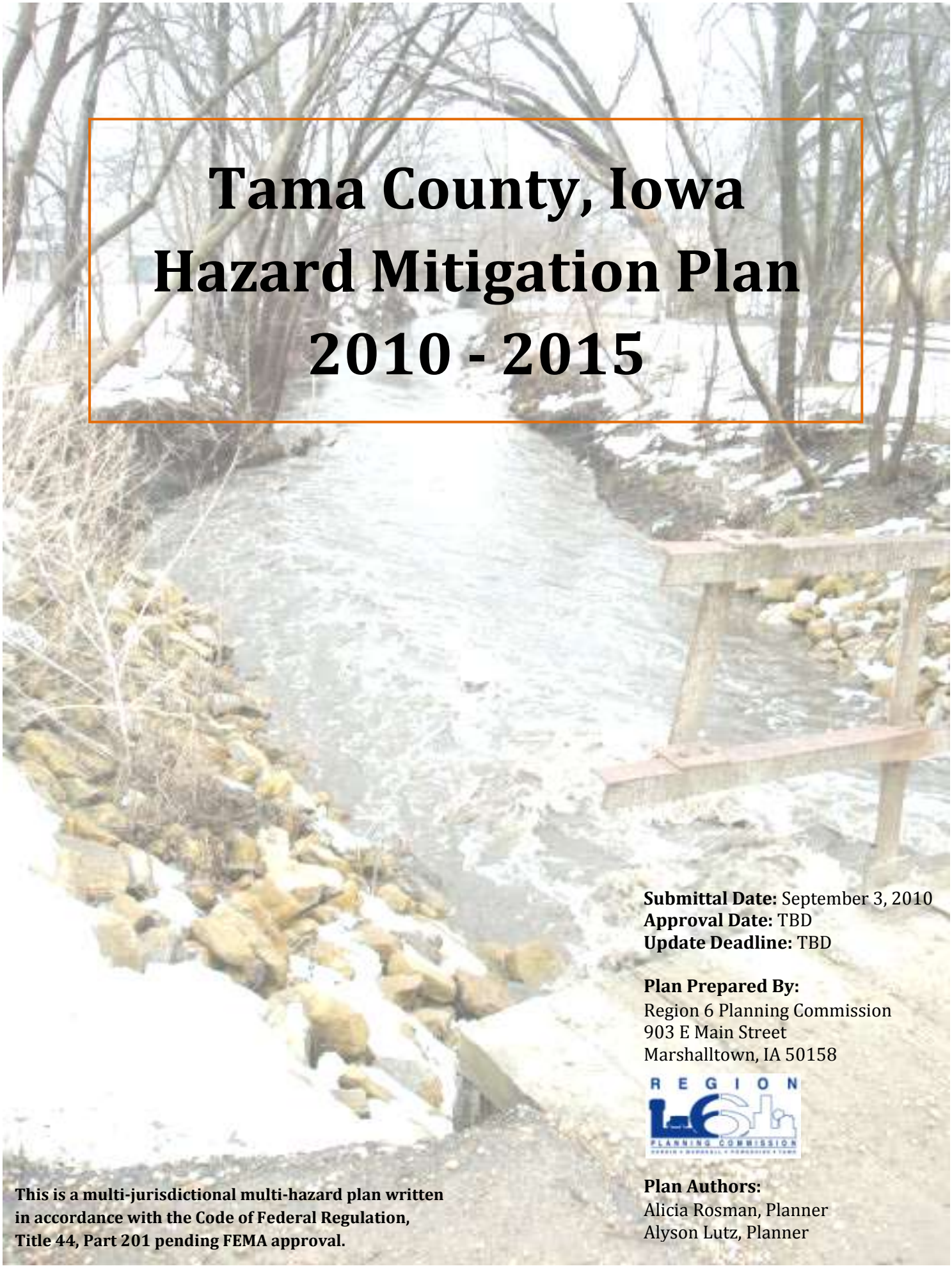

Tama County, Iowa
Hazard Mitigation Plan
2010 - 2015

Submittal Date: September 3, 2010
Approval Date: TBD
Update Deadline: TBD

Plan Prepared By:
Region 6 Planning Commission
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Marshalltown, IA 50158

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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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Special Thanks

The Region 6 Planning is extremely thankful to all of the people who helped in the development of this plan. We would like to specially thank Tama County Emergency Management and all other Tama County staff who assisted with plan development. We also would like to specially thank Tama County Economic Development for helping to assemble the Task Force, provide meeting space, and give support in organizing meetings. Finally, we thank the Task Force and city staff for participating in the plan development and providing the information that was essential for development and overall success of this plan.

Executive Summary

This multi-jurisdictional hazard mitigation grant 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.

One of the most important steps is the risk assessment and mitigation strategy in which countywide meetings attended by each participating jurisdiction were held. Asset mapping, identifying critical facilities and vulnerable populations, as well as establishing goals and prioritizing mitigation actions are all exercises the participants completed to help Region 6 have a better idea as to the need of each jurisdiction.

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. Four school districts are also included in the planning area; profiles include enrollment and school building locations.

In the Risk Assessment chapter, every hazard that could possibly affect Tama County is identified and profiled with the information of its description, historical occurrence, probability, vulnerability of the county, the maximum extent of its possible destruction, severity and speed of onset included. Based on the frequency and/or impact of each of these descriptors, the hazards are ranked with the highest, tornado, being the biggest threat to Tama County.

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

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

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.

The mitigation strategy, produced by each jurisdiction 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 continuity of operations of the jurisdictions and county. Projects identified to help achieve those goals include the installation of safe rooms, purchase of generators, elevation of roads, and the creation of emergency contact sheets and procedures. Projects are evaluated and ranked to set their priority to each community using the STAPLEE evaluation method.

It is of the utmost importance that the maintenance and update of this plan continues in order to carry on proactive efforts in all jurisdictions of the planning area 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 publicizing 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 A.

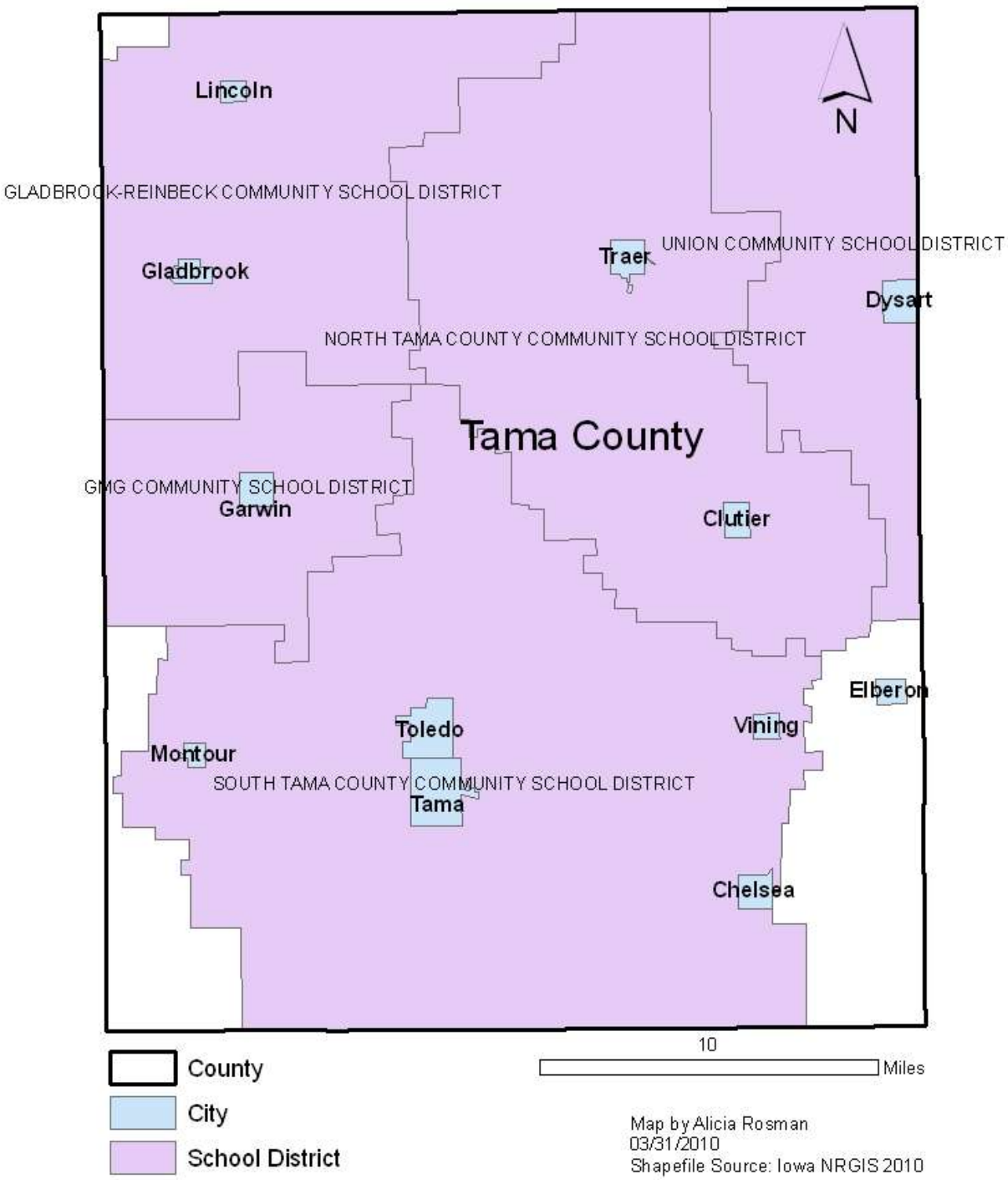
The following 17 jurisdictions participated in the creation of this plan and have adopted the multi-jurisdictional plan. Refer to Figure 1 for a map of the jurisdictions included in this plan.

- 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)
- Union Community School District
- North Tama County Community School District
- South Tama County Community School District
- Gladbrook-Reinbeck 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. Also, the Green Mountain-Garwin Community School District and the Benton Community School District were invited to participate in this plan process but did not respond to the invitation.

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. Also, all of the school districts and associated buildings that are located in Tama County are included in the planning boundary. Refer to Figure 1 on the next page.

Figure 1: Tama County Participating Jurisdictions



Note: Some school districts that are included in this hazard mitigation plan cross county boundaries with some buildings located in an adjacent county. For these school districts, only the buildings located in Tama County are included in the plan. This will be discussed further in each school district's section of the plan. Note that GMG and Benton Community School District are not included in the plan.

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

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

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

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

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

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

Jurisdiction	Representative	Kick-Off Meeting	County Meeting #1	County Meeting #2	Make-up Meeting
City of Chelsea	Roger Ochs	X	X	X	NA
City of Clutier	Ardene Cross	X	X	X	NA
	Arlene Vondracek	X	X	X	NA
City of Dysart	Don Lyons	X	X	X	NA
	Dwayne Luze	X	X	X	NA
City of Elberon	Laurie McMains	X	X	X	NA
	Linda Kaloupek	X	X	X	NA
City of Garwin	Merle Parks	X	X	X	NA
	Ron Smith	---	---	X	NA
	Carl Zoffka	---	---	X	NA
City of Gladbrook	Lori Bearden	X	X	---	X
	Mark Lowry	X	X	---	X
City of Lincoln	Annie Stocker	---	X	X	NA
City of Montour	Karman Downs	X	X	---	X
City of Tama	Tracy Brady	---	X	---	---
	Stuart Eisentrager	X	X	---	---
	Chris Bearden	X	---	---	X
	Dan Zimmerman	X	---	---	X
City of Toledo	Mark McFate	---	X	---	NA
	Steve Kenkel	---	---	X	NA
City of Traer	Ellen Young	X	X	X	NA
	Jon Panfil	---	X	X	NA
City of Vining	Midge Horton	---	X	X	NA
	Dale Stout	---	---	X	NA
Unincorporated Tama County	Kendall Jordan	---	X	---	NA
Tama County Emergency Mgmt.	Roxane Warnell	X	X	X	NA
	Julie Vokoun	---	X	X	NA
Tama County Engineer	Lyle Brehm	---	X	---	NA
Tama County Sherriff	Dennis Kucera	---	X	X	NA
Tama County Conservation	Bob Etzel	---	X	---	NA
Tama County Economic Dev.	Lindi Roelofse	X	X	X	NA
Tama County Medical Examiner	Bruce McEltree	---	X	---	NA
Union Community School District	Neil Mullen	---	X	---	NA
	David Hill	X	---	X	NA
Gladbrook Reinbeck Community SD	Jessica Weber	---	X	---	---
	Tim Kuehl	---	---	---	X
North Tama County School District	Gary Janssen	---	X	X	NA
South Tama County School District	Mark McFate	---	X	---	X
	Joanna Hofer	---	---	---	X

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, though, there are two types of hazards. The first type of hazard is a natural hazard, which is one that occurs in nature often due to climate and geographic location. There are 16 main natural hazards identified by the State of Iowa. The other hazard type is a man-made or technological hazard, which is caused by some sort of human activity. Table 1.1 lists both natural and man-made hazards.

Table 1.1: All Hazards

Natural Hazards	Man-made Hazards
Drought	Agro-Terrorism
Dam Failure	Air Transportation Incident
Earthquake	Communications Failure
Expansive Soils	Energy Failure
Extreme Heat	Fixed Hazardous Materials Incident
Flash Flood	Fixed Radiological Incident
Grass or Wildland Fire	Highway Transportation Incident
Hailstorm	Pandemic Human Disease
Levee Failure	Pipeline Transportation Incident
Landslide	Railway Transportation Incident
River Flood	Transportation Hazardous Materials Incident
Sinkholes	Transportation Radiological Incident
Severe Winter Storm	Waterway Incident
Thunderstorms and Lightning	Enemy Attack
Tornado	Public Disorder
Windstorm	Biological Terrorism
	Chemical Terrorism
	Conventional Terrorism
	Cyber Terrorism
	Radiological Terrorism
	Animal/Crop/Plant Disease
	Human Disease Epidemic
	Structural Failure
	Structural Fire

Note that dam and levee failure are included under natural hazards. These are normally considered man-made, but FEMA requires the inclusion of these two hazards so they are considered a natural hazard in this plan. The natural hazards listed are identified by both FEMA and the 2007 Iowa Hazard Mitigation Plan while the man-made hazards were only identified in Iowa's state hazard mitigation plan. Currently (2010), the Iowa Hazard Mitigation Plan is being updated so the list of hazards will be reduced. Both natural and man-made hazards will be considered in this plan.

Hazard Mitigation Planning

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

1. **Mitigation** is defined as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event. Mitigation, also known as prevention, encourages long-term reduction of hazard vulnerability. The goal of mitigation is to save lives and reduce property damage. Mitigation can accomplish this, and should be cost-effective and environmentally sound. This, in turn, can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities, reduce exposure to liability, and minimize community disruption. Examples include land use planning, adoption of building codes, elevation, acquisition, or relocation of homes away from floodplains.

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

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

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

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

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

Hazard Mitigation Planning Enabling Legislation

In the past, federal legislation has provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act of 2000 (DMA 2000) is the latest legislation to improve this planning process and was put into motion on October 20, 2000, when 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. Operating as a non-profit, council of government, Region VI maintains planning staff who has 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.

2 Hazard Mitigation Planning Process

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

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

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

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

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

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

(FEMA 386-1/September 2002)

This is a general outline of the planning process that was used to create the hazard mitigation plans for 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 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 in each jurisdiction with Region 6
    C. Region 6 completes county and community profiles, determine local capabilities, research existing regulations
    D. Hazard mitigation planning kick-off meeting in jurisdictions facilitated by Region 6
    E. Tama County Economic Development assists Region 6 with forming county-wide strategic planning task force

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

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

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

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

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

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

1. Organize Community Resources

A. Meeting with Tama County Emergency Management Coordinator

In February 2009, Region 6 met with the Emergency Management Coordinator (EMC) for Tama County. We discussed the EMC's role in the hazard mitigation process in terms of the information she can provide, involvement in kick-off and planning team meetings, and the main hazards affecting 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.

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

B. Complete community inventory

After meeting with the Tama County EMC, 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. Refer to Appendix B.

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

Through extensive research and local knowledge, Region 6 completed a profile for 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. Also, each jurisdiction's capability to administer and fund mitigation projects, current regulations, and existing mitigation projects are included. Existing regulations in each jurisdiction were used like the city code, zoning ordinance, and Iowa Code.

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

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

- City of Chelsea
- City of Clutier
- City of Dysart
- City of Elberon
- Tama County (Unincorporated)
- City of Lincoln
- City of Montour
- City of Tama
- City of Toledo
- City of Garwin
- City of Gladbrook
- City of Traer
- City of Vining

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

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

E. Form countywide strategic planning task force

Once kick-off meetings were held in jurisdictions, the Tama County Strategic Planning Task Force was formed. This group of people is 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. These particular people were sought out for the Tama County Strategic Planning Task Force with the help of the Tama County Economic Development Commission. Everyone except the Tama County Emergency Management Coordinator participated as a volunteer planner who was not compensated for their time spent on hazard mitigation planning.

The Tama County Strategic Planning Task Force is made up of nearly 40 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

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

A. Tama County Strategic Planning Task Force Meeting #1

All of the Task Force members plus people from the jurisdictions that did not participate 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, this was considered a refusal to participate. To invite the general public, the meeting was also published in local newspapers: The Dysart Reporter, Northern Sun Print, Traer Star Clipper, and the Tama News-Herald/The Toledo Chronicle. For all meeting materials, refer to Appendix D. Other counties were invited to the following meeting so they could provide input on goals, projects, and possible collaborations. The regional presence at this meeting was a staff member of Congressman Leonard Boswell.

On Thursday, December 3, 2009, the first Task Force meeting was held in the City of Toledo (county seat) at the Reinig Center. The meeting doubled as a luncheon so the members of the Task Force could use their lunch break to volunteer their time. The theme of this meeting was "Dine and Diagram," which involved eating, listening, discussing, and participating in diagramming exercises tailored to hazard mitigation planning.

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

Tama County Strategic Planning Task Force Meeting #1: Dine and Diagram

Region 6 providing directions to jurisdiction representatives

Jurisdiction representatives discussing hazards

i. Identify hazards for Tama County

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 2007 Iowa Hazard Mitigation Plan, research, and knowledge of the area.

At the meeting, the Task Force was asked to agree or disagree with the list of hazards that Region 6 assumed would be chosen. The entire list of possible hazards, minus two hazards from the State plan due to an oversight (Table 1.1), was provided so Task Force members could add hazards to the list. Members were also able to eliminate hazards if they could provide sufficient reasoning.

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.

The actual profiles of each possible hazard are based on the format used by Iowa's 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 in the future
- Vulnerability of citizens, visitors, and emergency responders during and after a hazard event
- Maximum geographic extent of the hazard
- 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. Rank hazards

Once the hazards for Tama County were chosen and profiled, they were ranked against each other to determine which hazards can have the greatest impact on the county. The ranking was done according to the method used in the 2007 Iowa Hazard Mitigation Plan. The ranking method involves assigning a rating for historical occurrence, probability, vulnerability, maximum geographic extent, severity of impact, and speed of onset.

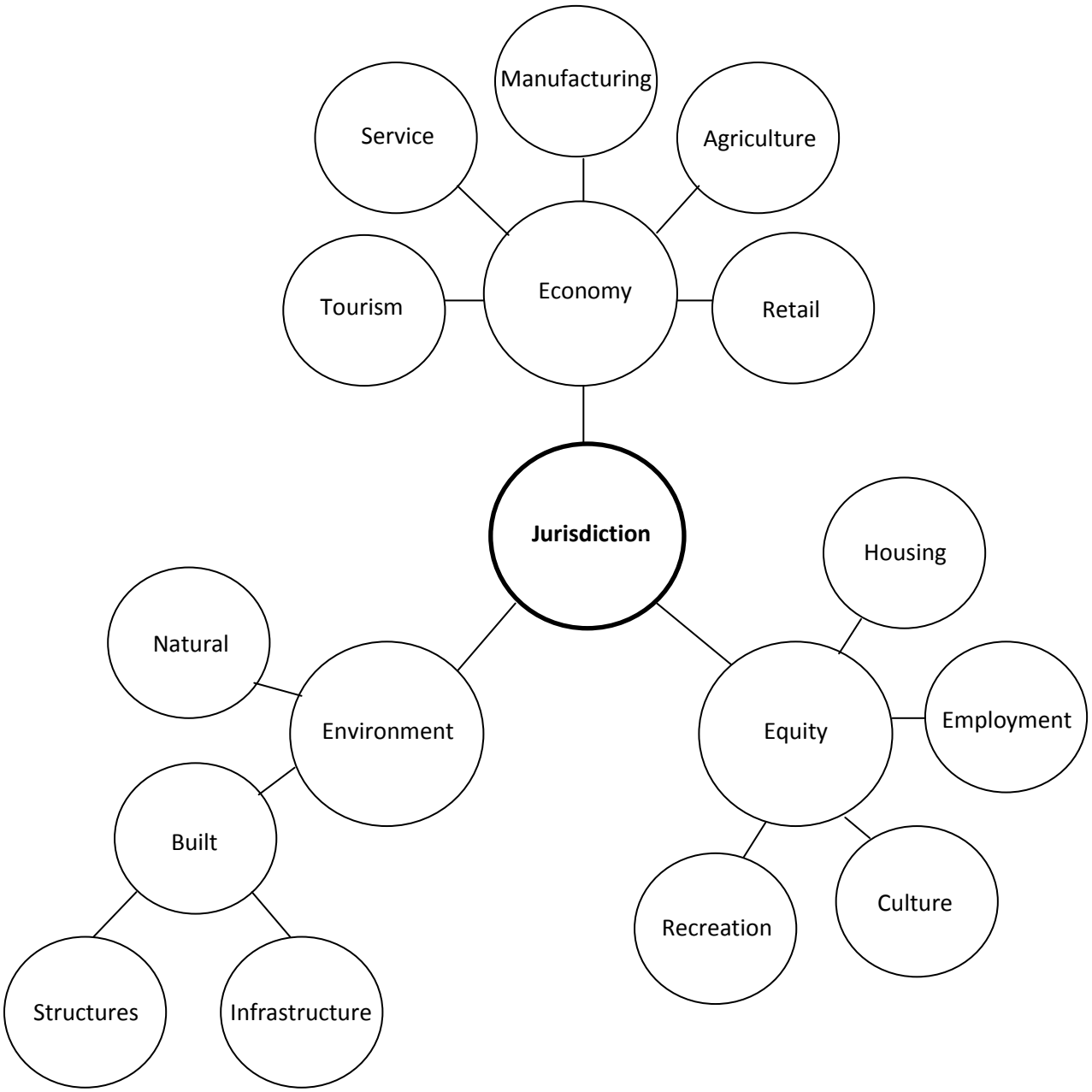
iv. Determine hazard boundaries

Many hazards are countywide 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. Maps were also created to easily identify hazard boundaries.

iv. Inventory community assets through concept mapping

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

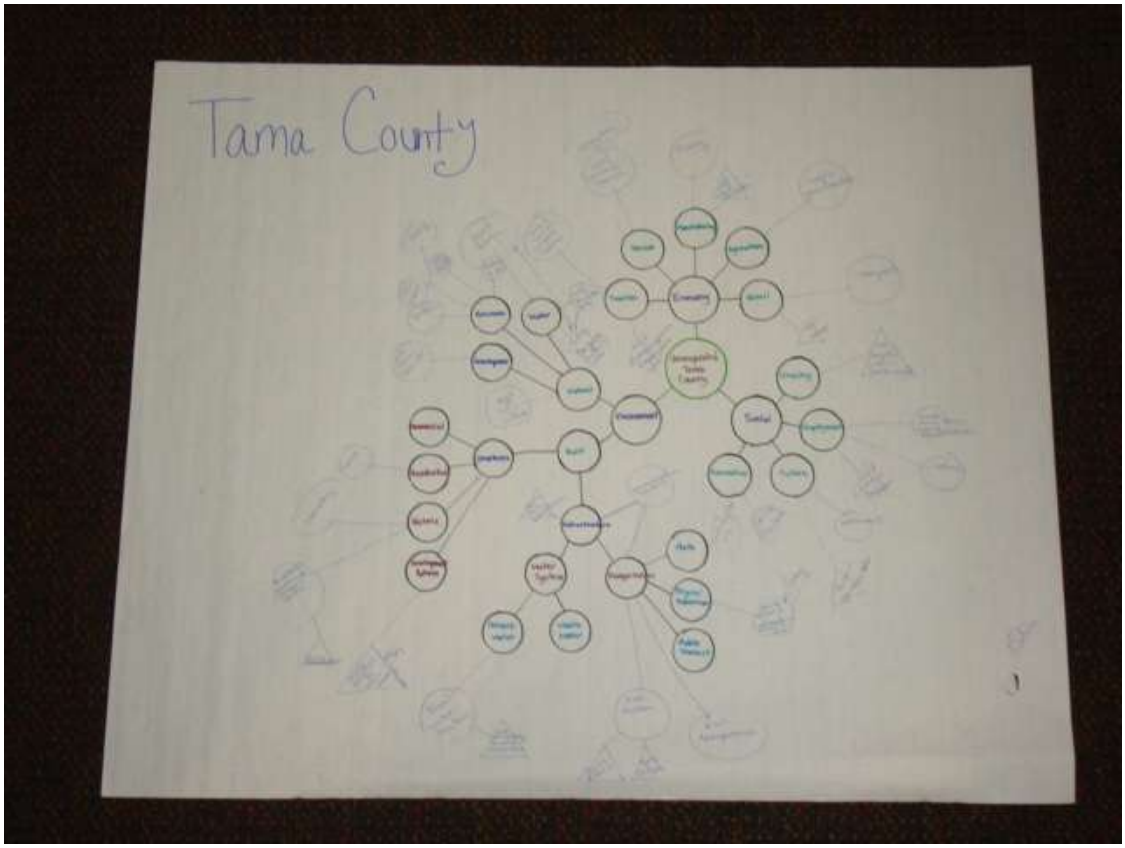
Figure 2.1: Basic Asset Identification Diagram



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

A community asset diagram was completed for each individual jurisdiction and the unincorporated areas of 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 vulnerability section of the risk assessment section of this plan. An example of a completed diagram is below in Figure 2.2.

Figure 2.2: Example Asset Identification Diagram



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. Task Force members were asked to use the results of their asset identification for the next meeting activity involving goal setting and identifying potential mitigation actions.

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

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

B. Tama County Strategic Planning Task Force Meeting #2

A second countywide meeting was held at the Reinig/Toledo Civic Center on February 4, 2010 from noon to 1:30 PM. This meeting was also held at lunchtime so Task Force members could volunteer their lunch time in order to contribute to the hazard mitigation planning process.

All of the Task Force members plus others were invited to attend the first countywide hazard meeting by either mail or email depending on the contact information that was available. To invite the general public, the meeting was also published in local newspapers: The Dysart Reporter, Northern Sun Print, Traer Star Clipper, and the Tama News-Herald/The Toledo Chronicle. 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 F for all meeting related materials.

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

Tama County Planning Strategic Planning Task Force Meeting #2

Tama County representatives identifying critical facilities

Region 6 assisting the representatives for the City of Vining

Attendance at this meeting was not as expected so an additional meeting was needed to ensure that all Tama County jurisdictions and participating school districts could be included in the plan. All jurisdictions and participating school districts were represented except Gladbrook, Montour, Tama, Gladbrook-Reinbeck Community School District, and North Tama Community School District.

Tama County Strategic Planning Task Force Make-up Work Session

Jurisdiction representatives choosing hazard mitigation actions

Identifying critical facilities

i. Identify critical facilities and vulnerable populations

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

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

It should be noted that communities were allowed to list structures not located in their own community as a critical facility. 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.

ii. Vulnerability assessment

The vulnerability assessment involves the identification of assets, critical facilities, and vulnerable populations, which was completed in the previous step. It also includes determining how vulnerable or open to damage jurisdictions are to each hazard. To make this determination, the Task Force helped identify what hazards affect the entire county and what hazards affect only certain jurisdictions. This was used along with certain scores given to hazards during the ranking process.

The scores within the ranking process that were used include: the percentage of people that would be adversely affected by a hazard, the potential spatial extent of the area impacted by a hazard, and the assessment of severity in terms of injuries, fatalities, and damage to property and infrastructure. The sum of these scores is the score for vulnerability to determine whether a jurisdiction is at a high, medium, or low-risk for that particular hazard. The scores were distributed among the three categories to articulate the magnitude of a jurisdiction's risk. Refer to the vulnerability section of this plan for a range and explanation of scores.

iii. Determine goals

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

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

1. Minimize losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority structures.
2. Protect the health and safety of 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.

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

iv. Determine potential mitigation actions

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

To choose potential mitigation actions, Task Force members were asked to narrow down their large list of mitigation ideas according to the hazard mitigation goals for their jurisdiction. 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.

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

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

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

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

v. Evaluate mitigation actions

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

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

Most Task Force members did not have sufficient time to complete all of the evaluations for their jurisdiction's mitigation actions so many finished outside of the meeting and mailed their paperwork back to Region 6. All related materials for this activity can be found in Appendix G.

C. Follow-up with the county and each jurisdiction

i. Finish determining goals, mitigation actions, and evaluations

Since 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 Region 6 so they could be incorporated into the plan.

ii. Create work plans

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

iii. Prioritize mitigation actions based on evaluations and work plans

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

iv. Create implementation plan

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

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

Above all, the public and 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 September 3, 2010 and ended October 3, 2010. 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 J once the affidavit of publications is received from each newspaper.

5. Submit Plan

The plan was submitted by email to the state plan review staff and the State Hazard Mitigation Officer on September 3, 2010. The plan must receive approval by October 18, 2010 due to an exception granted to the City of Chelsea. The exception allows the City to use Hazard Mitigation Grant Program funds for an acquisition and demolition project. The City's project received approval on October 19, 2009 so this plan must be approved and adopted within one year of that date. Refer to the letter in Appendix H explaining the plan approval deadline.

6. Plan Approval and Adoption

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

7. Plan Implementation by Jurisdictions and County

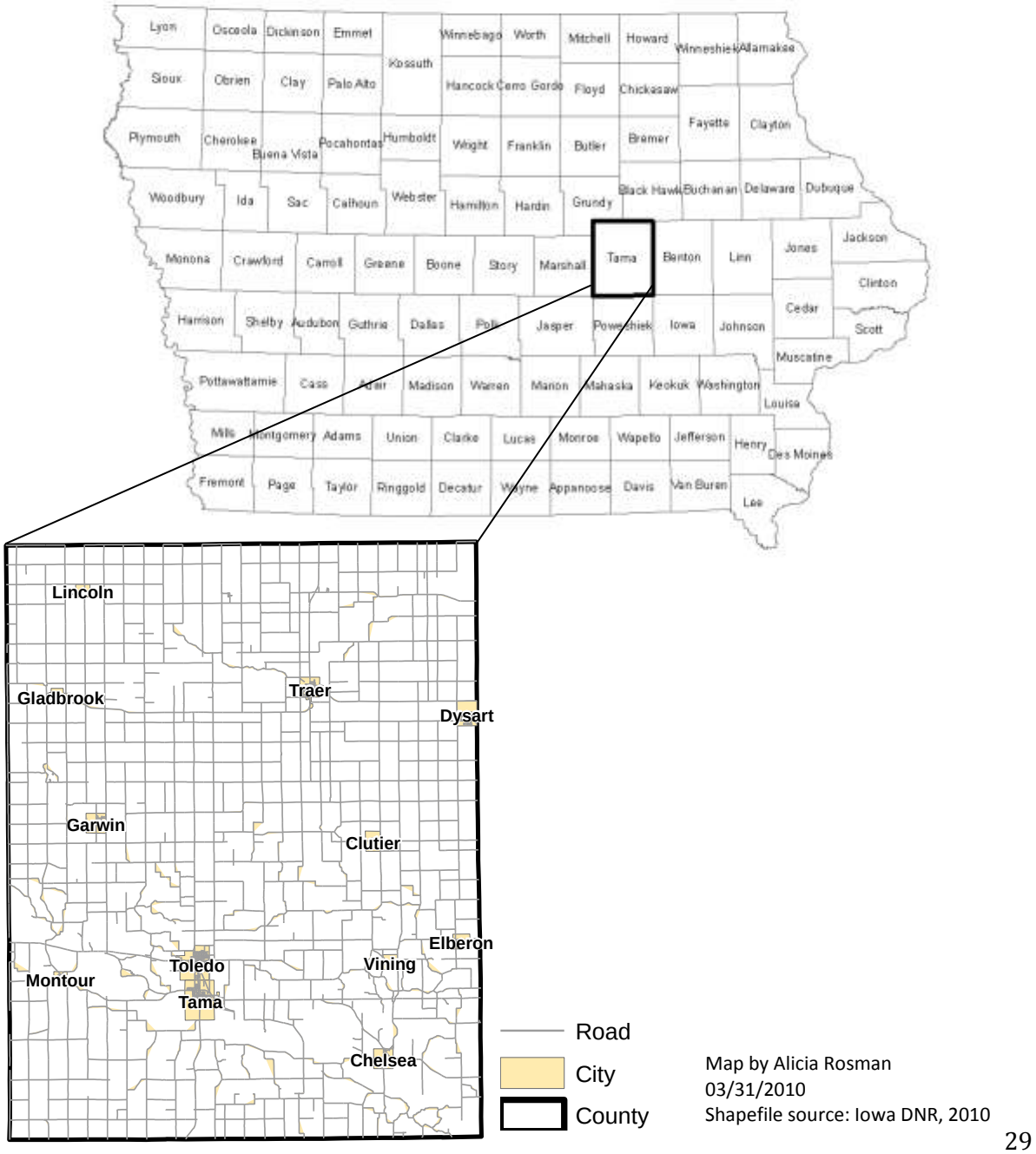
This part of the planning process is yet to be seen. In the next five years, the jurisdictions included in this plan will be expected to fulfill their goals and implement the projects they have identified to mitigate their hazards.

3.1 Planning Area Profile

Location

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



Map by Alicia Rosman
03/31/2010
Shapefile source: Iowa DNR, 2010

Geography, Topography, and Hydrology

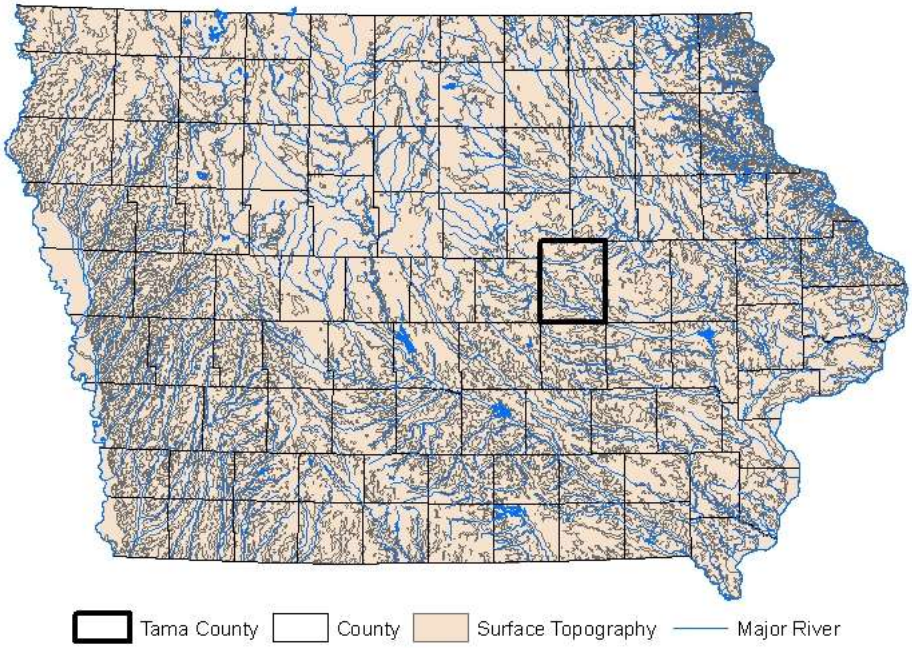
Tama County has an area of 462,300 acres, or about 720 square miles. The Iowa River, one of the main rivers in the state, crosses the southern part of the county and runs in a southeasterly direction to its southeast corner. It is of medium gradient and is subject to flooding of low velocity and short 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



Map by Alicia Rosman, 04/02/2010, Shapefile Source: Iowa DNR

All of Iowa is shown in the map in Figure 3.2 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 (13,102 people) of its population living in rural areas. Of these rural residents, just over 16% live on farms so a majority of rural residents do not farm. According to a previous Tama County hazard mitigation plan, in 1990, less people (6,825) lived in Tama County's rural areas but more (3,392) lived on farms. So there is a population shift toward rural living without farming. Today, the urban population, which is about 25% (5,001 people) of the county's total population, lives in the county area characterized as an urban cluster. Refer to Table 3.1.1.

