consider what materials an equipment should be stored in the shed.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Clutier Street Department, Sewer Department, and Maintenance Department
Partners:	To be identified
Potential Funding Source:	City of Clutier General Funds, FEMA HMGP, and others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	The shed would protect equipment and materials critical to the City during and immediately following a hazard event.
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	2017

Goal 2: Protect the health and safety of Tama County residents and visitors.**Mitigation Action 2.1: Construct safe room (8)**

Plan for implementation and administration:	Construct a safe room in Clutier. Vulnerable populations in the city do not currently have access to a safe place in the event of inclement weather or tornado warnings.
Hazards Addressed:	Tornado, Thunderstorms, Wind Storms
Responsible Party/Dept.:	City of Clutier City Council
Partners:	To be identified
Potential Funding Source:	City of Clutier General Funds, FEMA HMGP, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Life safety for residents and visitors

Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2020

Mitigation Action 2.2: Recruit firemen and first responders (11)

Plan for implementation and administration:	Recruit and train new firemen and EMTs among Clutier residents. This action has already begun and will continue for the fire department. This action will also focus on First Responders.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Clutier Fire Department, First Responders
Partners:	To be identified
Potential Funding Source:	City of Clutier General Funds, City of Clutier Fire Department, Assistance to Firefighters Grants, and others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	More firemen and EMTs to respond to emergencies, decreased response time
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing – annual

Goal 3: Educate Tama County citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Public education program (11)

Plan for implementation and administration:	Create a program to educate Clutier residents about the dangers of hazard and how to prepare through informational flyers, meetings, or other interactive media like drills and workshops.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Clutier City Council
Partners:	To be identified, possibly other Tama County jurisdictions
Potential Funding Source:	City of Clutier General Funds and others to be identified
Estimated cost:	Unknown, this project may be of little cost depending on the medium used
Benefits (loss avoided):	\$9,999 or less
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing – annual

Goal 4: The continuity of operations will not be significantly disrupted by disasters in Clutier.

Mitigation Action 4.1: Create list of emergency contacts (11)

Plan for implementation and administration:	Create a list of emergency contacts for City personnel to use during and immediately following a hazard event like Tama County Emergency Management, power company, other utility providers, etc.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Clutier City Council, Fire Department
Partners:	To be identified
Potential Funding Source:	None needed
Estimated cost:	None (printing costs may be an exception)
Benefits (loss avoided):	Quick response during and immediately following hazard events
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing – annual

Mitigation Action 4.2: Develop emergency command center (11)

Plan for implementation and administration:	The city plans to develop an emergency command center with a safe room. The city will reach out to residents and make them aware that a safe room is available for use in case of emergency. The city will purchase a backup generator for this facility so that it can operate in the event of a power loss. The city will also develop a means of communication in the event of a disaster such as a phone tree for city officials and emergency personnel and a back-up door-to-door system.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Clutier City Council, Fire Department
Partners:	To be identified
Potential Funding Source:	None needed
Estimated cost:	None (printing costs may be an exception)
Benefits (loss avoided):	Quick response during and immediately following hazard events
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	2017

Clutier Mitigation Action Prioritization

1. **Mitigation Action 4.1:** Create list of emergency contacts (11)
2. **Mitigation Action 4.2:** Develop emergency command center (11)
3. **Mitigation Action 3.1:** Public education program (11)
4. **Mitigation Action 2.2:** Recruit firemen and first responders (11)
5. **Mitigation Action 1.4:** Construct City Shed (10)
6. **Mitigation Action 2.1:** Construct safe room (8)
7. **Mitigation Action 1.1:** Add lift station (2)
8. **Mitigation Action 1.2:** Add culverts (1)
9. **Mitigation Action 1.3:** Elevate roads (1)

Goal 1: Minimize losses to existing and future structures within hazard areas.

Mitigation Action 1.1: Purchase new rescue equipment for City Shop and Fire Department (10)

Plan for implementation and administration:	The city will update or replace substandard equipment for the City and Fire Department. The city continues to purchase equipment as department heads bring the needs before the City Council. Dysart maintains a savings account and plan for future purchases of these large ticket items.
Hazards Addressed:	All
Responsible Party/ Dept.:	City of Dysart Fire Department Chief, Public Works Director
Partners:	To be identified
Potential Funding Source:	City of Dysart Fire Department, Federal/State Grants, City General Fund, County Foundation
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Quality equipment can afford higher quality work and rescue, help avoid equipment failure due to overuse or age
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	2025

Goal 2: Protect the health and safety of Tama County residents and visitors.

Mitigation Action 2.1: Construct a safe room (7)

Plan for implementation and administration:	The city will make both the Elementary and Middle School aware of funds available to construct safe rooms at their buildings.
Hazards Addressed:	All
Responsible Party/Dept.:	School Board/Superintendent, City General Fund
Partners:	To be identified
Potential Funding Source:	City of Dysart, FEMA HMGP and PDM, CDBG, and others to be identified
Estimated cost:	Costs are variable depending on the size of the shelter and whether or not it is a retrofit or newly constructed safe room. For a large community shelter, the cost usually ranges from \$250,000 to over \$1 million depending on the size. The community estimated the cost of a safe room to be over \$300,000.
Benefits (loss avoided):	Life safety of residents and visitors
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2020

Mitigation Action 2.2: Update the City's emergency action plan and complete training (7)

Plan for implementation and administration:	The city will make needed updates to the Dysart Emergency Action Plan and train City personnel and the public to make the updates effective. The city has implemented safety meetings six times per year that add to the emergency action plan and discuss other safety-related issues that affect the city. These meetings have all city department heads, the fire chief, the Mayor, and City Council members in attendance.
Hazards Addressed:	Tornadoes, Thunderstorms, Wind Storms
Responsible Party/Dept.:	City of Dysart City Clerk, Ambulance Director, Fire Chief
Partners:	All City of Dysart Departments, others to be identified
Potential Funding Source:	City of Dysart General Fund
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Situations and issues not currently covered in the plan can be added
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	2016

Mitigation Action 2.3: Maintain Alert Iowa participation (7)

Plan for implementation and administration:	The city will switch to the new alert system, Alert Iowa. The city will encourage residents to sign up their cell phone numbers for this service and keep their contact information up to date. Land line numbers are automatically listed in the program.
Hazards Addressed:	All
Lead agency:	City of Dysart City Clerk
Partners:	Tama County Emergency Management
Potential Funding Source:	City of Dysart General Fund
Estimated cost:	There is no cost for this program
Benefits (loss avoided):	Dysart residents can be kept up-to-date on hazards and other dangerous situations
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.4: Use siren to warn Dysart residents of severe weather (9)

Plan for implementation and administration:	The city purchased a new siren in 2014. The city will use this siren to warn Dysart residents of severe weather situations.
Hazards Addressed:	Tornadoes, Thunderstorms, Wind Storms
Responsible Party/Dept.:	City of Dysart Fire Department
Partners:	Tama County Emergency Management
Potential Funding Source:	City of Dysart General Funds, Federal/State Grants, County Foundation
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Life safety of residents and visitors
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing

Target Completion Date:	Ongoing
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Goal 3: Educate Tama County citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Prepare education flyers about storm procedures to go to all homes in Dysart (10)

Plan for implementation and administration:	A flyer with storm procedures determined for the city will be distributed to all homes in Dysart. The flyer could be distributed with city bills or by using volunteer groups who might visit homes.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Dysart City Clerk, Fire Department
Partners:	Volunteer groups (help with distribution)
Potential Funding Source:	City of Dysart General Fund, others to be identified
Estimated cost:	Less than \$9,999 - main cost will be printing
Benefits (loss avoided):	Resident education about storm procedures
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2016

Mitigation Action 3.2: Stage practice drills and town meetings to educate citizens (7)

Plan for implementation and administration:	The City will run drills and host meetings meant to educate Dysart citizens about disaster plans and general information about hazards and preparation. A meeting was held in June 2012 with fire departments, ambulance personnel, city employees, the police department, city council, and the Mayor to run through disaster scenarios and Dysart's plan of action. The city will plan to meet again and also consider hosting a meeting for citizens to attend so that the city can educate them on the plan of action.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Dysart Fire Department, Ambulance Director, City Council, Mayor
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Dysart General Fund, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Dysart City personnel and citizens will be informed and/or prepared for disaster situations
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 4: The continuity of county and local operations will not be significantly disrupted by disasters in Tama County.

Mitigation Action 4.1: Purchase new communications equipment (10)

Plan for implementation and administration:	The city will update or replace substandard communication equipment in all City departments. New radios were purchased for the police department in 2014. Until new equipment is purchased for other department, cell phones are used by public works, ambulance personnel, the police department, and City Hall when needed.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Dysart EMS/Ambulance, Fire Department
Partners:	Others to be identified
Potential Funding Source:	City of Dysart General Fund, Federal and State Grants, County Foundation
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Dysart City personnel will have better communication capabilities
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing as needed

Dysart Mitigation Action Prioritization

1. **Mitigation Action 3.1:** Prepare education flyers about storm procedures to go to all homes in Dysart (10)
2. **Mitigation Action 4.1:** Purchase new communications equipment (10)
3. **Mitigation Action 1.1:** Purchase new rescue equipment for City Shop and Fire Department (10)
4. **Mitigation Action 2.4:** Use siren to warn Dysart residents of severe weather (9)
5. **Mitigation Action 2.3:** Maintain Alert Iowa participation (7)
6. **Mitigation Action 3.2:** Stage practice drills and town meetings to educate citizens (7)
7. **Mitigation Action 2.2:** Update the City's emergency action plan and complete training (7)
8. **Mitigation Action 2.1:** Construct a safe room (7)

Goal 1: Protect the health and safety of Tama County residents and visitors.

Mitigation Action 1.1: Add new culverts (8)

Plan for implementation and administration:	Add culverts where needed in Elberon. The city plans to add several new culverts on the southwest side of town beginning in the summer of 2015.
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	City of Elberon City Council
Partners:	To be identified
Potential Funding Source:	City of Elberon General Funds, others to be identified
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:	Ongoing - as funding allows

Goal 2: Minimize losses to existing and future structures within hazard areas.

Mitigation Action 2.1: Update County-owned bridges and inspect annually (10)

Plan for implementation and administration:	The City with possibly collaboration with the county engineer - will inspect bridges in and near the community on an annual basis. The city plans to take out a bridge located on the east side of town and install a large culvert in that area within a year from plan adoption.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	City of Elberon City Council
Partners:	Tama County Engineer, others to be identified
Potential Funding Source:	City of Elberon General Funds, Tama County Engineer, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Avoid bridge failure that may cause loss of life and interrupt travel for an extended period of time
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing - annual
Target Completion Date:	Ongoing - annual

Mitigation Action 2.2: Enforce building codes (10)

Plan for implementation and administration:	The City will work on improving enforcement of building codes throughout Elberon
Hazards Addressed:	All
Responsible Party/Dept.:	City of Elberon City Council
Partners:	To be identified
Potential Funding Source:	City of Elberon General Funds
Estimated cost:	Less than \$10,000
Benefits (loss avoided):	Safer structures that can better withstand hazard events, prevention of structural failure
Mitigation Measure Category:	Prevention
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing - annual

Goal 3: Educate Tama County citizens about dangers of hazards and how to be prepared.**Mitigation Action 3.1: Smoke detector program (9)**

Plan for implementation and administration:	A program has been created that encourages residents to use and maintain smoke detectors in their homes. The city intends to continue to offer this program.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	City of Elberon Fire Department
Partners:	To be identified
Potential Funding Source:	City of Elberon Fire Department, Assistance to Firefighters Grant
Estimated cost:	Less than \$10,000
Benefits (loss avoided):	Prevent loss of life due to fire
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing - annual
Target Completion Date:	Ongoing - annual

Mitigation Action 3.2: Educate residents about disaster kits and encourage them to build one (10)

Plan for implementation and administration:	Create a program or host meeting/workshop to teach Elberon residents about the benefits of disaster kits and the basic items needed to build one for their family and home. The city has this project planned for 2015. The city will include this information in water bills and put up posters near the garage, elevator, and the bar.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Elberon City Council, Fire Department
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Elberon General Funds, Fire Department, Tama County EMA
Estimated cost:	Less than \$10,000
Benefits (loss avoided):	Elberon residents will be prepared for disasters
Mitigation Measure	Public Education and Awareness

Category:	
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing - annual

Mitigation Action 3.3: Distribute NOAA All-Hazard Radios to all Elberon residents (6)

Plan for implementation and administration:	Create a program or secure funding to provide NOAA All-Hazard Radios to all Elberon residents
Hazards Addressed:	All
Responsible Party/Dept.:	City of Elberon City Council
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Elberon General Funds, Fire Department, Tama County EMA
Estimated cost:	Less than \$10,000
Benefits (loss avoided):	Elberon residents will be informed of approaching hazards and updates throughout a hazard event
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	Ongoing - annual

Goal 4: Continuity of local operations will not be significantly disrupted by disasters in Tama County.

Mitigation Action 4.1: Construct new fire station with generators (8)

Plan for implementation and administration:	Replace the existing fire station and install generators to maintain communication with County EMS and Sherriff's Department during a hazard event. The city has already formed a committee to evaluate a station remodel or new build. The city purchased a generator during the last plan. The generator is housed at the current fire station until the new fire station is built.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Elberon Fire Department, City Council
Partners:	To be identified
Potential Funding Source:	City of Elberon General Funds, Fire Department, County Foundation, FEMA HMGP
Estimated cost:	\$100,000 - \$299,999 The cost of a new fire station cannot be determined until architectural plans and cost estimates are developed.
Benefits (loss avoided):	A new fire station will afford better protection to the fire department's equipment, possibly provide shelter, and the backup power will make this critical facility available for use during and immediately following a hazard event. Also communication can be maintained.
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2022

Mitigation Action 4.2: Create a plan for quick cleanup (9)

Plan for implementation and administration:	Create a citywide plan for cleaning up after hazard events that cause trees, housing materials, and other debris to block roadways
Hazards Addressed:	All
Responsible Party/Dept.:	City of Elberon City Council, Fire Department
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Elberon General Funds, Fire Department, Tama County EMA
Estimated cost:	Less than \$10,000
Benefits (loss avoided):	Shorter interruption of daily life
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2018

Mitigation Action 4.3: Establish a command center (10)

Plan for implementation and administration:	Decide where a command center for the city will be located if a major disaster occurs. This action is planned to begin in 2015.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Elberon City Council, Fire Department
Partners:	Tama County EMA
Potential Funding Source:	City of Elberon General Funds, Fire Department, Tama County EMA
Estimated cost:	Less than \$10,000
Benefits (loss avoided):	No time will be lost in establishing a command center in the event of a disaster
Mitigation Measure Category:	Emergency Services Protection
Completion Date:	To be identified
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2016

Elberon Mitigation Action Prioritization

Mitigation Action 2.1: Update County-owned bridges and inspect annually (10)

Mitigation Action 2.2: Enforce building codes (10)

Mitigation Action 3.2: Educate residents about disaster kits and encourage them to build one (10)

Mitigation Action 4.3: Establish a command center (10)

Mitigation Action 3.1: Smoke detector program (9)

Mitigation Action 4.2: Create a plan for quick cleanup (9)

Mitigation Action 1.1: Add new culverts (8)

Mitigation Action 4.1: Construct new fire station with generators (8)

Mitigation Action 3.3: Distribute NOAA All-Hazard Radios to all Elberon residents (6)

Goal 1: Protect the health and safety of Tama County residents and visitors.

Mitigation Action 1.1: Build a new fire station (8)

Plan for implementation and administration:	The city's fire station needs an updated building that will include more storage space for more equipment.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Garwin City Council, Fire Department
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Garwin Property Taxes, FEMA HMGP, others to be identified
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Life safety of Garwin residents and visitors
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2019

Mitigation Action 1.2: Construct a safe room (10)

Plan for implementation and administration:	Construct a safe room for Garwin residents and visitors to use during severe weather. The location of the safe room is still to be determined, but it could potentially be located at the High School. A new disaster plan includes plans to build the safe room and command center. A verbal agreement with the school is in place, and the city will work to create a written agreement with the school.
Hazards Addressed:	Tornado, Thunderstorm, Wind Storm
Responsible Party/Dept.:	City of Garwin City Council, GMG Community School District
Partners:	GMG Community School District, others to be identified
Potential Funding Source:	City of Garwin Property Taxes, Federal and State Grants, FEMA HMGP
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Life safety of Garwin residents and visitors
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2019

Mitigation Action 1.3: Update water metering system (8)

Plan for implementation and administration:	The city plans to update their water metering systems to a system with electronic radio-read meters.
Hazards Addressed:	Drought
Responsible Party/Dept.:	City of Garwin City Council, Water Supervisor
Partners:	Tama County EMA, others to be identified
Potential Funding Source:	Local Bank
Estimated cost:	\$10,000 - \$99,999 - The community estimated the cost to be close to \$50,000
Benefits (loss avoided):	Water metering system will be more efficient and have more data

Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	2017

Mitigation Action 1.4: Encourage residents to sign up for Alert Iowa (10)

Plan for implementation and administration:	The city will change over to a new alert system, Alert Iowa, and will encourage residents to sign up for the system so that they can be notified in a timely manner when the city issues boil orders and other important notices or warnings.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Garwin City Clerk
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	None – the program is free of cost
Estimated cost:	None
Benefits (loss avoided):	Residents will be notified in a timely manner of warnings
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing

Mitigation Action 1.5: Purchase new SCBA air tanks for the fire department (11)

Plan for implementation and administration:	The fire department has old SCBA air tanks that need to be updated.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Garwin Fire Department
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Garwin Property Taxes, FEMA HMGP
Estimated cost:	\$10,000 - \$99,999 – the community estimated the cost to be close to \$24,000
Benefits (loss avoided):	Life safety of Garwin firefighters and residents and visitors who rely on fire department rescue services
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	2016

Goal 2: The continuity of local operations will not be significantly disrupted by disasters in Tama County.

Mitigation Action 2.1: Establish a command center (11)

Plan for implementation and administration:	Establish and plan for a particular location to be Garwin's command center if a disaster were to occur. The location of the command center could potentially be located at the Fire Station or the High School. A new disaster plan includes plans to build the safe room and command center. A verbal agreement with the school is in place, and the city will work to create a written agreement with the school.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Garwin City Council, GMG Community School District

Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	None needed – cost will be minimal
Estimated cost:	Minimal to none
Benefits (loss avoided):	No time lost in setting up a command center during disaster situation
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	2016

Goal 3: Minimize losses to existing and future structures within hazard areas.

Mitigation Action 3.1: Create ditches and repair culverts (9)

Plan for implementation and administration:	The city plans to improve its drainage system by creating ditches and repairing existing culverts. Better drainage will decrease flooding and street erosion.
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	City of Garwin City Maintenance Manager
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Garwin Property Tax, Road Use Tax
Estimated cost:	\$10,000 - \$99,999 the community estimated the cost to be close to \$25,000
Benefits (loss avoided):	Improved drainage will decrease the need for infrastructure repairs
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing
Target Completion Date:	2019

Garwin Mitigation Action Prioritization

1. **Mitigation Action 2.1:** Establish a command center (11)
2. **Mitigation Action 1.5:** Purchase new SCBA air tanks for the fire department (11)
3. **Mitigation Action 1.4:** Encourage residents to sign up for Alert Iowa (10)
4. **Mitigation Action 1.2:** Construct a safe room (10)
5. **Mitigation Action 3.1:** Create ditches and repair culverts (9)
6. **Mitigation Action 1.1:** Build a new fire station (8)
7. **Mitigation Action 1.3:** Update water metering system (8)

Goal 1: Minimize losses to existing and future structures within hazard area.

Mitigation Action 1.1: Purchase generators to help prevent critical site damage from freezing temperatures (10)

Plan for implementation and administration:	The City of Gladbrook has had issues with freezing temperatures and power loss so the City would purchase generators to use at critical facilities to avoid damage. Specific areas in need of generators include the lagoon/lift station, the tower, and fire/ambulance building.
Hazards Addressed:	Severe Winter Storm
Responsible Party/Dept.:	City of Gladbrook City Council, Fire Department, Water Department
Partners:	To be identified
Potential Funding Source:	City of Gladbrook General Fund, Water/Sewer Fund, State and Local Grants
Estimated cost:	\$100,000 - \$299,999
Benefits (loss avoided):	Prevent to damage to critical facilities
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Unknown
Target Completion Date:	Within 1 year of plan adoption

Mitigation Action 1.2: Grand Street bridge improvements (9)

Plan for implementation and administration:	Complete needed improvements for the Grand Street bridge.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	City of Gladbrook City Council, City Clerk, Public Works
Partners:	Tama County Engineer, others to be identified
Potential Funding Source:	Federal Grants, Local Options Sales Tax City Match
Total cost:	\$300,000 or more
Benefits (loss avoided):	Prevent structural failure, human loss, and extended interruption of traffic
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing
Target Completion Date:	Within 1 year of plan adoption

Goal 2: Protect the health and safety of Tama County residents and visitors.