Table 3.1.1: Urban Vs. Rural Population in 2000

		Urban			Rural		
Area	Total Population	Total	Inside Urbanized Areas	Inside Urban Clusters	Total	Farm	Nonfarm
State of Iowa	2,926,324	1,786,683	1,114,949	671,734	1,139,641	171,374	968,267
Tama County	18,103	5,001	0	5,001	13,102	2,107	10,995
Chelsea	292	0	0	0	292	0	292
Clutier	239	0	0	0	239	0	239
Dysart	1,296	0	0	0	1,296	8	1,288
Elberon	213	0	0	0	213	0	213
Garwin	594	0	0	0	594	7	587
Gladbrook	1,003	0	0	0	1,003	13	990
Lincoln	196	0	0	0	196	0	196
Montour	235	0	0	0	235	0	235
Tama	2,723	2,574	0	2,574	149	8	141
Toledo	2,548	2,356	0	2,356	192	0	192
Traer	1,593	0	0	0	1,593	0	1,593
Vining	80	0	0	0	80	8	72

Data Source: State Data Center of Iowa, 2009

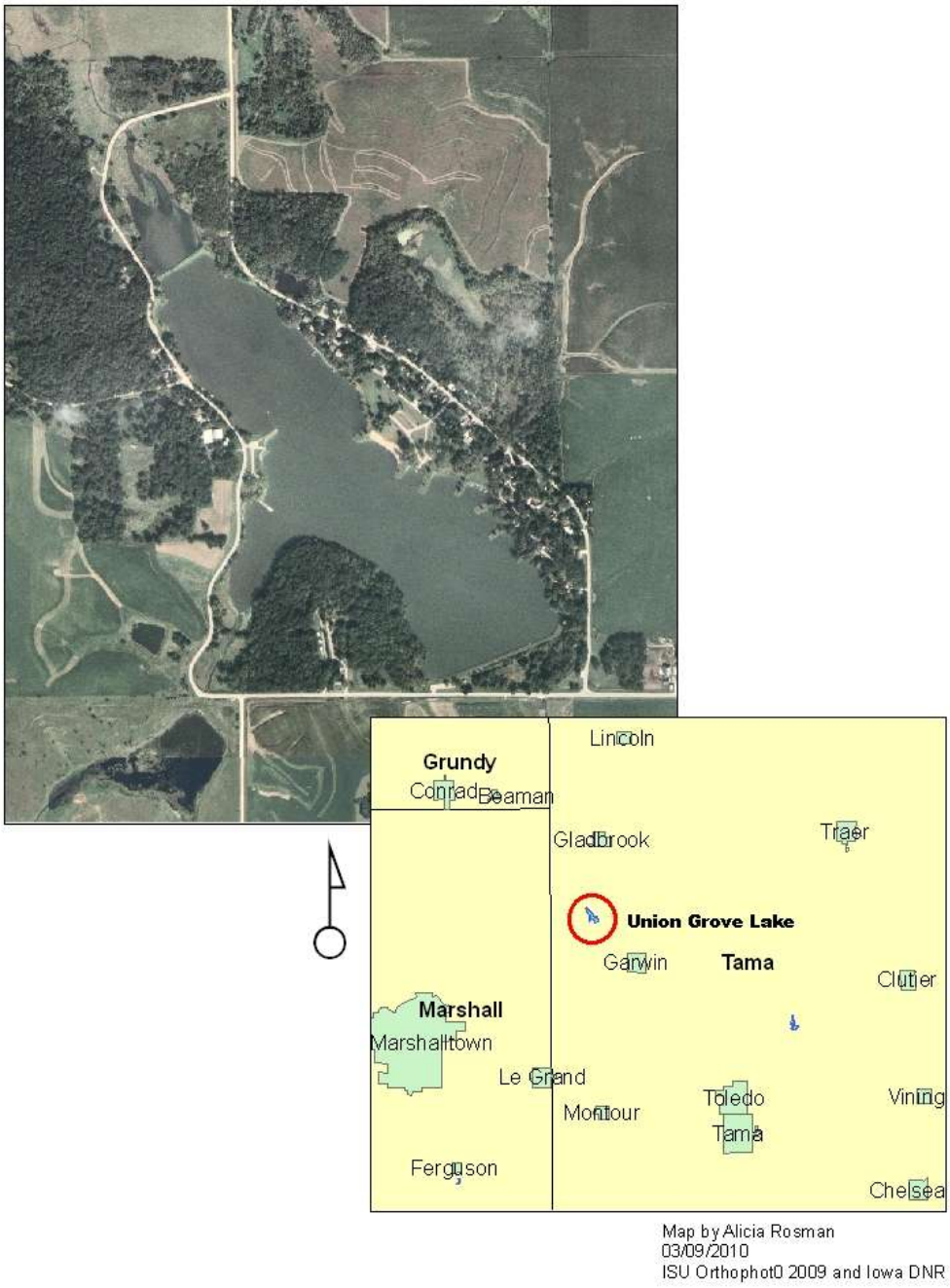
The most urban cities in Tama County are considered Tama (2,574 people) and Toledo (2,356 people). These two cities, which are located in the south central part of the county, share a boundary making one contiguous urban area or cluster. These cities may have a larger urban population due to their location 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.

Keep in mind that this data is from 2000, and more accurate data can be provided once the 2010 Census is completed. Based on Tama County's history, though, the county will 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.

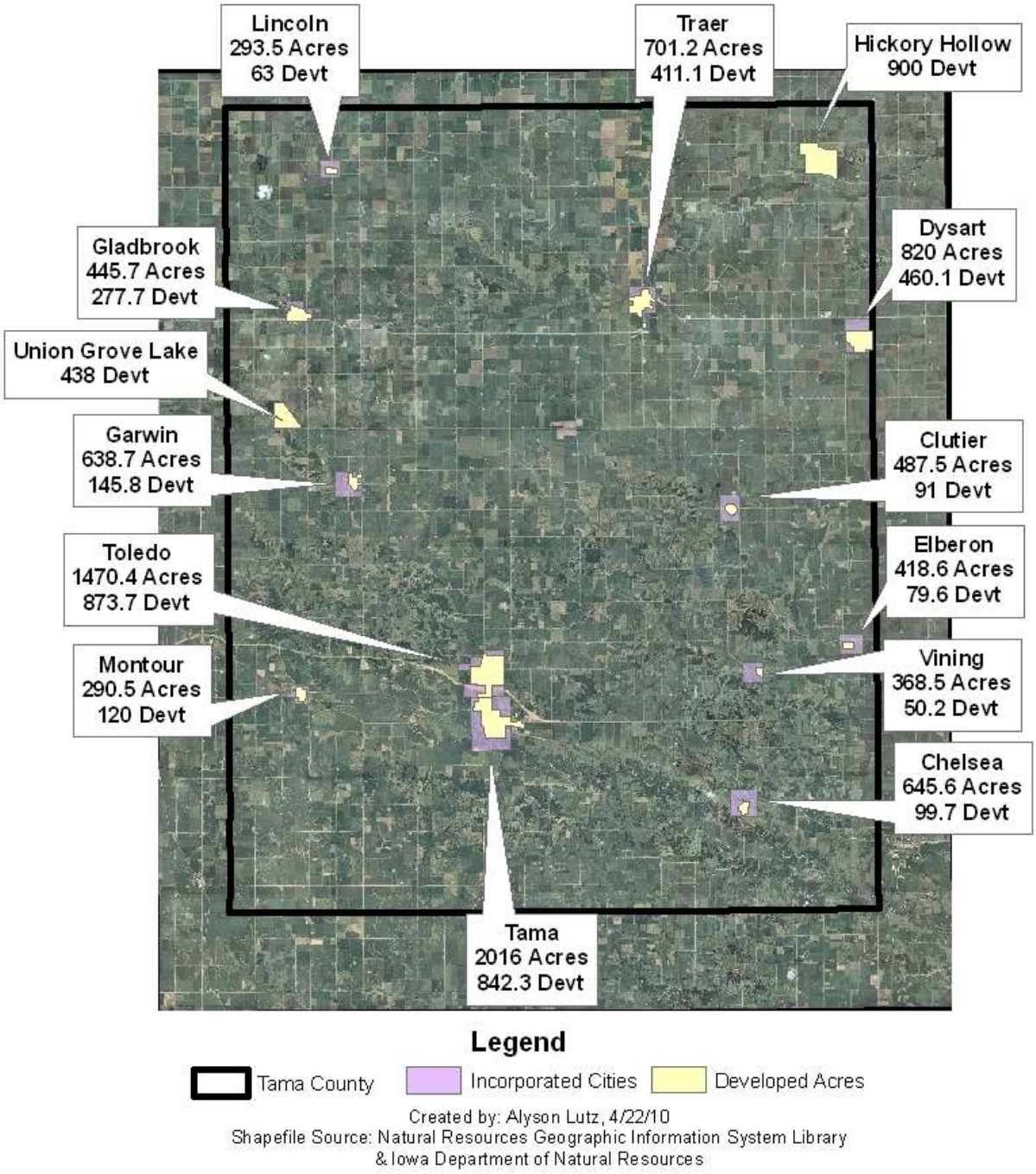
The area around Union Grove Lake is where the majority of new residential development is occurring in Tama County. The development ranges from traditional homes to cabins to manufactured units. This development has approximately 200 homes.

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 3.1.4, 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



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 State Data Center of Iowa, the population of Tama County in 2007 was estimated at 17,767. Of this total, 10,915 people live in the incorporated cities of the County leaving the remaining 6,852 people in the unincorporated areas of Tama County. Refer to Table 3.1.2. This means 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 2000 to 2007

				2000 to 2007	
Area	2007 Estimate	2005 Estimate	2000 Estimate	Numeric change	Percent change
State of Iowa	2,983,360	2,951,775	2,926,381	56,979	1.9%
Tama County	17,767	17,910	18,103	-336	-1.9%
Chelsea	275	277	287	-12	-4.2%
Clutier	225	228	229	-4	-1.7%
Dysart	1,285	1,292	1,303	-18	-1.4%
Elberon	234	238	245	-11	-4.5%
Garwin	542	550	565	-23	-4.1%
Gladbrook	1,012	1,023	1,015	-3	-0.3%
Lincoln	156	158	182	-26	-14.3%
Montour	280	285	285	-5	-1.8%
Tama	2,587	2,616	2,731	-144	-5.3%
Toledo	2,685	2,686	2,539	146	5.8%
Traer	1,584	1,577	1,594	-10	-0.6%
Vining	50	54	70	-20	-28.6%

Data Source: State Data Center of Iowa, 2009

Out of all Tama County jurisdictions, Toledo and Tama 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 decade, Tama County and all of its jurisdictions have experienced a population decrease with the exception of Toledo (+5.8%). This population change does not coincide with Iowa, which experienced a small, 1.9% population increase since 2000. The cities with the largest population loss in terms of percentage are Vining (-28.6%) and Lincoln (-14.3%). The largest loss in number of people occurred in Tama with a loss of 146 people between 2000 and 2007. These 146 people resulted in a 5.3% population decrease. Refer to Figure 3.1.2 for the population changes in each jurisdiction. It should be noted that more accurate information will be available after the completion of the 2010 U.S. Census.

Age

As a whole, Tama County is aging. Comparing the county's change in population composition from 2000 to 2008, the amount of people aged 65 and above is nearly the same, but the population between 45 and 65 and 85+ groups has noticeably increased. Refer to Figures 3.1.5-6.

Figure 3.1.5: Tama County Population Pyramid 2000

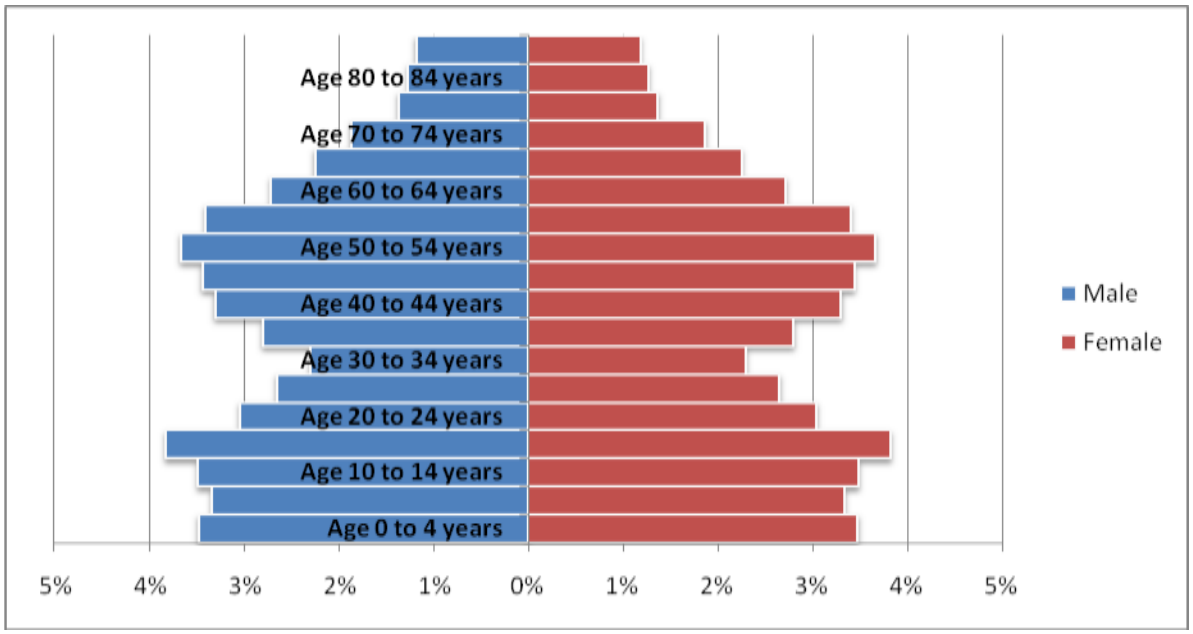
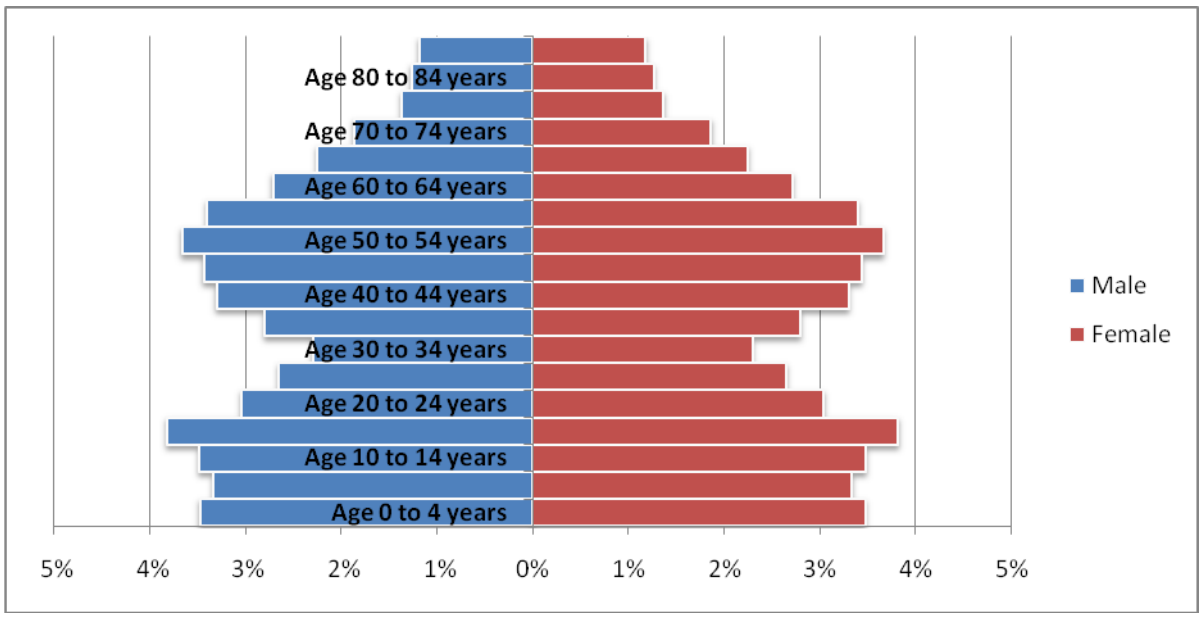


Figure 3.1.6: Tama County Population Pyramid 2008



Data Source: State Data Center of Iowa, 2009

Like most counties in Iowa that are primarily rural, Tama County's population distribution does not resemble the ideal pyramid shape. The main issue is retaining the young adult population. The population between the ages of 20 and 34 is small compared to the rest of the population. After graduating from high school, young adults often move away to attend college or find work elsewhere. Providing the lifestyle demanded by this segment of the population is often difficult and may need to be addressed in order to retain and attract the young adult population in Tama County.

In 2000, Tama County had a median age of 39.1 while the State of Iowa had a median age of 36.6. 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 2000

City	Median Age
Chelsea	33.1
Clutier	44.3
Dysart	41.6
Elberon	29.7
Garwin	36
Gladbrook	41.7
Lincoln	40.3
Montour	38.8
Tama	37.3
Toledo	37.5
Traer	45
Vining	45.7

Data Source: State Data Center of Iowa, 2010

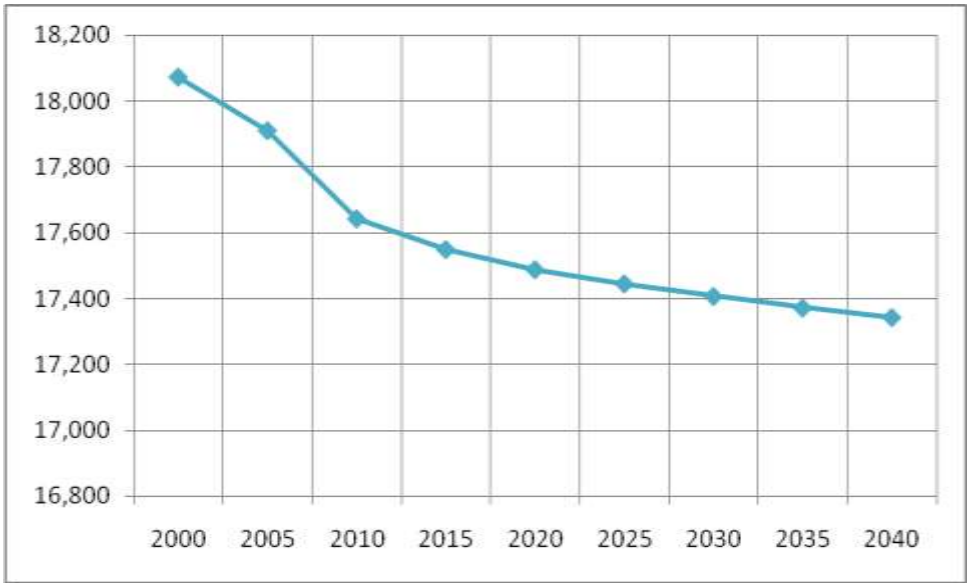
There is a range of 16 years in the median age in cities across Tama County. Of all Tama County cities, Vining has the highest median age of almost 46. Traer, though, is very close with 45 as the median age of residents. The City of Elberon is the youngest with a median age that is just under 30 years of age. Chelsea is the next youngest city in Tama County with a median age just over 33.

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 17,536, which is a decrease of 539 people or nearly 3%. Currently, this projection seems to be accurate, because Tama County's 2007 population estimate is 17,767 people, and this coincides with the 40-year projection's population for 2007. Refer to Figure 3.1.7.

Figure 3.1.7: Tama County Population Projection 2000-2040



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

Although a 3% population decrease is not an alarming population loss, there may be a lasting effect 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.

Looking at the population pyramids, there is a noticeable decrease of individuals aged 20 to 29 years old between 2000 and 2008, which has other implications besides direct population loss. Refer to Figures 3.1.5-6. A small or decreasing population aged 20 to 34 means that less population growth through birth will occur in Tama County so the young age cohorts may also decrease, which affects school funding and the amount and quality of youth-oriented services and activities. Like mentioned earlier, retaining the young adult population in Tama County will be a challenge that must be addressed in order to maintain or increase the county's population.

Housing Characteristics and Market

Amount and Occupancy

According to the State Data Center of Iowa, Tama County had 4,022 owner-occupied housing units and approximately 3,500 rental housing units in 2000. Just over 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 3.1.7 below for the total number of housing units in each jurisdiction.

Table 3.1.7: Number of Housing Units in Tama County in 2000

Jurisdiction	Number of Housing Units
Tama County	7,583
Chelsea	113
Clutier	124
Dysart	571
Elberon	94
Garwin	248
Gladbrook	437
Lincoln	90
Montour	124
Tama	1,173
Toledo	1,050
Traer	728
Vining	36

Data Source: State Data Center of Iowa, 2010

Logically, the ranking for the highest to lowest number of housing units coincides with the population ranking for the cities. Toledo 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, only 7% were vacant in 2000. This is consistent with the state, which also had 93% of its housing occupied. The homeowner vacancy rate, though, is higher in Tama County than the entire State of Iowa so a higher share of Tama County's housing units is vacant or for sale.

Table 3.1.8: Housing Occupancy in 2000

	Tama County	State of Iowa
Percent Occupied Housing	93%	93%
Homeowner Vacancy Rate	2.2	1.7
Rental Housing Vacancy Rate	8.8	6.8

Data Source: State Data Center of Iowa, 2009

Please note that this data may not be telling of the current housing situation. The age of the data, increase in home foreclosures, and economic uncertainty makes accurate and representative data difficult to obtain. This data is only a historic view of Tama County's housing.

Type of Housing Available

As shown in Figure 3.1.8, the type of housing in Tama County is dominantly 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 3.1.8: Tama County Housing by Type in 2000

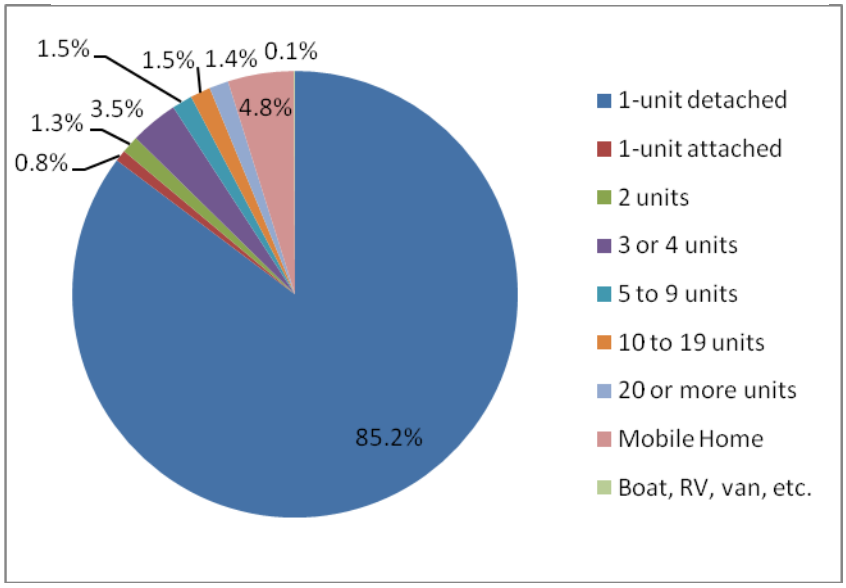
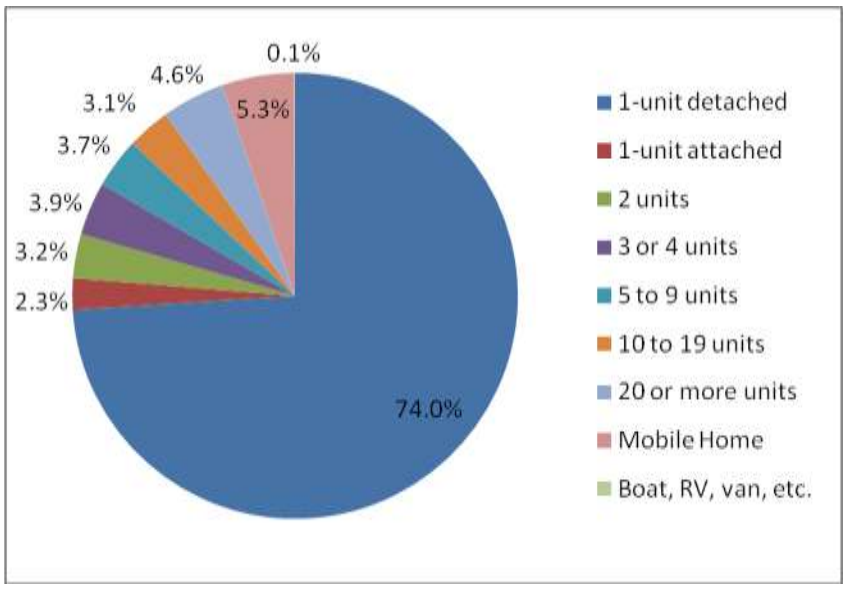


Figure 3.1.9: Iowa Housing by Type in 2000



Data Source: State Data Center of Iowa, 2009

Compared to the state, Tama County has a larger share of 1-unit detached housing units than the State of Iowa. 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 State Data Center of Iowa, in 2000, the median built year for Iowa's housing stock was 1959 while Tama County had a 1943 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 80% of the homes in Vining and 70% of homes in Chelsea were built before 1940. Clutier and Elberon also have high percentages that account for almost two-thirds of the city's housing stock. Dysart has the smallest percentage (43.1%) of older homes. Refer to Table 3.1.9.

Table 3.1.9: Tama County Housing Units Built in 1939 as of 2000

Jurisdiction	Percentage
Tama County	47.4
Chelsea	73
Clutier	64.5
Dysart	43.1
Elberon	64.9
Garwin	45.5
Gladbrook	47.8
Lincoln	46.2
Montour	44.8
Tama	49.2
Toledo	45.8
Traer	45.7
Vining	81.4

Data Source: State Data Center of Iowa, 2010

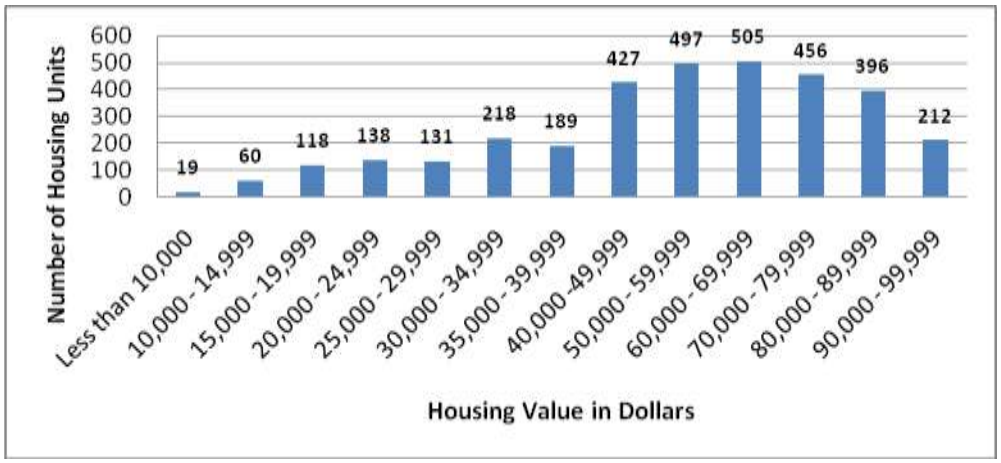
Since nearly half of all housing units in Tama County have been built in 1939 or earlier, there may be common issues associated with an older housing stock. Anything from electrical to structural issues could be a problem in homes across the county. In terms of hazard mitigation, some older housing may 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 is 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 4,022 owner occupied housing units, 62% have a housing value over $40,000 where there is a noticeable leap from the $35,000 - $39,999 category. This is illustrated in Figure 3.1.10. The range with the highest percent of housing units is $60,000 - $69,999 with almost 13% of the county's units.

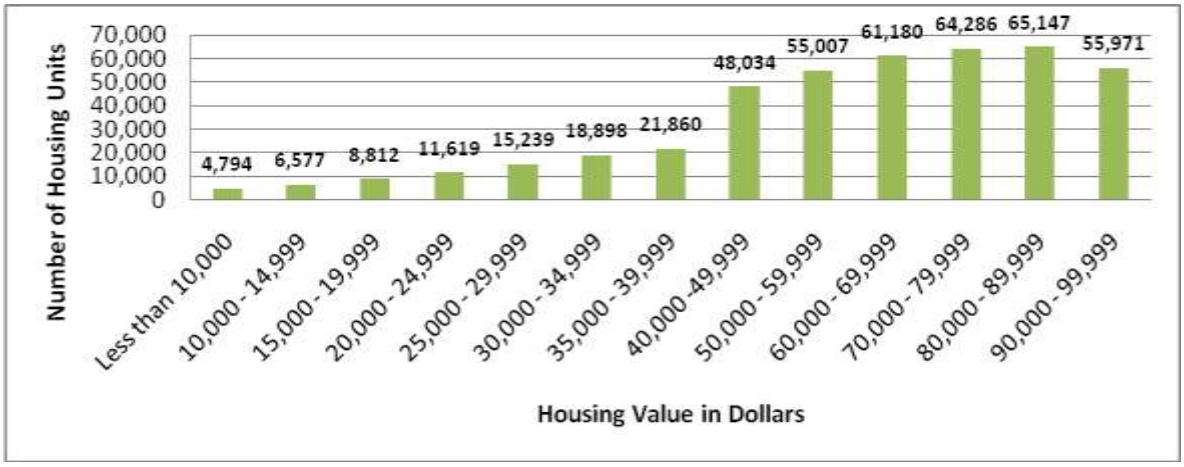
Figure 3.1.10: Tama County Owner-occupied Housing Values in 2000



Data Source: State Data Center of Iowa, 2009

Compared to the State of Iowa (Figure 3.1.11), Tama County has a rather low housing value range ($60,000 - $69,999) comprising their biggest percent of owner occupied units. The highest percent (10%) of the state's housing values lie in the $80,000 - $89,999 range.

Figure 3.1.11: Iowa Owner-occupied Housing Values in 2000



Data Source: State Data Center of Iowa, 2009

Comparing Tama County to Iowa, the state shows a progressive upward trend from the Less than $10,000 range to its peak at $80,000 - $89,999. Tama County, on the other hand, varies and has a concentration of housing in the $30,000 - $34,999 range and peaks much earlier in the $60,000 - $69,999 range before decreasing in number of units as the value increases to $99,999.

When looking at the median value of owner-occupied housing in Tama County, the value is quite low compared to Iowa, which had a median value at $82,500, according to the State Data Center of Iowa. Comparing specific jurisdictions, Chelsea, Vining, and Lincoln, Iowa's median housing value is over $50,000 higher than the housing in these jurisdictions. Refer to Table 3.1.10.

Table 3.1.10: Median Owner-occupied Housing Values and Gross Rent for Renter-occupied Housing in 2000

Jurisdiction	Median Housing Value	Median Gross Rent
Tama County	$64,200	$418
Chelsea	$30,700	$425
Clutier	$39,600	$350
Dysart	$75,000	$435
Elberon	$48,800	$481
Garwin	$51,100	$368
Gladbrook	$57,400	$366
Lincoln	$35,900	$381
Montour	$41,700	$438
Tama	$58,400	$436
Toledo	$61,900	$398
Traer	$68,400	$433
Vining	$31,900	$363

Data Source: State Data Center of Iowa, 2010

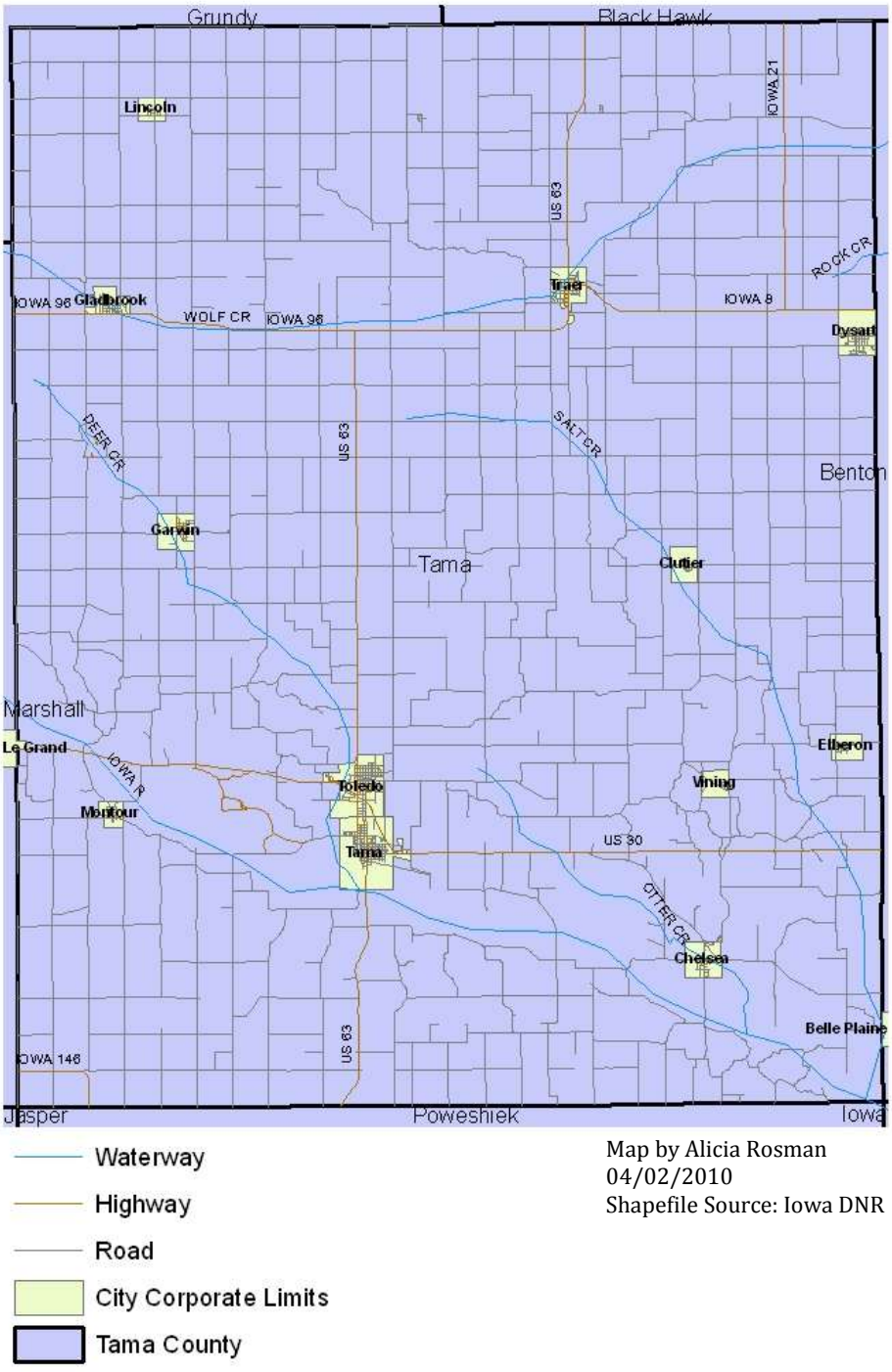
Dysart, Traer, Toledo, and Tama (in this order) by far have the largest median housing values in Tama County. The cities with the lowest housing values in Tama County have less than 50% of the values found in Dysart, Traer, Toledo, and Tama. This is a huge range of values across the county.

Looking at the median gross rent for tenants of rental properties in Tama County, the lowest median rent can be found in Clutier ($350) while the highest rents can be found in Dysart ($435) and Traer ($433). Compared to the state, Tama County's rental market is less expensive. Iowa's median gross rent in 2000 was $470 according to the State Data Center of Iowa. Across Tama County, there is less than a $100 range in the median gross rent paid by tenants so there is not a substantial variation in rental costs across the county.

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 3.1.12: Tama County Highways and Roads



Map by Alicia Rosman
04/02/2010
Shapefile Source: Iowa DNR

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. 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 fifteen trucking companies that operate in Tama County. (Soil Survey of Tama County, Iowa, 1989)

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. This trail extension is planned for after the year 2012.

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

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

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

Economic Conditions

Individual Economic Indicators

Some evidence of Tama County's economic stability can be seen in its income, poverty status, crime rates and education. The per capita income for Tama County in 2007 was $29,039. This is only $5,877 lower than the State's $34,916. The Tama County median income is closer in range to the state's median family income with $47,298 versus $49,007, only a $1,709 difference. (State Data Center of Iowa, 2010)

Poverty is an economic factor that has the potential to have a negative effect on people's perception of an area. According to the US Census Bureau, in 2008 39.8 million people lived in poverty in the United States. This is a rate of 13.2%. The State Data Center of Iowa contributes that at the state level, Iowa has 331,057 people living in poverty out of its 3,002,555 residents. This is a rate of 11%. Tama County makes up only 0.5% of the state's population in poverty with 1,840 people. Tama County has a population of 18,103. With 1,840 people living in poverty, this means that 10% of the county is in poverty.

Crime rates have an effect on an area's economic value because people want to live and work in a place they feel will be safe for themselves and their loved ones. Tama County has relatively low violent crime with two forcible rapes and 26 aggravated assaults in 2008. (Federal Bureau of Investigation, 2008) Property crimes including burglary, larceny theft, motor vehicle theft, and arson totaled 135 in 2008. Compared to the state of Iowa as a whole, Tama accounts for 2.74% of violent crimes and 1.64% of property crimes. If each of Iowa's 99 counties had an equal share of crime, their percentage would each be 1.01%.

Educational attainment for Tama County starts with six community school districts, the Meskwaki Settlement School, and several community colleges located in and near Tama County. Also, Iowa's three major universities are all located 30 minutes to an hour from the county seat of Toledo. As for school enrollment, a total of 3,557 children were enrolled in the six Tama County Community School Districts in the 2009-2010 school year. (Iowa Department of Education, 2009) Of the Tama County population that is 25 years or older, 40.8% have a high school degree or its equivalent. From this group, 24.2% attended college and 12.9% received a bachelor's degree or higher education. (ISU RECAP, 2009)

Economy

Looking at capital investments in Tama County, the Meskwaki enterprise is believed to have the largest capital investment in Tama County. The exact investment is not known because the bingo, casino, and hotel are located on the Meskwaki Settlement, which means that the business is not regulated for taxing purposes. Other establishments with a large capital investment in the county include DuPont, Cosmo International, Iowa Cattlemen, and Mid America Co-Op. Refer to Table 3.1.11 for the county's largest establishments and their capital investment.

Table 3.1.11: Tama County Establishment Activity in 2006

Establishment	Capital Investment	Establishment Type
Meskwaki Bingo, Casino, Hotel	Unknown	Tourism
DuPont (Pioneer Hi-Bred)	$3,775,820	Manufacturing
Cosmo International (Traer Manufacturing)	$2,775,820	Manufacturing
Iowa Cattlemen (Iowa Quality Beef)	$1,358,420	Manufacturing
Mid America Co-Op	$1,057,970	Manufacturing
Linco Seeds	$456,230	Agriculture
Caraustar (Tama Paper Board)	$407,240	Manufacturing
Restonic	$234,890	Manufacturing
USS Polaris	$186,130	Retail
Rube's Steakhouse	$109,090	Food
Z Line	$153,680	Repair

Data Source: Tama County Economic Development, 2009

The establishments with the largest investment besides the Meskwaki establishments are mainly manufacturing companies. Two of the four major employers listed in 3.1.11 are manufacturing companies and are listed as establishments with large capital investments. Traer Manufacturing has a $2.75 million capital investment and Tama Paper Board has nearly a half million dollar capital investment. The only non-manufacturing establishments with a large investment besides the Meskwaki Casino are Linco Seeds, Rube's Steakhouse, which processes and distributes meat products along with operating a restaurant, and Z Line, which is a repair company. Both of these establishments have an investment over one million dollars.

As for revenue in Tama County, retail trade yields the largest source of revenue. According to Tama County Economic Development, in 2006, Tama County had a reported $101.1 million dollars in retail sales. On average, the retail sales per business were just over $200,000. Compared to 2005, retail trade has significantly improved in Tama County with a 32.8% increase in sales between 2005 and 2006.

The City of Tama is a very unique case in terms of retail trade in Tama County. According to a 2008 study by Iowa State University's Retail Trade Analysis Program, in 2007, the City of Tama's retail sales totaled $43.2 million, which is over a 200 percent increase from sales in 2002. A decline did occur in 2008 so total retail sales fell 20.1 percent to $34.5 million. This resulted in a loss of $8.7 million in Tama's retail trade. The dramatic difference in industry revenues between 2002 and

2008 may have to do, not only with an increase in trade, but also the use of a different system to report revenue.

When considering all of this economic information, remember that the information is dated. The recent economic downturn may have significantly changed the economic climate in Tama County. With more recent data and predicted economic improvements, a better assessment can be prepared.