Mitigation Action 2.1: Maintain Alert Iowa participation and educate citizens (8)

Plan for implementation and administration:	Continue to participate in the Alert Iowa program and educate citizens about its benefits and encourage them to keep their contact information up to date
Hazards Addressed:	All
Responsible Party/Dept.:	City of Gladbrook City Council, Clerk, Public Works

Partners:	Tama County Emergency Management
Potential Funding Source:	City of Gladbrook General Fund, Property Tax
Estimated cost:	This service has no cost
Benefits (loss avoided):	Gladbrook residents can be kept up-to-date on hazards and other dangerous situations
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.2: Relocate smaller tornado siren to east side of town and install wireless/radio control capability (12)

Plan for implementation and administration:	The city will relocate a smaller tornado siren to the east side of town so that residents in this area can better hear the siren. The city will also pursue the addition of wireless/radio control capacity of the siren so that it can be activated remotely.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Gladbrook City Council, Clerk, Public Works
Partners:	Tama County Emergency Management
Potential Funding Source:	City of Gladbrook General Funds, additional grant sources to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Gladbrook residents can be kept up-to-date on hazards and other dangerous situations
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Within 1 year of plan adoption

Mitigation Action 2.3: Work with school district to isolate west side of school so that it could be designated as an emergency shelter (9)

Plan for implementation and administration:	The Gladbrook school facility of Gladbrook-Reinbeck School District will be closing in the summer of 2015. The city would like to work with the school district to create a shelter area in the west side of the school that could be designated as an emergency shelter. This area already had shower facilities, which would be helpful so that the city does not have to install these facilities elsewhere.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Gladbrook City Council, Gladbrook-Reinbeck School District
Partners:	Tama County Emergency Management
Potential Funding Source:	City of Gladbrook General Funds, School District
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Gladbrook residents can have an emergency shelter to use in the event of inclement weather.
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Within 1 year of plan adoption

Goal 3: Educate Tama County citizens about dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Develop emergency procedures with assistance (12)

Plan for implementation and administration:	The City of Gladbrook will develop emergency procedures for the city with guidance of an emergency management professional.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Gladbrook City Council, Fire Department
Partners:	Tama County Emergency Management, some sort of emergency management organization or consultant, others to be identified
Potential Funding Source:	City of Gladbrook General Fund, Property Tax
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	The City will be prepared for disasters
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Within 1 year of plan adoption

Mitigation Action 3.2: Procedure education (12)

Plan for implementation and administration:	Once procedures are developed, create a program to inform Gladbrook residents about their details and execution
Hazards Addressed:	All
Responsible Party/Department:	City of Gladbrook City Council, City Clerk, Fire Department
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Gladbrook General Fund, Property Tax
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Gladbrook residents will be aware of city procedures
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Within 1 year of plan adoption

Mitigation Action 3.3: Daycare/Pre-School age hazard education (12)

Plan for implementation and administration:	Create a hazard education program that targets a youth audience.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Gladbrook City Council, Fire Department
Partners:	Private Businesses, Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Gladbrook General Fund, Local Grant
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Gladbrook youth will be educated about the dangers of hazards
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Within 1 year of plan adoption

Goal 4: The continuity of county and local operations will not be significantly disrupted by disasters in Tama County.

Mitigation Action 4.1: Water source research and potential increase of supply (6)

Plan for implementation and administration:	Research Gladbrook's water source and other sources for a potential increase of supply.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	City of Gladbrook Water Department
Partners:	Iowa Department of Natural Resources, engineer firm, and others to be identified
Potential Funding Source:	City of Gladbrook Water Fund, others to be identified
Estimated cost:	\$100,000 - \$299,000
Benefits (loss avoided):	Prevent disruption of water distribution
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	Ongoing

Mitigation Action 4.2: Storm drainage improvements (9)

Plan for implementation and administration:	Complete storm drainage improvements
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	City of Gladbrook City Council, Public Works
Partners:	To be identified
Potential Funding Source:	City of Gladbrook Local Options Sales Tax, General Fund, Road Use Tax
Estimated cost:	\$100,000 or more
Benefits (loss avoided):	Prevent flash flooding
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	5 or more years from plan adoption

Mitigation Action 4.3: Sewer improvements and purchase generator for backup (9)

Plan for implementation and administration:	General storm & sanitary sewer improvements. Improve inflow and infiltration issues in lagoon. Replace or clean and line sewer mains and man holes.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	City of Gladbrook Public Works
Partners:	To be identified
Potential Funding Source:	City of Gladbrook Sewer Fund, Capital Projects Fund, Local Grant Project Fund
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Prevent damages due to sewer backup
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing
Target Completion Date:	Within 1 year of plan adoption

Gladbrook Mitigation Action Prioritization

1. **Mitigation Action 3.3:** Daycare/Pre-School age hazard education (12)
2. **Mitigation Action 3.1:** Develop emergency procedures with assistance (12)
3. **Mitigation Action 3.2:** Procedure education (12)
4. **Mitigation Action 2.2:** Relocate smaller tornado siren to east side of town and install wireless/radio control capability (12)
5. **Mitigation Action 1.1:** Purchase generators to help prevent critical site damage from freezing temperatures (10)
6. **Mitigation Action 1.2:** Grand Street bridge improvements (9)
7. **Mitigation Action 4.2:** Storm drainage improvements (9)
8. **Mitigation Action 4.3:** Sewer improvements and purchase generator for backup (9)
9. **Mitigation Action 2.3:** Work with school district to isolate west side of school so that it could be designated as an emergency shelter (9)
10. **Mitigation Action 2.1:** Maintain Alert Iowa participation and educate citizens (8)
11. **Mitigation Action 4.1:** Water source research and potential increase of supply (6)

Lincoln

Goal 1: Minimize losses to existing and future structures within hazard areas.

Mitigation Action 1.1: Purchase road equipment for snow and debris removal (12)

Plan for implementation and administration:	Purchase equipment for snow and debris removal. The city currently has sufficient equipment, but they might make a purchase in the next five years.
Hazards Addressed:	Severe Winter Storm
Responsible Party/Dept.:	City of Lincoln Fire Department, City Council
Partners:	To be identified
Potential Funding Source:	City of Lincoln General Funds
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Shorter interruption of daily life following a hazard event
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing – as needed
Target Completion Date:	Ongoing – as needed

Goal 2: Protect the health and safety of Tama County residents and visitors.

Mitigation Action 2.1: Update all fire equipment (8)

Plan for implementation and administration:	Update the Lincoln Fire Department's equipment. The city currently has sufficient equipment at this time, but they might make a purchase in the next five years. A large grant in the last several years allowed the city to purchase special fire suits and other items.
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Hazards Addressed:	Infrastructure Failure, Grass and Wildland Fire
Responsible Party/Dept.:	City of Lincoln Fire Department, City Council
Partners:	To be identified
Potential Funding Source:	City of Lincoln General Funds
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Quality equipment can afford higher quality rescue and response, help avoid equipment failure due to overuse or age
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing – as needed
Target Completion Date:	Ongoing – as needed

Mitigation Action 2.2: Update emergency siren (6)

Plan for implementation and administration:	The siren currently works, but it is old and could fail. As long as it remains in working order, the city will not prioritize its replacement. If the city does need to replace the siren, they would search for an updated model with backup power and a switch that allows remote triggering so that Tama County Emergency Management can activate the siren when appropriate.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Lincoln Fire Department, City Council
Partners:	Tama County Emergency Management
Potential Funding Source:	FEMA HMGP, City of Lincoln General Funds
Estimated cost:	\$10,000 - \$99,999. New sirens can cost up to \$25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety for Lincoln residents and visitors, quicker and more reliable warning before a hazard occurs
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2022

Mitigation Action 2.3: Train a local citizen to be an EMT (11)

Plan for implementation and administration:	Recruit and train a new Emergency Medical Technician who is a Lincoln resident. The training itself will rely on assistance from the fire department and ambulance services. The volunteer citizen will not be compensated.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Lincoln Fire Department, City Council, Ambulance Service
Partners:	Gladbrook Emergency Medical Response, others to be identified
Potential Funding Source:	City of Lincoln Fire Department
Estimated cost:	Less than \$9,999
Benefits (loss avoided):	Lincoln depends on Gladbrook's emergency response service-having a resident who may be able to respond quicker and stabilize the situation before the Gladbrook EMS arrives
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing – as needed
Target Completion Date:	Ongoing – as needed

Mitigation Action 2.4: Remodel Amvet Hall for community shelter (9)

Plan for implementation and administration:	The Amvet Hall has already been used as a shelter in the past during the ice storm in 2007. The building has a backup generator available and plenty of space. The city will work with the Amvet Hall to make sure that it can continue to be used as a shelter in the future. The whole building could use update improvements (new roof, updated ceiling, plumbing, insulation, etc.). Amvet has already taken steps to fund some of these improvements; the organization got a grant from the Tama County Foundation to replace the roof. Any future funding for updates (and associated work) would be the responsibility of the Amvet Hall.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Lincoln City Council, Amvet Hall
Partners:	To be identified
Potential Funding Source:	City Foundation, County Foundation, FEMA HMGP
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Life safety for Lincoln residents and visitors
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing

Goal 3: Educate Lincoln citizens about the dangers of hazards and how to be prepared.

Mitigation Action 3.1: Create an emergency, strategic plan of action for disasters i.e. determine who makes the call to open a shelter, when should the shelter be opened, etc. (11)

Plan for implementation and administration:	Create a plan of action for disasters determining who makes the call to open a shelter, when should the shelter be opened, etc. This plan should also consider the actions that would be taken in the event of an accident at the Heartland Coop with anhydrous or grain.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Lincoln Fire Department
Partners:	All City Departments, Tama County Emergency Management, and others to be identified
Potential Funding Source:	City of Lincoln General Funds, Fire Department
Estimated cost:	Less than \$9,999
Benefits (loss avoided):	No time lost in opening a shelter, residents will have access as soon as possible if the shelter is needed
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing

Lincoln Goal Prioritization

1. **Mitigation Action 1.1:** Purchase road equipment for snow and debris removal (12)
2. **Mitigation Action 3.1:** Create an emergency, strategic plan of action for disasters i.e. determine who makes the call to open a shelter, when should the shelter be opened, etc. (11)
3. **Mitigation Action 2.3:** Train a local citizen to be an EMT (11)
4. **Mitigation Action 2.4:** Remodel Amvet Hall for community shelter (9)
5. **Mitigation Action 2.1:** Update all fire equipment (8)
6. **Mitigation Action 2.2:** Update emergency siren (6)

Montour

Goal 1: Minimize losses to existing and future structures within hazard areas.

Mitigation Action 1.1: Create a sandbag committee (10)

Plan for implementation and administration:	Create a committee that is responsible for organizing sandbagging efforts when they are needed
Hazards Addressed:	River Flooding
Responsible Party/Dept.:	City of Montour Fire Department, Mayor, City Council
Partners:	Tama County Emergency Management, interested citizen volunteers
Potential Funding Source:	Tama County EMA
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	A group of people who already know how to sandbag will be ready to assemble whenever sandbagging might be needed
Mitigation Measure Category:	Property Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2016

Mitigation Action 1.2: Maintain culverts (11)

Plan for implementation and administration:	Keep existing culverts in good condition through regular inspection and maintenance
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	City of Montour City Council
Partners:	To be identified
Potential Funding Source:	City of Montour General Fund, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Prevent flooding due to inadequate culverts
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing (annual)

Mitigation Action 1.3: Regular debris removal from waterways (11)

Plan for implementation and administration:	Create a community wide or city government initiative to regularly inspect waterways and remove debris
Hazards Addressed:	River Flooding
Responsible Party/Dept.:	City of Montour Water Department
Partners:	Safety Committee, others to be identified
Potential Funding Source:	City of Montour Property Taxes, volunteer labor
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Prevent flooding due to waterway blockage
Mitigation Measure Category:	Property Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing (annual)

Mitigation Action 1.4: Annually inspect roads, culverts, creeks, and city facilities (9)

Plan for implementation and administration:	Annually inspect the City's physical and natural assets i.e. infrastructure, buildings, waterways, etc.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Montour Public Works, Tama County
Partners:	Safety Committee, Volunteers
Potential Funding Source:	City of Montour Property Taxes
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Ensure City's assets are properly functioning in order to avoid failures
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing (annual)

Mitigation Action 1.5: Install surge protection (10)

Plan for implementation and administration:	The city would like to install surge protection in critical places such as the office of the City Clerk and the lift station.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Montour City Council
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Montour Local Options Sales Tax, FEMA HMGP, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Ensure City's assets are properly functioning in order to avoid failures
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 1.6: Look into backflow rebate forms (7)

Plan for implementation and administration:	The city will look into backflow rebate forms for residents who experience flooding from sewer backups. It would be beneficial to residents to have backflow valves for individual homeowners. The city will research the possibility of a rebate program for residents who wish to purchase the
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	backflow valve.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	City of Montour City Council
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Montour Local Options Sales Tax, FEMA HMGP, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Ensure City's assets are properly functioning in order to avoid failures
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2018

Goal 2: Protect the health and safety of Tama County residents and visitors.

Mitigation Action 2.1: Purchase new siren warning system that includes audio (9)

Plan for implementation and administration:	A new siren warning system should include an audio system that can give Montour residents more information about the warning for which the siren warning system is being used.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Montour City Council
Partners:	To be identified
Potential Funding Source:	City of Montour Local Options Sales Tax, FEMA HMGP, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Life safety of Montour residents
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2016

Mitigation Action 2.2: Purchase generator / battery for warning siren (8)

Plan for implementation and administration:	Purchase generator / battery for warning siren and install hookup. This backup power source would be used for the current warning siren or the new siren system if the city is able to update the system.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Montour City Council
Partners:	To be identified
Potential Funding Source:	City of Montour General Fund, FEMA HMGP, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Life safety of Montour residents
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2018

Mitigation Action 2.3: Purchase backup generator for City Shed (8)

Plan for implementation and administration:	The city would like to purchase a backup generator for the City Shed.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Montour City Council
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, City of Montour General Fund, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Life safety of Montour residents
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2018

Mitigation Action 2.4: County firefighter training for Montour fire department (9)

Plan for implementation and administration:	The city would like to train its firefighters on issues related to hazardous materials and anhydrous ammonia.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Montour City Council
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Montour General Fund, FEMA HMGP
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Life safety of Montour residents
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 2.5: Create hazard manual for Montour fire department (9)

Plan for implementation and administration:	The city would like to create a hazard manual for the fire department
Hazards Addressed:	Hazardous Materials
Responsible Party/Dept.:	City of Montour Fire Department
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Montour Fire Department
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Life safety of Montour residents
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2016

Goal 3: Educate Tama County citizens about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Active safety committee (10)

Plan for implementation and administration:	Keep the newly formed safety committee active in the community
Hazards Addressed:	All
Responsible Party/Dept.:	City of Montour Fire Department
Partners:	To be identified
Potential Funding Source:	City of Montour Fire Department
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Residents actively trying to make the community safer
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2016

Mitigation Action 3.2: Maintain participation in Alert Iowa (9)

Plan for implementation and administration:	The city will implement a new warning system, Alert Iowa, and will maintain participation in that program and encourage Montour residents to register and keep their contact information up to date.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Montour
Partners:	Tama County Emergency Management
Potential Funding Source:	No funding required
Estimated cost:	No cost to the community
Benefits (loss avoided):	Montour residents can be kept up-to-date on hazards and other dangerous situations
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 3.3: Plan a community meeting (10)

Plan for implementation and administration:	The city would like to plan a community meeting that would inform Montour residents of the risk of hazards and other dangerous situations
Hazards Addressed:	All
Responsible Party/Dept.:	City of Montour City Council
Partners:	Community Clubs and Organizations
Potential Funding Source:	City of Montour General Fund
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Montour residents can be kept up-to-date on hazards and other dangerous situations
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Montour Mitigation Action Prioritization

1. **Mitigation Action 1.2:** Maintain culverts (11)
2. **Mitigation Action 1.3:** Regular debris removal from waterways (11)
3. **Mitigation Action 3.1:** Active safety committee (10)
4. **Mitigation Action 1.1:** Create a sandbag committee (10)
5. **Mitigation Action 1.5:** Install surge protection (10)
6. **Mitigation Action 3.3:** Plan a community meeting (10)
7. **Mitigation Action 1.4:** Annually inspect roads, culverts, creeks, and city facilities (9)
8. **Mitigation Action 2.4:** County firefighter training for Montour fire department (9)
9. **Mitigation Action 2.5:** Create hazard manual for Montour fire department (9)
10. **Mitigation Action 3.2:** Maintain participation in Alert Iowa (9)
11. **Mitigation Action 2.1:** Purchase new siren warning system that includes audio (9)
12. **Mitigation Action 2.3:** Purchase backup generator for City Shed (8)
13. **Mitigation Action 2.2:** Purchase generator / battery for warning siren (8)
14. **Mitigation Action 1.6:** Look into backflow rebate forms (7)

Tama

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: Community smoke detector program (7)

Plan for implementation and administration:	Create a program to encourage Tama residents to properly maintain smoke detectors in their homes. This project has been established and is currently funded by the city, but additional grant funding sources need to be identified so that the program can continue.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	Tama Fire Department
Partners:	City of Tama, others to be identified
Potential Funding Source:	Tama Fire Department, City of Tama, Fundraising, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Life safety of Tama residents
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 1.2: Scan and maintain critical records (10)

Plan for implementation and administration:	Scan and maintain critical records
Hazards Addressed:	All
Responsible Party/Dept.:	City of Tama City Clerk
Partners:	To be identified

Potential Funding Source:	City of Tama Property Tax
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	The city will have multiple copies of critical records in case a hazard event damages copies of the documents in one location.
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 1.3: Continue annual maintenance of dikes, dike pumps, and dike gates (9)

Plan for implementation and administration:	Continue annual maintenance of dikes, dike pumps, and dike gates
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	City of Tama Public Works Department
Partners:	To be identified
Potential Funding Source:	City of Tama Property Taxes
Estimated cost:	\$100,00 - \$299,999
Benefits (loss avoided):	Mitigation of flood damage to flood-prone areas
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 1.4: Purchase generator and generator hookup (10)

Plan for implementation and administration:	There is no generator if electricity fails to the dike pumps. The purchase of a generator and generator hookup would keep the dike pumps up and running in the event of a power loss.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Tama Sewer Department
Partners:	To be identified
Potential Funding Source:	City of Tama Utility Revenue
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Critical areas do not get flooded during a power loss
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Mitigation Action 1.5: Create a plan for backup water supply if the water treatment facility fails (6)

Plan for implementation and administration:	Determine and plan how city would cope if a disaster occurred that took out the water treatment facility.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	City of Tama Water Department
Partners:	To be identified
Potential Funding Source:	City of Tama Utility Revenue
Estimated cost:	\$100,000 - \$299,999
Benefits (loss avoided):	City of Tama residents will not have an interruption in water service in the event of a hazard

Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2020

Goal 2: Protect the health and safety of Tama residents and visitors

Mitigation Action 2.1: Establish citywide evacuation plan (8)

Plan for implementation and administration:	Establish a citywide evacuation plan for situations when large scale evacuation is needed. Once the evacuation plan has been established, the city will perform outreach to residents to inform them of the plan.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Tama Fire Department
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Tama Property Tax
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	No time will be lost when large scale evacuation is needed
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2018

Goal 3: Educate Tama citizens about dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Training for fire department and emergency medical services (9)

Plan for implementation and administration:	Fire Department and EMS update or complete additional training
Hazards Addressed:	All
Responsible Party/Dept.:	City of Tama Fire Department and EMS
Partners:	City of Tama, others to be identified
Potential Funding Source:	City of Tama Fire Department, EMS, Assistance to Fire Fighter Grant, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Updated or additional training may afford better response and results
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 3.2: Inform residents of evacuation plan for hazardous materials incidents (7)

Plan for implementation and administration:	Create an informational campaign about the evacuation plan for a hazardous materials incident
Hazards Addressed:	Hazardous Materials Incident

Responsible Party/Dept.:	City of Tama Fire Department
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Tama Property Taxes, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Less time will be lost when evacuation must occur
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2018-2019

Mitigation Action 3.3: Public outreach about hazards through mailings or Facebook (6)

Plan for implementation and administration:	Create short articles and publish the different hazards that the community may face either through a mailing or Facebook post, or through local papers.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Tama City Clerk
Partners:	To be identified
Potential Funding Source:	City of Tama Property Taxes
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Tama residents are informed about hazards
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2014-2020

Goal 4: The continuity of county and local operations will not be significantly disrupted.

Mitigation Action 4.1: Purchase generator for City Hall (7)

Plan for implementation and administration:	The city has identified City Hall as the communications station during a disaster. Because of this designation, it is important that this building have access to a backup power source in the event of a power outage.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Tama Public Works
Partners:	To be identified
Potential Funding Source:	City of Tama Property Tax, FEMA HMGP, and others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Prevent loss of power during and immediately following a hazard
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2016-2017

Tama Mitigation Action Prioritization

1. **Mitigation Action 1.4:** Purchase generator and generator hookup (10)
2. **Mitigation Action 1.2:** Scan and maintain critical records (10)
3. **Mitigation Action 1.3:** Continue annual maintenance of dikes, dike pumps, and dike gates (9)
4. **Mitigation Action 3.1:** Training for fire department and emergency medical services (9)
5. **Mitigation Action 2.1:** Establish citywide evacuation plan (8)
6. **Mitigation Action 1.1:** Community smoke detector program (7)
7. **Mitigation Action 3.2:** Inform residents of evacuation plan for hazardous materials incidents (7)
8. **Mitigation Action 4.1:** Purchase generator for City Hall (7)
9. **Mitigation Action 1.5:** Create a plan for backup water supply if the water treatment facility fails (6)
10. **Mitigation Action 3.3:** Public outreach about hazards through mailings or Facebook (6)

Toledo

Goal 1: Minimize losses to existing and future structures within hazard areas.

Mitigation Action 1.1: Demolish current structures in Deer Creek flood hazard area (3)

Plan for implementation and administration:	Limit and gradually reduce the amount of development in the Deer Creek flood hazard area.
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	City of Toledo Public Works
Partners:	To be identified
Potential Funding Source:	City of Toledo Property Tax, FEMA HMGP
Estimated cost:	\$100,000 - \$299,999
Benefits (loss avoided):	Prevent repetitive flood loss
Mitigation Measure Category:	Property Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2021

Goal 2: Protect the health and safety of all Tama County residents and visitors.

Mitigation Action 2.1: Construct safe room for combined mobile home park, Reinig Center, and daycare (9)

Plan for implementation and administration:	Construct a safe room near the mobile home park, Reinig Center, and daycare
Hazards Addressed:	Tornado, Thunderstorm, Wind Storm
Responsible Party/Dept.:	City of Toledo EMS, Fire Department, Public Works Department

Partners:	To be identified
Potential Funding Source:	FEMA HMGP and PDM, City of Toledo Property Tax, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Life safety of Toledo residents and vulnerable populations
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2018

Goal 3: Educate the population about the dangers of hazards and how they can be prepared.