According to the Tama County Economic Development Organization, the major government employer in Tama County is the South Tama County Community School District with 271 employees, and the largest non-government employer in the county is the Meskwaki Bingo, Casino, and Hotel with 1,100 employees. Refer to Table 3.1.12 for all major employers in the county.

Table 3.1.12: Major Employers in Tama County

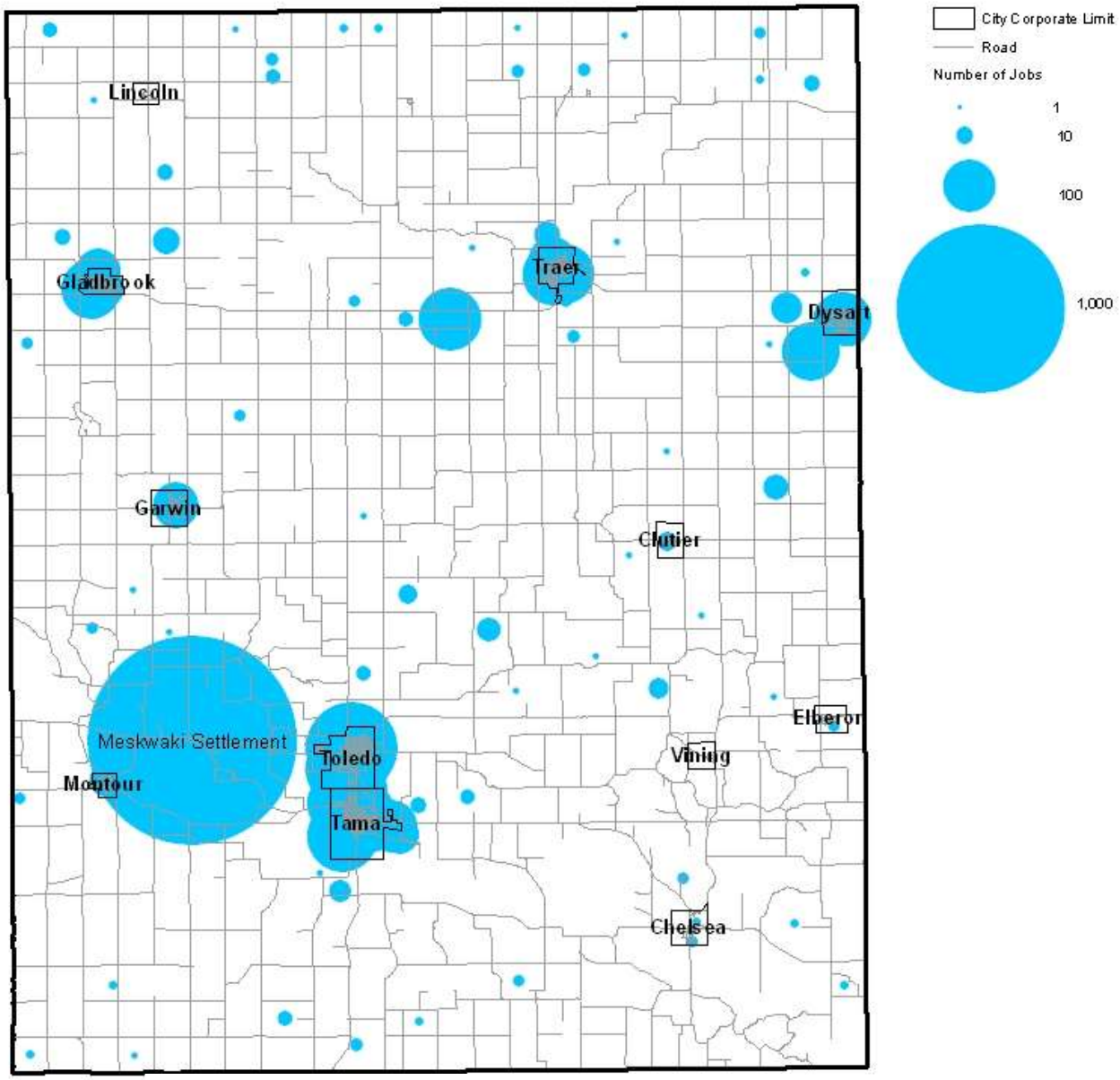
Major Government Employers	Employees
South Tama County Community School District	271
State of Iowa Juvenile Home	114
Tama County	150
Major Employers	**Employees**
Meskwaki Bingo, Casino, and Hotel	1,100
Sac and Fox Tribe	220
Caraustar (Tama Paperboard)	103
Cosmo International (Traer Manufacturing)	186

Data Source: Tama County Economic Development, 2009

Clearly, 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 the Sac and Fox Tribe employ 220 people to maintain the settlement whether they deal with road maintenance, public health, or natural resources. Refer to Figure 3.1.13 on the next page for a visual distribution of jobs in Tama County.

It should be mentioned that employment in Tama County is not limited to just county residents. A recent labor shed study (2009) by Tama County Economic Development, 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 28 miles one way for employment. So the number of employees for the county's major employers may not include just Tama County residents but also people from the neighboring counties.

Figure 3.1.13: Job Distribution in Tama County in 2008



Data Source: U.S. Census Bureau, On the Map tool, 2010

The job distribution map confirms that the larger cities in Tama County are also the major employment centers of the county. Tama, Toledo, Dysart, Traer, and Gladbrook are the cities with the highest concentrations of employment. Despite the job concentrations in Tama County's largest cities, the Meskwaki Settlement is by far the largest employment center even though it does not have a large population. The enormity of the casino and hotel's operation requires a large workforce.

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. As for the economic development strategy for the county, ten major economic goals are identified. These goals include:

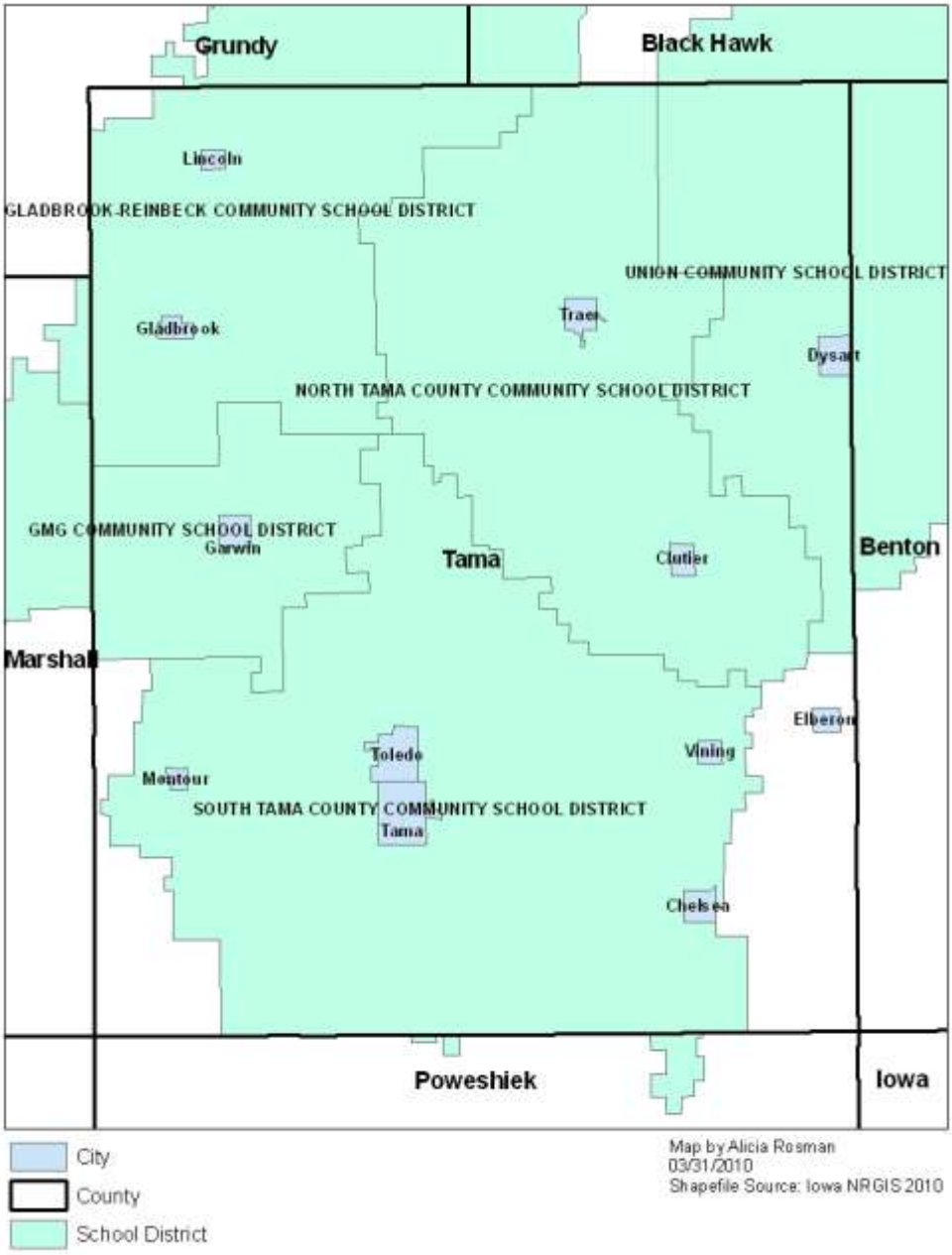
1. Preservation and restoration of natural environment
2. Create healthy, active lifestyles supported by "walkable" communities
3. Develop attractive, safe, and efficient "world class" multi-modal regional transportation system (i.e. highway, rail, pedestrian, and recreation)
4. Reduce blight and improve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

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

Educational Opportunities

There are five public school districts in Tama County: Gladbrook-Reinbeck, Green Mountain-Garwin, North Tama, South Tama, and the Union. Refer to Figure 3.1.14.

Figure 3.1.14: Tama County School Districts



Along with general education, college level and continuing education courses can be taken through Iowa Valley Community College. 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, though, 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 3.1.13.

Table 3.1.13: 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			
Union Grove Lake State Park	x	x		x	L	x		
Union Grove Wildlife Area							x	

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

Data Source: Tama County Conservation, 2009

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. This trail extension is planned for after the year 2012. 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 and work is underway to extend the trail north under U.S. Highway 30 toward Toledo's city park and baseball/soccer/disc golf facilities in 2009.

The trail is being developed and constructed by the nonprofit South Tama Recreation Trail Project, a small group of local volunteers with support from the cities of Tama and Toledo. The Board of Directors for the South Tama Recreation Trail Project is working on plans to extend the initial trail segment to connect the business districts of Tama and Toledo as well as the Meskwaki Settlement.

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 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

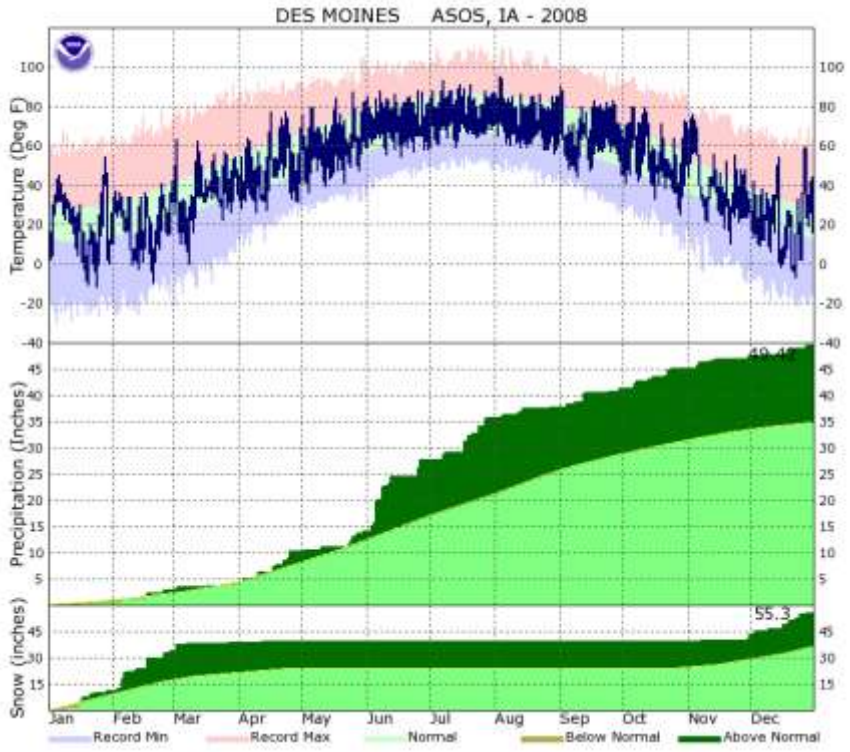
Climate

Tama County is cold in winter and quite hot with occasional cool spells in the summer season. Precipitation in the winter frequently occurs during snowstorms. Throughout the warm months, it is chiefly showers, which are often heavy and occur when warm, moist air moves in from the south, that produce precipitation. The total annual rainfall is normally adequate for corn, soybeans, and small grain.

Figure 3.1.15 graphically depicts monthly and yearly observed maximum, minimum, and precipitation recorded by the automated surface observing station (ASOS) located at the Des Moines International Airport. Additionally, it also depicts normal and record temperature.

In 2008, the highest temperatures for the area occurred in July and August. No new record temperatures were recorded for this year (2010). The most precipitation and largest amount of snow was received in December, and these levels exceeded what is normal for this time of year. Snow reached a level of 55.3 inches, and overall precipitation reached almost 50 inches.

Figure 3.1.15: Des Moines International Airport ASOS in 2008



Data Source: National Oceanic and Atmospheric Association, 2008

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

Agriculture

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

In 2007, the Census of Agriculture counted 2,204,792 farms in the United States. Tama County had 1,210 farms which lie on 430,855 acres of land. This is one percent of the 92,856 farms in the State of Iowa. Most of these farms are 50 – 179 acres in size and are worth $100,000 or more in sales. For the most part, hogs and pigs are the largest number of any animal sold on Tama County farms with 363,896 hogs and pigs across 67 farms. On the produce side, corn is the biggest seller with 33,475,285 bushels coming off of 194,190 acres from 679 farms.

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 Tuesday 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 relatively recent (March 1, 2009) state requirement of 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 CodeRED 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. Refer to newspaper article in Appendix I.

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, Garwin Fire Department, Le Grand Fire Department, Montour Fire Department, Montour Fire Department, Tama Fire Department, Toledo Fire Department, and Traer Fire Department
- **Hazardous Materials Assisstance:** 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, Meskwaki Trading Post, Cissy's in Le Grand, Sinclair Kitchen in Traer, Traer Short Stop, Caseys in Dysart, Cissy's in Gilman, Zipmart in Belle Plaine, Heartland Cooperative in Gladbrook, John's Qwik Stop 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

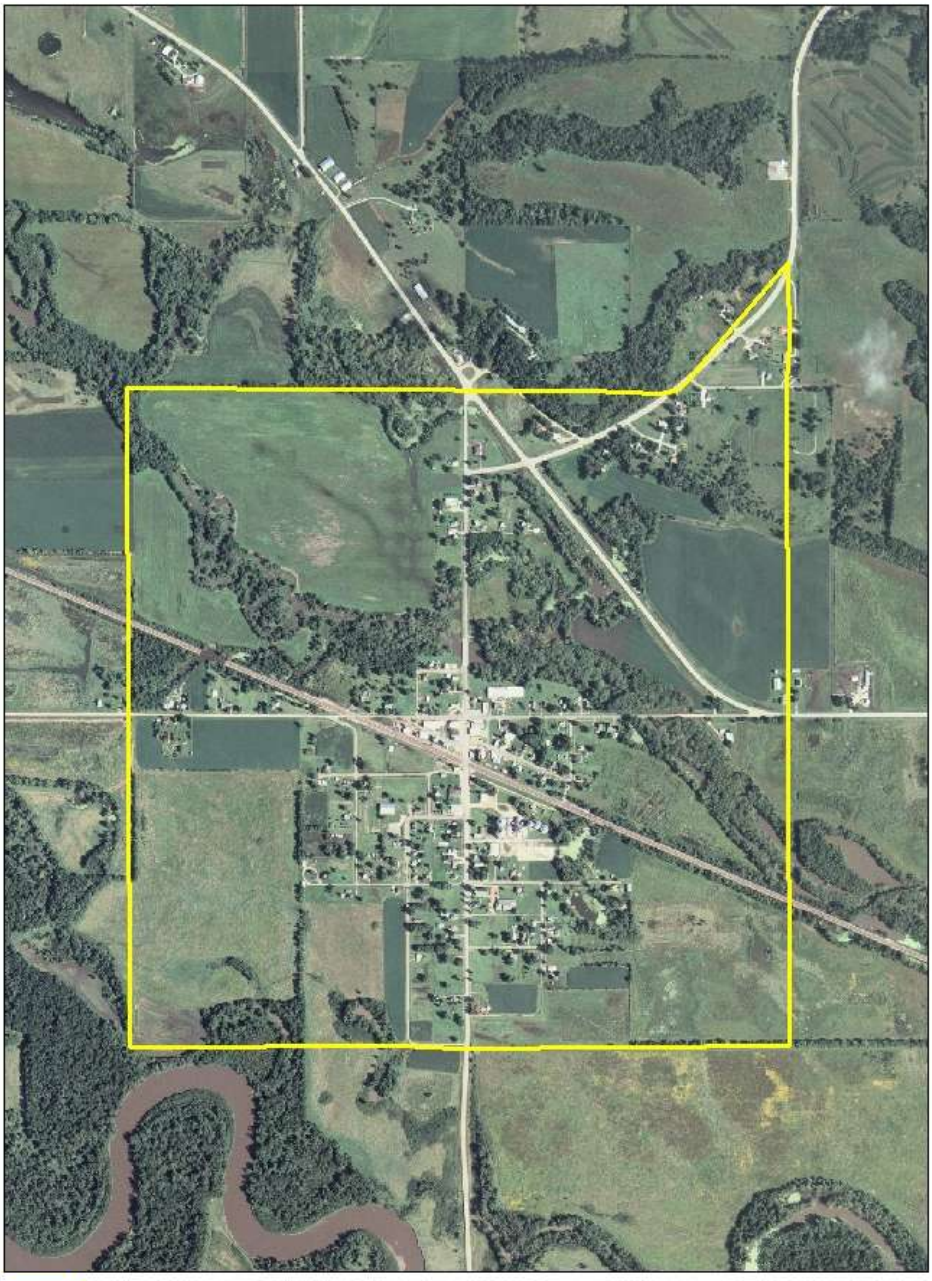
As indicated in the service list above, some services are provided to unincorporated areas by nearby cities. This is true for mainly fire protection and emergency medical services.

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.

Figure 3.2.2: Chelsea, Iowa



Map by Alicia Rosman
04/06/2010
Shapefile Source: Iowa DNRGIS

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, CodeRED
HazMat Assistance	Waterloo Fire Department
Fuel Station	24/7 card pump for both diesel and unleaded
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 41 policies in this community according to Iowa Homeland Security information. 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

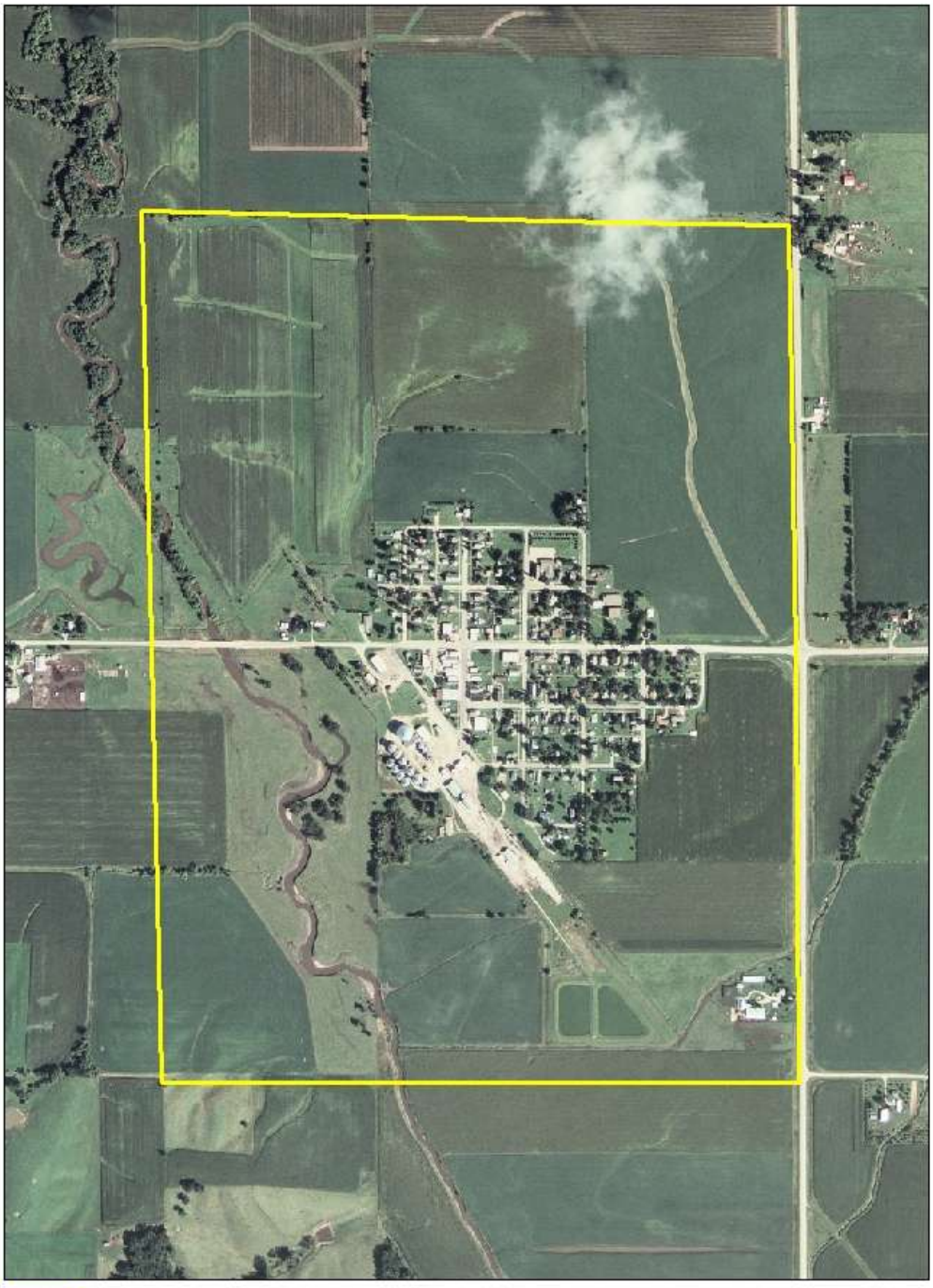
Chelsea is completing a Hazard Mitigation Grant Program project that involves acquiring and demolishing three structures that were badly damaged by flood waters in 2008. Documents specific to this project are in Appendix I. Chelsea also participates in Tama County's CodeRED system. With participation 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 ¾ square mile.

Figure 3.2.3: Clutier, Iowa



Map by Alicia Rosman
04/06/2010
Shapefile Source: Iowa DNRGIS

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, CodeRED
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). Although, according to Iowa Homeland Security information, there is no one currently taking advantage of the NFIP in Clutier. 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

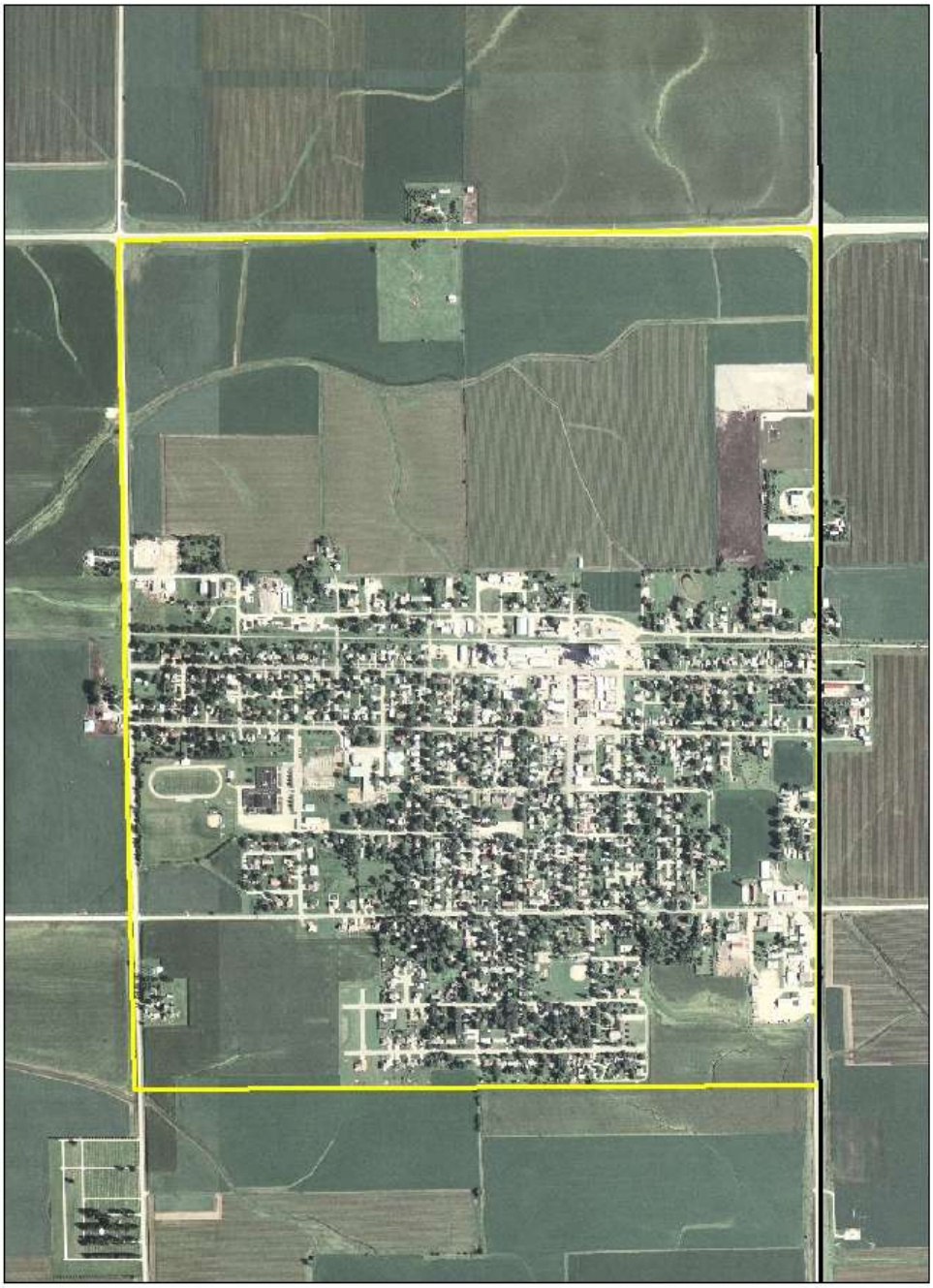
Clutier participates in Tama County's CodeRED system. With participation in the system, Clutier residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined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

Figure 3.2.4: Dysart, Iowa



City Corporate Limit
County Boundary

Map by Alicia Rosman
04/06/2010
Shapefile Source: Iowa DNRGIS

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, CodeRED
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. Aside from traditional building codes, there are no other requirements specific to hazard mitigation in the city's code. The City controls land use through zoning, which was last updated in 1983.

The zoning districts and requirements in Dysart are traditional and regulate use, location, density, site development, and appearance. There are no requirements or restrictions dealing directly with hazard mitigation. The City also does not have a floodplain ordinance but will be soon be developing and adopting one in order to comply with 2012 requirements. Dysart is one of four cities in Tama County that does not currently participate in the National Flood Insurance Program.

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 CodeRED 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.

Figure 3.2.5: Elberon, Iowa

Map by Alicia Rosman
04/06/2010
Shapefile Source: Iowa DNRGIS

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 and County both remotely and manually
HazMat Assistance	Cedar Rapids 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 information from Iowa Homeland Security and the City of Elberon, the City does not participate in the National Flood Insurance Program because it has been suspended.

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

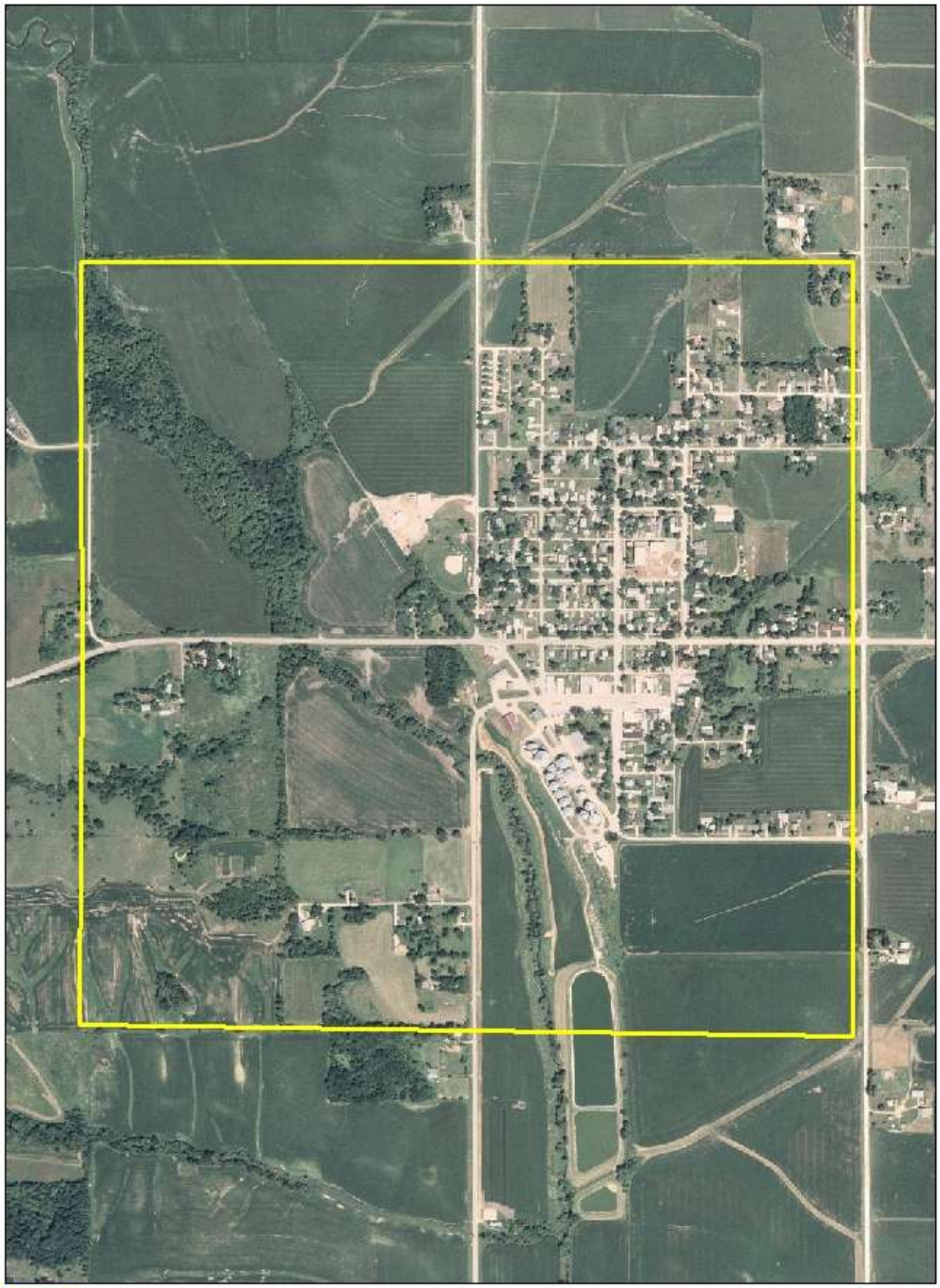
Elberon participates in Tama County's CodeRED system. With participation in the system, Elberon residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined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

Figure 3.2.6: Garwin, Iowa



Map by Alicia Rosman
04/06/2010
Shapefile Source: Iowa DNRGIS

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), CodeRED
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 Iowa Homeland Security information, there is only one flood insurance policy in Garwin. 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

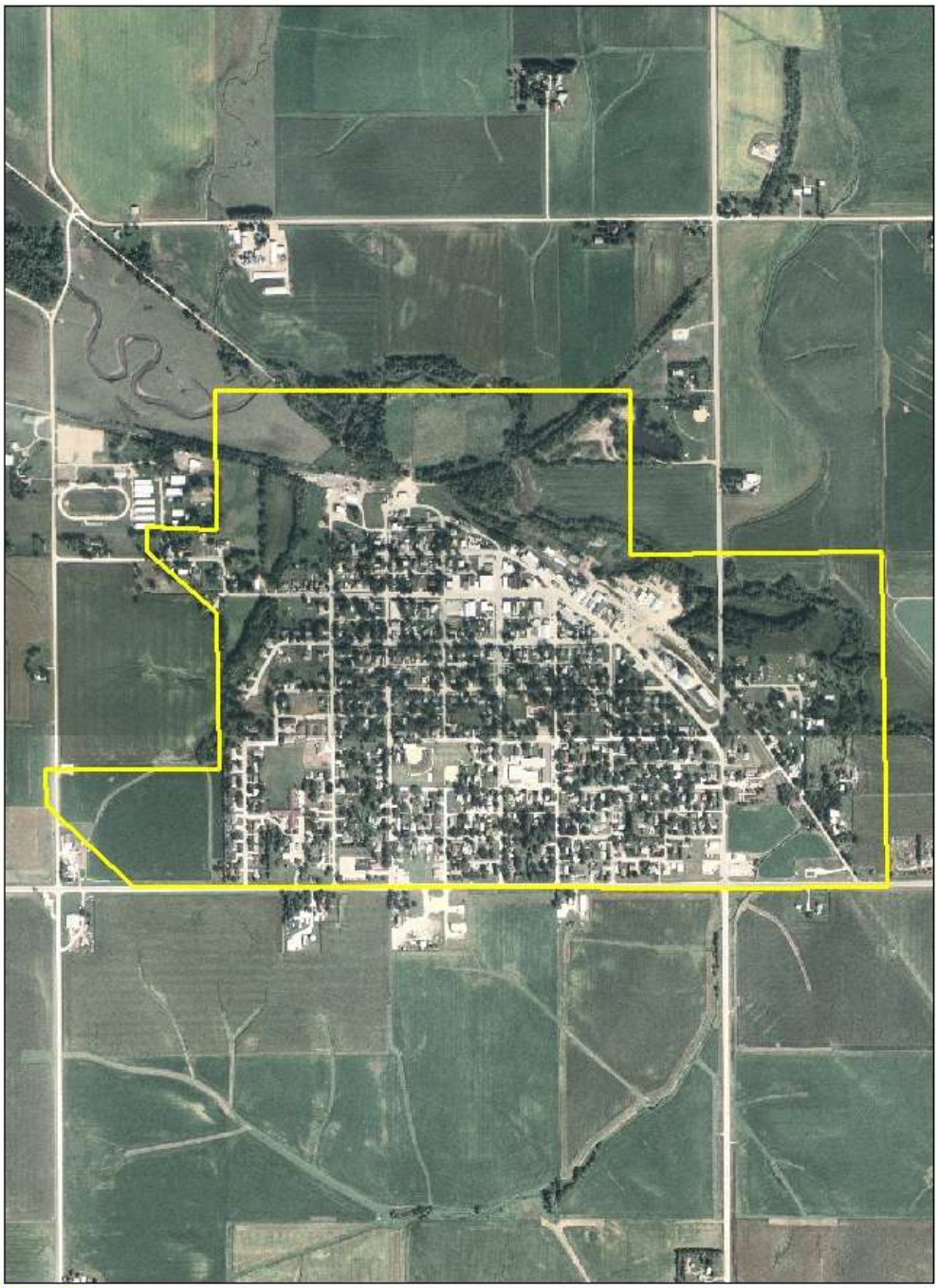
Garwin participates in Tama County's CodeRED system. With participation in the system, Garwin residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined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

Figure 3.2.7: Gladbrook, Iowa



Map by Alicia Rosman
04/06/2010
Shapefile Source: Iowa DNRGIS

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, CodeRED
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 Iowa Homeland Security information, there is just one flood insurance policy in Gladbrook.

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

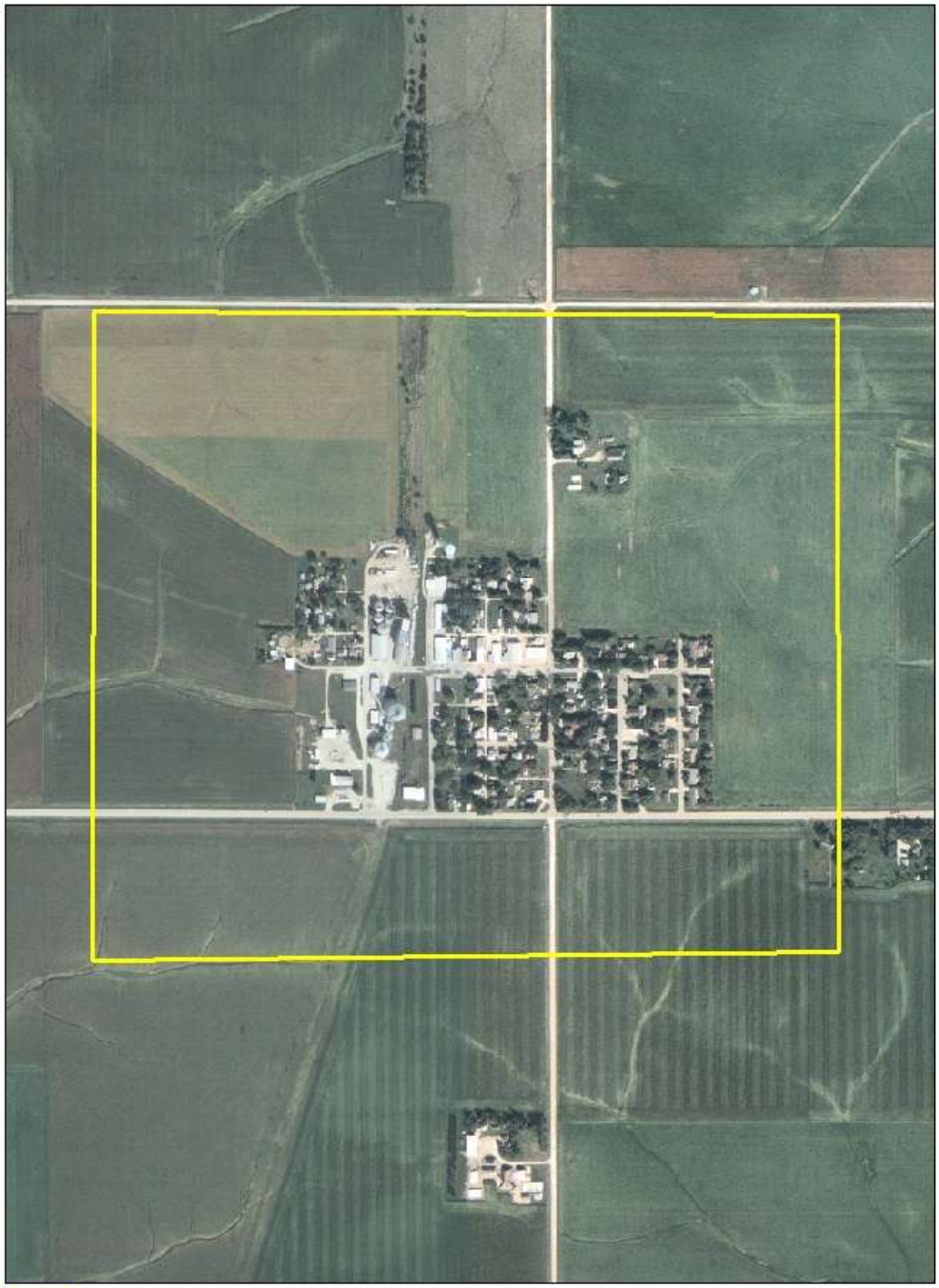
Gladbrook participates in Tama County's CodeRED system. With participation in the system, Gladbrook residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are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

Figure 3.2.8: City of Lincoln



City Corporate Limit

Map by Alicia Rosman
04/06/2010
Shapefile Source: Iowa DNRGIS

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, CodeRED
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
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.

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 information from Iowa Homeland Security, the City does not currently participate in the National Flood Insurance Program.

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

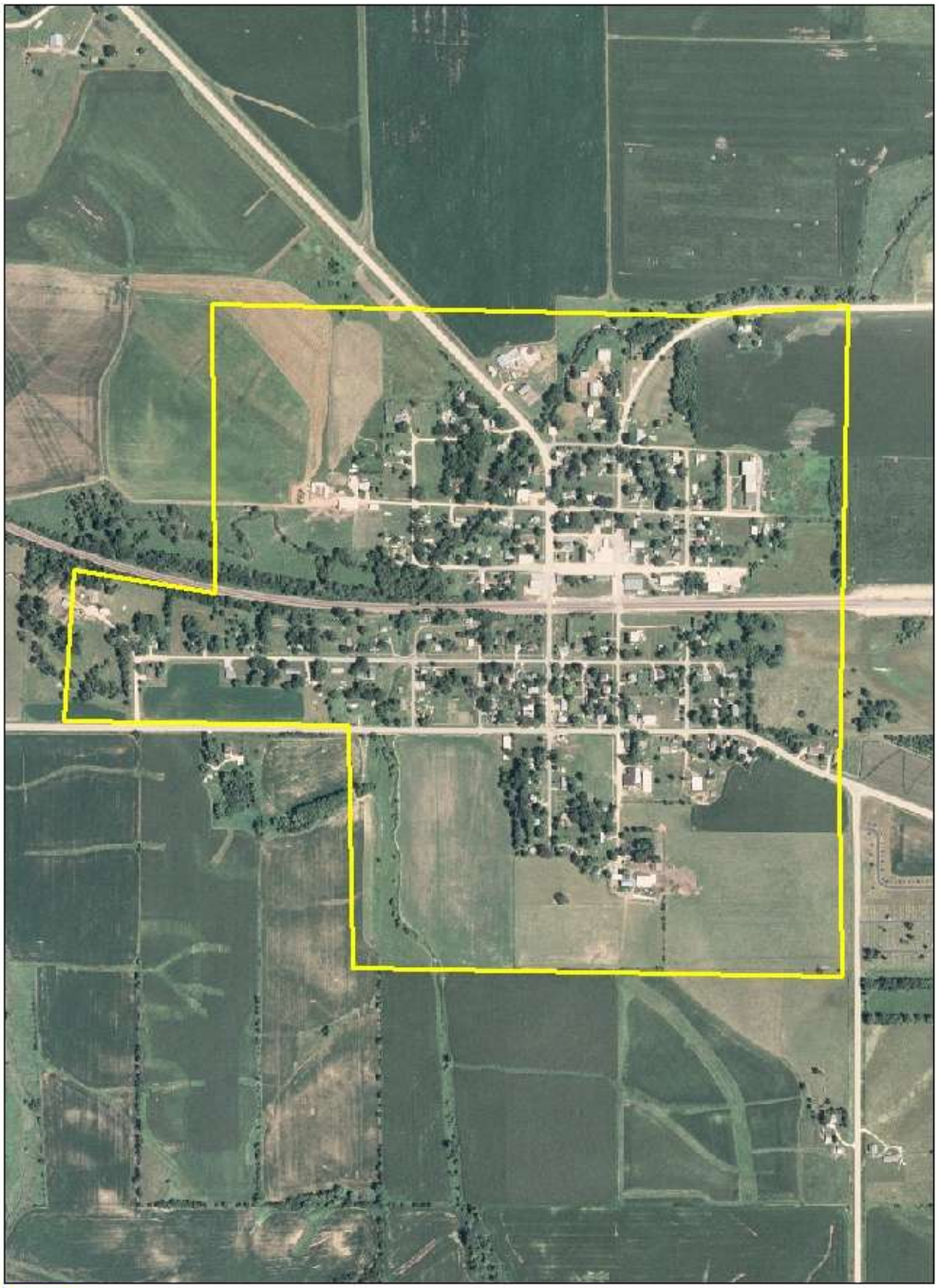
Lincoln participates in Tama County's CodeRED system. With participation in the system, Lincoln residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined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

Figure 3.2.9: City of Montour



Map by Alicia Rosman
04/06/2010
Shapefile Source: Iowa DNRGIS

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, CodeRED
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 CodeRED 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.

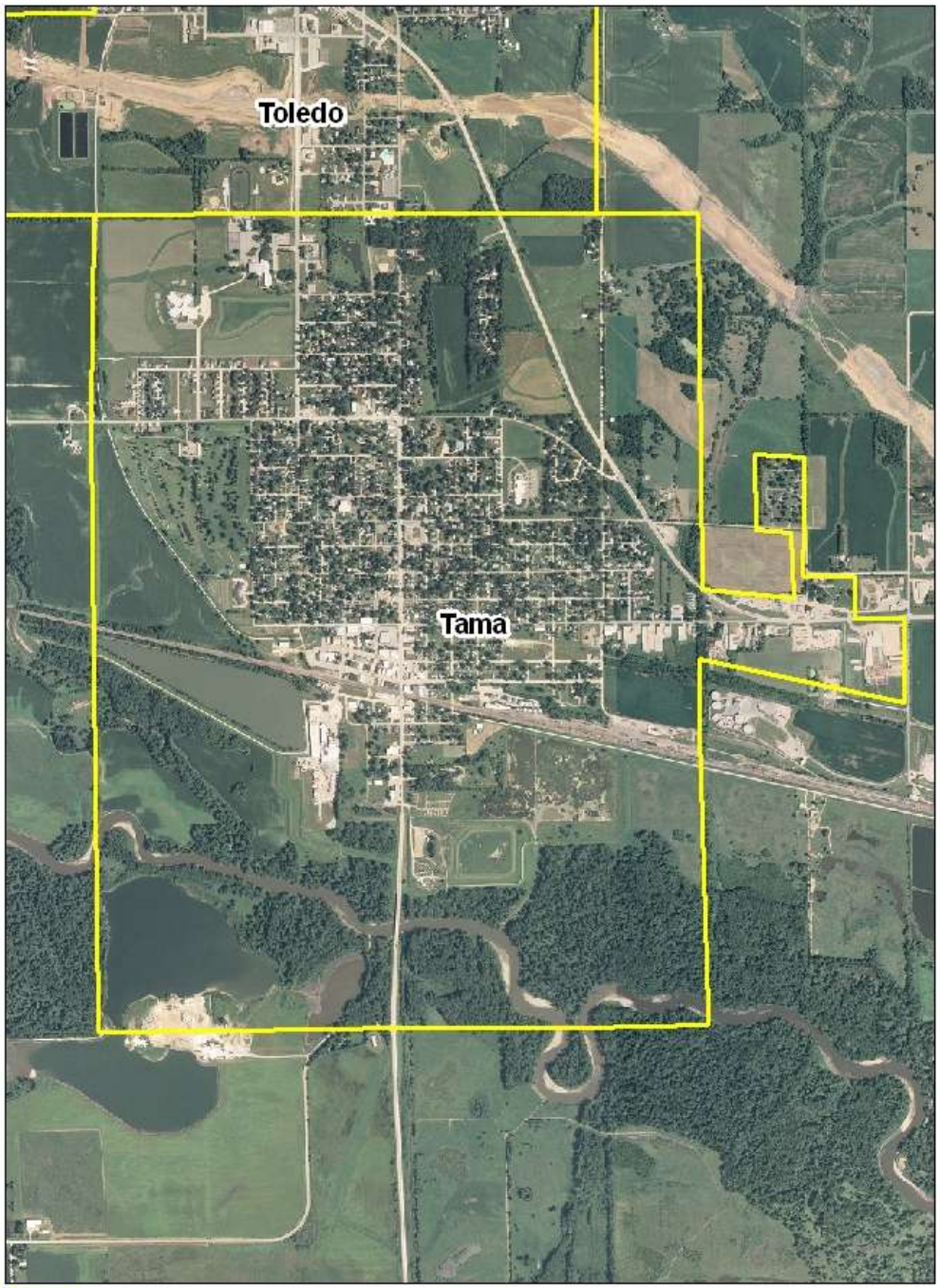
The impetus for this project is the frequent backups in the city wastewater system that causes substantial flooding in several Montour residents' homes. System backups also cause bypasses of raw sewage into Indian Creek, which is an Iowa River tributary. The poor condition of the wastewater system is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

Figure 3.2.10: City of Tama



Map by Alicia Rosman
04/06/2010
Shapefile Source: Iowa DNRGIS

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 Sherriff'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, CodeRED
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.

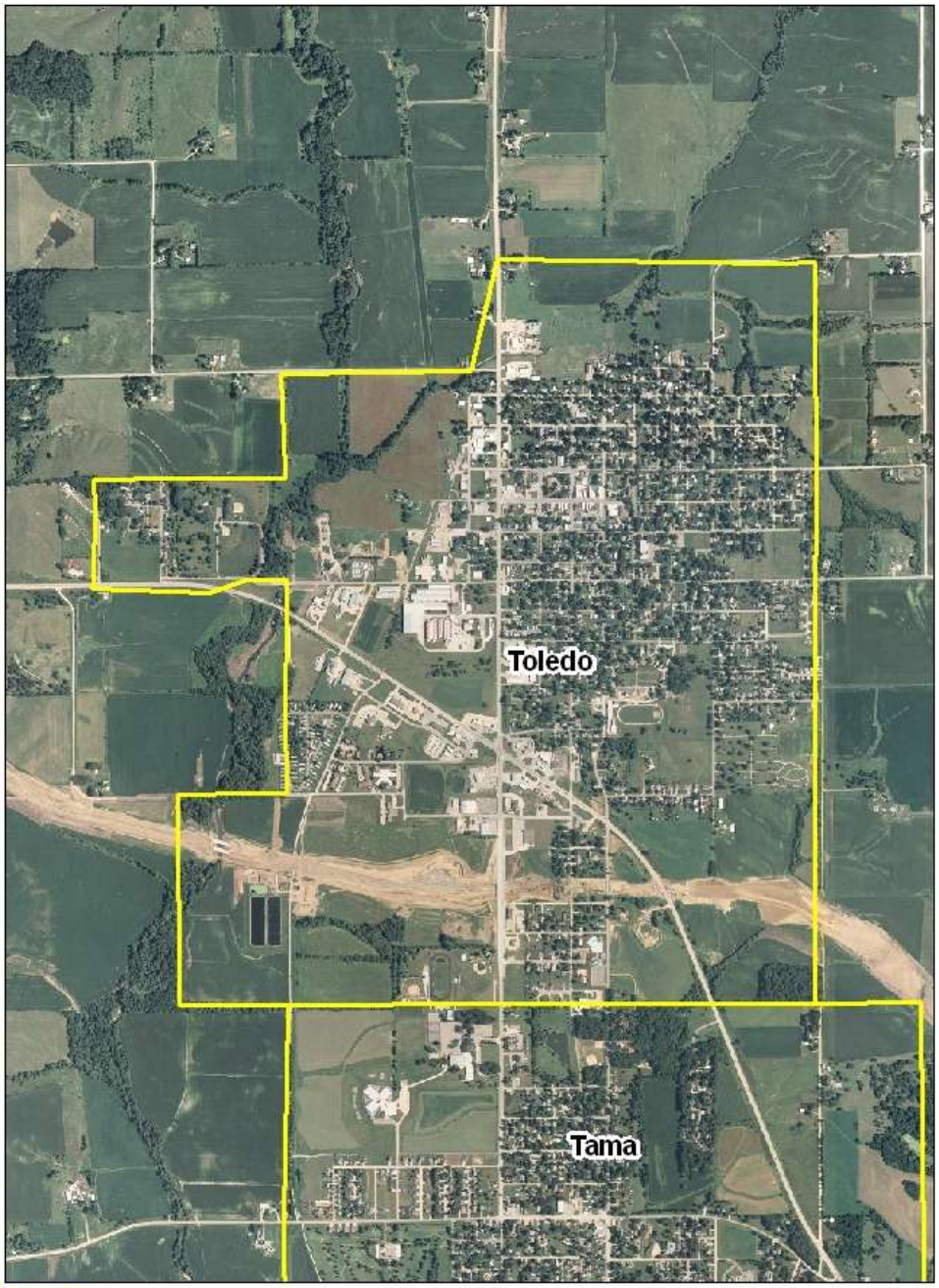
Also, Tama participates in Tama County's CodeRED system. With participation in the system, Tama residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined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

Figure 3.2.11: Toledo, Iowa



Map by Alicia Rosman
04/06/2010
Shapefile Source: Iowa DNR

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 lives 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
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

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 Iowa Homeland Security information, though, there are actually no NFIP policies in the city.

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 CodeRED 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.

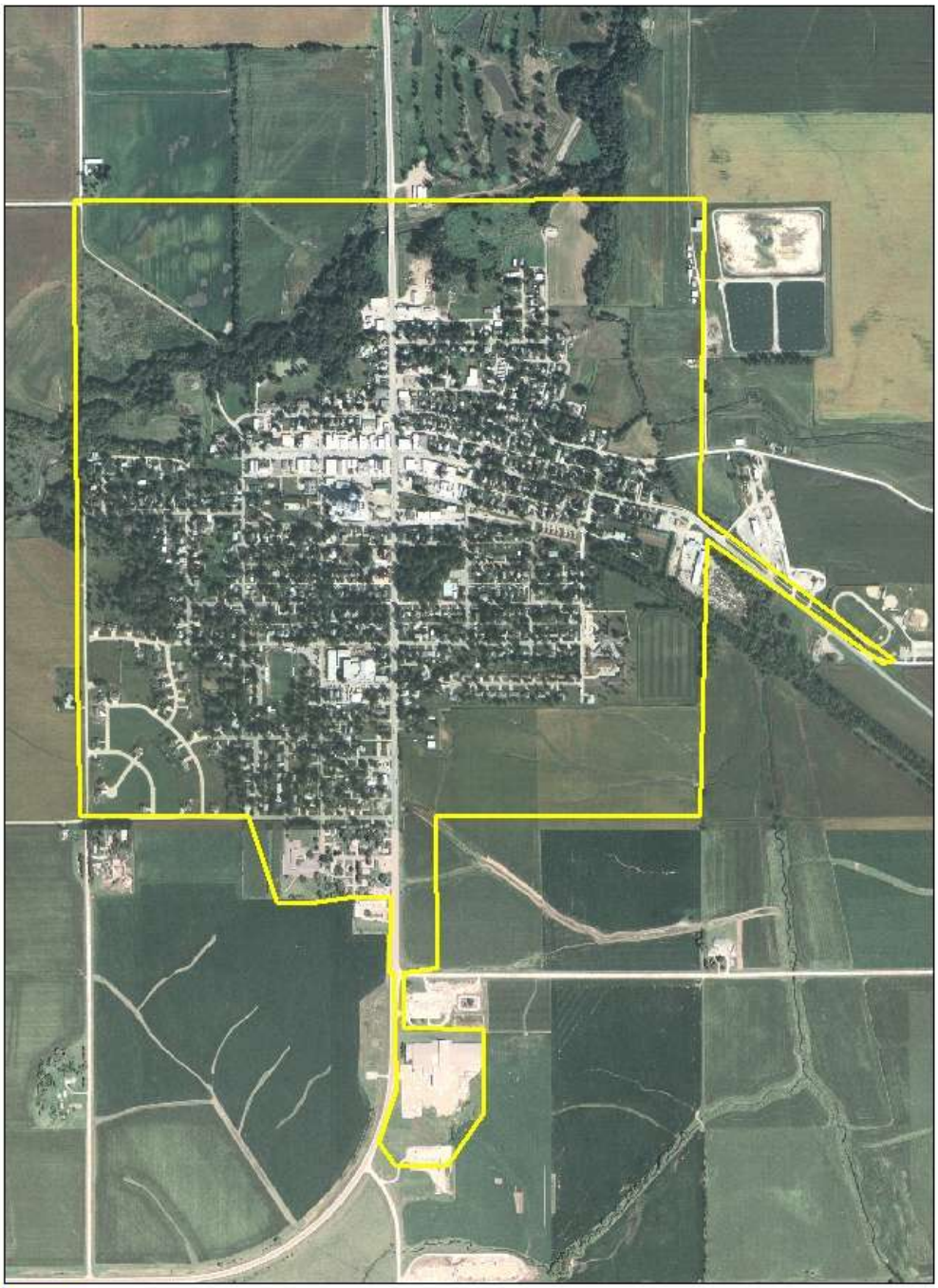
The City of Toledo was awarded approximately $800,000 in I-Jobs funding to move the Public Works Building. During the 2008 flood, the building was inundated with thirty inches of flood water. In the past thirty years, this building has flooded six times so the problem is definitely recurring. The equipment 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.

Figure 3.2.12: City of Traer



Map by Alicia Rosman
04/06/2010
Shapefile Source: Iowa DNR

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 and County, CodeRED
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 Iowa Homeland Security information, there are four NFIP policies in Traer.

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 CodeRED 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.

Figure 3.2.13: City of Vining

Map by Alicia Rosman
04/06/2010
Shapefile Source: Iowa DNR

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

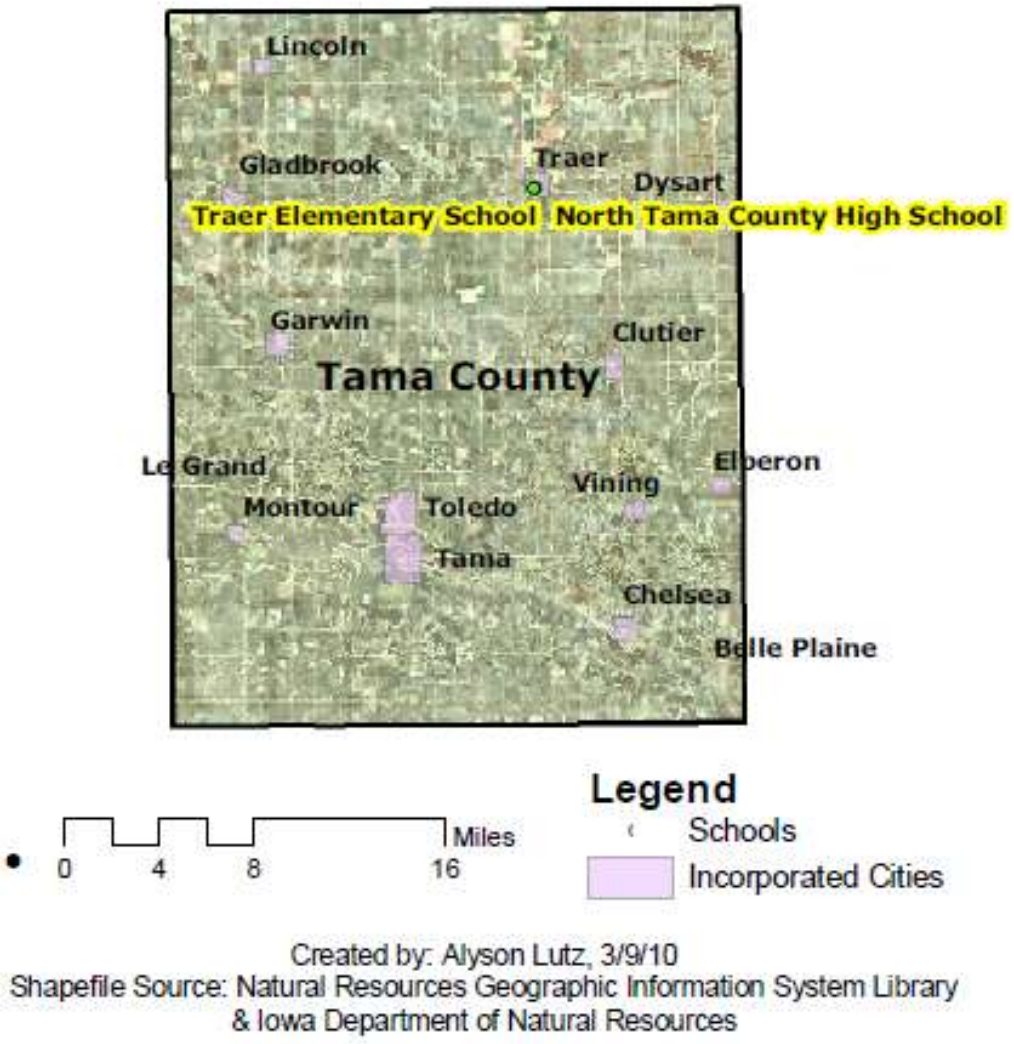
Vining participates in Tama County's CodeRED system. With participation in the system, Vining residents are notified of emergency situations in their area or across the entire county through messages by telephone. Both land lines and cell phones can be registered to receive the warnings that are determined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

Tama County School Districts

North Tama County Community School District

The North Tama County Community School District is located in Traer, Iowa which is in the northeastern portion of the county. This district contains the Traer Elementary School and North Tama High School with enrollments of 269 and 265, respectively for the 2009-2010 school year. Because the elementary school serves kindergarten through 6th grade and the high school serves grades 7-12, there is no need for a separate junior high building. Students are considered to be in junior high in the 7th and 8th grades. For more information visit their website at http://www.n-tama.k12.ia.us.

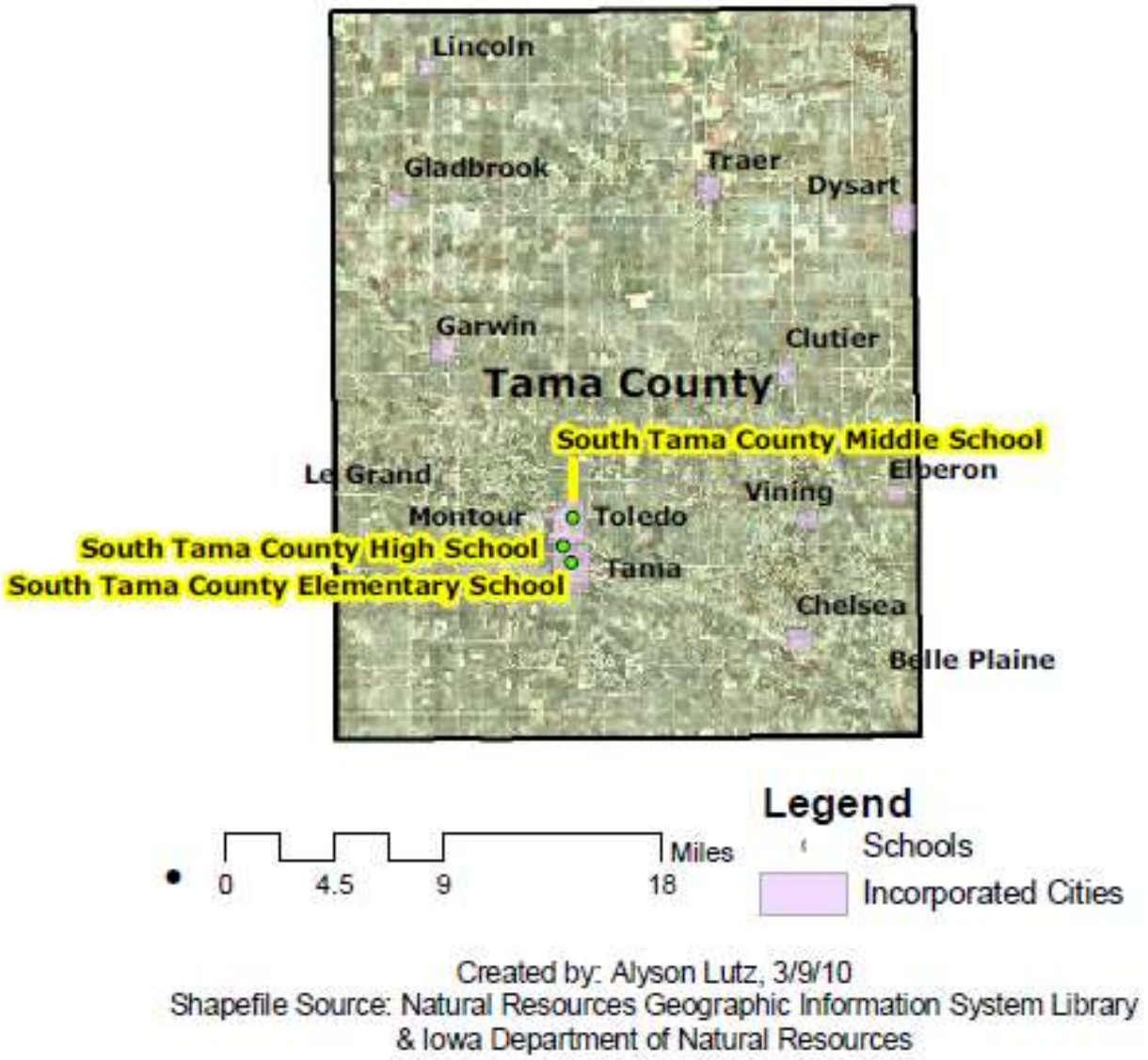
Figure 3.2.16: North Tama Community School District Buildings



South Tama County Community School District

Tama County is also home to the South Tama County Community School District, located in the cities of Tama and Toledo. Situated in the south central portion of the county, the district contains the South Tama County Elementary (Tama), Middle (Toledo) and High (Toledo) Schools with student enrollments of 740, 317, and 451, respectively. With 1,508 students enrolled, the South Tama County community school district is the largest of the five in Tama County. For more information visit their website at http://www.s-tama.k12.ia.us.

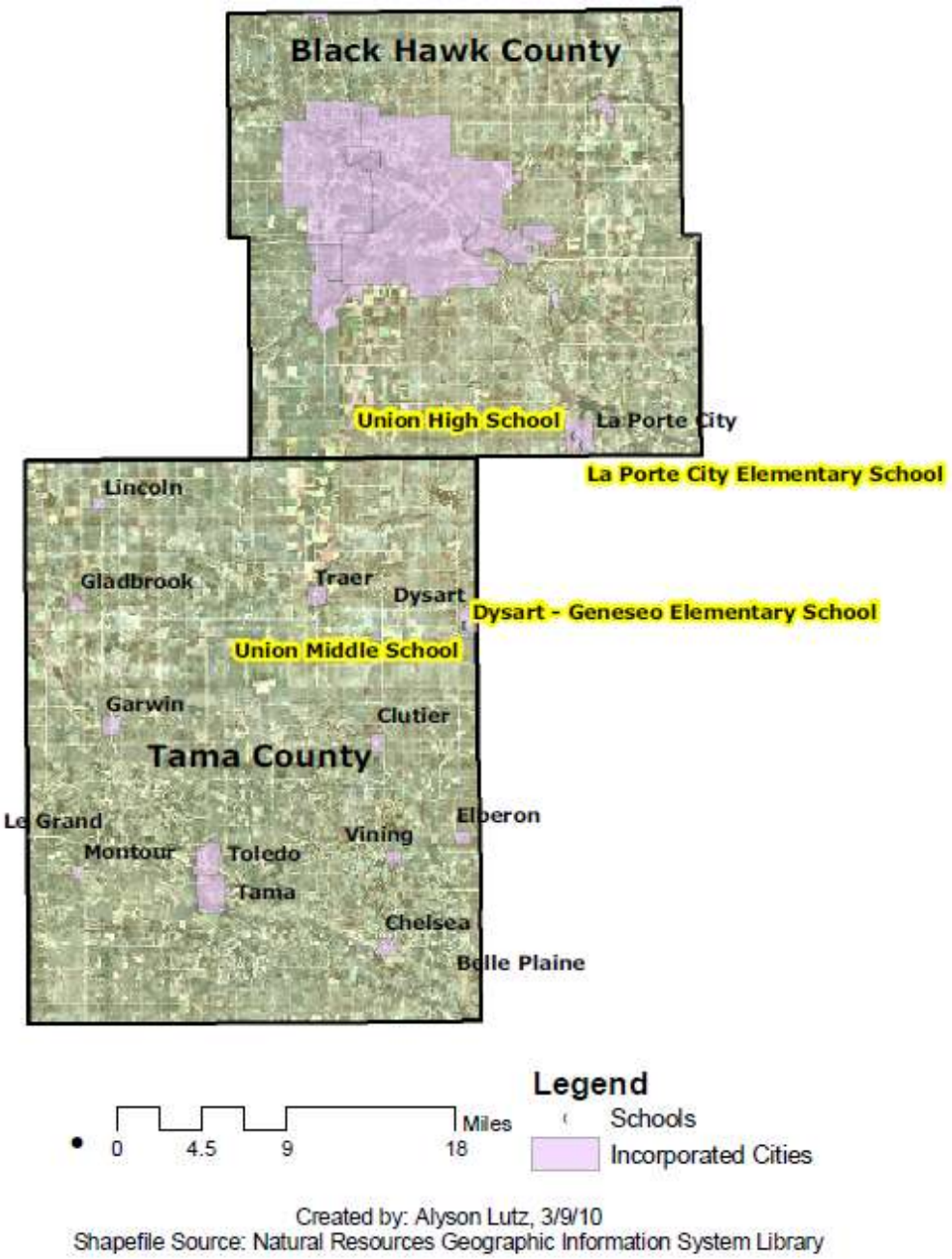
Figure 3.2.17: South Tama Community School District Buildings



Union Community School District

The Union Community District is like the Gladbrook-Reinbeck community school district in that its jurisdiction stretches across a county boundary line. This district's offices are located in La Porte City which is in the southeastern portion of Black Hawk County. The school buildings are split between the two cities of Dysart (located in the north eastern portion of Tama County) and La Porte City which are about 15 miles apart. This district contains the Dysart-Geneseo Elementary School with a 218 student enrollment, and La Porte City Elementary School with a 323 student enrollment, located in their respective cities. The Union Middle School, in Dysart has a 291 student enrollment while the Union High School is in La Porte City with a 416 student enrollment for the 2009-2010 school year. For more information visit their website at http://www.union/.k12.ia.us.

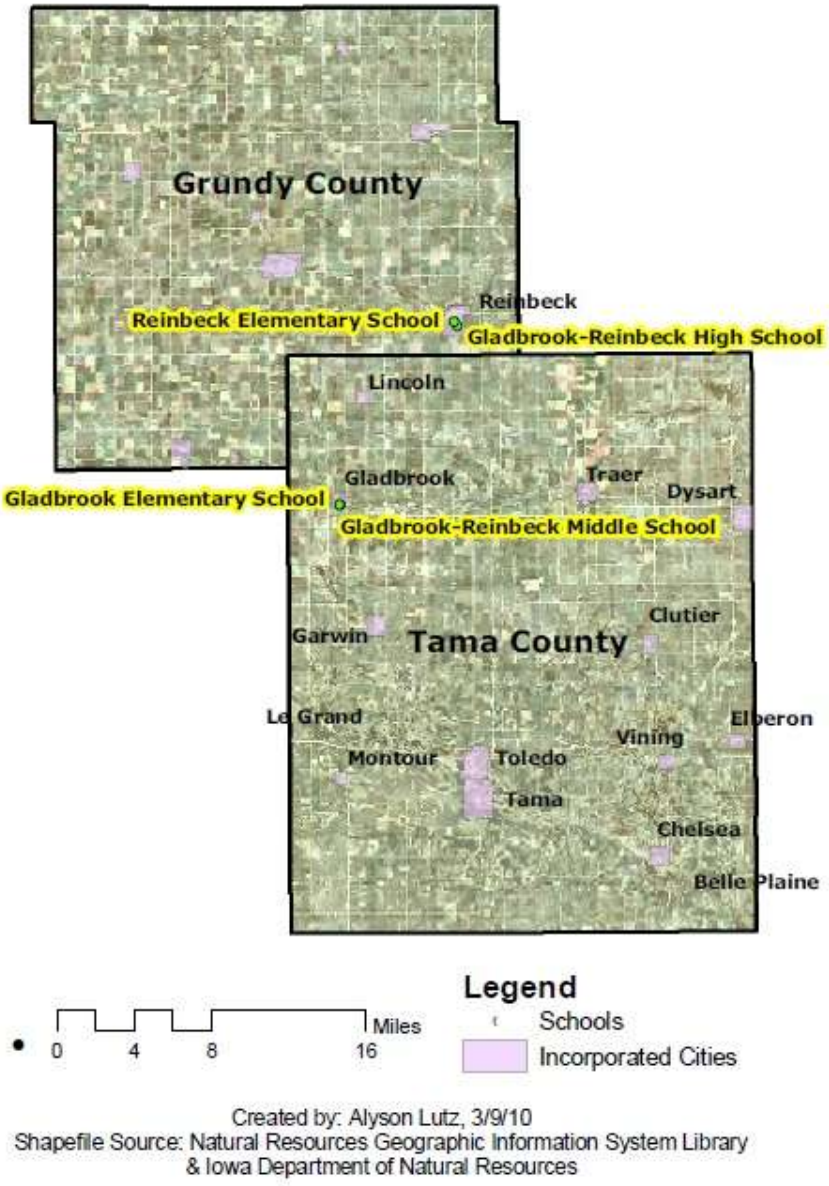
Figure 3.2.18: Union Community School District Buildings



Gladbrook-Reinbeck Community School District

The Gladbrook-Reinbeck Community School District is unique in that its jurisdiction stretches across a county boundary line. This district's offices are located in Reinbeck which is in the south eastern portion of Grundy County. The school buildings are split between the two cities of Gladbrook (located in the north western portion of Tama County) and Reinbeck which are about 18 brook miles apart. This district contains the Gladbrook Elementary School with a 35 student enrollment, and Reinbeck Elementary School with a 165 student enrollment, located in their respective cities. The Gladbrook-Reinbeck Middle School, in Gladbrook has a 176 student enrollment while the Gladbrook-Reinbeck High School is in Reinbeck with a 233 student enrollment for the 2009-2010 school year. For more information visit their website at http://www.gladbrook-reinbeck.k12.ia.us

Figure 3.2.19: Gladbrook-Reinbeck Community School District Buildings



Government and Regulation

All of the school districts in Iowa are governed by a local school board that is elected by the public. School boards in 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.

4 Risk Assessment

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

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

4.1 Hazard Identification

Ultimately, the hazards chosen for the plan were determined by the Task Force. First, Region 6 identified the hazards most likely to affect the county based on the 2007 Iowa Hazard Mitigation Plan, past disaster declarations in Iowa, research, and knowledge of the area.

Iowa has experienced 26 presidential declared disasters since 1990. The state's most recent disasters occurred in December of 2009 and January of 2010, when severe winter weather caused significant impacts to the western part of Iowa. Iowa's disaster declarations are listed below.

Table 4.1.1: Disaster Declarations in Iowa 1990-2010

Date Declared	Disaster Type
3/2/2010	Severe Winter Storms
2/25/2010	Severe Winter Storms
8/13/2009	Severe Storm
5/27/2008	Severe Storms, Tornadoes, Flooding
1/4/2008	Severe Winter Storm
9/14/2007	Severe Storms, Flooding
5/25/2007	Severe Storms, Flooding, Tornadoes
3/30/2007	Snow
3/14/2007	Severe Winter Storms
9/10/2005	Hurricane Katrina Evacuation
5/25/2004	Severe Storms, Tornadoes, Flooding
6/19/2002	Severe Storms, Flooding
5/2/2001	Severe Storms, Flooding
7/22/1999	Severe Storms, Flooding
5/21/1999	Severe Storms, Flooding, Tornadoes
7/2/1998	Severe Weather, Tornadoes, Flooding
11/20/1997	Severe Snow Storms
8/21/1996	Flooding
6/24/1996	Flooding
7/9/1993	Flooding, Severe Storm
4/26/1993	Flooding, Severe Storm
10/2/1992	Flooding, Severe Storm
12/26/91	Ice Storm
7/12/1991	Flooding, Severe Storm
9/9/1990	Flooding, Severe Storm
5/26/1990	Flooding, Severe Storm

Data Source: Iowa Homeland Security, April 2010

According to Iowa's presidential disaster declaration history, severe storms, severe winter storms, tornadoes, and flooding are the hazards that most frequently reach disastrous levels. Tama County was not included in all of these disaster declarations. According to available data, Tama County was included in at least six disaster declarations since 1993. These disasters involved the hazards listed as reaching disastrous levels most often.

To start narrowing down the number of hazards, Region 6 started with the list of hazards that includes all of the hazards identified in Iowa's 2007 hazard mitigation plan. Refer to Table 1.1 for the full list. Due to an oversight, the hazards Agro-Terrorism and Human Pandemic Disease were not originally included on the list. Based on research, Region 6 identified 23 unique hazards, from the comprehensive list, that could possibly affect Tama County. The hazards that were considered a general threat are listed in Table 4.1.2.

Table 4.1.2: Assumed Tama County Hazards

Natural Hazards	Man-made Hazards
Drought	Communications Failure
Dam Failure	Energy Failure
Earthquake	Hazardous Materials Incident
Extreme Heat	Highway Transportation Incident
Expansive Soils	Railway Transportation Incident
Flash Flood	Structural Failure
Grass or Wildland Fire	Structural Fire
Hailstorm	
Levee Failure	
Landslide	
River Flood	
Severe Winter Storm	
Sinkholes	
Thunderstorms and Lightning	
Tornado	
Windstorm	

At the meeting, the Task Force was asked to agree or disagree with the list of hazards in Table 4.1.2. The entire list of possible hazards (Table 1.1minus Agro-Terrorism and Human Pandemic Disease) was provided so Task Force members could add hazards to the list. Members were also able to eliminate hazards if they could provide sufficient reasoning. Hazards not on the list were also welcome to be added. There was no mention of any terrorism or human disease type hazards so the hazard list oversight may not have affected the results. The final list of hazards for Tama County is found on the next page.