Mitigation Action 3.1: Subsidize individual purchase of NOAA All-Hazard radios (11)

Plan for implementation and administration:	Create a program to help Toledo residents purchase radios at a discount or with a rebate
Hazards Addressed:	All
Responsible Party/Dept.:	City of Toledo EMS, Police Department
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Toledo Property Tax, Federal Grants, others to be identified
Estimated cost:	\$100,000 - \$299,999
Benefits (loss avoided):	Toledo residents will be informed before and during a hazard event
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing - annually

Mitigation Action 3.2: Establish monthly publicity to remind residents of seasonal hazards (10)

Plan for implementation and administration:	Establish monthly publicity campaigns to remind residents of seasonal hazards through radio, newspaper, or other media risks i.e. cooling centers in the summer, shelter during power outage, using NOAA All-Hazard radios, etc. The city has already begun this campaign through the local newspaper and will continue it into the next plan.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Toledo City Council, City Clerk
Partners:	Tama County Emergency Management (could possibly be countywide program)
Potential Funding Source:	City of Toledo Local Option Sales Tax, Tama County, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Toledo residents will regularly be kept aware of the dangers of hazards and how they can be prepared
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing - monthly

Mitigation Action 3.3: Homeowner inspections (7)

Plan for implementation and administration:	Provide vulnerability checklists to homeowners.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Toledo City Council, Fire Department
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Toledo, Tama County, FEMA HMGP, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Toledo residents will regularly be kept aware of the dangers of hazards and how they can be prepared
Mitigation Measure Category:	Property Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2019

Mitigation Action 3.4: Develop drought plan (5)

Plan for implementation and administration:	Work with experts to develop of drought plan for the city and discourage unnecessary water usage.
Hazards Addressed:	Drought
Responsible Party/Dept.:	City of Toledo City Council, US Army Corps of Engineers, NRCS
Partners:	Tama County Emergency Management, County Conservation
Potential Funding Source:	Tama County Conservation, others to be identified
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	In a drought, Toledo will be prepared to handle a situation of limited water supply.
Mitigation Measure Category:	Natural Resources Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2020

Mitigation Action 3.5: Water conservation (9)

Plan for implementation and administration:	Encourage homeowners to perform regular checks for water leaks.
Hazards Addressed:	Drought
Responsible Party/Dept.:	City of Toledo City Council, US Army Corps of Engineers, NRCS
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	Tama County Conservation, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Toledo homeowners will make their water use more efficient, which will be helpful during periods of drought.
Mitigation Measure Category:	Natural Resources Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing - annually

Goal 4: The continuity of county and local operations will not be significantly disrupted by disasters in Tama County.

Mitigation Action 4.1: Purchase generators for water/sewer plant and Reinig Center (9)

Plan for implementation and administration:	Purchase generator for critical facilities and complete needed steps to make generator use possible in these facilities. A generator has already been purchased for the water/sewer plant.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Toledo City Council
Partners:	Tama County Economic Development, others to be identified
Potential Funding Source:	FEMA HMGP, City of Toledo General Fund, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Preserve use of critical facilities during and immediately following a hazard event, prevent damages associated with the loss of function of certain critical facilities
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 4.2: Purchase portable generation equipment and wiring for critical facilities like gas stations and grocery store (6)

Plan for implementation and administration:	Purchase portable generation equipment and wiring for critical facilities like gas stations and grocery store.
Hazards Addressed:	All
Responsible Party/Dept.:	Private Property Owners
Partners:	Critical facilities wanting to participate
Potential Funding Source:	Private businesses, Federal/State Grants
Estimated cost:	\$100,000 - \$299,999
Mitigation Measure Category:	Emergency Services Protection
Benefits (loss avoided):	Critical facilities can avoid losses from power outage and Toledo residents and people from surrounding areas will be able to use these critical services
Estimated Start Date:	Ongoing
Completion Date:	Ongoing

Toledo Mitigation Action Prioritization

1. **Mitigation Action 3.1:** Subsidize individual purchase of NOAA All-Hazard radios (11)
2. **Mitigation Action 3.2:** Establish monthly publicity to remind residents of seasonal hazards (10)
3. **Mitigation Action 4.1:** Purchase generators for water/sewer plant and Reinig Center (9)
4. **Mitigation Action 3.5:** Water conservation (9)
5. **Mitigation Action 2.1:** Construct safe room for combined mobile home park, Reinig Center, and daycare (9)

6. **Mitigation Action 3.3:** Homeowner inspections (7)
7. **Mitigation Action 4.2:** Purchase portable generation equipment and wiring for critical facilities like gas stations and grocery store (6)
8. **Mitigation Action 3.4:** Develop drought plan (5)
9. **Mitigation Action 1.1:** Demolish current structures in Deer Creek flood hazard area (3)

Traer

Goal 1: Protect health and safety of Tama County residents and visitors.

Mitigation Action 1.1: Construct a shelter at the school or other location (6)

Plan for implementation and administration:	The city would like to construct a shelter facility at the school or other location. The city is currently considering building a new public safety building in the next five years that would replace its fire station, ambulance and public works buildings with one common building. All of these structures are too small for their current equipment. Current buildings were constructed in the 1930s. The city would hope to have a safe room constructed as a multi-use safe room / training facility at the new building.
Hazards Addressed:	All
Responsible Party/ Dept.:	North Tama County School Board, Traer City Council
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, City of Traer Bond
Estimated cost:	\$100,000 - \$299,999
Benefits (loss avoided):	A shelter facility will be available to Traer residents and people living in the surrounding area
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Mitigation Action 1.2: Require formal emergency plans for vulnerable populations (8)

Plan for implementation and administration:	Require and create emergency plans for vulnerable populations in Traer
Hazards Addressed:	All
Responsible Party/ Dept.:	City of Traer City Council
Partners:	Organizations serving vulnerable populations, Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Traer General Funds, Grants, Organizations serving vulnerable populations, others to be identified
Estimated cost:	Less than \$9,999
Benefits (loss avoided):	Vulnerable populations will be prepared for hazard events
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within a year of plan adoption
Target Completion Date:	2017

Mitigation Action 1.3: Purchase a siren for west side of the city (7)

Plan for implementation and administration:	Purchase a siren to serve residents on the west side of the city.
Hazards Addressed:	All
Responsible Party/ Dept.:	City of Traer City Council, Fire Dept.
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	FEMA HMGP, City of Traer Bond, others to be identified
Estimated cost:	\$10,000 to \$99,999 – The city estimated the cost to be between \$15,000 and \$18,000
Benefits (loss avoided):	All residents in the city will be able to hear warning siren during a hazard event.
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within a year of plan adoption
Target Completion Date:	2017

Goal 2: The continuity of county and local operations will not be significantly disrupted by disasters in Tama County.**Mitigation Action 2.1: Purchase portable generators (8)**

Plan for implementation and administration:	Purchase generator for critical facilities and complete needed steps to make generator use possible in these facilities. The city has already purchased several small generators but they need more.
Hazards Addressed:	All
Responsible Party/ Dept.:	City of Traer Utility Board
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, Tama County Foundation, others to be identified
Estimated cost:	Less than \$9,999
Benefits (loss avoided):	Prevent complete loss of power to critical facilities
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within a year of plan adoption
Target Completion Date:	2017

Mitigation Action 2.2: Construct safe room (5)

Plan for implementation and administration:	Construct safe room for local government operations and Traer residents. The safe room will be housed within a new building to park the city's ambulances. The city would like to complete this action before the next cycle of ambulance purchases in six or more years so that the new ambulances will have a garage that fits them.
Hazards Addressed:	All
Responsible Party/ Dept.:	City of Traer City Council, Fire, Ambulance
Partners:	To be identified
Potential Funding Source:	FEMA HMGP and PDM, City of Traer Bond, others to be identified
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Life safety of Traer residents, protection for local government operations, and

	minimal interruption
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2022

Mitigation Action 2.3: Purchase additional emergency equipment i.e. fire, ambulance, etc. (7)

Plan for implementation and administration:	Assess City's Departments' needs and purchase additional equipment i.e. emergency equipment for fire and ambulance
Hazards Addressed:	All
Responsible Party/ Dept.:	City of Traer Fire Department, Ambulance Department
Partners:	All City Departments
Potential Funding Source:	Assistance to Firefighter Grants, FEMA HMPG, City Fire Department, others to be identified
Estimated cost:	\$10,000 to \$99,999
Benefits (loss avoided):	Fulfill equipment needs that may improve response or avoid failure of old equipment
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Mitigation Action 2.4: Create Police Department (9)

Plan for implementation and administration:	There is interest in creating a Traer Police Department or sharing some services with the City of Dysart. The City of Traer currently relies on the county for police services. The city is already using operating funds to fund this service from the county. Traer would like to put these operating funds into funding its own police department. The city may seek out additional grant funding for one-time equipment purchase to get the department up and running.
Hazards Addressed:	All
Responsible Party/ Dept.:	City of Traer City Council
Partners:	Tama County Sheriff's Department, City of Dysart, others to be identified
Potential Funding Source:	City of Traer General Funds, FEMA HMGP, others to be identified
Estimated cost:	\$10,000 to \$99,999 (currently covered by operating costs)
Benefits (loss avoided):	Local protection with more frequent patrol and quicker response time
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2 to 4 years from plan adoption
Target Completion Date:	2020

Goal 3: Minimize loss to existing and future structures within hazard areas.

Mitigation Action 3.1: Replace fire and ambulance buildings with buildings are that are storm safe (5)

Plan for implementation and administration:	Replace the existing fire and ambulance building that are also safe rooms
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Hazards Addressed:	All
Responsible Party/ Dept.:	City of Traer City Council, Fire Department, Ambulance Department
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, Assistance to Firefighter Grants, City of Traer Bond, others to be identified
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Protection of critical rescue equipment, communication capabilities, and Traer residents
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2022

Traer Mitigation Action Prioritization

1. **Mitigation Action 2.4:** Create Police Department (9)
2. **Mitigation Action 1.2:** Require formal emergency plans for vulnerable populations (8)
3. **Mitigation Action 2.1:** Purchase portable generators (8)
4. **Mitigation Action 1.3:** Purchase a siren for west side of the city (7)
5. **Mitigation Action 2.3:** Purchase additional emergency equipment i.e. fire, ambulance, etc. (7)
6. **Mitigation Action 1.1:** Construct a shelter at the school or other location (6)
7. **Mitigation Action 2.2:** Construct safe room (5)
8. **Mitigation Action 3.1:** Replace fire and ambulance buildings with buildings are that are storm safe (5)

Vining

Goal 1: Educate Tama County residents about the dangers of hazards and how to be prepared.

Mitigation Action 1.1: Hold Red Cross first aid classes and encourage attendance (9)

Plan for implementation and administration:	Coordinate with the Red Cross to hold first aid classes for the public and encourage the public to attend. The city holds these classes every two years so that people can become recertified.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Vining Fire Department
Partners:	Local Red Cross Chapter, others to be identified
Potential Funding Source:	City of Vining Fire Department, Citizens
Estimated cost:	\$25/person – attendees cover their own cost
Benefits (loss avoided):	Vining residents will be more prepared for certain medical emergencies and may be able to assist each other
Mitigation Measure	Public Education and Awareness

Category:	
Estimated Start Date:	Ongoing – every two years
Target Completion Date:	Ongoing – every two years

Mitigation Action 1.2: Send letter to residents explain where shelter is located and when it will be open (7)

Plan for implementation and administration:	Write a letter with shelter information to distribute to all homes in Vining
Hazards Addressed:	All
Responsible Party/Dept.:	City of Vining Mayor, Pastor of the Church
Partners:	Tama County Emergency Management, local volunteers, others to be identified
Potential Funding Source:	City of Vining General Funds
Estimated cost:	\$9,999 or less - Printing costs plus postage or volunteers could deliver to all homes
Benefits (loss avoided):	Vining residents will be aware of the local shelter and its availability
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing – yearly or when there is a new resident
Target Completion Date:	Ongoing – yearly or when there is a new resident

Goal 2: Protect the health and safety of Tama County residents and visitors.