The final list of hazards for Tama County includes all except two of the natural hazards suggested by Iowa's State Hazard Mitigation Plan. About half of the man-made hazards identified in the Iowa Hazard Mitigation Plan are included, too. The two hazards removed from the list are expansive soils and landslides because they are not an issue in Tama County. Further explanation for exclusion is offered in the next section. In addition, there were two hazards that the Task Force wanted to add to the list of assumed hazards, pipeline transportation incident and animal/crop/plant disease.

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

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

Table 4.1.3: Tama County Hazards and Definitions

Hazard	Definition
Drought	Lack of precipitation for a long period of time
Dam Failure	A break in or threat from any water retention fixture
Earthquake	Shaking or vibrating of the earth
Extreme Heat	Temperatures in excess of 100 degrees Fahrenheit or 3 days of 90+ degrees
Flash Flood	Flooding with little or no warning where water levels rise at a fast rate
Grass or Wildland Fire	Uncontrolled fire that threatens life and property
Hailstorm	Balls or irregularly shaped lumps of ice fall with rain
Levee Failure	Loss of structural integrity of a wall, dike, berm, or elevated soil
River Flood	Rising or overflowing of a body of water onto adjacent land
Severe Winter Storm	Severe winter weather conditions that affect day-to-day activities
Sinkhole	Collapsed land surface
Thunderstorms and Lightning	Heavy rains, high speed winds, tornadoes, hail
Tornado	Rotating column of air with wind speeds that can exceed 200 miles per hour
Windstorm	Extreme winds associated with severe storms
Animal/Crop/Plant Disease	Medical, health, or sanitation threat to wildlife or domestic animals
Communications Failure	Breakdown or disruption of normal communications
Energy Failure	Extended interruption of an energy source
Hazardous Materials Incident	Accidental release of chemical substances or mixtures that present a danger to the public
Highway Transportation Incident	Auto accident exceeding normal, local capabilities
Railway Transportation Incident	Derailment or accident threatening life and property
Structural Failure	Collapse of structures, includes roads, bridges, etc.
Structural Fire	Uncontrolled fire of structures that threatens life and property
Pipeline Transportation Incident	Break in a pipeline that creates the potential for an explosion or leak of a dangerous substance (oil, gas, etc.)

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

Across Tama County, there is variance in what hazards can affect particular jurisdictions. Some communities do not have a rail line and others are not susceptible to sinkholes. Tama County is just one percent of Iowa's land area, but even in such a relatively small area, hazards vary in their coverage. Refer to Table 4.1.4 for the hazards identified for each jurisdiction in Tama County.

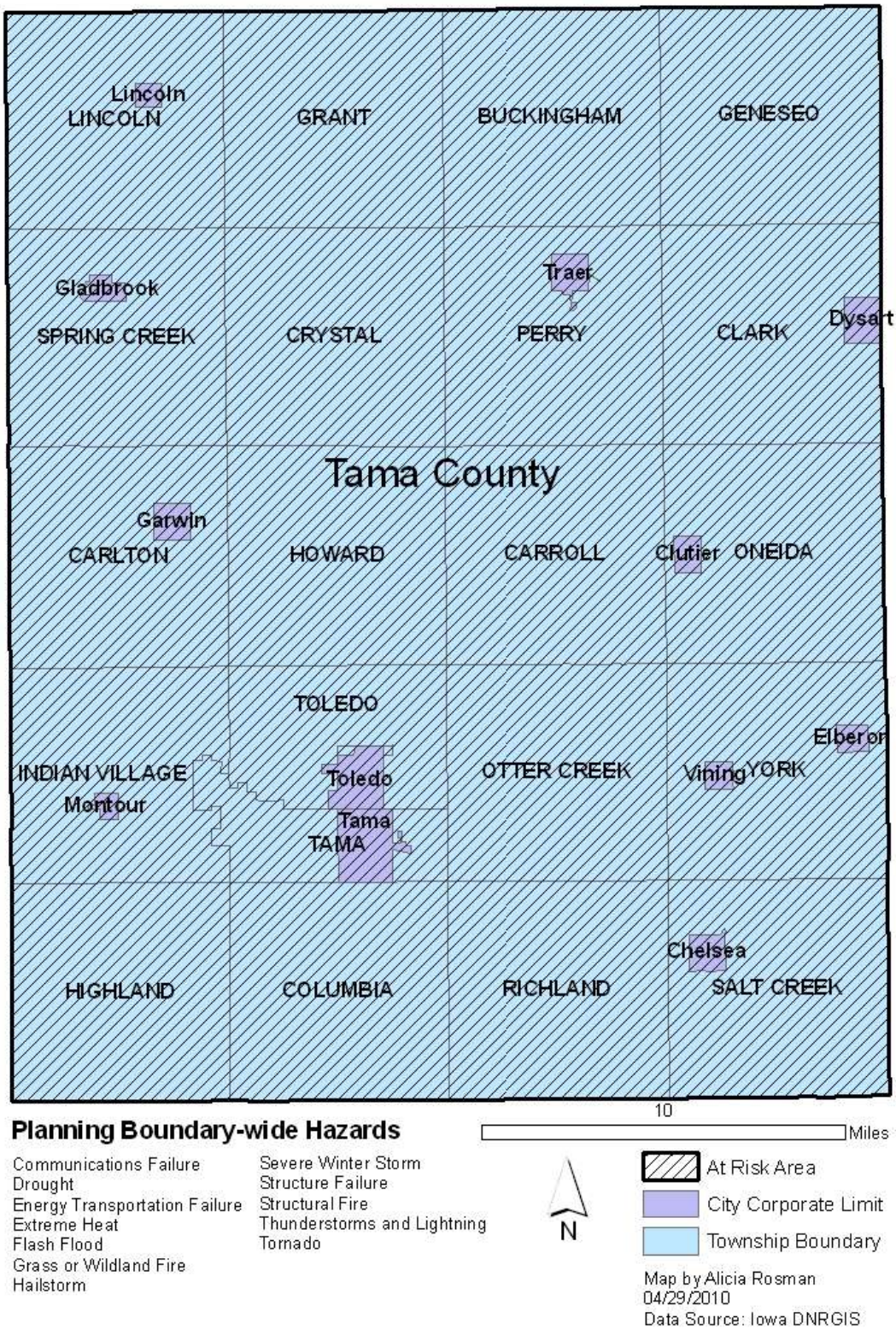
Table 4.1.4: Tama County Hazard Boundaries

Hazard	Jurisdictions	Source(s) of Identification
Tornado	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan NCDC Data Past disaster declarations
Severe Winter Storm	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan NCDC Data Past disaster declarations
Windstorm	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan NCDC Data
Thunderstorms and Lightning	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan NCDC Data
Highway Transportation Incident	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan Iowa DOT Data
Rail Transportation Incident	Tama County Chelsea Montour Tama South Tama School District	Local knowledge 2007 Iowa Hazard Mitigation Plan Tama County EMC Data
Flash Flood	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan NCDC Data
Hazardous Materials Incident	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan Tama County EMC Data
Structural Fire	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan Tama County EMC Data
Hailstorm	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan NCDC Data
Energy Failure	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan Tama County EMC Data
Extreme Heat	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan NCDC Data
River Flood	Tama County Chelsea Clutier Dysart Elberon Gladbrook Montour Tama Toledo Traer Vining	Local knowledge 2007 Iowa Hazard Mitigation Plan NCDC Data FEMA FIRM maps Past disaster declarations

	North Tama School District South Tama School District Union School District	
Animal/Crop/Plant Disease	Tama County	Local knowledge 2007 Iowa Hazard Mitigation Plan
Drought	All Jurisdictions	2007 Iowa Hazard Mitigation Plan
Grass or Wildland Fire	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan
Pipeline Transportation Incident	Tama County Montour Tama Toledo Gladbrook Chelsea Traer Dysart All school districts	Local knowledge 2007 Iowa Hazard Mitigation Plan Tama County EMC Data
Earthquake	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan
Communications Failure	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan
Levee Failure	Tama Toledo South Tama School District	Local knowledge 2007 Iowa Hazard Mitigation Plan
Structural Failure	All Jurisdictions	Local knowledge 2007 Iowa Hazard Mitigation Plan Tama County EMC Data
Sinkhole	Tama County Montour Tama South Tama School District	Local knowledge 2007 Iowa Hazard Mitigation Plan Iowa DNR Data
Dam Failure	Tama County Chelsea Garwin Montour Tama Toledo Vining	2007 Iowa Hazard Mitigation Plan Iowa DNR Data

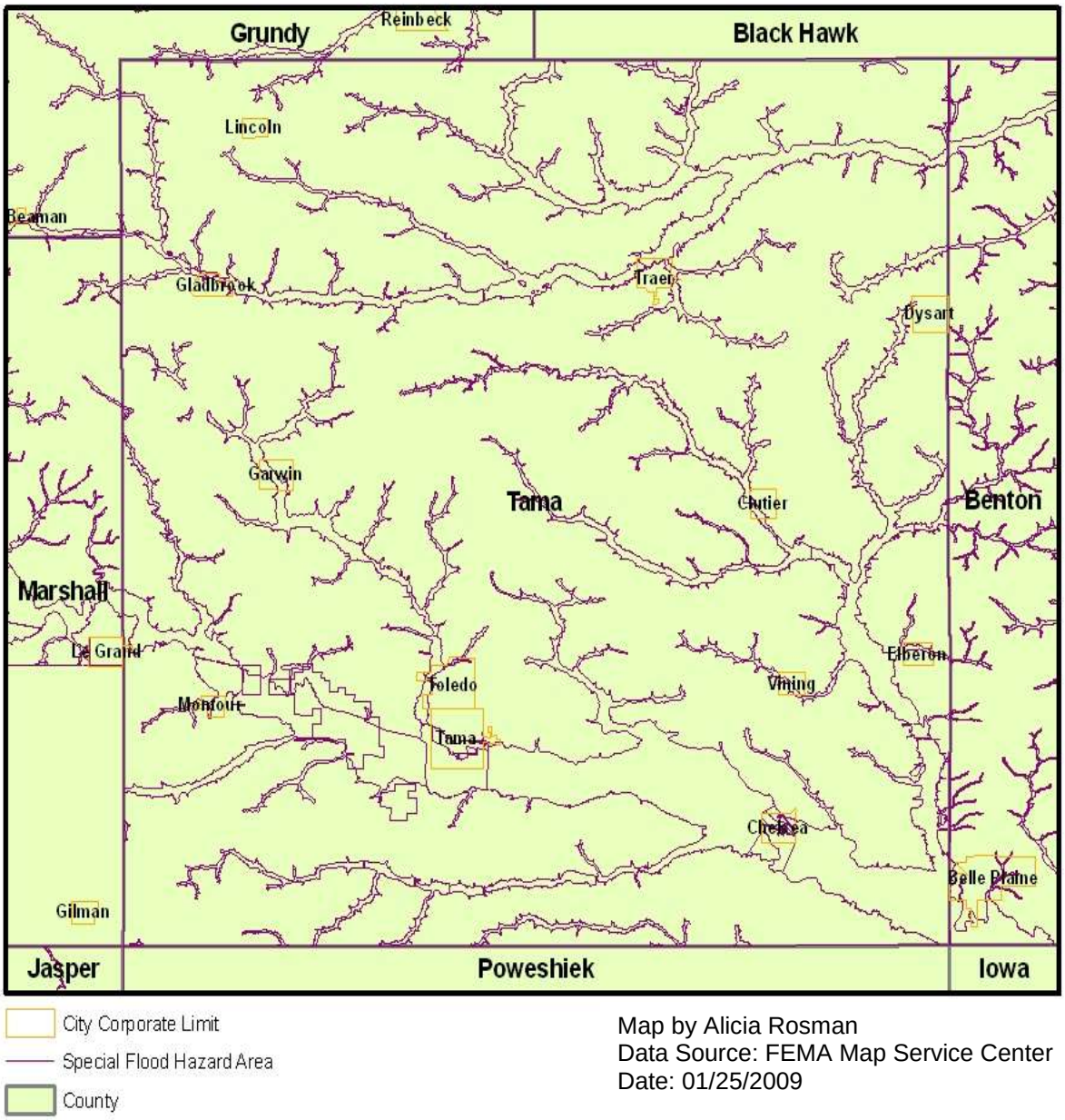
Besides tables, maps are a valuable tool for displaying which jurisdictions are affected by hazards. The following pages include maps that depict each hazard's coverage among the jurisdictions in the planning boundary.

Figure 4.1.1: Planning Boundary-wide Hazards



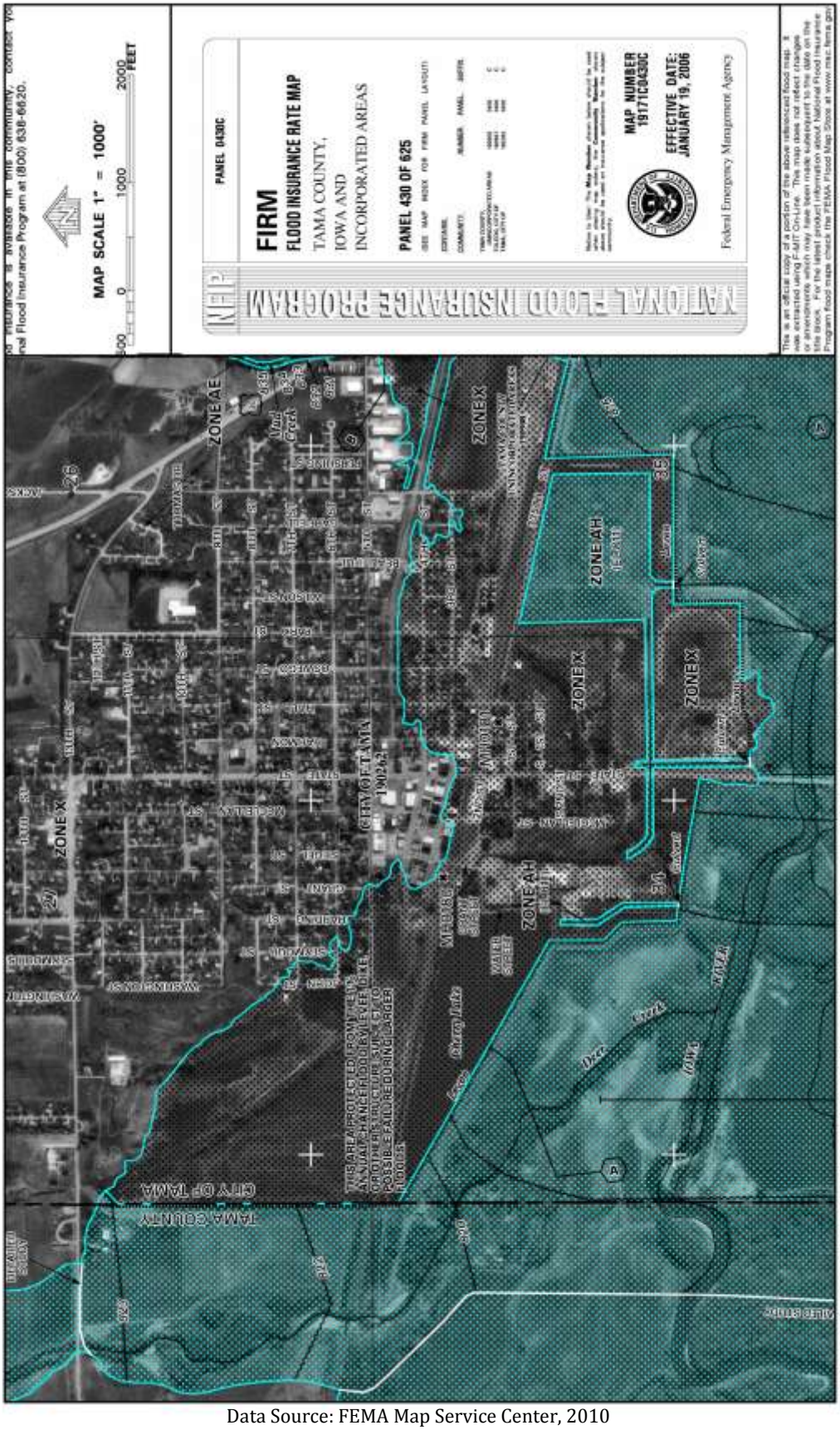
The map below depicts the Special Flood Hazard Areas in Tama County, which indicates the areas that have 1% chance of flooding each year. These areas account for about a fifth of the county's land area. A portion of each Tama County jurisdiction, except the City of Lincoln, is located in a Special Flood Hazard Area. The map, however, does not depict the areas with a lower probability of being flooded. The flooding disaster in the summer of 2008 proved that Iowa's waterways are more than capable of exceeding the 100-year floodplain boundary. The specific boundaries of flooding for each jurisdiction will be discussed later in the plan.

Figure 4.1.2: Special Flood Hazard Areas



Map by Alicia Rosman
Data Source: FEMA Map Service Center
Date: 01/25/2009

Figure 4.1.3: Levee Failure

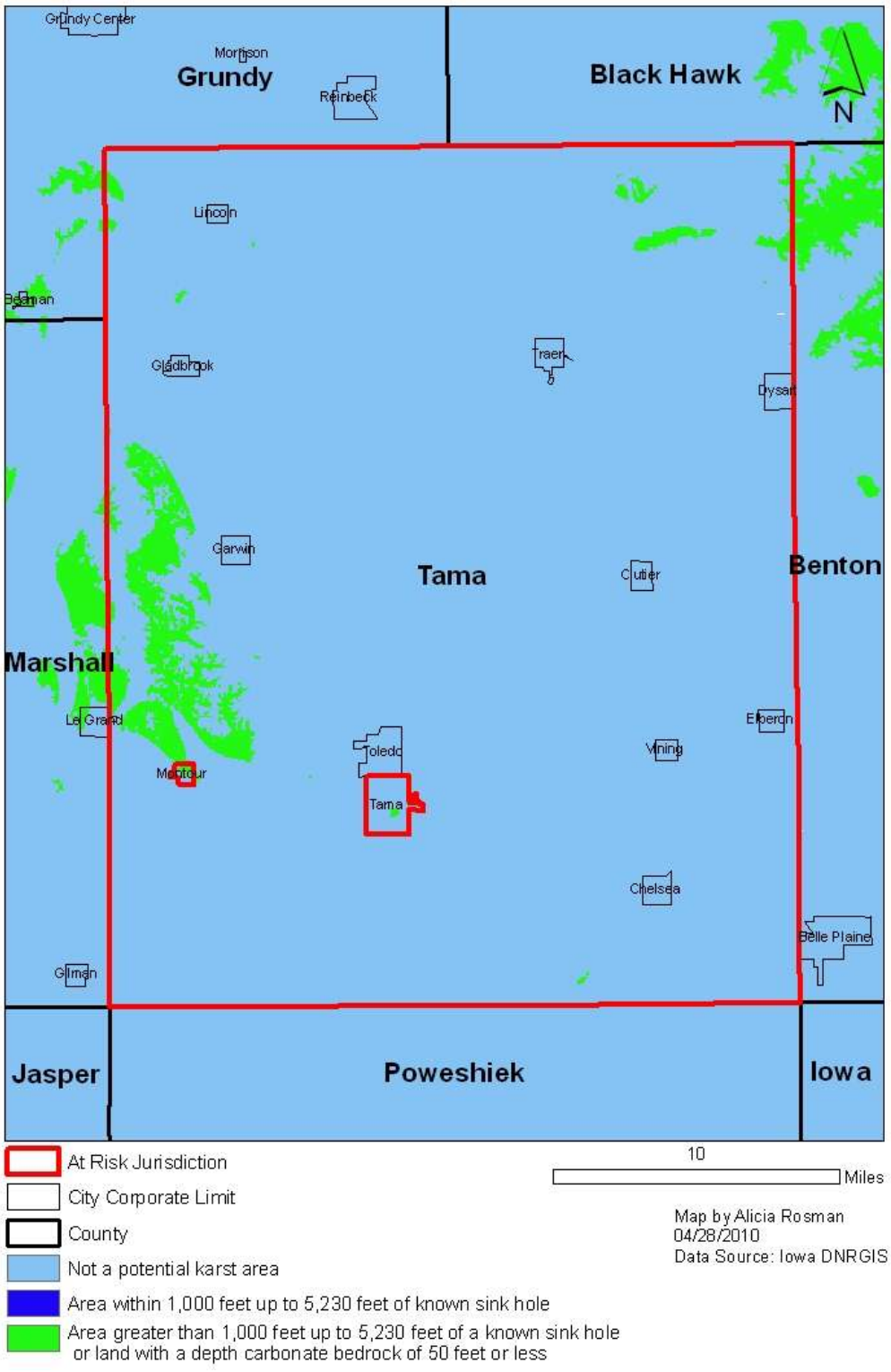


Data Source: FEMA Map Service Center, 2010

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.

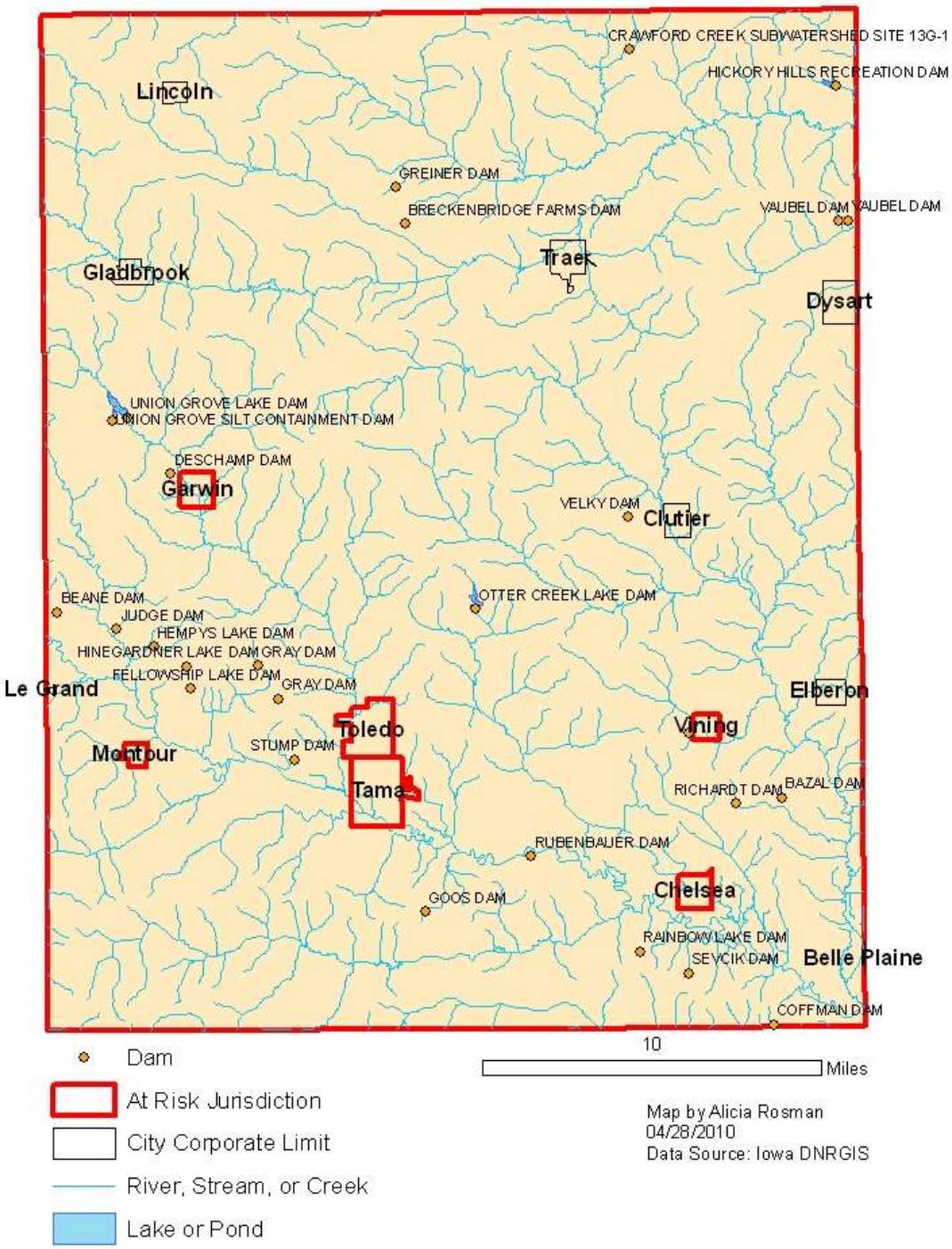
Karst soils are an indicator of possible sinkholes. The map above shows areas that are either near or vulnerable to the sinkhole hazard. The two cities in Tama County that are vulnerable in terms of sinkholes are Montour and Tama. Rural sections along the east central and northeast sections of the county are also vulnerable to this hazard.

Figure 4.1.4: Sinkholes



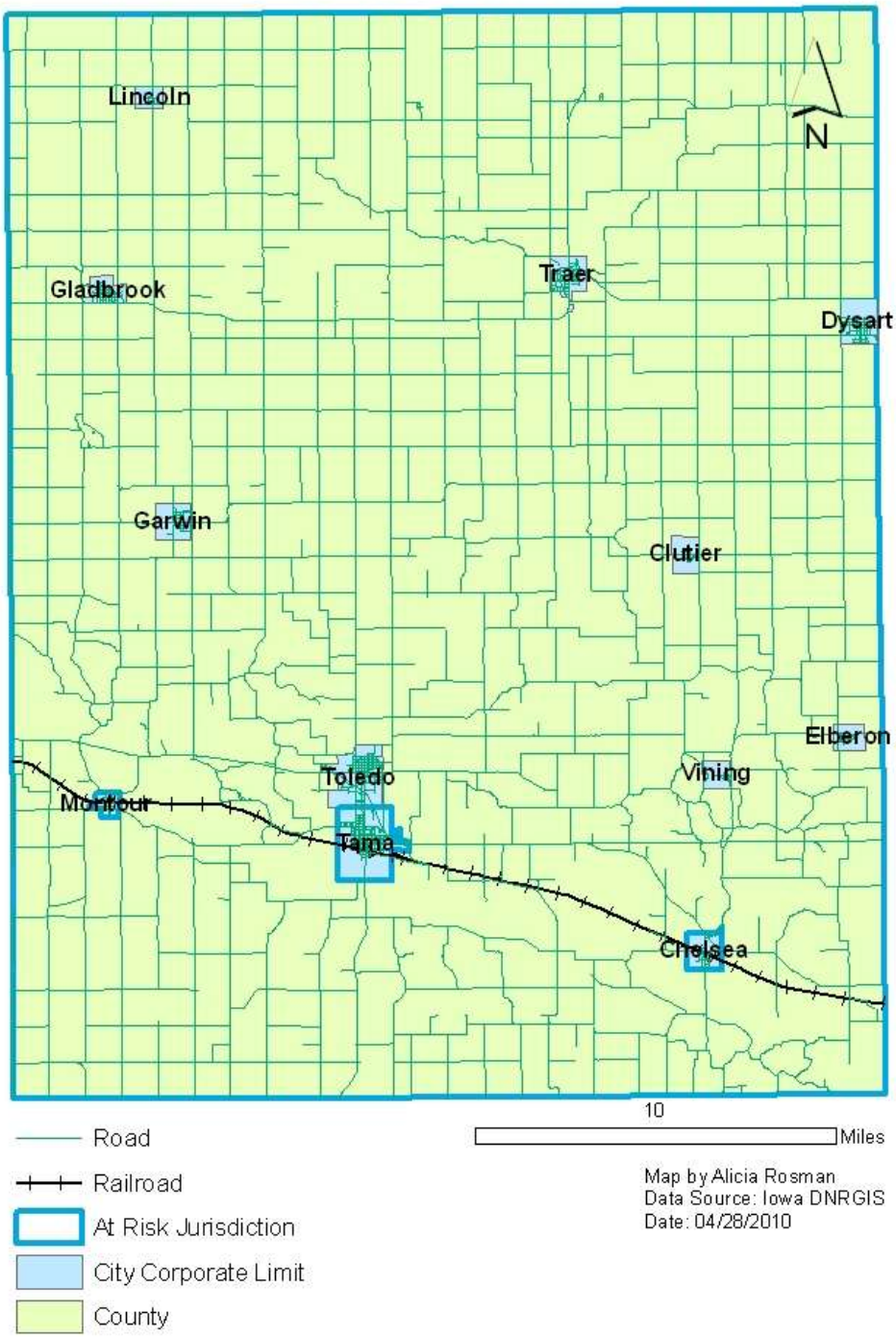
There are fewer than 20 dams located on the waterways of Tama County. None of these dams are high hazard but generally all areas near and downstream from a failed dam can be adversely affected by a dam failure. Just in case this hazard may occur, the jurisdictions that are downstream from a dam were identified to be within dam failure hazard boundaries.

Figure 4.1.5: Dam Failure



A Union Pacific Railroad freight line runs through the southern portion of Tama County. Only the jurisdictions along the rail line should be at risk for a rail transportation incident. Unincorporated Tama County is listed, but only the immediate surroundings of the rail line throughout the county are most at risk.

Figure 4.1.6: Rail Transportation Incident

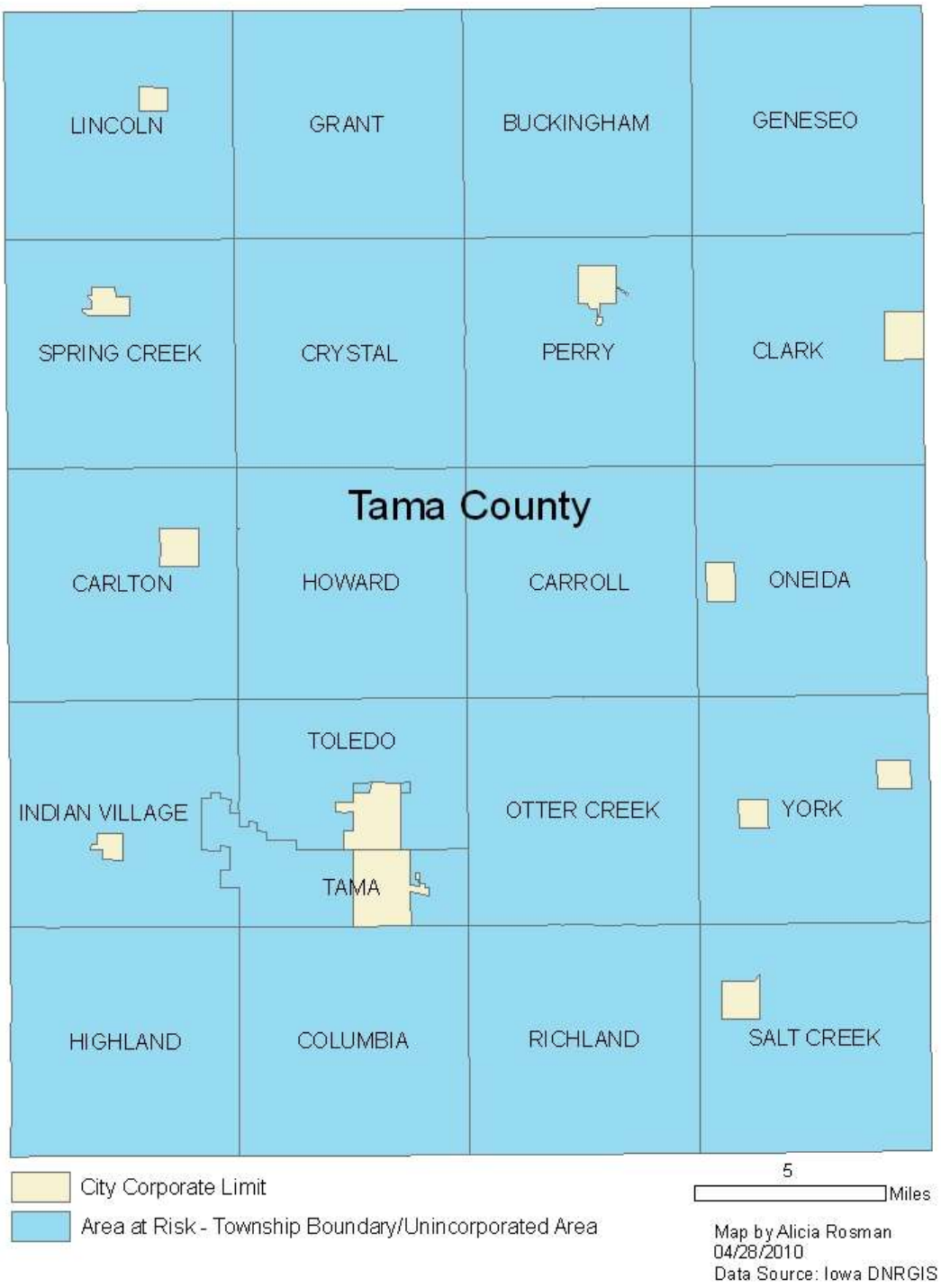


Major pipelines do not run through all jurisdictions in Tama County. At least for natural gas lines, looking at the natural gas utility service availability in the county is an indicator besides this map. Most of the lines that run through the county are natural gas along with one ammonia line and one petroleum line.

Figure 4.1.7: Pipeline Transportation Incident

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

Figure 4.1.8: Animal/Crop/Plant Disease



4.2 Hazard Profiles

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

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

The actual profiles of each possible hazard are based on the format used by Iowa's 2007 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 in the future
- Vulnerability of citizens, visitors, and emergency responders during and after a hazard event
- Maximum geographic extent of the hazard
- 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 and ranking method from Iowa's 2007 plan is also used and included in the hazard profiles in the following pages. Refer to pages 168-169 for an explanation of the score for each element of the hazard profiles. The total score for each hazard is at the bottom of its profile. The higher the score, the higher priority the hazard is in Tama County. The hazards will be formally ranked in the next step of the planning process.

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

Description

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

Historical Occurrence (2)

According to the Palmer Drought Severity Index, a composite of evapotranspiration, recharge, runoff, loss, and precipitation, Iowa has suffered seven periods of drought conditions since 1910. While some may have been more severe than others, agricultural areas were affected much more than the metropolitan areas where impacts were indirect.

According to the National Climatic Data Center (NCDC), Tama County has experienced five drought events since 1995. The most recent drought was in 2003. The total property damage to Tama County and the other areas affected by all recorded droughts total $645 million, and crop damaged reached a total of $1.39 billion. No deaths or injuries were reported during any of drought events.

Probability (2)

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.

Vulnerability (4)

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.

Maximum Extent (4)

A drought would likely affect most of Tama County and Iowa if not the entire Midwest. Because of the dependence on precipitation and water, the agricultural areas would be most adversely impacted. Though this is the case, the entire County would likely feel at least some impact.

Severity (2)

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 (1)

Drought warning is based on a complex interaction of many different variables, water uses, and consumer needs. Drought warning is directly related to the ability to predict the occurrences of atmospheric conditions that produce the physical aspects of drought, primarily precipitation and temperature. There are so many variables that can affect the outcome of climatic interactions, and it is difficult to predict a drought in advance. An area may already be in a drought before it is recognized. While the warning of the drought may not come until the drought is already occurring, the secondary effects of a drought may be predicted and warned against weeks in advance.

Total Score: 15

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

Description

Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation, and recreation. Flooding, operating error, poor construction, lack of maintenance, damage due to burrowing animals, vandalism, terrorism, and earthquakes can cause dam failure. Dams are classified into three categories based on the potential risk to people and property should a failure occur: High Hazard – if the dam 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.

Historical Occurrence (1)

There are no major dam failures to report for Tama County.

Probability (1)

The probability of a major dam failure occurring in or affecting Tama County is low.

Vulnerability (2)

People and property along streams are most vulnerable. Facilities and lives considerable distances from the actual impoundment are not immune from the hazard. Depending on the size and volume of the impoundment as well as the channel characteristics, a flash flood can travel a significant distance.

Maximum Extent (1)

The area impacted following a dam failure would be limited to those areas in and near the floodplain. People and property outside the floodplain could also be impacted depending on the proximity to the dam and the height above the normal stream level.

According to a study in 2007 by the Iowa DNR, there are five dams (not high hazard) along the Iowa River that are located upstream from the City of Tama. Failure at any of these dams especially the dam closest to Tama can affect the cities of Tama, Toledo, and Chelsea, which are downstream. Tama does have a levy on its south side near the Iowa River, but dam failure upstream can increase water levels to those higher than the levy can handle especially if there is already river flooding. Chelsea on the other hand, already has frequent flooding issues that do not need to be increased.

Garwin, Montour, and Vining were also identified as jurisdictions that are at risk for this hazard. All of these cities have dam(s) located upstream. These dams, though, are not high hazard so the chance of major issues is very low like in Tama, Toledo, and Chelsea.

Severity (3)

There are 2,442 inventoried dams located in Iowa. Of these, 63 are high hazard, 160 are categorized as significant hazard, and 2,219 are classified as low-hazard dams. The severity of damage could range from property damage, if a small subdivision impoundment failed, all the way to multiple deaths, injuries, and extensive property damage if a large high-hazard dam, such as the Saylorville Reservoir, failed upstream from Des Moines. None of the dams in Tama County are considered high hazard.

Speed of Onset (4)

A dam failure can be immediate and catastrophic leaving little or no time to warn those downstream of the imminent hazard. With maintenance and monitoring, weak areas and possible failure points can be identified allowing time for evacuation and securing of the dam. Most dams are only inspected periodically thus allowing problems to go undetected until a failure occurs.

Total Score: 12

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

Description

An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the Earth's surface. This shaking can cause buildings and bridges to collapse; disrupt gas, electric, and phone service; and sometimes trigger landslides, flash floods, and fires. The three general classes of earthquakes now recognized are: tectonic, volcanic, and artificially produced.

Historical Occurrence (1)

Iowa as a whole has experienced the effects of only a few earthquakes in the past two centuries. The epicenters of 12 earthquakes have been located in the state. The majority has been along the Mississippi River, and none have been in central Iowa. The last earthquake to occur in Iowa was near the eastern Iowa town of Oxford in 1948. Since the early 1800s, another 9 earthquakes have occurred outside of Iowa but have impacted areas in the state. While more than 20 earthquakes have occurred in or impacted Iowa in the past 200 years, they have not seriously affected the state. According to the National Climatic Data Center, there have been no earthquakes in Tama County.

Probability (1)

Seismologists attempt to forecast earthquake size and frequency based on data from previous events. In the New Madrid Fault Zone, this analysis is difficult because there are few historic moderate to large earthquakes, and the active faults are too deeply buried to monitor effectively. Based on recurrence intervals for small earthquakes, scientists estimate a 90% chance of a Richter magnitude 6.0 earthquake in the New Madrid Fault Zone by 2040. A magnitude 6.5 in New Madrid would create a magnitude 4 effect in Iowa resulting in little or no damage to fear.

Vulnerability (4)

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

Maximum Extent (4)

The strongest earthquake in Iowa occurred in Davenport in 1934 and resulted in only slight damage. Estimated effects of a 6.5 Richter magnitude earthquake along the New Madrid Fault Zone suggests Iowans in four southeast counties could experience trembling buildings, some broken dishes and cracked windows. About 29 other counties, from Page to Polk to Muscatine, could experience vibrations similar to the passing of a heavy truck, rattling of dishes, creaking of walls, and swinging of suspended objects. If an earthquake were to occur, it would more than likely be felt in all of Tama County.

Severity (2)

Due to the relatively low magnitude of earthquakes that would occur in the state, and the distance from the epicenter of an earthquake that would occur in the New Madrid Fault Zone, Iowans would likely see only minor impacts. Fatalities would be very rare, injuries limited to falls and small-unsecured objects, property loss would likely be minimal, and economic loss could occur due to short disruptions in commercial and industrial activities.

Speed of Onset (4)

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

Total Score: 16

Extreme Heat [Temperatures, including heat index, in excess of 100 degrees Fahrenheit or three successive days of 90+ degrees Fahrenheit. A head advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees]

Description

A prolonged period of excessive heat and humidity. The heat index is a number in degrees Fahrenheit that tells how hot it really feels when relative humidity is added to the actual air temperature. Exposure to full sunshine can increase the heat index by at least 15 degrees. Extreme heat can impose stress on humans and animals. Heatstroke, sunstroke, cramps, exhaustion, and fatigue are possible with prolonged exposure or physical activity due to the body's inability to dissipate the heat. Urban areas are particularly at risk because of air stagnation and large quantities of heat absorbing materials such as streets and buildings. Extreme heat can also result in distortion and failure of structures and surfaces such as roadways and railroad tracks.

Historical Occurrence (1)

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

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

Probability (4)

Based on historical information, Iowa will likely experience about 26 days a year with temperatures above 90 degrees. There is a very good change that there will also be a period of 3 consecutive days or more with temperatures in the 90s. It is also common for the temperature to hit 100 degrees or more once every three years during the summer months.

Vulnerability (4)

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.

Maximum Extent (4)

Most of the County and State would likely be impacted by extreme heat, but urban areas pose special risks. The stagnant atmospheric conditions of the heat wave trap pollutants in urban areas and add to the stresses of hot weather.

Severity (2)

Extreme heat has broad and far-reaching sets of impacts. These include significant loss of life and illness, economic costs in transportation, agriculture, production, energy, and infrastructure. Transportation impacts include the loss of lift for aircrafts, softening of asphalt roads, buckling of highways and railways, and stress on automobiles and trucks (increase in mechanical failures). Livestock and other animals are adversely impacted by extreme heat. High temperatures at the wrong time inhibit crop yields as well. Electric transmission systems are impacted when power lines sag in high temperatures. High demand for electricity also outstrips supply, causing electric companies to have rolling blackouts. The demand for water also increases sharply during periods of extreme heat. This can contribute to fire suppression problems for both urban and rural fire departments.

Speed of Onset (1)

As with other weather phenomena, periods of extreme heat are predictable within a few degrees within three days or so. Variations in local conditions can affect the actual temperature within a matter of hours or even minutes. The National Weather Service will initiate alert procedures when the heat index is expected to exceed 105 degrees Fahrenheit for at least two consecutive days.

Total Score: 16

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

Description

Flash flooding result from intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area. Flash flooding is an extremely dangerous form of flooding which can reach full peak in only a few minutes and allows little or no time for protective measures to be taken by those in its path. Flash flood water moves at very fast speeds and can roll boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. Flash flooding often results in higher loss of life, both human and animal, than slower developing river and stream flooding.

Historical Occurrence (4)

Flash floods are the most common and widespread of all-natural disasters except fire. In Iowa, as much as 21" of rain has fallen in a 24-hour period. According to the National Climatic Data Center, eight flash flood events have affected Tama County since 2000. Five of these flash floods occurred very recently in 2008 and resulted in $90,000 in property damage. The other three flash floods occurred in 2000 and resulted in $350,000 in property. 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.

Probability (4)

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

Vulnerability (4)

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

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

Maximum Extent (4)

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

Severity (3)

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.

Speed of Onset (4)

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.

Total Score: 23

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

Description

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

Historical Occurrence (1)

According to the National Climatic Data Center, there were no wildland or forest fire events reported in Tama County. This does not account for small or contained grass fires that may not have been reported.

Probability (4)

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

Vulnerability (4)

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

Maximum Extent (2)

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. 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 fire issues.

Severity (2)

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

Speed of Onset (4)

As mentioned above, most grassfires occur without warning and travel at a moderate rate. This situation depends upon conditions at the time such as moisture, wind, and land cover.

Total Score: 14

Hailstorm [An outgrowth of a severe thunderstorm in which balls or irregularly shaped lumps of ice greater than 0.75 inches in diameter fall with rain]

Description

Hail is produced by many strong thunderstorms. Strong rising currents of air within a storm carry water droplets to a height where freezing occurs. 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.

Historical Occurrence (4)

According to the National Climatic Data Center, there have been 70 hail events in Tama County since 1961. No deaths or injuries were reported, but the sum total of all the property damage from these hail events is $334,000. The resulting crop damage is $379,000.

Probability (4)

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

Vulnerability (3)

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.

Maximum Extent (4)

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

Severity (3)

Hailstorms cause nearly $1 billion annually in property and crop damage in the United States. The peak hail activity coincides with the Midwest's peak agricultural season. Financial impacts resulting from damage to property is in the millions of dollars every year, most of which is covered by crop and hazard insurance.

Speed of Onset (4)

Forecasting of hailstorms as with their parent thunderstorms is becoming quite accurate due to the advancement in Doppler Radar and other technologies operated by the National Weather Service and television network weather departments. Warnings in the 20 to 30 minute range are usually available prior to the occurrence of the storm.

Total Score: 22

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

Description

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

Historical Occurrence (1)

The only levee in Tama County is located in the City of Tama along the Iowa River and Deer Creek on the south side of the community. The levee was constructed in 1995 and has not yet had any failures. The levee's length is 2.75 miles, and it protects less than five square miles of the community. The level of protection, though, is for 1% annual chance and 0.2% annual chance year flood boundaries. There have been no reported failures since its construction.

Probability (1)

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

Vulnerability (2)

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

Maximum Extent (1)

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

Severity (3)

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

Speed of Onset (4)

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

Total Score: 12

River Flood [A rising or overflowing of a tributary or body of water that covers adjacent land not usually covered by water when the volume of water in a stream exceeds the channel's capacity]

Description

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

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

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

Historical Occurrence (4)

According to the NCDC, since 1950, Tama County has experienced 47 river flood events with no deaths or injuries reported. The total property damages that resulted from these events total nearly $165.5 million, and the crop damages total nearly $47.3 million.

The most recent and major floods in Iowa since 1993 occurred in the Spring and Summer of 2008. According to the National Climatic Data Center (NCDC), in Tama County, there were six river flooding events that affected the cities of Dysart, Gladbrook, Toledo, Haven, Montour, and the Tama and Traer Airport areas. The total property damages that resulted reached $205,000, and the crop damages totaled $10,000.

The City of Tama is fortunate to have a levee that is built 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.

Other communities in Tama County that experienced flooding in 2008 include: Chelsea, Toledo, Dysart, Traer, and Montour. The flooding ranged from homes inundated by water, to wastewater backups in homes, to flooded streets. Each community has its own specific issues pertaining to flooding. These will be discussed further in the Vulnerability Assessment.

Probability (4)

With the presence of the levee on the south side of Tama and considering the results of the flood in the summer of 2008, flooding is very likely to occur in some Tama County cities and unincorporated areas. The chance of human injury or property damage is low or will result in minimal damages.

Vulnerability (4)

The vulnerability from river flooding is quite delineated. 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.

Maximum Extent (3)

The Federal Emergency Management Agency has delineated the probable extent of the 1% annual chance floodplain in most areas. Flood Insurance Rate Maps (FIRMs) show properties affected by the floods that have at least 1% chance of occurring in any particular year. Generally, these areas are in the floodplain or adjacent areas. A large portion of the land in Tama County's incorporated cities is within the 1% annual chance floodplain, and a great deal of land outside the city corporate limits is also within the floodplain. All of the jurisdictions included in this plan are considered at risk except Lincoln.

Severity (3)

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.

Speed of Onset (2)

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.

Total Score: 20

Severe Winter Storm [Severe winter weather conditions that affect day-to-day activities. These can include blizzard conditions, heavy snow, bowing snow, freezing rain, heavy sleet, and extreme cold]

Description

Winter storms are common during the months October through April. The various types of extreme winter weather cause considerable damage. Heavy snows cause immobilized transportation systems, downed trees and power lines, collapsed buildings, and loss of livestock and wildlife.

Blizzard conditions are winter storms which last at least three hours with sustained wind speeds of 35 mph or more, reduced visibility of ¼ mile or less, and white-out conditions. Heavy snows of more than six inches in a 12-hour period or freezing rain greater than ¼ inch accumulation causing hazardous conditions in the community can slow or stop the flow of vital supplies as wells as disrupting emergency and medical services. Loose snow begins to drift when the wind speed reaches 9 to 10 mph under freezing conditions. The potential for some drifting is substantially higher in open country than in urban areas where buildings, trees, and other features obstruct the wind.

Severe ice storms have caused total electric power losses over large areas of Iowa and rendered assistance unavailable to those in need due to impassable roads. Frigid temperatures and wind chills are dangerous to people, particularly the elderly and the very young. Dangers include frostbite or hypothermia. Water pipes, livestock, fish and wildlife, and pets are also at risk from extreme cold and severe winter weather.

Historical Occurrence (4)

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

According to the National Climatic Data Center, Tama County has been affected by 50 snow and ice events since 1993. A total of six deaths and no injuries were reported due to these snow and ice events. Also, property damage reached a total of almost $56 million, and crop damages reached $65 million.

Probability (4)

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.

Vulnerability (4)

Hazardous driving conditions due to snow and ice on highways and bridges lead to many traffic accidents. The leading cause of death during winter storms is transportation accidents. About 70 percent of winter-related deaths occur in automobiles and about 25 percent are people caught out in the storm. The majority of these are males over 40 years of age. Emergency services such as police, fire, and ambulance are unable to respond due to road conditions. Emergency needs of remote or isolated residents for food or fuel, as well as feed, water and shelter for livestock are unable to be met. People, pets, and livestock are also susceptible to frostbite and hypothermia during winter storms. Those at risk are primarily either engaged in outdoor activity like shoveling snow, digging out vehicles, assisting stranded motorists, or are the elderly or very young. Schools often close during extreme cold or heavy snow conditions to protect the safety of children and bus drivers. Citizens' use of kerosene heaters and other alternative forms of heating may create other hazards such a structural fires and carbon monoxide poisoning.

Maximum Extent (4)

Winter storms are quite vast and would likely impact multiple counties. Certain areas may experience local variations in storm intensity and quantity of snow or ice. The Iowa Department of Transportation, county road departments, and local public works agencies are responsible for the removal of snow and treatment of snow and ice with sand and salt on the hundreds of miles of streets and highways in the area. Overall, any area of Tama County can be affected.

Severity (3)

Immobilized transportation, downed trees and electrical wire, building and communication tower collapse, and bodily injury or death are just a few of the impacts of a severe winter storm. Vehicle batteries and diesel engines are stressed and the fuel often gels in extreme cold weather. This impacts transportation, trucking, and rail traffic. Rivers and lakes freeze and subsequent ice jams threaten bridges and can close major highways. Ice jams can also create flooding problems when temperatures begin to rise.

An ice coating at least ¼ inch in thickness is heavy enough to damage trees, overhead wires, and similar objects and to produce widespread power outages. Buried water pipes can burst causing massive ice problems, loss of water, and subsequent evacuations during sub-zero temperatures.

Fire during winter storms presents a great danger because water supplies may freeze, and firefighting equipment may not function effectively or personnel and equipment may be unable to get to the fire. If power is out, interiors of homes become very cold, causing pipes to freeze and possibly burst.

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

Speed of Onset (2)

The National Weather Service has developed effective weather advisories that are promptly and widely distributed. Radio, television, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public up to a day in advance. Several notifications made by the National Weather Service include winter storm warning, blizzard warning, winter weather advisory, and a frost/freeze advisory.

Total Score: 21

Sinkhole [Land surface that is collapsed into subsurface voids]

Description

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

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

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

New sinkholes have been correlated to land-use practices, especially from ground-water pumping and from construction and development practices. Sinkholes can also form when natural water-drainage patterns are changed and new water-diversion systems are developed. Some sinkholes form when the land surface is changed, such as when industrial and runoff-storage ponds are

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

Historical Occurrence (1)

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

Probability (1)

In Tama County, there are a few areas (Montour, Tama, and western and northern rural areas) that are susceptible to sinkholes but there is no history of this issue so the probability of a sinkhole occurring is very low.

Vulnerability (2)

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

Maximum Extent (1)

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

Severity (3)

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

Most of Iowa's sinkholes occur in rural areas where their main impact is rendering some land unsuitable for row-crop agriculture. Sinkholes have also resulted in the failure of farm and other types of ponds, roads, and one sewage-treatment lagoon. As sinkholes sometimes allow surface runoff to directly enter bedrock aquifers, their presence has implications for groundwater quality.

Speed of Onset (4)

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

Total Score: 12

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

Description

Thunderstorms are common in Iowa and can occur singly, in clusters, or in lines. They are formed from a combination of moisture, rapidly raising warm air, and a lifting mechanism such as clashing warm and cold air masses. Most thunderstorms produce only thunder, lightning, and rain. Severe storms, however, can produce tornadoes, high straight-line winds above 58 mph or higher, microburst, lightning, hailstorms, and flooding.

The National Weather Service considers a thunderstorm severe if it produces hail at least ¾ inch in diameter, wind 58 mph or higher, or tornadoes. High straight-line winds, which can often exceed 60 mph, are common occurrences and are often mistaken for tornadoes.

Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a “bolt.” This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches temperatures approaching 50,000 degrees Fahrenheit in a split second. This rapid heating, expansion, and cooling of air near the lightning creates thunder.

Historical Occurrence (4)

According to the National Climatic Data Center, Tama County has experienced about 100 thunderstorm and high wind events since 1962. Out of these 100 events, no deaths but 29 injuries occurred. The total property damage from these storms reaches almost 3.5 million, and the crop damage totals $100,000. The high winds ranged from speeds of zero mph to nearly 90 mph.

Probability (4)

Iowa experiences between 30 and 50 thunderstorm days per year on average. With Iowa's location in the interior of the U.S., there is a very high likelihood that a few of these summer storms will become severe and cause damage. Because of the humid continental climate that Iowa experiences, ingredients of a severe thunderstorm are usually available (moisture to form clouds and rain, relatively warm and unstable air that can rise rapidly, and weather fronts and convective systems that lift air masses).

Vulnerability (4)

People in unprotected areas, mobile homes, or automobiles during a storm are at risk. Sudden strong winds often accompany a severe thunderstorm and may blow down trees across roads and power lines. Lightning presents the greatest immediate danger to people and livestock during a thunderstorm. It is the second most frequent weather-related killer in the U.S. with nearly 100 deaths and 500 injuries each year. Floods and flash floods are the number one cause of weather-related deaths in the U.S.

Livestock and people who are outdoors, especially under a tree or other natural lightning rods, in or on water, or on or near hilltops are at risk from lightning. Hail can be very dangerous to people, pets, and livestock if shelter is not available.

Flash floods and tornadoes can develop during thunderstorms as well. People who are in automobiles or along low-lying areas when flash flooding occurs and people who are in mobile homes are vulnerable to the impacts of thunderstorms.

Maximum Extent (4)

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

Severity (2)

Like tornadoes, thunderstorms and lightning can cause death, serious injury, and substantial property damage. Severe thunderstorms can bring a variety of associated hazards with them including straight-line winds in excess of 100 mph. Straight-line winds are responsible for most thunderstorm damage. High winds can damage trees, homes (especially mobile homes), and businesses and can knock vehicles off of the road. The power of lightning's electrical charge and intense heat can electrocute people and livestock on contact, split trees, ignite fires, and cause electrical failures.

Thunderstorms can also bring large hail that can damage homes and businesses, break glass, destroy vehicles, and cause bodily injury to people, pets, and livestock. One or more severe thunderstorms occurring over a short period can lead to flooding and cause extensive damage, power and communication outages, and agricultural damage.

Speed of Onset (2)

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

Total Score: 20

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

Description

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

Historical Occurrence (4)

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.

According to the National Climatic Data Center, there have been three reported funnel clouds since 1994, and there have been 39 tornadoes reported since 1953, in Tama County. From these events, one death and ten injuries have occurred. The intensity of these tornadoes ranged from FO to F3. The total property damage throughout the county totaled about $33 million, and the crop damage was just $4,000.

Probability (4)

Historically, 30-40 tornadoes are confirmed in Iowa per year. Looking at historical data, tornadoes do not occur every year in Tama County. However, in the years that the county does have a tornado, often multiple tornadoes will occur. It should be noted that in the past decade, tornadoes have been reported every year except the most recent year (2008).

Vulnerability (4)

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.

Maximum Extent (4)

Generally, the destructive path of a tornado is only a couple hundred feet in width, but stronger tornadoes can leave a path of devastation up to a mile wide. Normally, a tornado will stay on the ground for no more than 20 minutes; however, one tornado can touch ground several times in different areas. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. The most damaging tornado that is likely to occur is an F3, which is based on historical tornado events in Tama County.

Severity (4)

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.

Speed of Onset (4)

Tornadoes strike with an incredible velocity. Wind speeds may approach 300 mph and the storm can travel across the ground at more than 70 mph. These winds can uproot trees and structures and turn harmless objects into deadly missiles, all in a matter of seconds. The advancement in weather forecasting has allowed 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.

Total Score: 24

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

Description

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

Historical Occurrence (4)

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

In Tama County, according to the National Climatic Data Center, there are about 32 high wind events that were separated from either a thunderstorm or extreme wind chill. These windstorms occurred between 1993 and 2006, and wind speeds during these windstorms ranged from less than one knot to 72 knots. One death and eight injuries were reported during these windstorm events. The total amount of property damage from these windstorms is almost $3.5 million, and the total crop damage is about $513,000.

Probability (4)

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 (4)

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.

Maximum Extent (4)

Unlike tornadoes, windstorms may have a destructive path that is several miles wide. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. Wind speeds can reach up to 70 knots or greater during a windstorm event, so a major event is possible.

Severity (2)

The severity of damage from windstorms can be very high. Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows, all the way to complete destruction and disintegration of well-constructed structures, infrastructure, and trees. Injury or death related to windstorms most often occurs when buildings collapse; people are hit by flying objects or are caught trying to escape the windstorm in a vehicle. Crop damage is often associated with windstorms, laying down crops, breaking stalks, and twisting plants, reduce the yield and making it difficult to harvest.

Speed of Onset (4)

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.

Total Score: 22

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

Description

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

Historical Occurrence (1)

Statewide, the most recent animal/crop/plant disease was the West Nile Virus (WNV). First indentified in New York City and carried by birds and mosquitoes, the disease spread to four states in 1999 and to 12 states and the District of Columbia in 2000. WNV causes severe neuralgic infections 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. 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.

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.

Probability (2)

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

Vulnerability (4)

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

Maximum Extent (4)

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

Severity (3)

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

Speed of Onset (2)

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

Total Score: 16

Communications Failure [The widespread breakdown or disruption of normal communication capabilities. This could include major telephone outages, loss of local government radio facilities, or long-term interruption of electronic broadcast services]

Description

Emergency 911, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Business and industry rely heavily on various communication media as well. Mechanical failure, traffic accidents, power failure, line severance, and weather can affect communication systems and disrupt service. Disruptions and failures can range from localized and temporary to widespread and long-term. If switching stations are affected, outage could be more widespread.

Historical Occurrence (1)

No widespread communications failures have occurred in Iowa. Local incidents due to weather conditions, equipment failure, excavation incidents, and traffic accidents have been reported, but outages have usually been resolved in a timely manner.

Probability (1)

Widespread communications losses are unlikely due to backup systems and redundant system designs. Local communications failures are likely to affect small areas of the county.

Vulnerability (4)

Citizens of the community would only be impacted indirectly. Phone and data transmission could be impacted. Most communication systems that are highly necessary have backup and are redundant in order to provide continuity of service.

Maximum Extent (2)

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

Severity (2)

A communications failure would not directly result in injuries or fatalities. Most financial losses would be incurred due to the direct damage to electronic equipment and the communication system infrastructure. If emergency 911 systems were to fail due to phone communication disruption, secondary impacts could occur by the inability of citizens to alert responders of their needs. Inter-agency and intra-agency communications would be limited. Data transmission could also be affected. This could disrupt business and financial transactions resulting in potential loss of business.

Speed of Onset (4)

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

Total Score: 14

Energy Failure [An extended interruption of electric, petroleum or natural gas service, which could create a potential health problem for the population]

Description

International events could potentially affect supplies of energy-producing products, while local conditions could affect distribution of electricity, petroleum, or natural gas. The magnitude and frequency of energy shortages are associated with international markets. Local and state events such as ice storms can disrupt transportation and distribution systems. If disruptions are long lasting, public shelters may need to be activated to provide shelter from either extreme cold or extreme heat. Stockpiles of energy products eliminate short disruptions, but can also increase the level of risk to people and property in proximity to the storage site.

On the other hand, there are also shorter term interruptions of energy due to some sort of damage or malfunction to infrastructure. An example is a loss of electricity due to damaged electric lines or loss of natural gas due to a damage pipeline.

Historical Occurrence (4)

According to Tama County Emergency Management, over the past five years there have been approximately 36 power outages. Most outages are due to summer or winter storms. During some storms, multiple outages have been reported. There have been no major interruptions or shortages at an international level to affect Tama County.

Probability (4)

Only when free market forces cease to provide for the health, welfare, and safety of the citizens, can governments take appropriate actions to limit the effects of an energy shortage. The State of Iowa has three strategies to limit the likelihood of an energy shortage. Through voluntary an mandatory demand reduction mechanisms; the substitution of alternative energy sources when possible; and state government programs to curtail excessive use, energy supply and demand can be kept in check. The federal government has a strategic petroleum reserve to supplement the fuel supply during energy emergencies. Shortage, especially electrical shortage, can be unpredictable with immediate effects. Natural events, human destruction, price escalation, and national security energy emergencies can cause unavoidable energy shortages.

Vulnerability (4)

Because Iowa is almost entirely dependent on out-of-state resources for energy, Iowans must purchase oil, coal, and natural gas from outside sources. World and regional fuel disruptions are felt in Iowa. It is likely that increasing prices will occur as market mechanisms are used to manage supply disruptions. This will disproportionately affect the low-income population because of their lower purchasing power. Agricultural, industrial, and transportation sectors are also vulnerable to supply, consumption, and price fluctuations. In Iowa, petroleum represents 97% of transportation fuel. Individual consumers such as commuters are also vulnerable.

In the case of shorter term outages, people in their homes or care facilities are vulnerable if they have special medical needs that require equipment powered by electricity or some other form of power that can be lost. Also, during times of extreme temperature, people are vulnerable because they may not be able to heat or cool their home.

Maximum Extent (4)

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

Severity (3)

Injuries and fatalities would not be directly caused by an energy shortage. Injuries and fatalities could occur if energy was not available for heating during extreme cold periods or for cooling during extreme heat. Hospitals, shelters, emergency response vehicles and facilities, and other critical facilities would have priority during energy shortages. Rotating blackouts, voluntary conservation measures, and possibly mandatory restrictions could be used to limit the severity of an energy shortage. Effects could range from minor heating and air conditioning disruptions to transportation limitations all the way to civil unrest due to the high demand, low supply, and subsequent high price. Business disruption and increased cost of business would have far-reaching financial implications across many sectors of the economy.

Speed of Onset (4)

The Iowa Department of Natural Resources Energy Bureau monitors domestic and international energy situations and has developed a plan to deal with an energy crisis. Signs that an energy shortage may be developing can be recognized even months in advance, but energy shortages/emergencies can rise suddenly and unexpectedly. Supply distribution problems in other countries and local weather situations can lead to low supply coupled with high demand in a matter of a day or two. As for outages, there is no warning for this type of Energy failure.

Total Score: 23

Highway Transportation Incident [A single or multi-vehicle incident which requires responses exceeding normal day-to-day capabilities]

Description

An extensive surface transportation network exists in Tama County. Local residents, travelers, business, and industry rely on this network on a daily basis. Thousands of trips a day are made on the streets, roads, and highways. If the designed capacity of the roadway is exceeded, the potential for a major highway incident increases. Weather conditions play a major factor in the ability of traffic to flow safely in and through the county as does the time of day and day of week. Incidents involving buses and other high-occupancy vehicles could trigger a response need that exceeds the normal day-to-day capabilities of response agencies.

Historical Occurrence (4)

According to the Iowa Department of Transportation, between 2001 and 2005, there were a total of 1,638 car crashes in Tama County. Within these crashes, 662 injuries were sustained while 31 of these injuries were fatal.

Rural crashes outnumber urban crashes in Tama County with 1,164 crashes occurring in rural areas between 2001 and 2005. The urban crashes during this period of time are less than half that total, at 474. Also, more rural crashes result in fatal injuries than urban crashes. Four urban crashes resulted in four fatal injuries while rural crashes resulted in 27 fatal injuries.

Probability (4)

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

Vulnerability (4)

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.

Maximum Extent (1)

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

Severity (2)

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. Between 2001 and 2005 there were over 1,600 car crashes; 21 of these crashes resulted in 31 fatal injuries.

Speed of Onset (4)

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.

Total Score: 19

Pipeline Transportation Incident [A break in a pipeline creating a potential for an explosion or leak of a dangerous substance—oil, gas, water from water mains, etc.—possibly requiring evacuation]

Description

Iowa is served by many high pressure pipelines to residents and industries. 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.

Historical Occurrence (1)

According to Tama County Emergency Management, there have been no pipeline incidents in the history of Tama County.

Probability (1)

The vast majority of pipeline incidents that occur are caused by third-party damage to the pipeline, often due to construction or some other activity that involves trenching or digging operations. With development occurring at an unprecedented rate and the ground becoming more and more congested with utilities, the probability of an underground pipeline incident is significant.

Petroleum and natural gas pipeline accidents occur with some regularity, but they usually have a limited impact and are quickly and adequately handled by pipeline company emergency crews and local and state responders. Pipeline operators are required to coordinate all safety preparedness and response activities with the communities. Planning, training, and exercising of emergency procedures with all involved parties helps to limit the occurrence and severity of incidents.

Vulnerability (2)

People and property with pipelines on their land or nearby are the most at risk. In the event of a pipeline incident, those downwind and downhill of the release are the most vulnerable. People excavating earth near a pipeline are also at risk. Private homes and business served by natural gas have small diameter pipelines connected to their structure. The underground pipelines cross public streets, roads, and highways as well as streams. Iowa's natural environment is also vulnerable to contamination from an underground pipeline incident.

Maximum Extent (2)

Though often overlooked, petroleum and natural gas pipelines pose a real threat in the community. Most incidents affect only the area directly above or near the damaged pipeline. Depending on the size of pipeline and amount of product released, the extent of impact could be several hundred feet in diameter. Large areas may need to be evacuated to remove people from the threat of fire, explosion, or exposure. Pipelines have automatic shutoff valves installed so that damaged sections can be isolated and the volume of product escaping can be limited. Identification and caution signs are posted wherever pipelines pass under roads, streams, fence lines, or at any aboveground utilities.

Major pipelines are located in or around Tama County, Montour, Tama, Toledo, Gladbrook, Chelsea, Traer, and Dysart. Other Tama County cities do not have natural gas service and use individual LP tanks for power. The jurisdictions with major pipelines are much more likely to be affected by a potential pipeline transportation incident than those jurisdictions that do not.

Severity (2)

Petroleum and natural gas pipelines can leak or erupt and cause property damage, environmental contamination, injuries, and even loss of life. Accidents may be caused by internal or external corrosion, defective welds, incorrect operation, outside damage, or other defective pipeline or equipment. Most incidents involve crude oil, gasoline, or natural gas pipelines. All petroleum liquids pose dangers from fire or explosion, and the fire may produce poisonous or irritating gasses. Toxic fumes and direct contact can cause health hazards. Vapor clouds can travel a distance and settle in low-lying areas where the fumes may overcome people and animals. Released products should be treated as any other hazardous material. Large areas may need to be evacuated to remove people from the threat of fire, explosion, or exposure. These evacuations potentially save lives and limit injury, but they also disrupt businesses and inconvenience residents. A break in water pipelines may impact fire protection and the continuity of operations of business and industry and may affect the area by saturating the soil and causing rapid erosion.

Speed of Onset (4)

A pipeline incident may occur suddenly, but sight, sound, and smell can alert individuals that there may have been damage done to a pipeline in the area. Products may bubble up from the ground or collect in low-lying areas, a roaring or hissing noise may be heard, and most products give off distinct odor. These warning signs can alert individuals not to use any devices that may act as ignition sources and cause a fire or explosion.

Total Score: 12

Railway Transportation Incident [A derailment or a train accident which directly threaten life or property, or which adversely impacts a community's capabilities to provide emergency services]

Description

Railway incidents may include derailments, collisions, and highway/rail crossing incidents. Train incidents can result from a variety of causes. Human error, mechanical failure, faulty signals, and problems with the track can all lead to railway incidents. Results of an incident can range from minor "track hops" to catastrophic hazardous materials incidents and even passenger casualties. With the many miles of track in Iowa, there are numerous at-grade crossings at which vehicles must cross the railroad tracks. These crossings can be found throughout the County.

Historical Occurrence (4)

According to Tama County Emergency Management, there have been three train derailments in Tama County since 1999. There have been three car versus train accidents since 2004.

Probability (3)

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 makes the probability of a highway/rail collision significant. Derailments are also possible, while a major derailment would occur less frequently.

Vulnerability (4)

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.

Maximum Extent (4)

The Union Pacific Railroad runs throughout the southern portion of Tama County, through rural Tama County, Montour, Tama, Chelsea, and the South Tama County Community School District. There are 25 railway crossings throughout Tama County. Vehicle/train collisions are usually limited to areas in and near intersections. The incident will rarely result in widespread effects. The direct area of impact is usually quite small, but depending on the materials involved, the effect could reach areas up to 1-5 miles from the scene. Harmful products may contaminate streams, rivers, water distribution systems, and storm water systems. If this occurs, a large portion of the community could be affected. The ability of response agencies to contain the product on-scene usually limits the area affected.

Severity (3)

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.

Speed of Onset (4)

Like other transportation incidents, a railway incident would occur with no warning. There may be a limited amount of time to warn those in the pathway of the harmful effects.

Total Score: 22

Structural Failure [The collapse (part or all) of any public or private structure including roads, bridges, towers, and buildings]

Description

A road, bridge, or building may collapse due to the failure of the structural components or because the structure was overloaded. Natural events such as heavy snow may cause a roof of a building to collapse under the weight of the snow. Heavy rains and flooding can undercut and washout a road or bridge. The age of the structure is sometimes independent of the cause of the failure. Enforcement of building codes can better guarantee that structures are designed to hold up under normal conditions. Routine inspection of older structures may alert inspectors to "weak" points. The level of damage and severity of the failure is dependent on factors such as the size of the building or bridge, the number of occupants of the building, the time of day, day of week, amount of traffic on the road or bridge, and the type and amount of products stored in the structure.

Historical Occurrence (1)

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

Probability (1)

Civil structures may fail in a variety of modes. The unprecedented growth in technology has resulted in a host of problems related to complex structures, special materials, and severe operation and environmental loads, such as fire, excessive vibrations, explosion, high-energy piping failures, missiles, and earthquakes. With the possible exception of misuse, accidental or environmental loads, the causes of failure may be found in deficiencies in design, detailing, material, workmanship, or inspection. With the aging structures in the county along with problems with new materials, structural failures will continue to occur. Efforts to inspect and maintain structures will lessen the probability of a failure, but not guarantee that it will not happen in the future. Internal weaknesses can be hidden from inspectors and not be realized until it is too late.

Vulnerability (2)

There are many buildings in Tama County that are very old or which may become hazardous in the event of an earthquake, fire, high winds, or other natural events. All bridges are vulnerable to the effects of natural elements and the deterioration that results. Increases in the amount and weight of traffic they are expected to support increase their likelihood of failure.

Maximum Extent (1)

The impacts of the failed structure would be contained to the immediate area and adjacent properties. This could be as small as the house and yard of a fallen chimney, or the area could be relatively extensive if the structure that failed was a multi-story building of a downtown or a tall communication tower. All Tama County jurisdictions are at risk for this hazard. Dam and levee failure would affect a much larger area and are discussed as separate hazards.

Severity (2)

Bridge failures and debris in streets and sidewalks would interrupt normal routes of travel. Functional purpose of the building would be terminated or suspended until the integrity of the structure could be restored. Personal injury, death, and property damage may occur in the collapse itself or by falling debris from nearby structures. There would also be a considerable cost to replace or fix the structure, not to mention the loss of revenue that would occur because the structure could not be used. Utilities may be cut off to surrounding areas and communication transmissions may be lost for a period of time.

Speed of Onset (4)

The actually failure of the structure would like occur suddenly with little or no warning. There are several events that could lead up to the failure, and these have various warning times and are discussed in separate hazard worksheets. Causal hazards can include fire, explosion, overloading of ice and snow, vibration, earthquakes, flooding, high wind, erosion, chemical corrosion, subsidence, and lack of general upkeep.

Total Score: 11

Structural Fire [An uncontrolled fire in a populated area that threatens life and property and is beyond normal day-to-say response capabilities]

Description

Structural fires present a great threat to life and property and the potential for large economic losses. Modern fire codes and fire suppression requirements in new construction and building renovations, couple with improved firefighting equipment, training, and techniques, lessen the chance and impact of a major urban fire. Most structural fires occur in residential structures, but the occurrences of a fire in a commercial or industrial facility could affect more people and pose a greater threat to those near the fire or fighting the fire because of the volume or type of the material involved.

Historical Occurrence (4)

According to Tama County Emergency Management, in the past five years there have been: 13 business fires, nine garage fires, 70 residential fires, 45 vehicle fires, and 78 other fires (to include grass, barns, farm buildings, etc.)

Probability (4)

Much of the fire prevention efforts have gone into impeding nonresidential fires and the results have been highly effective. Even with an increase in the prevention efforts for residential fires, both residential and nonresidential fire will continue to occur. During colder months, clogged chimneys and faulty furnaces and fire places can increase the probability of structural fires.

Vulnerability (4)

Older structures with outdated electrical systems not built to current fire code standards are particularly vulnerable to fire. Combustible building materials obviously are more vulnerable than structures constructed of steel or concrete. Structures without early detection devices are more likely to be completely destroyed before containment by response agencies. Structures in areas served by older, small, or otherwise inadequate water distribution infrastructure such as water mains and hydrants are also at significant risk. Problems vary from region to region, often as a result of climate, poverty, education, and demographics, but Iowa has about 13.4 fire deaths per million people. The fire death risk is nearly two times that of the average population for children 5 years of age or less.

Maximum Geographic Extent (1)

With modern training, equipment, fire detection devices, and building regulations and inspections, most fires can be quickly contained and limited to the immediate structure involved. Certain circumstances, such as the involvement of highly combustible material or high winds, can threaten a larger area. The age and density of a particular neighborhood can also make it more vulnerable to fire due to the spreading of fire from neighboring structures. All Tama County jurisdictions are at risk for structural fires.

Severity of Impact (2)

Based on national averages in the 1990s, there is one death for every 119 residential structure fires and one injury for every 22 of these fires. On average, each residential fire causes nearly $11,000 of damage. In nonresidential fires, there is one death for every 917 fires, one injury for each 52 fires, and each nonresidential fire causes and average of nearly $20,000 in damage.

Speed of Onset (4)

While fires usually start with little or no warning time, alert devices can allow time for responders to contain the fire and allow occupants to evacuate the structure.

Total Score: 20

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

Description

A hazardous substance is one that may cause damage to persons, property, or the environment when released to soil, water, or air. Chemicals are manufactured and used in ever increasing types and quantities. As many as 500,000 products pose physical or health hazards and can be defined as "hazardous chemicals." Each year, over 1,000 new synthetic chemicals are introduced and transported across the county via semi truck and train. Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous materials incidents generally affect a localized area, and the use of planning and zoning can minimize the area of impact.

Historical Occurrence (4)

According to Tama County Emergency Management, there have been approximately 73 hazardous materials incidents in Tama County since 2004. It was not specified whether these incidents were fixed or transportation related.

Probability (4)

Large quantities of hazardous materials are transported daily on Iowa streets, highways, interstates, and railways. Roadways are a common site for the release of hazardous materials. Railways are another source for hazardous materials releases. The Department of Transportation regulates routes and speed limits used by carriers and monitor the types of hazardous materials crossing state lines. Despite increasing safeguards, more and more potentially hazardous materials are being used for commercial, agricultural, and domestic uses and are being transported on Iowa roads and railways.

Vulnerability (4)

A hazardous materials incident can occur almost anywhere so any area is considered vulnerable to an accident. People, pets, livestock, and vegetation in close proximity to transportation corridors and populations downstream, downwind, and downhill of a released substance are particularly vulnerable. Depending on the characteristics of the substance released, a larger area may be in danger from explosion, absorption, injection, ingestion, or inhalation. Occupants of areas previously contaminated may be harmed directly or through consumption of contaminated food and water.

Maximum Geographic Extent (1)

Most of the 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. Depending on the characteristic of the hazardous or the volume of product involved, the affected area can be as small as a room in a building or as large as 5 square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the product contaminates the municipal water supply or water system such as a river, lake, or aquifer. All jurisdictions are at risk.

Severity of Impact (2)

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

Speed of Onset (4)

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

4.3 Hazard Ranking

Once the hazards for Tama County were chosen and profiled, they were ranked against each other to determine which hazards can have the greatest impact on the county. The ranking was done according to the method used in the 2007 Iowa Hazard Mitigation Plan. The ranking method involves assigning a rating for historical occurrence, probability, human vulnerability, maximum geographic extent, severity of impact, and speed of onset. The framework for this method is below:

1. Historical Occurrence is the number of times that a hazard has occurred in the jurisdiction in the past 25 years. Assign a score accordingly.

Score	Description
1	Less than 4 occurrences in the past 25 years
2	4 to 7 occurrences in the past 25 years
3	8 to 12 occurrences in the past 25 years
4	More than 12 occurrences in the past 25 years

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

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

3. Human vulnerability measures the percentage of people who will be adversely affected by the occurrence of a hazard. Assign a score accordingly.