Mitigation Action 2.1: Create call list for checking on vulnerable populations (8)

Plan for implementation and administration:	Create a call list for the City to use to check on vulnerable populations during and immediately following a hazard event
Hazards Addressed:	All
Responsible Party/Dept.:	City of Vining City Clerk
Partners:	Local volunteers, others to be identified
Potential Funding Source:	City of Vining General Funds
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Vulnerable populations may have needs met quicker
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Goal 3: Minimize losses to existing and future structures within hazard areas.

Mitigation Action 3.1: Upgrade fire department equipment (10)

Plan for implementation and administration:	Identify the Fire Department's specific needs and make the needed upgrades
Hazards Addressed:	All
Responsible Party/Dept.:	City of Vining Fire Department
Partners:	Other City Departments
Potential Funding Source:	Iowa Economic Development Grant, Alliant Energy, City General Funds,

	Assistance to Firefighter Grants, others to be identified
Estimated cost:	\$3,000 - \$5,000 per year
Benefits (loss avoided):	Equipment upgrades may afford better response and avoid failure of old equipment
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing – apply for grant yearly
Target Completion Date:	Ongoing – apply for grant yearly

Mitigation Action 3.2: Crown and grade streets (9)

Plan for implementation and administration:	Make needed street improvements when funding becomes available.
Hazards Addressed:	All
Responsible Party/Dept.:	City of Vining City Council
Partners:	Engineering firm, others to be identified
Potential Funding Source:	City of Vining Road Use Tax
Estimated cost:	\$150,000 every 10 years
Benefits (loss avoided):	Prevent existing streets from washing away and restricting access to residents and emergency vehicles
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	Ongoing – as funding allows

Mitigation Action 3.3: Establish and enforce a burn ban (7)

Plan for implementation and administration:	Enforce a burn ban during dry weather
Hazards Addressed:	Grass/Wildland Fire
Responsible Party/Dept.:	City of Vining City Council, Fire Department
Partners:	Tama County Emergency Management
Potential Funding Source:	City of Vining General Funds
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Prevent grass fires
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing – beginning every spring
Target Completion Date:	Ongoing – beginning every spring

Goal 4: The continuity of county and local operations will not be significantly disrupted by disasters in Tama County.

Mitigation Action 4.1: Replace culverts (6)

Plan for implementation and administration:	Replace or improve existing culverts with new culverts. We can only replace what funding will allow.
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	City of Vining City Council
Partners:	To be identified

Potential Funding Source:	FEMA HMPG, City of Vining Road Use Tax, others to be identified
Estimated cost:	\$3,000-\$5,000 per time that they are replaced
Benefits (loss avoided):	Prevent damages and flash flooding caused by inadequate culverts
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing – as funding allows
Target Completion Date:	Ongoing – as funding allows

Mitigation Action 4.2: Encourage residents to have a battery-operated radio (9)

Plan for implementation and administration:	Create an informational campaign to encourage Vining residents to keep a battery-operated radio in their home in case of power outage
Hazards Addressed:	All
Responsible Party/Dept.:	City of Vining City Council
Partners:	To be identified
Potential Funding Source:	City of Vining General Fund
Estimated cost:	\$9,999 or less – City estimated this cost to be less than \$1,000
Benefits (loss avoided):	Vining residents will be informed during times of power loss
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 4.3: Switch to a remote triggered warning siren (7)

Plan for implementation and administration:	Switch from primarily local control to a remote triggered system in which Tama County Emergency Management controls the warning siren
Hazards Addressed:	All
Responsible Party/Dept.:	City of Vining City Council, Fire Department
Partners:	Tama County Emergency Management
Potential Funding Source:	FEMA HMGP, City of Vining General Funds, others to be identified
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Immediate triggering of warning siren during severe weather
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2020

Vining Mitigation Action Prioritization

Mitigation Action 3.1: Upgrade fire department equipment (10)

Mitigation Action 1.1: Hold Red Cross first aid classes and encourage attendance (9)

Mitigation Action 3.2: Crown and grade streets (9)

Mitigation Action 4.2: Encourage residents to have a battery-operated radio (9)

Mitigation Action 2.1: Create call list for checking on vulnerable populations (8)

Mitigation Action 1.2: Send letter to residents explain where shelter is located and when it will be open (7)

Mitigation Action 3.3: Establish and enforce a burn ban (7)

Mitigation Action 4.3: Switch to a remote triggered warning siren (7)

Mitigation Action 4.1: Replace culverts (6)

Goal 1: Minimize losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority structures.

Mitigation Action 1.1: Enhance building codes (5)

Plan for implementation and administration:	Improve upon existing building codes by adding requirements that may help to reduce the adverse effects hazards may have on buildings
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Planning and Zoning
Partners:	Tama County Emergency Management, Tama County Supervisors
Potential Funding Source:	Tama County Planning and Zoning
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Prevent unnecessary damage to buildings during hazard events
Mitigation Measure Category:	Prevention
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2021

Mitigation Action 1.2: Elevate roads (7)

Plan for implementation and administration:	Where needed, elevate roads. As funding allows, the county elevates roads that are prone to flooding; however, elevating roads is expensive and the action is currently funded with local money.
Hazards Addressed:	River Flooding, Flash Flooding
Responsible Party/Dept.:	Tama County Engineer
Partners:	To be identified
Potential Funding Source:	Tama County Engineer, FEMA HMPG, others to be identified
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Prevent road damage and closures due to flooding
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing – as funding and staff time allows
Target Completion Date:	Ongoing – as funding and staff time allows

Mitigation Action 1.3: Implementation of burn bans (6)

Plan for implementation and administration:	Improve the implementation of burn bans throughout the county. Tama County Emergency Management is working with individual jurisdictions throughout the county to get burn bans in place when needed.
Hazards Addressed:	Grassland/Wildland Fire
Responsible Party/Dept.:	Individual Fire Departments in Tama County
Partners:	Tama County Emergency Management
Potential Funding Source:	Tama County, Individual Fire Departments, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Prevent grass fires during very dry weather
Mitigation Measure Category:	Prevention

Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 1.4: Install steel roofs on government buildings to protect from hail and other hazards (6)

Plan for implementation and administration:	Systematically replace county building roofs with steel or another durable material to protect them from hail and other hazards. The county just replaced the roof on one building in the last year with shingles and will not pursue a steel roof unless a significant hazard occurs and it would need to be replaced.
Hazards Addressed:	Thunderstorms, Lightning, and Hail
Responsible Party/Dept.:	Tama County Board of Supervisors
Partners:	To be identified
Potential Funding Source:	Tama County Board of Supervisors, others to be identified
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Protect the contents and functions of county buildings from hail and other hazards
Mitigation Measure Category:	Property Protection
Estimated Start Date:	5 years or more from plan adoption
Target Completion Date:	2025

Mitigation Action 1.5: Create list of disaster supplies and suppliers (5)

Plan for implementation and administration:	Create a list of disaster supplies and suppliers available to all cities and the public possibly through the county website
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Emergency Management
Partners:	Suppliers, others to be identified
Potential Funding Source:	Tama County
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Cities and residents will be able to access supplies quickly following a disaster
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2021

Mitigation Action 1.6: Update zoning in critical areas (7)

Plan for implementation and administration:	Update zoning in critical areas of the county i.e. discouraging development in floodplain or flood-prone areas, ensure proper development near critical facilities, etc. For flood-prone areas, the county already works with the DNR to ensure that unregulated development does not occur in flood-prone areas.
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Planning and Zoning Department
Partners:	To be identified
Potential Funding Source:	Tama County
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Prevent undesirable land uses that can lead to unnecessary damages, increased runoff, etc.
Mitigation Measure	Prevention

Category:	
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 1.7: Maintenance of vegetation near power lines (6)

Plan for implementation and administration:	Maintain proper distance between vegetation and power lines to help avoid damages to both the vegetation and electrical infrastructure. This action is ongoing as maintenance is needed.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	Electric companies (Brooklyn REC, East Central Iowa Coop, Alliant Energy) and Tama County
Partners:	To be identified
Potential Funding Source:	Tama County, electric companies, others to be identified
Estimated cost:	\$100,000 - \$299,999
Benefits (loss avoided):	Prevent power outage and damage to electrical infrastructure
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 1.8: Flood assessment requirement for building permit (7)

Plan for implementation and administration:	The county has established a flood assessment requirement to receive a building permit in the floodplain. The county collaborates with Iowa DNR for each permit to make sure all requirements are met. The county will continue this ongoing effort as they receive requests to build in flood-prone areas.
Hazards Addressed:	River Flooding
Responsible Party/Dept.:	Tama County Planning and Zoning Department
Partners:	To be identified
Potential Funding Source:	Tama County Planning and Zoning Department, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Improve flood research in county and avoid undesirable development in the floodplain and flood-prone areas
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 1.9: Improve capital improvements planning process (3)

Plan for implementation and administration:	Improve the capital improvements planning process for the county and also increase public awareness of this type of planning
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Board of Supervisors
Partners:	All county departments, others to be identified
Potential Funding Source:	Tama County Board of Supervisors
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Needs can better be incorporated into the county budget and the public is aware of upcoming and current county expenditures
Mitigation Measure	Prevention

Category:	
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Mitigation Action 1.10: Improve regular assessment and maintenance on county structures (7)

Plan for implementation and administration:	Identify ways to improve the assessment and maintenance on county structures, possibly make information available to the public about planned maintenance and current condition
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Maintenance Department
Partners:	Other Tama County departments, others to be identified
Potential Funding Source:	Tama County
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Life safety, public knowledge
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2025

Mitigation Action 1.11: Create fire extinguisher and fire alarm safety program (8)

Plan for implementation and administration:	Create a program to encourage Tama County residents and businesses to keep and maintain fire extinguishers and smoke detectors/fire alarms and teach them proper use and safety. Individual fire departments have made varied progress on this action and continue to implement the safety program.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	Individual Fire Departments in Tama County
Partners:	Tama County Emergency Management
Potential Funding Source:	Individual Fire Departments
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Life safety of Tama County residents, and preservation of structures
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 2: Protect health and safety of Tama County residents and visitors.