Score	Description
1	Negligible – Less than 1% of county
2	Limited – 1% to 10% of the county
3	Critical – 10% to 20% of the county
4	Catastrophic – More than 20% of the county

4. Maximum geographic extent is the percentage of the jurisdiction impacted by the hazard. Assign a score accordingly.

Score	Description
1	Negligible – Less than 1% of the county
2	Limited – 1% to 10% of the county
3	Critical – 10% to 20% of the county
4	Catastrophic – More than 20% of the county

5. Severity of impact is an assessment of severity in terms of injuries and fatalities, personal property, and infrastructure. Assign a score accordingly.

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

6. Speed of Onset: rating of the potential amount of warning time that is available before the hazard occurs. Assign a score accordingly.

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

Initially, the ranking of hazards was done by Region 6 before the first countywide meeting where they were presented for the Task Force to either agree or disagree with the outcome. The result of the ranking process is in Table 4.3.1 on the following page.

Table 4.3.1: Tama County Hazard Ranking Results

Hazard	Historical Occurrence	Probability	Human Vulnerability	Maximum Geographic Extent	Severity of Impact	Speed of Onset	Score
Tornado	4	4	4	4	4	4	**24**
Flash Flood	4	4	4	4	3	4	**23**
Energy Failure	4	4	4	4	3	4	**23**
Windstorm	4	4	4	4	2	4	**22**
Railway Transportation Incident	4	3	4	4	3	4	**22**
Hailstorm	4	4	3	4	3	4	**22**
Severe Winter Storm	4	4	4	4	3	2	**21**
Thunderstorms and Lightning	4	4	4	4	2	2	**20**
River Flood	4	4	4	3	3	2	**20**
Highway Transportation Incident	4	4	4	1	2	4	**19**
Hazardous Materials Incident	4	4	4	1	2	4	**19**
Structural Fire	4	4	4	1	2	4	**19**
Extreme Heat	1	4	4	4	2	1	**16**
Animal/Crop/Plant Disease	1	2	4	4	3	2	**16**
Earthquake	1	1	4	4	2	4	**16**
Drought	2	2	4	4	2	1	**15**
Grass or Wildland Fire	1	1	4	2	2	4	**14**
Communications Failure	1	1	4	2	2	4	**14**
Sinkhole	1	1	2	1	3	4	**12**
Pipeline Transportation Incident	1	1	2	2	2	4	**12**
Levee Failure	1	1	2	1	3	4	**12**
Dam Failure	1	1	2	1	3	4	**12**
Structural Failure	1	1	2	1	2	4	**11**

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

According to the ranking method, higher scores coincide with a greater potential for adverse impact on the county. In this case, the hazards with the greatest potential for adversely affecting Tama County are tornadoes, flash floods, and energy failure. Several other hazards scored very high, too.

The other hazards that ranked lower may occur less frequently and affect smaller areas, but do not necessarily cause less damage. This includes hazards like levee failure and structural failure. Other hazards like sinkhole and dam failure are ranked low. Their low ranking is mainly due to lack of historical data or knowledge. If one of these hazards were to occur, the results could be devastating.

During scoring process, several hazards received the same score so they share an equal ranking. Looking at the details of each hazard's total score, though, reveals the differences. An exception to this is flash flood and energy failure, because both hazards received a 23 with the exact same itemized score. Obviously these two hazards have unique effects on Tama County, but their occurrences, severity, etc. fall within the same range.

Three quite different hazards received a total score of 22. These hazards include windstorm, railway transportation incident, and hailstorm. Looking at each hazard, the severity of a windstorm—amount of injury, damage, and disruption—is perceived as slightly less than the other two hazards while the probability of a railway transportation incident happening is perceived as lower than the other hazards. The final hazard with this score, hailstorm, is set apart because it received a lower score for vulnerability. Overall, a hailstorm is perceived as less threatening in terms of how many people can be affected at one time.

Both thunderstorm and lightning and river flood received a score of 20. The main differences between these two hazards are geographic extent and severity. River floods usually affect smaller areas than thunderstorm and lightning while the results of a river flood can be more severe.

Another group of hazards that share a score are highway transportation incident, structural fire, and hazardous materials incident. These man-made hazards all received a score of 19, and they are another exception where there is no differentiation in their itemized scores. These three hazards, although all man-made, are inherently different. The type of damage will be quite different but all of them have a small geographic extent and little to no warning.

Extreme heat, animal/crop/plant disease, and earthquake all received a score of 16. These three hazards have quite a few differences within their scores starting with the probability that the hazard will occur in the next year. Animal/crop/plant disease is less probable than extreme heat, and an earthquake has less probability of happening than the other two hazards. The other major difference is that extreme heat has a much larger warning period than animal/crop/plant disease and an earthquake. With improved weather forecasts, extreme heat can often be predicted.

Grass or wildland fire and communications failure both received a final score of 14. The two hazards are another case where the breakdown of the score is exactly the same, but this does not mean that the two hazards should be considered the same in terms of effects. It is just the degree of severity, the extent of the county that will be affected, the speed of onset, etc. that are similar. Obvious differences exist between them due to the extremely unique nature of each hazard. Grass or wildland fire will more so affect the natural habitat and endanger nearby structures while communications failure would essentially eliminate all ability for county residents and/or officials and emergency responders to communicate, which poses a different threat.

The final set of hazards that tied in the hazard ranking process is sinkhole, pipeline transportation incident, levee failure, and dam failure. These hazards, too, would yield unique effects on Tama County. The main differences between the hazards in this set are the geographic extent and severity for a pipeline transportation incident. A pipeline transportation incident is believed to have a high geographic extent than the other three hazards while it is believed to be less severe overall.

4.4 Vulnerability Assessment

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

Methodology

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

- Statewide GIS datasets compiled by state and federal agencies
- FEMA HAZUS-MH loss estimation software
- Asset mapping completed by each jurisdiction
- Existing plans and reports
- Local knowledge
- Public and 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 be very unique from one another so the unique effects each can have on the county will be considered.

4.4.1 Vulnerability

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

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 ranking in section 4.3 were used to help determine just how vulnerable Tama County and its individual jurisdictions are to natural and manmade hazards. As a reminder, the ranking system considered the following hazard characteristics: historical occurrence, probability, vulnerability, maximum geographic extent, severity of impact, and speed of onset.

During the scoring process, the highest score a hazard could possibly receive is 24, and only one hazard received a score this high. These scores were used to assign a vulnerability rating of high, medium, or low. Hazards that scored 20 to 24 are considered high priority. Hazards that scored 15 to 19 are medium, and hazards 14 or below are considered lower priority. Refer to Table 4.4.2.1 for the rating each hazard received and which jurisdictions may potentially be affected.

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

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

Table 4.4.2.1: Vulnerability across Tama County

Hazard	Jurisdictions	Score	Priority
Tornado	All jurisdictions	24	High
Flash Flood	All jurisdictions	23	High
Energy Failure	All jurisdictions	23	High
Windstorm	All jurisdictions	22	High
Hailstorm	All jurisdictions	22	High
Railway Transportation Incident	Tama County, Chelsea, Montour, Tama, South Tama SD	22	High
Severe Winter Storm	All jurisdictions	21	High
Thunderstorms and Lightning	All jurisdictions	20	High
River Flood	Tama County, Chelsea, Clutier, Dysart, Elberon, Gladbrook, Montour, Tama, Toledo, Traer, Vining	20	High
Structural Fire	All jurisdictions	20	High
Highway Transportation Incident	All jurisdictions	19	Medium
Hazardous Materials Incident	All jurisdictions	19	Medium
Extreme Heat	All jurisdictions	16	Medium
Animal/Crop/Plant Disease	Tama County	16	Medium
Earthquake	All jurisdictions	16	Medium
Drought	All jurisdictions	15	Medium
Grass or Wildland Fire	All jurisdictions	14	Low
Communications Failure	All jurisdictions	14	Low
Levee Failure	Tama Toledo South Tama DS	12	Low
Pipeline Transportation Incident	Tama County, Montour, Tama, Toledo, Gladbrook, Chelsea, Traer, Dysart, All school districts	12	Low
Dam Failure	Tama County, Chelsea, Garwin, Montour, Tama, Toledo, Vining	12	Low
Sinkhole	Tama County Montour Tama South Tama SD	12	Low
Structural Failure	All jurisdictions	11	Low

Higher – Priority Hazards

Hazard: Tornado
Jurisdictions: All
Score: 24

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.

According to the National Climatic Data Center, there have been three reported funnel clouds since 1994, and there have been 39 tornadoes reported since 1953, in Tama County. From these events, one death and ten injuries have occurred. The intensity of these tornadoes range from FO to F3. The total property damage throughout the county totaled about $33 million, and the crop damage was just $4,000. According to the 2010 State of Iowa Hazard Mitigation Plan, the Tama County's Annual Loss Estimation from Tornado is $553,917.

The worst recorded tornado in Tama County was in September of 1989. This tornado was rated an F4 on the Fujita scale and caused approximately $25 million in property damage. All other recorded tornados in Tama County have never reached near the property damage of this tornado. Other tornados, though, had a small amount of property damage but caused several injuries and even death. Since the 1950s, there has only been one recorded death due to a tornado and this was in 1961. As for injuries, since the 1950s there have been 10 due to a tornado.

Those most at risk during tornadoes include people living in mobile/manufactured 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 tornado watches and warnings due to language barriers are also at risk.

Five jurisdictions in Tama County identified manufactured homes that may be extremely vulnerability during a tornado. Gladbrook, Tama, and Toledo all have two manufactured home parks located within the city. Dysart has just one manufactured home, and Traer has approximately twelve manufactured homes that are on slabs. The other jurisdictions in Tama County did not identify any manufactured or mobile homes that may be at risk.

The Hickory Hills development in unincorporated Tama County was identified as a vulnerable area because most homes in this development do not have basements. Out of nearly 200 homes, approximately five homes have a basement that can be used during severe weather. This development is located around Union Grove Lake, northwest of Garwin.

Generally, the destructive path of a tornado is only a couple hundred feet in width, but stronger tornadoes can leave a path of devastation up to a mile wide. Normally, a tornado will stay on the ground for no more than 20 minutes; however, one tornado can touch ground several times in different areas. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. The most damaging tornado that is likely to occur is an F3, which is based on historical tornado events in Tama County. In an absolute worst case scenario, a tornado along with associated hazards could affect over 50% of Tama County. This is not likely but very possible.

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. Injuries or deaths related to tornadoes most often occur when buildings collapse; people are hit by flying objects or are caught trying to escape the tornado in a vehicle.

Hazard: Flash Flood
Jurisdictions: All
Score: 23

Flash floods are the most common and widespread of all-natural disasters except fire. In Iowa, as much as 21" of rain has fallen in a 24-hour period. According to the National Climatic Data Center, eight flash flood events have affected Tama County since 2000. Five of these flash floods occurred very recently, in 2008, and resulted in $90,000 in property damage. The other three flash floods occurred in 2000 and resulted in $350,000 in property. 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.

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

Nearly half of all flash flood fatalities are auto-related. Motorists often try to traverse water-covered roads and bridges and are swept away by the current. Six inches of swiftly moving water can knock persons off their feet and only two feet of water can float a full-sized automobile. Recreational vehicles and mobile homes located in low-lying areas can also be swept away by water. According to the 2010 State of Iowa Hazard Mitigation Plan, the Tama County's Annual Loss Estimation from Flood (river and flash) is $12,570,176.

Areas in a floodplain, downstream from a dam or levee, or in low-lying areas can be impacted. People and property located in areas with narrow stream channels, saturated soil, or on land with large amounts of impermeable surfaces are likely to be impacted in the event of a significant rainfall. Unlike areas impacted by a river/stream flood, flash floods can impact areas a good distance from the stream itself. Flash flood-prone areas are not particularly those areas adjacent to

rivers and streams. Streets can become swift moving rivers, and basements can become deathtraps because flash floods can fill them with water in a manner of minutes. All Tama County communities are prone to flash flooding.

Flash floods are the number one weather-related killer in the United States. They can quickly inundate areas thought not to be flood-prone. Other impacts can include loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock damage and interruption of business. Hazards of fire, health and transportation accidents, and contamination of water supplies are likely effects of flash flooding situations. In Iowa, there have been 643 flash flood events since 1993, and there have been four deaths and eight injuries.

Hazard: Energy Failure
Jurisdictions: All
Score: 23

Only when free market forces cease to provide for the health, welfare, and safety of the citizens, can governments take appropriate actions to limit the effects of an energy shortage. The State of Iowa has three strategies to limit the likelihood of an energy shortage. Through voluntary and mandatory demand reduction mechanisms; the substitution of alternative energy sources when possible; and state government programs to curtail excessive use, energy supply and demand can be kept in check. The federal government has a strategic petroleum reserve to supplement the fuel supply during energy emergencies. Shortage, especially electrical shortage, can be unpredictable with immediate effects. Natural events, human destruction, price escalation, and national security energy emergencies can cause unavoidable energy shortages.

Because Iowa is almost entirely dependent on out-of-state resources for energy, Iowans must purchase oil, coal, and natural gas from outside sources. World and regional fuel disruptions are felt in Iowa. It is likely that increasing prices will occur as market mechanisms are used to manage supply disruptions. This will disproportionately affect the low-income population because of their lower purchasing power. Agricultural, industrial, and transportation sectors are also vulnerable to supply, consumption, and price fluctuations. In Iowa, petroleum represents 97% of transportation fuel. Individual consumers such as commuters are also vulnerable.

The effects of an energy shortage could be felt throughout all of Tama County, but because the distribution systems are very developed, local shortages can be quickly covered. The likelihood of this hazard occurring is very low. The reason this hazard scored so high is because if it were to happen, the effects would be felt across the entire county and more than likely most of Iowa.

Injuries and fatalities would not be directly caused by an energy shortage. Injuries and fatalities could occur if energy was not available for heating during extreme cold periods or for cooling during extreme heat. Hospitals, shelters, emergency response vehicles and facilities, and other critical facilities would have priority during energy shortages. Rotating blackouts, voluntary conservation measures, and possibly mandatory restrictions could be used to limit the severity of an energy shortage. Effects could range from minor heating and air conditioning disruptions to

transportation limitations all the way to civil unrest due to the high demand, low supply, and subsequent high price. Business disruption and increased cost of business would have far-reaching financial implications across many sectors of the economy.

As for more localized, shorter-term energy failures, communities like Traer have an advantage over other communities because they have power generation capabilities. If for some reason it was no longer feasible to buy power in bulk, the city's cooperative could generate power for its customers. Since most communities are dependent on large energy suppliers like Alliant, generators to power critical facilities at a bare minimum are extremely important.

Hazard: Windstorm
Jurisdictions: All
Score: 22

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

In Tama County, according to the National Climatic Data Center, there are about 32 high wind events that were separated from either a thunderstorm or extreme wind chill. These windstorms occurred between 1993 and 2006, and wind speeds during these windstorms ranged from less than one knot to 72 knots. One death and eight injuries were reported during these windstorm events. The total amount of property damage from these windstorms is almost $3.5 million, and the total crop damage is about $513,000.

The worst windstorm recorded in Tama County occurred in November of 1998. During this windstorm, winds reached 61 knots and caused over $17 million in property damage and $260,000 worth of crop damage. This is the storm that caused one death. According to the 2010 State of Iowa Hazard Mitigation Plan, the Tama County's Annual Loss Estimation from Windstorm is $65,327.

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

Five jurisdictions in Tama County identified manufactured homes that may be extremely vulnerability during a windstorm. Gladbrook, Tama, and Toledo all have two manufactured home parks located within the city. Dysart has just one manufactured home, and Traer has approximately twelve manufactured homes that are on slabs. The other jurisdictions in Tama County did not identify any manufactured or mobile homes that may be at risk.

The Hickory Hills development in unincorporated Tama County was identified as a vulnerable area because most homes in this development do not have basements. Out of nearly 200 homes,

approximately five homes have a basement that can be used during severe weather. This development is located around Union Grove Lake, northwest of Garwin.

Unlike tornadoes, windstorms may have a destructive path that is tens of miles wide so over 50% of Tama County could be affected by a windstorm event. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area. Wind speeds can reach up to 70 knots or greater during a windstorm event so a major event is possible.

The severity of damage from windstorms can be very high. Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows, all the way to complete destruction and disintegration of well-constructed structures, infrastructure, and trees. Injury or death related to windstorms most often occurs when buildings collapse; people are hit by flying objects or are caught trying to escape the windstorm in a vehicle. Crop damage is often associated with windstorms, laying down crops, breaking stalks, and twisting plants, reduce the yield and making it difficult to harvest.

Hazard: Hailstorm
Jurisdictions: All
Score: 22

According to the National Climatic Data Center, there have been 70 hail events in Tama County since 1961. The size of hail ranges from 0.75 inches in diameter to 2.75 inches. No deaths or injuries were reported, but the sum total of all the property damage from these hail events is $334,000. The resulting crop damage is $379,000.

Agricultural crops such as corn and beans are particularly vulnerable to hailstorms stripping the plant of its leaves. Hail can also do considerable damage to vehicles and buildings. Hail only rarely results in loss of life directly, although injuries can occur.

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

Hailstorms cause nearly $1 billion annually in property and crop damage in the United States. The peak hail activity coincides with the Midwest's peak agricultural season. Financial impacts resulting from damage to property is in the millions of dollars every year, most of which is covered by crop and hazard insurance. According to the 2010 State of Iowa Hazard Mitigation Plan, the Tama County's Annual Loss Estimation from Hail is $44,563.

Hazard: Railway Transportation Incident
Jurisdictions: Tama County, Chelsea, Montour, Tama, and South Tama Community School District
Score: 22

According to Tama County Emergency Management, there have been three train derailments in Tama County since 1999. There have been three car versus train accidents since 2004.

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.

The Union Pacific Railroad runs throughout the southern portion of Tama County through rural Tama County, Montour, Tama, Chelsea, and the South Tama County Community School District. There are 25 railway crossings throughout Tama County. Vehicle/train collisions are usually limited to areas in and near intersections. The incident will rarely result in widespread effects. The direct area of impact is usually quite small, but depending on the materials involved, the effect could reach areas up to 1-5 miles from the scene. Harmful products may contaminate streams, rivers, water distribution systems, and storm water systems. If this occurs, a large portion of the community could be affected. The ability of response agencies to contain the product on-scene usually limits the area affected.

The maximum geographic extent for this hazard was estimated at approximately 35% of the jurisdiction. This does apply to all of Tama County unless the incident was to occur in rural areas. In this case, less than 10% of Tama County would be affected. This percentage (35%) does apply to jurisdictions that are cities. If a major railway transportation incident were to occur in Montour, Tama, or Chelsea, the effects would have a large impact.

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 hundreds 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.

In Montour, Tama, and Chelsea, critical facilities are located either directly adjacent to the rail line or very close. If a railway transportation incident were to occur near these facilities, not much could be done to save these facilities or protect the people inside because these incidents happen with very little warning.

Hazard: Severe Winter Storm
Jurisdictions: All
Score: 21

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

According to the National Climatic Data Center, Tama County has been affected by 50 snow and ice events since 1993. A total of six deaths and no injuries were reported due to these snow and ice events. Also, property damage reached a total of almost $56 million, and crop damages reached $65 million. Of all these winter storms, four different storms caused a total of four deaths. The worst storm in terms of property damage was an October of 1997 storm that caused $25 million in property damage and $65 million in crop damage. According to the 2010 State of Iowa Hazard Mitigation Plan, the Tama County's Annual Loss Estimation from Severe Winter Storm (Extreme Cold and Snow&Ice is $283,375+258,919) = $542,294.

Hazardous driving conditions due to snow and ice on highways and bridges lead to many traffic accidents. The leading cause of death during winter storms is transportation accidents. About 70 percent of winter-related deaths occur in automobiles and about 25 percent are people caught out in the storm. The majority of these are males over 40 years of age. Emergency services such as police, fire, and ambulance are unable to respond due to road conditions. Emergency needs of remote or isolated residents for food or fuel, as well as feed, water and shelter for livestock are unable to be met. People, pets, and livestock are also susceptible to frostbite and hypothermia during winter storms. Those at risk are primarily either engaged in outdoor activity like shoveling snow, digging out vehicles, assisting stranded motorists, or are the elderly or very young. Schools often close during extreme cold or heavy snow conditions to protect the safety of children and bus drivers. Citizens' use of kerosene heaters and other alternative forms of heating may create other hazards such a structural fires and carbon monoxide poisoning.

Winter storms are quite vast and would likely impact multiple counties. Certain areas may experience local variations in storm intensity and quantity of snow or ice. Overall, any area of Tama County can be affected, and it is very possible that over 50% of Tama County could be affected during just one severe winter storm.

Immobilized transportation, downed trees and electrical wire, building and communication tower collapse, and bodily injury or death are just a few of the impacts of a severe winter storm. Vehicle batteries and diesel engines are stressed and the fuel often gels in extreme cold weather. This impacts transportation, trucking, and rail traffic. Rivers and lakes freeze and subsequent ice jams threaten bridges and can close major highways. Ice jams can also create flooding problems when temperatures begin to rise.

An ice coating of at least ¼ inch in thickness is heavy enough to damage trees, overhead wires, and similar objects and to produce widespread power outages. Buried water pipes can burst causing massive ice problems, loss of water, and subsequent evacuations during sub-zero temperatures.

Fire during winter storms presents a great danger because water supplies may freeze, and firefighting equipment may not function effectively or personnel and equipment may be unable to get to the fire. If power is out, interiors of homes become very cold, causing pipes to freeze and possibly burst.

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

Hazard: Thunderstorm and Lightning
Jurisdictions: All
Score: 20

According to the National Climatic Data Center, Tama County has experienced about 100 thunderstorm and high wind events since 1962. Out of these 100 events, no deaths but 29 injuries occurred. The total property damage from these storms reached almost 3.5 million, and the crop damage totaled $100,000. The high winds ranged from speeds of zero mph to nearly 90 mph.

Of all recorded thunderstorms, the most damaging recorded was in June of 1998. This thunderstorm caused $1 million in property damage and $150,000 in crop damage. Most often, the damages that occur during thunderstorms are due to the associated wind, which is most likely the case for this particular storm. According to the 2010 State of Iowa Hazard Mitigation Plan, the Tama County's Annual Loss Estimation from Thunderstorm & Lightning is ($161,176 + 5,882) = $167,058.

People in unprotected areas, mobile homes, or automobiles during a storm are at risk. Sudden strong winds often accompany a severe thunderstorm and may blow down trees across roads and power lines. Lightning presents the greatest immediate danger to people and livestock during a thunderstorm. It is the second most frequent weather-related killer in the U.S. with nearly 100 deaths and 500 injuries each year. Floods and flash floods are the number one cause of weather related deaths in the U.S.

Livestock and people who are outdoors, especially under a tree or other natural lightning rods, in or on water, or on or near hilltops are at risk from lightning. Hail can be very dangerous to people, pets, and livestock if shelter is not available.

Flash floods and tornadoes can develop during thunderstorms as well. People who are in automobiles or along low-lying areas when flash flooding occurs and people who are in mobile/manufactured homes are vulnerable to the impacts of thunderstorms.

Five jurisdictions in Tama County identified manufactured homes that may be extremely vulnerability during a tornado. Gladbrook, Tama, and Toledo all have two manufactured home parks located within the city. Dysart has just one manufactured home, and Traer has approximately twelve manufactured homes that are on slabs. The other jurisdictions in Tama County did not identify any manufactured or mobile homes that may be at risk.

The Hickory Hills development in unincorporated Tama County was identified as a vulnerable area because most homes in this development do not have basements. Out of nearly 200 homes, approximately five homes have a basement that can be used during severe weather. This development is located around Union Grove Lake, northwest of Garwin.

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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.

Like tornadoes, thunderstorms and lightning can cause death, serious injury, and substantial property damage. Severe thunderstorms can bring a variety of associated hazards with them including straight-line winds in excess of 100 mph. Straight-line winds are responsible for most thunderstorm damage. High winds can damage trees, homes (especially mobile homes), and businesses and can knock vehicles off of the road. The power of lightning's electrical charge and intense heat can electrocute people and livestock on contact, split trees, ignite fires, and cause electrical failures. Thunderstorms can also bring large hail that can damage homes and businesses, break glass, destroy vehicles, and cause bodily injury to people, pets, and livestock. One or more severe thunderstorms occurring over a short period can lead to flooding and cause extensive damage, power and communication outages, and agricultural damage.

Hazard: River Flood
Jurisdictions: Tama County, Chelsea, Clutier, Dysart, Elberon, Gladbrook, Montour, Tama, Toledo, Traer, and Vining
Score: 20

According to the NCDC, since 1950, Tama County has experienced 47 river flood events with no deaths or injuries reported. The total property damages that resulted from these events total nearly $165.5 million, and the crop damages total nearly $47.3 million.

The most recent and major floods in Iowa since 1993 occurred in the Spring and Summer of 2008. According to the National Climatic Data Center (NCDC), in Tama County, there were six river flooding events that affected the cities of Dysart, Gladbrook, Toledo, Haven, Montour, and the Tama and Traer Airport areas. The total property damages that resulted reached $205,000, and the crop damages totaled $10,000.

The City of Tama is fortunate to have a levee that is built 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.

Other communities in Tama County that experienced flooding in 2008 include: Chelsea, Toledo, Dysart, Traer, and Montour. The flooding ranged from homes inundated by water, to wastewater backups in homes, to flooded streets. Each community has its own specific issues pertaining to flooding.

Chelsea is an extreme case in Tama County for river flooding. The city lies within the floodplains of the Iowa River and Otter Creek. Both streams flow in a southeasterly direction and join southeast of the city. The Iowa River passes within one-half mile of the southern corporate limits. Otter Creek passes through the northern part of the town. Flooding can come from either of these water sources. Flooding is also exacerbated by the presence of a bridge under the Union Pacific railroad tracks upstream from Chelsea. These structures allow floodwater from the Iowa River to enter Otter Creek. As a result, access to the town is often completely restricted during a flood. Flooding in Chelsea is primarily associated with intense rainfall with or without snowmelt. At the 100-year flood frequency, the average water depth would be 1.8 feet, with a maximum depth of 4.2 feet.

While Chelsea is subject to frequent flooding, several flood events stand out as significant in the city's history. In 1881, generally recognized as one of the worse in the state, Chelsea was inundated with waters from a broken dam upstream. The flood waters filled the valley forcing residents to take refuge in the upper floors of their homes.

On July 16, 1918, Chelsea flooded once more. This event flooded the city to depths similar to those in 1881. According to a recollection of the time, "The waters subsided and the people set about the work of cleaning up and repairing damage. After all, 38 years is a long time between floods, and it might never happen again." Another flood occurred in May 1944. Property damage was significant, and four young girls were swept off their feet by the current. Only two were saved.

The "Year of Three Floods" occurred in 1947. While these floods were not as severe as some in the past, the recurring flooding taxed the resources and patience of Chelsea's citizens. Heavy rains flooded the Iowa River in the spring. In June, the water rose again. Soon after the floodwaters receded, heavy rains upstream flooded the city again. This last flood was the worse since 1918. In 1969, Chelsea was gain tested. Flooding from both the Iowa River and Otter Creek inundated homes and properties. In addition, a train derailed nearby.

One of the most severe floods in the history of Chelsea occurred in 1993. Snowmelt and spring rains resulted in flooding along the Iowa River, including Chelsea. Above normal rainfall fell across the

state, which filled the Coralville Reservoir to flood control capacity in mid-June. Water filled Chelsea despite flood fighting efforts. Most basements in the city flooded; some residences were flooded on the first floor. Some businesses experienced two to three feet of water on the main floor. The damage included approximately 53 homes with major damage, 111 homes with minor damage, 23 businesses with major damage and 3 businesses with minor damage. The flood also damaged the wastewater collection system, the water distribution system, and the streets. The wastewater collection system experienced severe infiltration during the floods. The water distribution system was unable to serve the community due to elevated fecal coliform levels. Also, city streets were structurally damaged.

After the 1993 flood, the City of Chelsea suffered a major decline. The population slowly decreased and the number of businesses and homes dropped dramatically. Currently, there are still two commercial structures and approximately 100 residential structures located in the 100-year floodplain. In 2008, the community experienced record level floods when the Iowa River and Otter Creek exceeded their banks. Approximately 30 homes sustained heavy damages, and commercial structures were inundated with several feet of water for at least 10 days. Overall, more than half of Chelsea's residents were affected by flood waters. (Tama County Hazard Mitigation Plan, 2001)

As of May 2009, the City of Chelsea had 50 flood insurance claims since May 2008. The total closed paid losses in the community reached $562,962 (NFIP). Currently, the Region 6 Planning Commission is assisting with an acquisition and demolition project for badly damaged homes in the community ($107,000 plus demolition costs). The City of Chelsea was granted an exception and was allowed to apply for hazard mitigation funding for this project because the flood impacted the community so severely. Chelsea's water infrastructure was also badly damaged so Region 6 helped secure a CDBG Block Grant for sewer improvements totaling $549,000.

The past century has indicated that extensive flood mitigation work needs to be completed in the City of Chelsea in order to prevent the devastation that will likely occur during future flood events. A few homeowners have used private funds to elevate their homes and prevent future flood damages while others restored their property to pre-flood condition. The housing demolition and infrastructure project are currently being completed, but these projects are only repairing damages rather than preventing future damages.

Flooding in Clutier is generally confined to the Salt Creek floodplain in the southwest corner of the city. There is little development in this area save for two satellite dishes owned by the Farmers Telephone Cooperative. In 1993, no damage was noted to structures along the floodplain. However, flooding along Salt Creek briefly closed county road V18 on the south side of Clutier and 4th Street on the west side of the city. Clutier was still accessible from the north. Basement flooding was also noted during 1993. Clutier's streets lack curb and gutter in most locations so it is difficult to control runoff.

The Troublesome Creek floodplain crosses through the north-central part of Elberon. While the floodplain passes close to the inhabited portions of the city, the presence of an abandoned railroad right-of-way has limited the extent of flooding in the city. In 1993, flooding along Troublesome Creek did not enter any structures. Elberon has experienced significant episodes of infiltration and

inflow in its storm sewer system. During the abnormally high precipitation experienced in 1993 the sewage treatment lagoons filled. As a result, the lagoon cells were expanded and the banks were also raised.

A significant portion of the City of Garwin is located in the Deer Creek floodplain. While most of this area is not inhabited, flooding events can still cause substantial damage to the southern portion of the city along Carlton Street. Storm water control is also a significant issue. The city has limited curb and gutter. Because Garwin's central business district is located at one of the lowest parts of the city, storm water tends to flow downhill to the Main Street area.

The Wolf Creek floodplain passes through the northern portions of Gladbrook. For the most part, the floodplain is contained by the abandoned Chicago & Northwestern railroad right-of-way. However, a number of homes, including a mobile home park, are located in the floodplain. Flooding in Gladbrook is usually associated with heavy rain falling on saturated soils. Storm water movement, unimpeded by curbs and gutter in most of the city, accounts for most flooding. Wet basements are common in low parts of the city. In 1993, the mobile home court experienced significant sewage back up.

The City of Tama has experienced numerous flood events during its history. The most serious floods in Tama occurred in 1918, 1947, 1960, 1974, 1982, 1983 and 1993. It was common for the Iowa River to top its banks and flood both rural and urban properties in the Tama area. Damage could be expected to impact those properties north of the Union Pacific railroad tracks between Harmon and Garfield streets and all properties south of the railroad tracks in the city. Despite its size, the railroad embankment did little to minimize flooding. At the fifty-year flood level, floodwaters backed up through a culvert under the tracks just south of Wilson Street and entered the low-lying area north of the tracks. During one hundred-year flood events, water would top the embankment.

Deer Creek also had a history of flash flooding. Flooding primarily occurred because of spring runoff or runoff due to heavy summer thunderstorms. Flooding along Deer Creek was also impacted by the presence of the railroad embankment. During flood events, water would overtop the creek channel near the west edge of Cherry Lake. Water then traveled east along the north edge of the lake, along the railroad embankment, to the central business district then south to the junction of Deer Creek and the Iowa River. The railroad embankment essentially acted as a dam, redirecting water into the central business district. Damage from Deer Creek flooding would begin at approximately the one-year flood level. The highest level of flooding caused damage to properties in an area starting two blocks north of the railroad, between the east and west city limits south of the tracks, to the Iowa River, also between the east and west city limits. Residents of Tama also reported anecdotal evidence of short duration flooding from heavy summer thunderstorms along Mud Creek in the eastern portion of the city. With few exceptions, this flooding has generally had little impact on the city.

In response to continued flooding, the City of Tama committed to the construction of a flood control levee system along Deer Creek and the Iowa River. These flood control structures were under construction in 1993, when one of the largest floods on record arrived in Tama. The levee had been

completed and performed as designed. However, the internal drainage structures had not been completed, nor had the pumps been installed. Consequently, the levee acted as a dam, holding storm water runoff in the southern reaches of the city. The resulting ponding damaged homes and businesses. In order to facilitate drainage, the levee was intentionally breached.

Flooding in Toledo is limited and is not viewed as a problem by residents. The Deer Creek floodplain crosses the western edge of the city, north of U.S. 30, however there are no occupied structures in the area. Most of the area is owned by the city and has been converted to parkland and a baseball field. The city has implemented an effective set of development controls to limit construction in this area.

Portions of the city are subject to flooding from both Wolf Creek and Coon Creek. A large part of the Wolf Creek floodplain is occupied by the Traer Golf and Country Club. In addition, several structures are located in the floodplain. Subsequent to flooding in 1993, the City purchased one residential structure in the Wolf Creek floodplain that was heavily damaged.

The vulnerability from river flooding is quite delineated. 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. According to the 2010 State of Iowa Hazard Mitigation Plan, the Tama County's Annual Loss Estimation from Flood (river and flash) is $12,570,176.

The Federal Emergency Management Agency has delineated the probable extent of the 1% annual chance floodplain in most areas. Flood Insurance Rate Maps (FIRMs) show properties affected by the floods that have at least 1% chance of occurring in any particular year. Generally, these areas are in the floodplain or adjacent areas. A large portion of the land in Tama County's incorporated cities is within the 1% annual chance floodplain, and a great deal of land outside the city corporate limits is also within the floodplain. All of the jurisdictions included in this plan are considered at risk except Lincoln.

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

Hazard: Structural Fire
Jurisdictions: All
Score: 20

According to Tama County Emergency Management, in the past five years there have been: 13 business fires, nine garage fires, 70 residential fires, 45 vehicle fires, and 78 other fires (to include grass, barns, farm buildings, etc.)

Older structures with outdated electrical systems not built to current fire code standards are particularly vulnerable to fire. Combustible building materials obviously are more vulnerable than structures constructed of steel or concrete. Structures without early detection devices are more likely to be completely destroyed before containment by response agencies. Structures in areas served by older, small, or otherwise inadequate water distribution infrastructure such as water mains and hydrants are also at significant risk. Problems vary from region to region, often as a result of climate, poverty, education, and demographics, but Iowa has about 13.4 fire deaths per million people. The fire death risk is nearly two times that of the average population for children 5 years of age or less.

With modern training, equipment, fire detection devices, and building regulations and inspections, most fires can be quickly contained and limited to the immediate structure involved. Certain circumstances, such as the involvement of highly combustible material or high winds, can threaten a larger area. The age and density of a particular neighborhood can also make it more vulnerable to fire due to the spreading of fire from neighboring structures. All Tama County jurisdictions are at risk for structural fires.

Based on national averages in the 1990s, there is one death for every 119 residential structure fires and one injury for every 22 of these fires. On average, each residential fire causes nearly $11,000 of damage. In nonresidential fires, there is one death for every 917 fires, one injury for each 52 fires, and each nonresidential fire causes and average of nearly $20,000 in damage.

Medium – Priority Hazards

Hazard: Highway Transportation Incident
Jurisdictions: All
Score: 19

According to the Iowa Department of Transportation, between 2001 and 2005, there were a total of 1,638 car crashes in Tama County. Within these crashes, 662 injuries were sustained while 31 of these injuries were fatal.

Rural crashes outnumber urban crashes in Tama County with 1,164 crashes occurring in rural areas between 2001 and 2005. The number of urban crashes during this period of time are less than half that total with 474. Also, more rural crashes result in fatal injuries than urban crashes. Four urban crashes resulted in four fatal injuries while rural crashes resulted in 27 fatal injuries.

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.

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

The percentage of Tama County that could be affected by a highway transportation incident may have been overestimated in the hazard ranking process. More than likely, this hazard would affect much less than 10% of the county, but it received a ranking that indicates nearly 40% of the county could be affected, which is not likely.

A more vulnerable area in Tama County may be the intersection of highways U.S. 30 and Iowa 63. These are two well-traveled highways in the state and they intersect each other in Toledo. The highways run through both Tama and Toledo so both jurisdictions and the South Tama Community School District are vulnerable. Although, more crashes were rural than urban so rural county roads may be more vulnerable in Tama County.

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 very real 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.

Hazard: Hazardous Materials Incident
Jurisdictions: All
Score: 19

According to Tama County Emergency Management, there have been approximately 73 hazardous materials incidents in Tama County since 2004. It was not specified whether these incidents were fixed or transportation related.

A hazardous materials incident can occur almost anywhere so any area is considered vulnerable to an accident. People, pets, livestock, and vegetation in close proximity to transportation corridors and populations downstream, downwind, and downhill of a released substance are particularly vulnerable. Depending on the characteristics of the substance released, a larger area may be in danger from explosion, absorption, injection, ingestion, or inhalation. Occupants of areas previously contaminated by a persistent material may also be harmed either directly or through consumption of contaminated food and water.

Most of the hazardous materials incidents are localized and are quickly contained or stabilized by highly trained fire departments and hazardous materials teams. Tama County depends on the Waterloo or Cedar Rapids Fire Department for these incidents because their firemen are trained for

hazardous materials incidents. Depending on the characteristic of the hazardous or the volume of product involved, the affected area can be as small as a room in a building or as large as 5 square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the product contaminates the municipal water supply or water system such as a river, lake, or aquifer. All jurisdictions are at risk for this hazard.

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

Hazard: Extreme Heat
Jurisdictions: All
Score: 16

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

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

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

Most (over 50%) of the County and State would likely be impacted by extreme heat, but urban areas pose special risks. The stagnant atmospheric conditions of the heat wave trap pollutants in urban areas and add to the stresses of hot weather. According to the 2010 State of Iowa Hazard Mitigation Plan, the Tama County's Annual Loss Estimation from Extreme Heat is $3,000.

Extreme heat has broad and far-reaching sets of impacts. These include significant loss of life and illness, economic costs in transportation, agriculture, production, energy, and infrastructure.