Mitigation Action 2.1: Train emergency responders in search and rescue for structural failure situations (6)

Plan for implementation and administration:	Create a program or incentives for emergency responders to be trained in search and rescue in structural failure situations. Each individual fire department is responsible for this training.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	Individual Fire Departments in Tama County
Partners:	Tama County Emergency Management
Potential Funding Source:	Individual Fire Departments, Assistance to Firefighters Grant, others to be identified
Estimated cost:	\$100,000 - \$299,999

Benefits (loss avoided):	Quick and proper response in structural failure situations
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.2: Establish cooling centers (7)

Plan for implementation and administration:	Establish one or multiple cooling centers to be located throughout the county. The county will assist communities that wish to establish cooling centers and help them to get resources.
Hazards Addressed:	Extreme Heat
Responsible Party/Dept.:	Tama County Emergency Management
Partners:	Local city government, others to be identified
Potential Funding Source:	Tama County EMA, FEMA HMGP
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Prevent heat-related illness and death
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.3: Train fire departments for grass fires and maintain needed equipment (7)

Plan for implementation and administration:	Create a program or incentives for firemen to be trained for grass fires and purchase or maintain the needed equipment. Each individual fire department is responsible for this training.
Hazards Addressed:	Grassland/Wildland Fire
Responsible Party/Dept.:	Individual Fire Departments in Tama County
Partners:	Tama County Emergency Management
Potential Funding Source:	Assistance to Firefighters Grant, others to be identified
Estimated cost:	\$100,000 - \$299,999
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

Mitigation Action 2.4: Establish community shared shelters (8)

Plan for implementation and administration:	Explore the option of creating or consolidating shelters to be shared between communities.
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Emergency Management, Individual Jurisdictions
Partners:	To be identified
Potential Funding Source:	To be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	When services are shared, the service is usually more cost-effective and may be better quality overall
Mitigation Measure Category:	Structural Mitigation

Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.5: Construct safe rooms in communities and recreational areas (9)

Plan for implementation and administration:	Where needed most, construct safe rooms in Tama County communities and recreational areas.
Hazards Addressed:	All
Responsible Party/Dept.:	Individual Jurisdictions, Tama County Emergency Management (for County Parks)
Partners:	Tama County Conservation, others to be identified
Potential Funding Source:	FEMA HMGP and PDM, Tama County Emergency Management, Individual Jurisdictions, CDBG, and others to be identified
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Life safety of Tama County residents and visitors
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.6: Establish advance warning system for recreational areas (7)

Plan for implementation and administration:	Establish an advanced warning system for recreational areas that is effective in warning people who are outdoors
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Emergency Management
Partners:	Tama County Conservation, others to be identified
Potential Funding Source:	Tama County Emergency Management , FEMA HMGP, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Life safety of people using Tama County's recreational areas
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2021

Mitigation Action 2.7: Require and enforce maintenance of vegetation near traffic signs (7)

Plan for implementation and administration:	Make requirements and enforce maintenance of vegetation near traffic signs
Hazards Addressed:	Transportation Incident
Responsible Party/Dept.:	Tama County Engineers, Tama County Secondary Roads
Partners:	Tama County Emergency Management, Tama County Planning and Zoning, others to be identified
Potential Funding Source:	Tama County Engineers, County Secondary Roads, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Traffic safety, reduce accidents
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.8: Improve fire code enforcement (6)

Plan for implementation and administration:	Identify how fire code enforcement can be improved and implement the improvements. Tama County will assist individual communities as needed. Individual jurisdictions are responsible for completing this action.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	Individual Fire Departments in Tama County, Tama County Planning and Zoning Department
Partners:	To be identified
Potential Funding Source:	Individual Fire Departments
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Prevent fires in Tama County structures
Mitigation Measure Category:	Prevention
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 2.9: Establish communication between emergency management and vets regarding animal/crop/plant diseases (5)

Plan for implementation and administration:	Establish communication between emergency management and vets regarding animal/crop/plant diseases. This action falls under an emergency support function of Tama County Emergency Management. It was last completed in 2013 and is updated every five years. The action undergoes an annual evaluation.
Hazards Addressed:	Animal/Plant/Crop Disease
Responsible Party/Dept.:	Tama County Emergency Management
Partners:	Veterinarians throughout Tama County
Potential Funding Source:	Tama County Emergency Management, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Information sharing
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 3: Educate Tama County citizens about the dangers of hazards and how they can be prepared.**Mitigation Action 3.1:** Extreme heat, severe weather, pipeline safety, thunderstorms and lightning, etc. info, PSAs, and information on County website (8)

Plan for implementation and administration:	The county includes information about hazards including extreme heat, severe weather, and other hazards on their website, through public service announcements, and also via social media (Facebook). The county will continue to provide this information through a variety of sources so that it can reach as many people as possible.
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Emergency Management
Partners:	Tama County Public Health, other county departments, others to be identified

Potential Funding Source:	Tama County, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Public education
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 3.2: Public education program about general fire prevention and prevention of grass and wildland fires (6)

Plan for implementation and administration:	Create a separate program to educate the public about grass fires. Individual communities are responsible for implementing this action. The county will assist as needed.
Hazards Addressed:	Infrastructure Failure, Grass and Wildland Fire
Responsible Party/Dept.:	Tama County Emergency Management
Partners:	Tama County Conservations, city fire departments, others to be identified
Potential Funding Source:	Tama County Emergency Management, city fire departments, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Grass fire prevention
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 3.3: Encourage farmers to invest in crop insurance (6)

Plan for implementation and administration:	Through education or some sort of incentive program, encourage Tama County farmers to invest in crop insurance. This action is part of an emergency support function through Tama County EMA. An update of the action was last completed in 2013. It is updated every 5 years.
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Emergency Management
Partners:	Tama County departments, others to be identified
Potential Funding Source:	Tama County Emergency Management, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Protection of farmers' investment
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 3.4: Education on dangers of highway transportation incidents and how to avoid collisions (6)

Plan for implementation and administration:	Initiate some sort of special education program about the dangers of highway transportation incidents and how to avoid collisions. This action falls under an Emergency Support Function of Tama County EMA. It was last updated in 2014.
Hazards Addressed:	Transportation Incident

Responsible Party/Dept.:	Tama County Emergency Management
Partners:	Tama County Sheriff's Department, DOT, others to be identified
Potential Funding Source:	Tama County Emergency Management, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Public education, prevention of collisions resulting in injury, death, and property damage
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 4: Continuity of county and local operations will not be significantly disrupted by disasters in Tama County.

Mitigation Action 4.1: Complete government continuity planning (8)

Plan for implementation and administration:	Complete government continuity planning for all Tama County departments. This action is part of an ongoing process that is administered by Tama County EMA.
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Emergency Management and Board of Supervisors
Partners:	All county departments, others to be identified
Potential Funding Source:	Tama County
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Protect Tama County government assets and prevent major disruption of operations
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 4.2: Establish an impact assessment form for communities (9)

Plan for implementation and administration:	Establish an information gathering/impact assessment form for Tama County cities to use immediately following a disaster
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Emergency Management
Partners:	Tama County cities, disaster relief-related organizations
Potential Funding Source:	Tama County Emergency Management
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Expedite the data gathering process
Mitigation Measure Category:	Prevention
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2021

Mitigation Action 4.3: Purchase generators for critical facilities (11)

Plan for implementation and administration:	Identify critical facilities with the greatest vulnerability and purchase generators to be used in them during an extended power outage. A generator
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	has already been purchased for the building that houses the Sheriff's Office and the EMA Office. The county still needs to purchase generators for additional facilities, including the North Building that houses the Assessor's Office.
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Maintenance Department
Partners:	Tama County Emergency Management
Potential Funding Source:	FEMA HMPG, Tama County Emergency Management, others to be identified
Estimated cost:	\$100,000 - \$299,999
Benefits (loss avoided):	Avoid loss of critical facilities' function and prevent damages to critical facilities and other structures associated with an extended power outage
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 4.4: Bury utility lines (5)

Plan for implementation and administration:	Collaborate with power providers to identify areas that would benefit the most from burying electrical infrastructure and actually bury the power lines
Hazards Addressed:	Infrastructure Failure, Tornado, Thunderstorm, Lightning, and Hail, Wind Storm
Responsible Party/Dept.:	Power providers (Brooklyn REC, East Central Iowa Coop, Alliant Energy)
Partners:	Tama County Emergency Management Tama County Engineer, others to be identified
Potential Funding Source:	Power provider, others to be identified
Estimated cost:	\$300,000 or more - Approximately \$10 or more per foot of power line
Benefits (loss avoided):	Prevent costly power outages due to damage to above ground electrical infrastructure
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2023

Mitigation Action 4.5: Budget and plan for communication failures (9)

Plan for implementation and administration:	Find an alternate location for the 911 PSAP—plan for how to acquire computers, radio consoles, phone equipment and predetermine a facility to relocate and secure. Tama County Emergency Management has made this an ongoing action that is continuously being worked on.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	Tama County Emergency Management
Partners:	Other Tama County departments
Potential Funding Source:	Tama County Emergency Management, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	No loss of 911 PSAP functions
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 4.6: Establish procedure for community to notify Tama County Emergency Management after Energy failure occurs (8)

Plan for implementation and administration:	Establish procedure for community to notify Emergency Management after Energy failure occurs
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Emergency Management
Partners:	City Governments
Potential Funding Source:	Tama County Emergency Management
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Consolidate information if outage occurs in more than one community, quicker and more direct contact with power provider
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2021

Mitigation Action 4.7: Create emergency fuel supply and map other sources (5)

Plan for implementation and administration:	Create a small emergency fuel supply for county vehicles and map other sources of fuel
Hazards Addressed:	All
Responsible Party/Dept.:	Tama County Emergency Management
Partners:	Tama County departments
Potential Funding Source:	Tama County Emergency Management
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Prevent loss of fuel for vehicles that are critical
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2023

Tama County Mitigation Action Prioritization

Mitigation Action 4.3: Purchase generators for critical facilities (11)

Mitigation Action 2.5: Construct safe rooms in communities and recreational areas (9)

Mitigation Action 4.2: Establish an impact assessment form for communities (9)

Mitigation Action 4.5: Budget and plan for communication failures (9)

Mitigation Action 1.11: Create fire extinguisher and fire alarm safety program (8)

Mitigation Action 2.4: Establish community shared shelters (8)

Mitigation Action 4.6: Establish procedure for community to notify Tama County Emergency Management after Energy failure occurs (8)

Mitigation Action 3.1: Extreme heat, severe weather, pipeline safety, thunderstorms and lightning, etc. info, PSAs, and information on County website (8)

Mitigation Action 4.1: Complete government continuity planning (8)

Mitigation Action 1.6: Update zoning in critical areas (7)

Mitigation Action 1.8: Flood assessment requirement for building permit (7)

Mitigation Action 2.2: Establish cooling centers (7)

Mitigation Action 2.3: Train fire departments for grass fires and maintain needed equipment (7)

Mitigation Action 2.6: Establish advance warning system for recreational areas (7)
Mitigation Action 2.7: Require and enforce maintenance of vegetation near traffic signs (7)
Mitigation Action 1.10: Improve regular assessment and maintenance on county structures (7)
Mitigation Action 1.2: Elevate roads (7)
Mitigation Action 1.7: Maintenance of vegetation near power lines (6)
Mitigation Action 2.1: Train emergency responders in search and rescue for structural failure situations (6)
Mitigation Action 2.8: Improve fire code enforcement (6)
Mitigation Action 3.2: Public education program about general fire prevention and prevention of grass and wildland fires (6)
Mitigation Action 3.3: Encourage farmers to invest in crop insurance (6)
Mitigation Action 3.4: Education on dangers of highway transportation incidents and how to avoid collisions (6)
Mitigation Action 1.3: Implementation of burn bans (6)
Mitigation Action 1.4: Install steel roofs on government buildings to protect from hail and other hazards (6)
Mitigation Action 2.9: Establish communication between emergency management and vets regarding animal/crop/plant diseases (5)
Mitigation Action 4.7: Create emergency fuel supply and map other sources (5)
Mitigation Action 1.1: Enhance building codes (5)
Mitigation Action 1.5: Create list of disaster supplies and suppliers (5)
Mitigation Action 4.4: Bury utility lines (5)
Mitigation Action 1.9: Improve capital improvements planning process (3)

GMG Community School District

Goal 1: Minimize losses to existing and future structures within the hazard area.

Mitigation Action 1.1: Purchase generator for high school in Garwin (9)

Plan for implementation and administration:	The high school in Garwin is designated as a safe area and command center for the town. It would be great to have the building powered during a disaster.
Hazards Addressed:	All
Responsible Party/Dept.:	GMG Community School District Board, City of Garwin City Council
Partners:	Tama County Emergency Management
Potential Funding Source:	FEMA HMGP, GMG School District Funds, City of Garwin Local Options Sales Tax
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Avoid major disruptions
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2016

Goal 2: Protect the health and safety of Tama County residents and visitors.

Mitigation Action 2.1: Bury overhead electrical lines near school (8)

Plan for implementation and administration:	Removal of overhead wires by school. These wires are a safety issue during high winds and snow.
Hazards Addressed:	Infrastructure Failure, Wind Storm, Thunderstorm, Tornado, Severe Winter Storms
Responsible Party/Dept.:	GMG Community School District Board, City of Garwin City Council
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Garwin Utility Revenue, FEMA HMGP, HSEMD
Estimated cost:	\$100,000 - \$299,999
Benefits (loss avoided):	Life safety of Garwin residents and visitors
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2018

Mitigation Action 2.2: Build safe room (6)

Plan for implementation and administration:	Connect a safe room to the high school. This shelter would be used by school students, staff, and city residents and visitors.
Hazards Addressed:	Wind Storm, Thunderstorm, Tornado
Responsible Party/Dept.:	GMG Community School District Board, City of Garwin City Council
Partners:	Tama County Emergency Management
Potential Funding Source:	School District, FEMA HMGP, HSEMD
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Life safety of Garwin residents and visitors
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2018

Goal 3: The continuity of county and local operations will not be significantly disrupted by disasters in Tama County.

Mitigation Action 3.1: Hazardous material drop off program (6)

Plan for implementation and administration:	Work with County and Community to offer a hazardous materials drop off day. This event will help to safely remove hazardous chemicals and materials.
Hazards Addressed:	Hazardous Materials Incident
Responsible Party/Dept.:	City of Garwin City Council, GMG Community School District Board
Partners:	Tama County EMA, others to be identified
Potential Funding Source:	School district, FEMA HMGP, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Prevent unnecessary pollution from hazardous materials, especially in the

	event of an emergency
Mitigation Measure Category:	Natural Resources Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing - biannual

Mitigation Action 3.2: Increase tree planting around school (8)

Plan for implementation and administration:	Plant trees around school to shade parking and school area. Increased shade on school grounds can help to keep school building cooler during summer months and help prevent infrastructure failure.
Hazards Addressed:	Infrastructure Failure
Responsible Party/Dept.:	GMG Community School District Board
Partners:	To be identified
Potential Funding Source:	School District Funds, Local and State Grants
Estimated cost:	\$10,000 - \$99,999
Benefits (loss avoided):	Increase shade area near school infrastructure, prevent high energy use and overloading of school utility infrastructure
Mitigation Measure Category:	Natural Resources Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	Ongoing - biannual

GMG Community School District Mitigation Action Prioritization

1. **Mitigation Action 1.1:** Purchase generator for high school in Garwin (9)
2. **Mitigation Action 2.1:** Bury overhead electrical lines near school (8)
3. **Mitigation Action 3.2:** Increase tree planting around school (8)
4. **Mitigation Action 3.1:** Hazardous material drop off program (6)
5. **Mitigation Action 2.2:** Build safe room (5)

North Tama Community School District

Goal 1: Protect the health and safety of Tama County residents and visitors.

Mitigation Action 1.1: Build a safe room for students, staff, and community members (6)

Plan for implementation and administration:	The school district is currently planning to purchase property that is across the street from their current facilities. With this property, the district would provide an additional parking lot and build a new, free-standing safe room building. This action is important to the district because there is currently no safe room in the City of Traer. The safe room would be available for the entire community to use. The purchase of the property would cost roughly \$85,000. Additional costs would include demolition of a house that is currently on the property, leveling of the site, and the construction of the new building. The
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	district would rely primarily on grant funding. For any match money, LOST or bonding would be required in collaboration with the City of Traer. The school recently funded a multi-million dollar project with bonding, so any additional fundraising for a match would be several years away.
Hazards Addressed:	All
Responsible Party/Dept.:	North Tama Community School District Board
Partners:	City of Traer and Tama County
Potential Funding Source:	FEMA HMGP, Local Options Sales Tax, City Bonds, others to be identified
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Life safety of students, staff, and community
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 years or more from plan adoption
Target Completion Date:	2022

North Tama Community School District Mitigation Action Prioritization

1. Mitigation Action 1.1: Build a safe room for students, staff, and community members (6)

South Tama Community School District

Goal 1: Protect the health and safety of Tama County residents and visitors.

Mitigation Action 1.1: Build a storm shelter (6)

Plan for implementation and administration:	Build a storm shelter at South Tama High School. This shelter would ideally be able to handle a capacity of 2,500 – 3,000 people. The people who could use this shelter include students, staff, and residents.
Hazards Addressed:	Tornado, Thunderstorm, Wind Storm
Responsible Party/Dept.:	Steve McAdoo, South Tama Community School District
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Tama Property Taxes, School District Funds, FEMA HMGP
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Life safety of students, staff, and community members
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2018

Goal 2: The continuity of county and local operations will not be significantly disrupted by disasters in Tama County.

Mitigation Action 2.1: Purchase generators (7)

Plan for implementation and administration:	The school would like to purchase three generators for each of the major school buildings in the district (high school, elementary school, and middle school). If the school district established a designated shelter at the high school, the purchase of one generator would be adequate.
Hazards Addressed:	All
Responsible Party/Dept.:	Steve McAdoo, South Tama Community School District
Partners:	Tama County Emergency Management, City of Tama
Potential Funding Source:	City of Tama Local Option Sales Tax, FEMA HMGP, School District Funds
Estimated cost:	\$300,000 or more (if generators are purchased for all 4 buildings)
Benefits (loss avoided):	Avoid major disruptions
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Within 1 year of plan adoption
Target Completion Date:	2017

Goal 3: educate Tama County citizens about the dangers of hazards and how they can be prepared.**Mitigation Action 3.1: Communicate crisis plan to parents, officials, and the public (8)**

Plan for implementation and administration:	Establish a program to teach parents, officials, and the public about the school's crisis plan
Hazards Addressed:	All
Responsible Party/Dept.:	Steve McAdoo, South Tama County Community School District
Partners:	Tama County Emergency Management, City of Tama
Potential Funding Source:	School District Funds
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Parents, officials, and the public would be aware of the school's plan
Mitigation Measure Category:	Public Education and Awareness
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

South Tama Community School District Mitigation Action Prioritization

1. **Mitigation Action 3.1:** Communicate crisis plan to parents, officials, and the public (8)
2. **Mitigation Action 2.1:** Purchase generators (7)
3. **Mitigation Action 1.1:** Build a storm shelter (6)

Goal 1: Protect the health and safety of Union students, employees, and visitors

Mitigation Action 1.1: Construct a safe room (2)

Plan for implementation and administration:	Construct safe room on school grounds for students, faculty, and possibly the public to use during the severe weather.
Hazards Addressed:	All
Responsible Party/Dept.:	Union Community School District Board
Partners:	Tama County, city, others to be identified
Potential Funding Source:	Capital Improvement Funds, Federal Grants, State Grants, FEMA HMPG and PDM
Estimated cost:	\$300,000 or more
Benefits (loss avoided):	Life safety of students, staff, and possibly nearby citizens and visitors
Mitigation Measure Category:	Structural Mitigation
Estimated Start Date:	5 years or more from plan adoption
Target Completion Date:	2022

Mitigation Action 1.2: Improve communication systems (9)

Plan for implementation and administration:	Identify and implement ways to improve the district's communication systems
Hazards Addressed:	All
Responsible Party/Dept.:	Union Community School District Board
Partners:	To be identified
Potential Funding Source:	Capital Improvement Funds, others to be identified
Estimated cost:	\$10,000 to \$99,999
Benefits (loss avoided):	Better communication
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2020

Mitigation Action 1.3: Complete crisis planning (9)

Plan for implementation and administration:	Complete crisis planning for the entire school district
Hazards Addressed:	All
Responsible Party/Dept.:	Union Community School District Board
Partners:	County Emergency Management, local fire, law enforcement, and emergency response personnel, and possibly a consultant to aid in plan development and writing if not handled by schools
Potential Funding Source:	Union Community School District Funds
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Quick and efficient response to crises
Mitigation Measure	Emergency Services Protection

Category:	
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 2: Minimize losses to Union Community School District facilities.

Mitigation Action 2.1: Roof improvements (8)

Plan for implementation and administration:	Make roof improvements to school district buildings
Hazards Addressed:	All
Responsible Party/Dept.:	Union Community School District Board
Partners:	To be identified
Potential Funding Source:	Capital Improvement Funds, others to be identified
Estimated cost:	\$100,000 to \$299,999
Benefits (loss avoided):	Prevent further costly damage to structures, protect structure contents, maintain value of property
Mitigation Measure Category:	Property Protection
Estimated Start Date:	2-4 years from plan adoption
Target Completion Date:	2020

Goal 3: Educate Union students about the dangers of hazards and how to be prepared.

Mitigation Action 3.1: Crisis planning and drills (9)

Plan for implementation and administration:	Complete practice drills based on crisis planning for the school district
Hazards Addressed:	All
Responsible Party/Dept.:	Union Community School District Board
Partners:	County Emergency Management, local fire, law enforcement, and emergency response personnel, and possibly a consultant to aid in plan development and writing if not handled by schools
Potential Funding Source:	Union Community School District Funds, others to be identified
Estimated cost:	\$10,000 to \$99,999
Benefits (loss avoided):	Students and staff will be prepared for crises and respond correctly and quickly, modifications can be made to crisis plans if problems occur
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Mitigation Action 3.2: Safety education (10)

Plan for implementation and administration:	Create and implement a safety education program to teach students about many different safety issues
Hazards Addressed:	All
Responsible Party/Dept.:	Union Community School District Board

Partners:	Organizations with expertise in certain safety issues, local fire, law enforcement, and emergency response personnel
Potential Funding Source:	Union Community School District Funds, others to be identified
Estimated cost:	\$9,999 or less
Benefits (loss avoided):	Youth education
Mitigation Measure Category:	Public Awareness and Education
Estimated Start Date:	Ongoing
Target Completion Date:	Ongoing

Goal 4: The continuity of school operations will not be significantly disrupted by disasters.

Mitigation Action 4.1: Purchase generators (4)

Plan for implementation and administration:	Purchase generators and install hookups for school district buildings
Responsible Party/Dept.:	Union Community School District Board
Partners:	Tama County Emergency Management
Potential Funding Source:	FEMA HMPG, Capital Improvement Funds, others to be identified
Estimated cost:	\$100,000 to \$299,999
Benefits (loss avoided):	Prevent major disruptions
Mitigation Measure Category:	Emergency Services Protection
Estimated Start Date:	5 or more years from plan adoption
Target Completion Date:	2022

Union Community School District Mitigation Action Prioritization

1. **Mitigation Action 3.2:** Safety education (10)
2. **Mitigation Action 1.2:** Improve communication systems (9)
3. **Mitigation Action 1.3:** Complete crisis planning (9)
4. **Mitigation Action 3.1:** Crisis planning and drills (9)
5. **Mitigation Action 2.1:** Roof improvements (8)
6. **Mitigation Action 4.1:** Purchase generators (4)
7. **Mitigation Action 1.1:** Construct a safe room (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 Tama 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 Tama 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 Tama 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 Tama County Emergency Management deems appropriate and necessary, and as approved by the Tama 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 Tama 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.