Transportation impacts include the loss of lift for aircrafts, softening of asphalt roads, buckling of highways and railways, and stress on automobiles and trucks (increase in mechanical failures). Livestock and other animals are adversely impacted by extreme heat. High temperatures at the wrong time inhibit crop yields as well. Electric transmission systems are impacted when power lines sag in high temperatures. High demand for electricity also outstrips supply, causing electric companies to have rolling blackouts. The demand for water also increases sharply during periods of extreme heat. This can contribute to fire suppression problems for both urban and rural fire departments.

Hazard: Animal/Crop/Plant Disease
Jurisdiction: Tama County
Score: 16

Statewide, the most recent animal/crop/plant disease was the West Nile Virus (WNV). First indentified in New York City and carried by birds and mosquitoes, the disease spread to four states in 1999 and to 12 states and the District of Columbia in 2000. WNV causes severe neuralgic infections 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. 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.

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.

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

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

Animal health emergencies can take many forms: disease epidemics, large-scale incidents of feed and water contamination, extended periods without adequate water, harmful exposure to chemical, radiological, or biological agents, and large-scale infestations of disease-carrying insects or rodents, to name a few. One of the principal dangers of disease outbreaks, they can rapidly overwhelm the animal care system. Perhaps the greatest animal health hazard would be the intentional release of a

foreign animal disease agent to adversely impact a large number of animals. Such a release would likely not be an act of sabotage and is covered in biological/agri-terrorism hazard worksheet.

Hazard: Earthquake
Jurisdictions: All
Score: 16

Iowa as a whole has experienced the effects of only a few earthquakes in the past two centuries. The epicenters of 12 earthquakes have been located in the state. The majority have been along the Mississippi River, and none have been in central Iowa. The last earthquake to occur in Iowa was near the eastern Iowa town of Oxford in 1948. Since the early 1800s, another 9 earthquakes have occurred outside of Iowa but have impacted areas in the state. The most recent quakes were in the 1960s and occurred in Illinois and Missouri. While more than 20 earthquakes have occurred in or impacted Iowa in the past 200 years, they have not seriously affected the state. According to the National Climatic Data Center, there have been no earthquakes in Tama County.

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

The strongest earthquake in Iowa occurred in Davenport in 1934 and resulted in only slight damage. Estimated effects of a 6.5 Richter magnitude earthquake along the New Madrid Fault Zone suggests Iowans in four southeast counties could experience trembling buildings, some broken dishes and cracked windows. About 29 other counties, from Page to Polk to Muscatine, could experience vibrations similar to the passing of a heavy truck, rattling of dishes, creaking of walls, and swinging of suspended objects. If an earthquake were to occur, it would more than likely be felt in all of Tama County.

Due to the relatively low magnitude of earthquakes that would occur in the state, and the distance from the epicenter of an earthquake that would occur in the New Madrid Fault Zone, Iowans would likely see only minor impacts. Fatalities would be very rare, injuries limited to falls and small-unsecured objects, property loss would likely be minimal, and economic loss could occur due to short disruptions in commercial and industrial activities. Data limitations of annual loss estimations are cited for those hazards for which the Planning Team has no documentation. The Team will make every attempt to gather such data by the time of the next Plan Update.

Hazard: Drought
Jurisdictions: All
Score: 15

According to the Palmer Drought Severity Index, a composite of evapotranspiration, recharge, runoff, loss, and precipitation, Iowa has suffered seven periods of drought conditions since 1910.

While some may have been more severe than others, agricultural areas were affected much more than the metropolitan areas where impacts were indirect.

According to the National Climatic Data Center (NCDC), Tama County has experienced five drought events since 1995. The most recent drought was in 2003. The total property damage to Tama County and the other areas affected by the drought total $645 million, and crop damaged reached a total of $1.39 billion. No deaths or injuries were reported during any of these drought events.

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. According to the 2010 State of Iowa Hazard Mitigation Plan, the Tama County's Annual Loss Estimation from Drought is $2,681,156.

A drought would likely affect most of Tama County and Iowa if not the entire Midwest. Because of the dependence on precipitation and water, the agricultural areas would be most adversely impacted. Though this is the case, the entire County would likely feel at least some impact.

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

Lower – Priority Hazards

Hazard: Grass or Wildland Fire
Jurisdictions: All
Score: 14

According to the National Climatic Data Center, there were no wildland or forest fire events reported in Tama County. This does not account for small or contained grass fires that may not have been reported.

While wildfires have proven to be most destructive in the Western States, they have become an increasingly frequent and damaging phenomenon nationwide. People choosing to live in wildland settings are more vulnerable to wildfires, and the value of exposed property is increasing at a faster rate than population. Iowa is less vulnerable to wildfires because of the extremely large percentage of land that is developed. Grass fires are often more easily contained and extinguished before there is damage to people or developed property. Fires often burn large portions of field crops in the fall when the crops are dry and the harvesting equipment overheats or throws sparks. This can be quite costly to farmers in terms of lost production. Data limitations of annual loss estimations are cited for those hazards for which the Planning Team has no documentation. The Team will make every attempt to gather such data by the time of the next Plan Update.

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. 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 fire issues.

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

Hazard: Communications Failure
Jurisdictions: All
Score: 14

No widespread communications failures have occurred in Iowa. Local incidents due to weather conditions, equipment failure, excavation incidents, and traffic accidents have been reported, but outages have usually been resolved in a timely manner.

Citizens of the community would only be impacted indirectly. Phone and data transmission could be impacted. Most communication systems that are highly necessary have backup and are redundant in order to provide continuity of service.

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

A communications failure would not directly result in injuries or fatalities. Most financial losses would be incurred due to the direct damage to electronic equipment and the communication system infrastructure. If emergency 911 systems were to fail due to phone communication disruption, secondary impacts could occur by the inability of citizens to alert responders of their needs. Inter-agency and intra-agency communications would be limited. Data transmission could also be affected. This could disrupt business and financial transactions resulting in potential loss of business.

Hazard: Levee Failure
Jurisdictions: Tama, Toledo, and South Tama Community School District
Score: 12

The only levee in Tama County is located in the City of Tama along the Iowa River and Deer Creek on the south side of the community. The levee was constructed in 1995 and has not yet had any failures. The levee's length is 2.75 miles, and it protects less than five square miles of the community. The level of protection, though, is for 1% annual chance and 0.2% annual chance year flood boundaries.

People, property, and utilities in the floodplain are most at risk. Levees and floodwalls give a false sense of security. People feel that levees will protect them and their property against and future flooding. While this is usually true, the hazard is only temporarily contained. Data limitations of annual loss estimations are cited for those hazards for which the Planning Team has no documentation. The Team will make every attempt to gather such data by the time of the next Plan Update.

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

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

Hazard: Pipeline Transportation Incident
Jurisdictions: Tama County, Montour, Tama, Toledo, Gladbrook, Chelsea, Traer, Dysart, and school districts
Score: 12

According to Tama County Emergency Management, there have been no pipeline incidents in the history of Tama County.

People and property with pipelines on their land or nearby are the most at risk. In the event of a pipeline incident, those downwind and downhill of the release are the most vulnerable. People excavating earth near a pipeline are also at risk. Private homes and business served by natural gas have small diameter pipelines connected to their structure. The underground pipelines cross public streets, roads, and highways as well as streams. Iowa's natural environment is also vulnerable to contamination from an underground pipeline incident.

Though often overlooked, petroleum and natural gas pipelines pose a real threat in the community. Most incidents affect only the area directly above or near the damaged pipeline. Depending on the size of pipeline and amount of product released, the extent of impact could be several hundred feet in diameter. Large areas may need to be evacuated to remove people from the threat of fire, explosion, or exposure. Pipelines have automatic shutoff valves installed so that damaged sections can be isolated and the volume of product escaping can be limited. Identification and caution signs are posted wherever pipelines pass under roads, streams, fence lines, or at any aboveground utilities.

Major pipelines are located in or around Tama County, Montour, Tama, Toledo, Gladbrook, Chelsea, Traer, and Dysart. Other Tama County cities do not have natural gas service and use individual LP tanks for power. The jurisdictions with major pipelines are much more likely to be affected by a potential pipeline transportation incident than those jurisdictions that do not.

Petroleum and natural gas pipelines can leak or erupt and cause property damage, environmental contamination, injuries, and even loss of life. Accidents may be caused by internal or external corrosion, defective welds, incorrect operation, outside damage, or other defective pipeline or equipment. Most incidents involve crude oil, gasoline, or natural gas pipelines. All petroleum liquids pose dangers from fire or explosion, and the fire may produce poisonous or irritating gasses. Toxic fumes and direct contact can cause health hazards. Vapor clouds can travel a distance and settle in low-lying areas where the fumes may overcome people and animals. Released products should be treated as any other hazardous material. Large areas may need to be evacuated to remove people from the threat of fire, explosion, or exposure. These evacuations potentially save lives and limit injury, but they also disrupt businesses and inconvenience residents. A break in water pipelines may impact fire protection and the continuity of operations of business and industry and may affect the area by saturating the soil and causing rapid erosion.

Hazard: Dam Failure
Jurisdictions: Tama County, Chelsea, Garwin, Montour, Tama, Toledo, Vining
Score: 12

Looking at Tama County history, there are no major dam failures to report for Tama County. People and property along streams are most vulnerable. Facilities and lives considerable distances from the actual impoundment are not immune from the hazard. Depending on the size and volume of the impoundment as well as the channel characteristics, a flash flood can travel a significant distance.

The area impacted following a dam failure would be limited to those areas in and near the floodplain. People and property outside the floodplain could also be impacted depending on the proximity to the dam and the height above the normal stream level. Data limitations of annual loss estimations are cited for those hazards for which the Planning Team has no documentation. The Team will make every attempt to gather such data by the time of the next Plan Update.

According to a study in 2007 by the Iowa DNR, there are five dams (not high hazard) along the Iowa River that are located upstream from the City of Tama. Failure at any of these dams especially the dam closest to Tama can affect the cities of Tama, Toledo, and Chelsea, which are downstream.

Tama does have a levy on its south side near the Iowa River, but dam failure upstream can increase water levels to those higher than the levy can handle especially if there is already river flooding. Chelsea on the other hand, already has frequent flooding issues that do not need to be increased.

Garwin, Montour, and Vining were also identified as jurisdictions that are at risk for this hazard. All of these cities have dam(s) located upstream. These dams, though, are not high hazard so the chance of major issues is very low like in Tama, Toledo, and Chelsea.

There are 2,442 inventoried dams located in Iowa. Of these, 63 are high hazard, 160 are categorized as significant hazard, and 2,219 are classified as low-hazard dams. The severity of damage in Tama County would most likely be some property damage since none of the dams in Tama County are considered high hazard.

Hazard: Sinkhole
Jurisdictions: Tama County, Montour, Tama, South Tama Community School District
Score: 12

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

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

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

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

hazards for which the Planning Team has no documentation. The Team will make every attempt to gather such data by the time of the next Plan Update.

Most of Iowa's sinkholes occur in rural areas where their main impact is rendering some land unsuitable for row-crop agriculture. Sinkholes have also resulted in the failure of farm and other types of ponds, roads, and one sewage-treatment lagoon. As sinkholes sometimes allow surface runoff to directly enter bedrock aquifers, their presence has implications for groundwater quality.

Hazard: Structural Failure
Jurisdictions: All
Score: 11

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

There are many buildings in Tama County that are very old or which may become hazardous in the event of an earthquake, fire, high winds, or other natural events. All bridges are vulnerable to the effects of natural elements and the deterioration that results. Increases in the amount and weight of traffic they are expected to support increase their likelihood of failure.

The impacts of the failed structure would be contained to the immediate area and adjacent properties. This could be as small as the house and yard of a fallen chimney, or the area could be relatively extensive if the structure that failed was a multi-story building of a downtown or a tall communication tower. All Tama County jurisdictions are at risk for this hazard. Dam and levee failure would affect a much larger area and are discussed as separate hazards.

Bridge failures and debris in streets and sidewalks would interrupt normal routes of travel. Functional purpose of the building would be terminated or suspended until the integrity of the structure could be restored. Personal injury, death, and property damage may occur in the collapse itself or by falling debris from nearby structures. There would also be a considerable cost to replace or fix the structure, not to mention the loss of revenue that would occur because the structure could not be used. Utilities may be cut off to surrounding areas and communication transmissions may be lost for a period of time.

4.4.2 Community Assets

44 CFR Requirement §201.6(c)(2)(ii)(A): *The plan should describe vulnerability in terms of types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area…*

This section covers the location and density of the population, structures, critical facilities, infrastructure, and other important assets in Tama County that may be at risk of the natural and manmade hazards identified in the previous section.

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

- Communication Failure
- Drought
- Energy Failure
- Extreme Heat
- Flash Flood
- Grass or Wildland Fire
- Hailstorm
- Severe Winter Storm
- Structural Failure
- Structural Fire
- Thunderstorm and Lightning
- Tornado

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

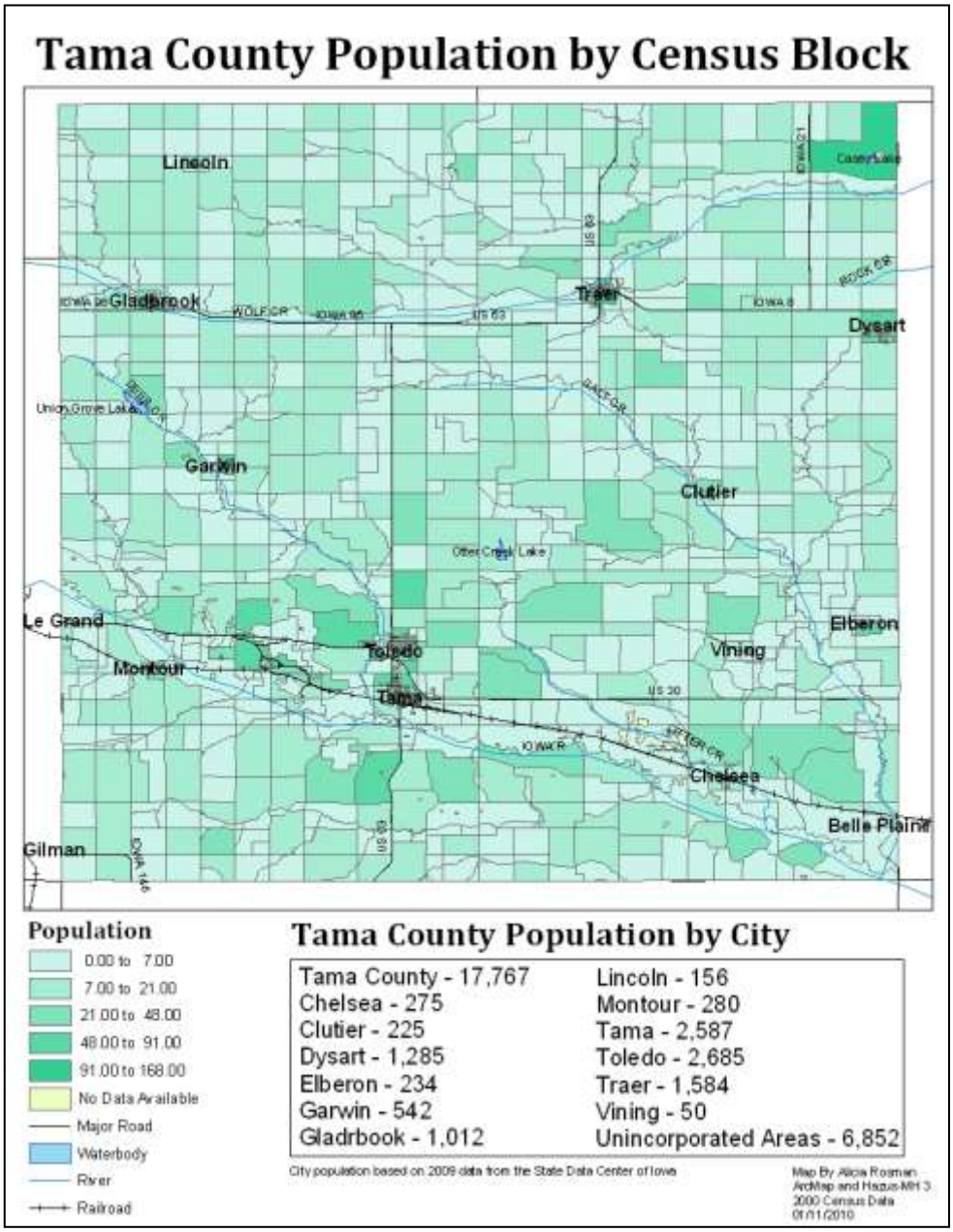
- Animal/Crop/Plant Disease—Tama County
- Dam Failure—Tama County, Chelsea, Garwin, Montour, Tama, Toledo, Vining
- Levee Failure—Tama, Toledo, South Tama School District
- Pipeline Transportation Incident—Tama County, Montour, Tama, Toledo, Gladbrook, Chelsea, Traer, Dysart
- Railway Transportation Incident—Tama County, Chelsea, Montour, Tama, South Tama School District
- River Flooding—Tama County, Chelsea, Clutier, Dysart, Elberon, Gladbrook, Montour, Tama, Toledo, Traer, Vining
- Sinkholes—Tama County, Montour, Tama, South Tama School District

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 4.4.1.1 below for the population distribution across Tama County.

Table 4.4.1.1: Tama County Population by Jurisdiction and Census Block

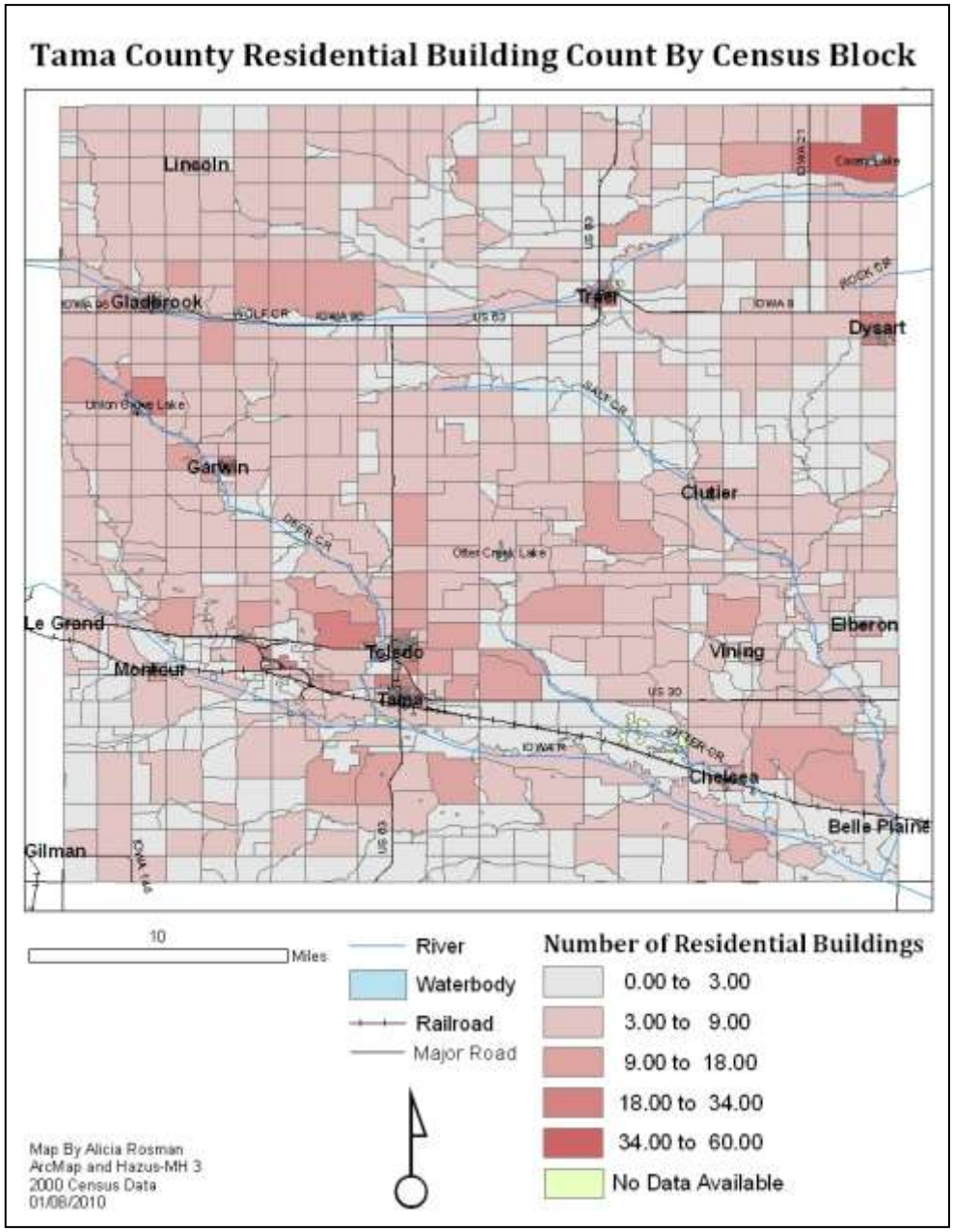


The largest concentration of people in Tama County is in its incorporated cities. Tama and Toledo have the highest populations followed by Traer and Dysart. There is also a higher concentration of people living in the northeast corner of the county. Otherwise, the rest of the population is evenly spread 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 five different use categories: residential, commercial, industrial, agricultural, religious, and historic. Figure 4.4.1.2 below features residential structures.

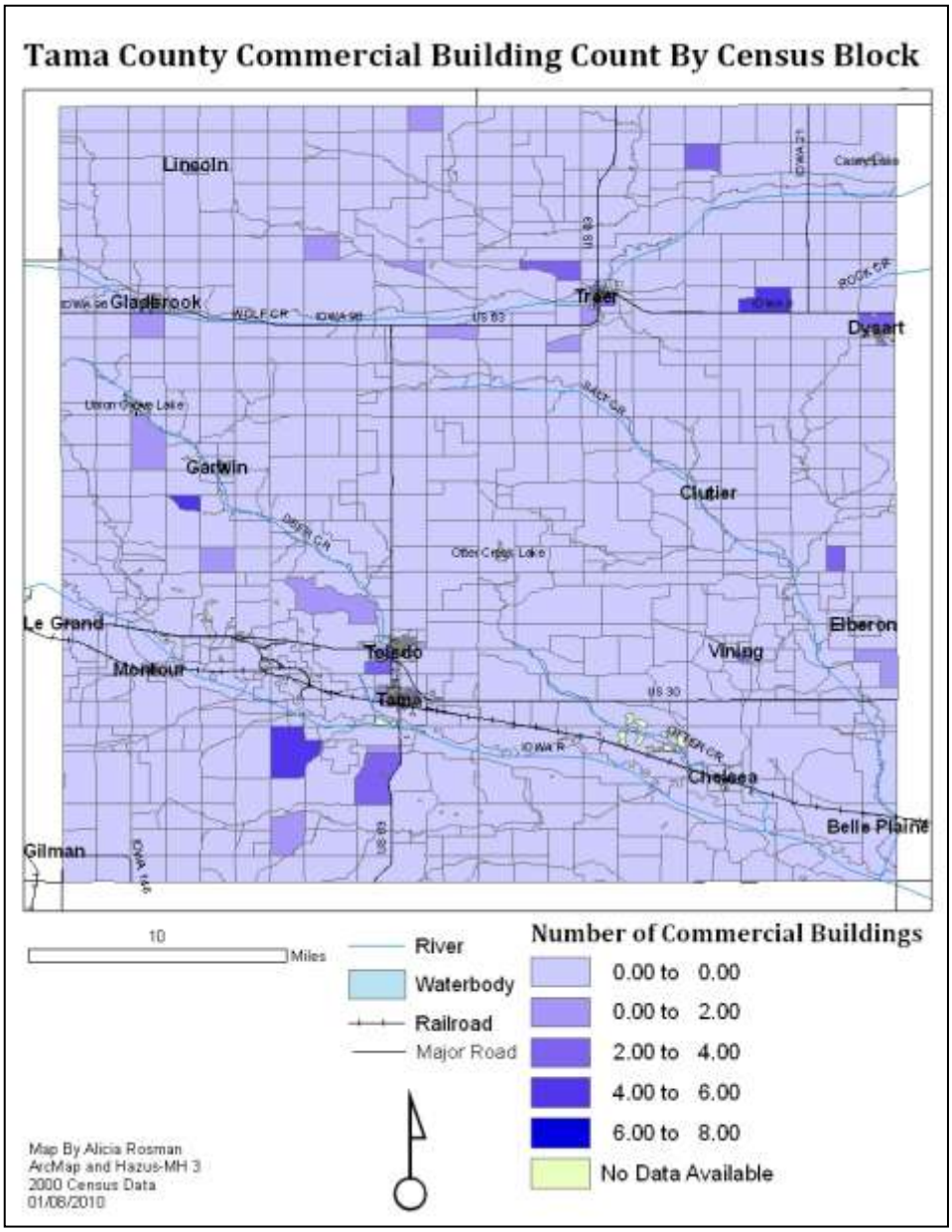
Figure 4.4.1.2: Tama County Residential Building Count by Census Block



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 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 4.4.1.2.

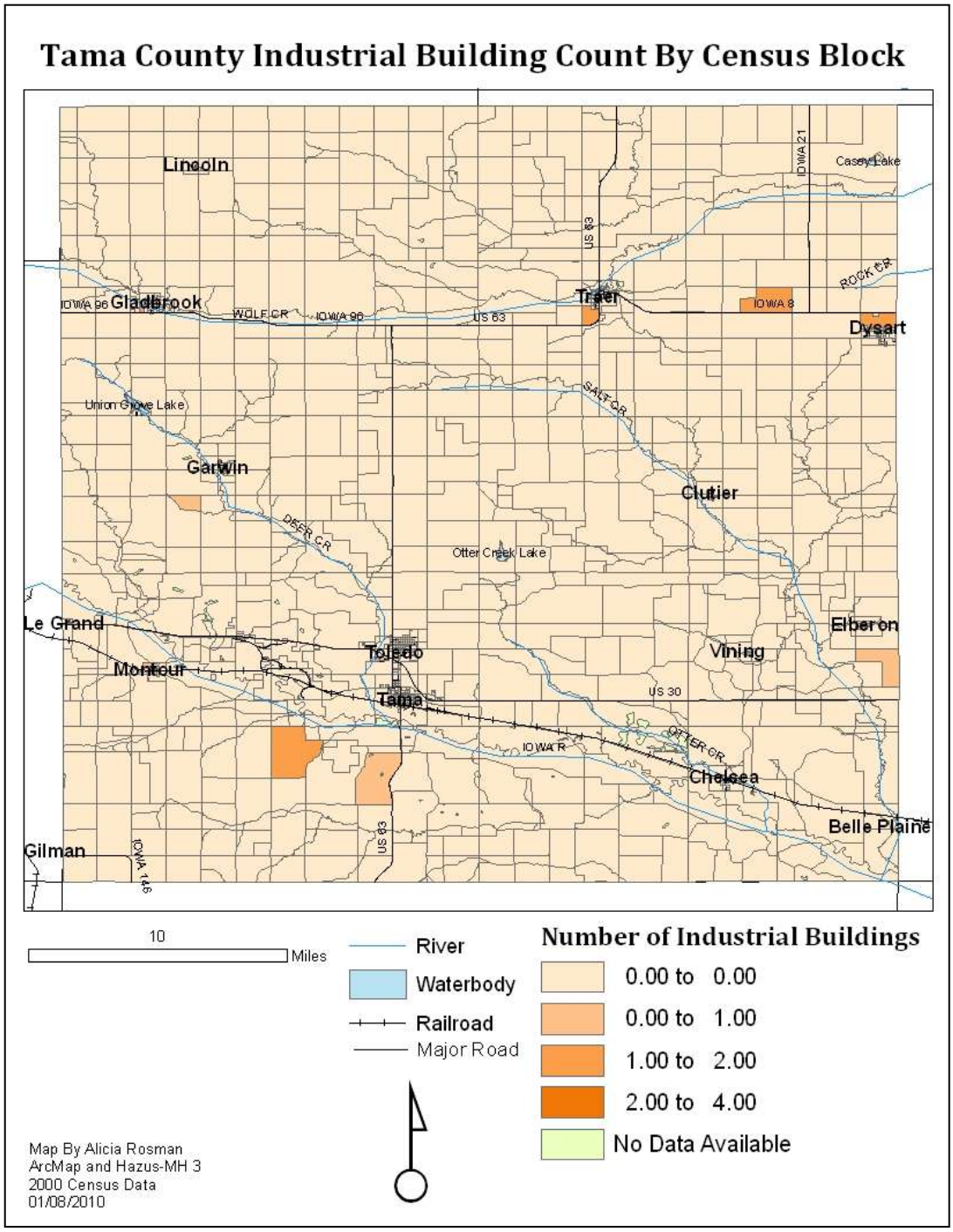
The second structure type, commercial, does not closely resemble the patterns of residential development. Most commercial buildings are located in the north and western portions of the county. The highest concentrations of buildings in one census block, though, is just six to eight so there are no extremely 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 4.4.1.3: Tama County Commercial Building Count by Census Block



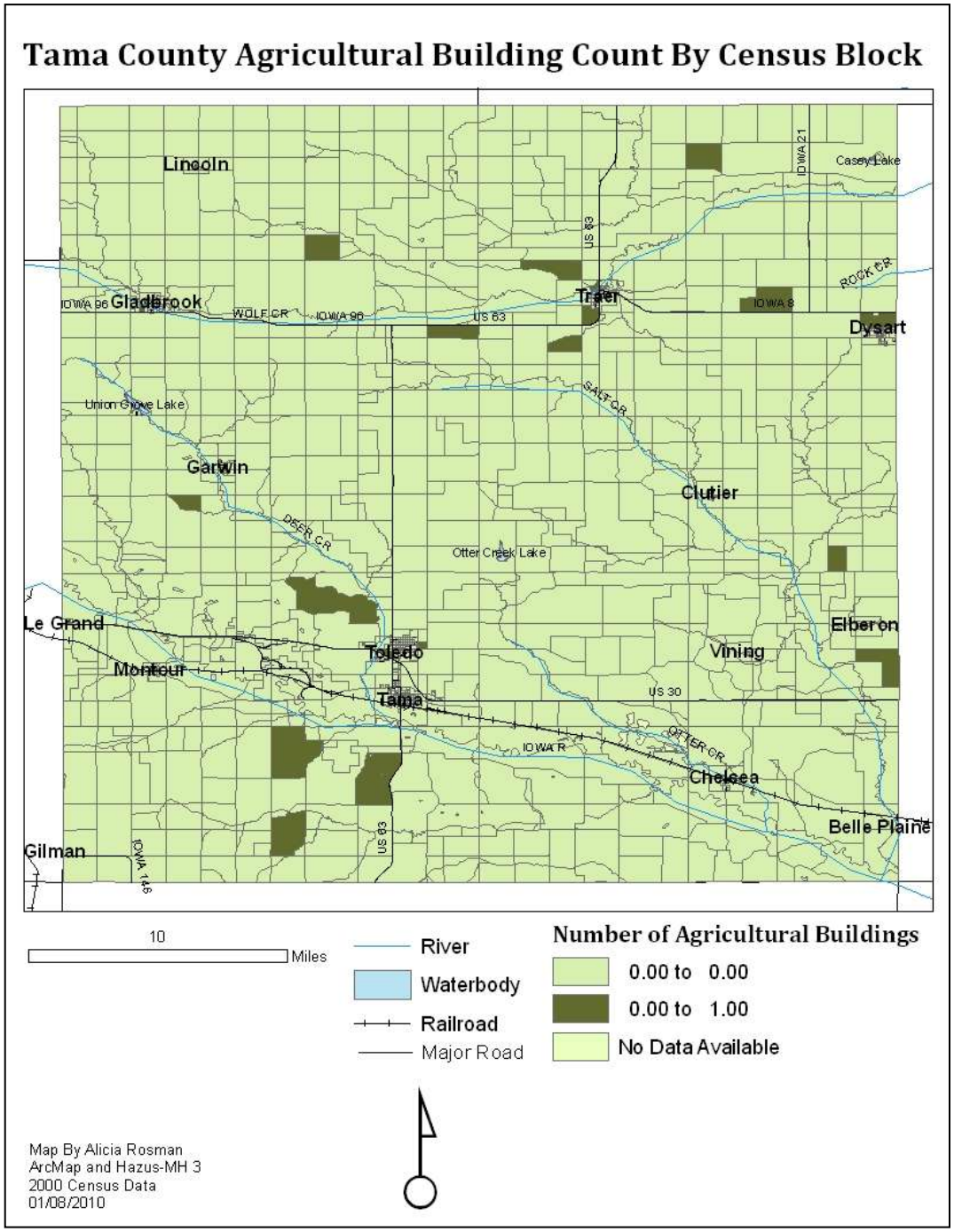
The concentration of industrial buildings is also not very dense with the highest concentration ranging from just two to four buildings. Refer to Figure 4.4.1.4. There are four areas that stand out as the densest industrial areas with two to four buildings. There are also three areas with just one industrial 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 4.4.1.4: 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 4.4.1.5 for the location of agricultural buildings in Tama County.

Figure 4.4.1.5: Tama County Agricultural Building Count by Census Block



Historic Assets

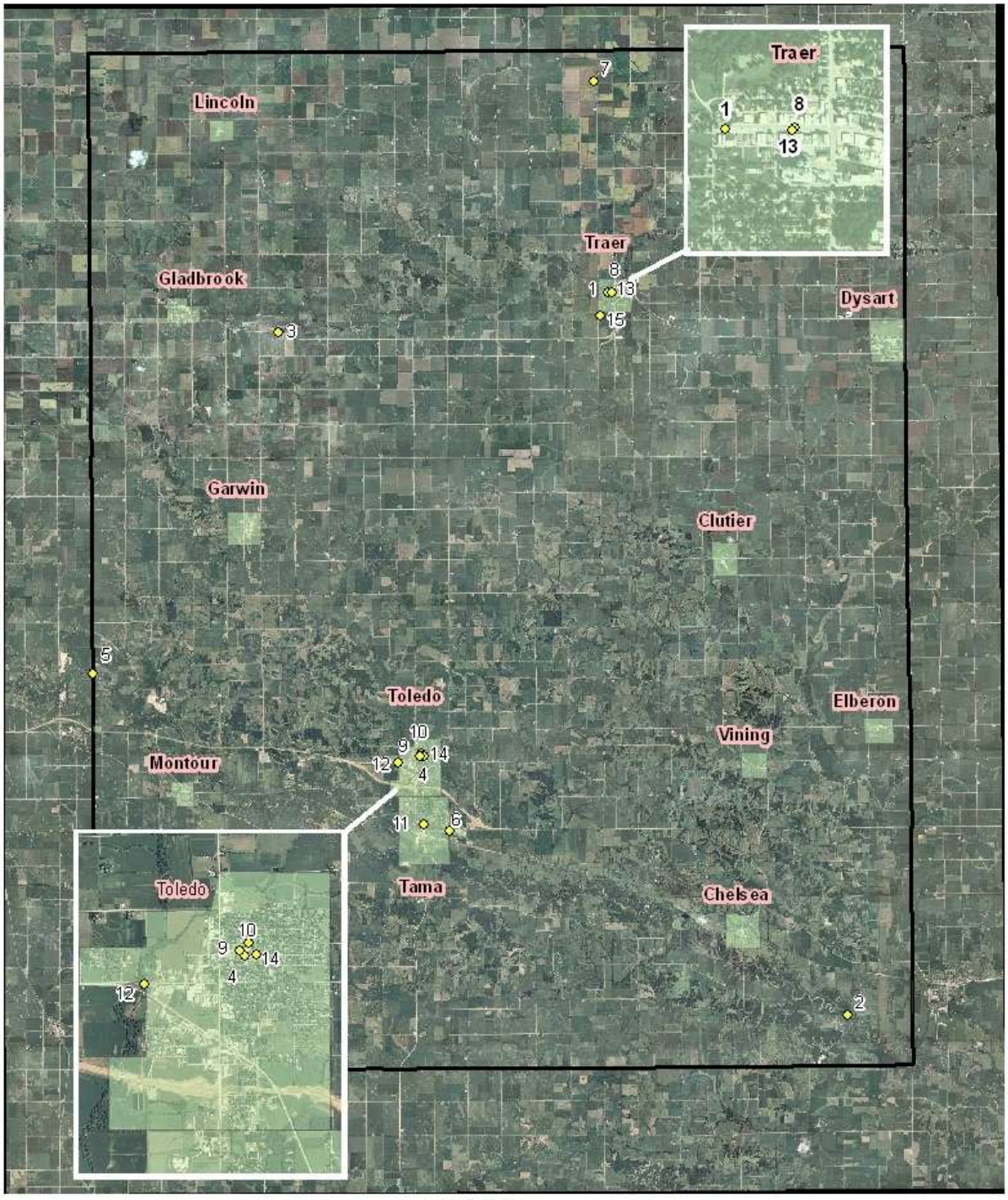
The fifteen historic sites are well spread across the entirety of Tama County. There are two major clusters of historic sites in the cities of Traer and Toledo, which can be seen in the call outs in Figure 4.4.1.6 on the next page. These clusters contain three or more sites each, which is just over half 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 4.4.1.6 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 4.4.1.6: Tama County Historic Sites



Jurisdiction Identified Assets, Critical Facilities, and Vulnerable Populations

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

Critical facilities and vulnerable populations were also identified for each jurisdiction. These facilities and populations are also important to identify for the purpose of determining hazard mitigation priorities. Knowing who is most vulnerable during a hazard event and what facilities are most important during and immediately after a hazard event is extremely valuable.

Critical facilities are defined as facilities that are extremely important to the health, safety, and welfare of the people of 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 be identified, too. An example is a grocery store or gas station. These facilities may not be located in a certain community but residents depend on that grocery store or gas station for their basic needs.

A vulnerable population includes people who may require special assistance or medical care. These people should be identified so their needs are a priority in the event of a disaster. Examples of vulnerable populations include but are not limited to:

- Elderly in their homes, assisted living, or nursing facility
- Disabled in their homes, assisted living, or nursing facility
- Young children in school or daycare

The elderly or disabled people in a jurisdiction may not be able to cope with a disaster as well as others. These people might require help getting to a shelter, boarding up broken windows, buying groceries, or contacting their family.

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. Gas station
6. Bank
7. Farm Coop
8. Poweshiek Rural Water Association
9. Open lots for development
10. Location on major county road (V18)
11. 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. Gas Station
4. Bank
5. Food and hardware stores in neighboring communities
6. Poweshiek Rural Water Association
7. Telephone service and infrastructure
8. Electrical service and infrastructure
9. Post Office
10. Community Center

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. The new gas station is also important because a large supply of fuel is needed near the fire station during disasters. During the 2008 flood, there was no easily accessed fuel supply in the community for the boats and large equipment needed to deal with the disaster. Refer to Figure 4.4.1.7 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 4.4.1.7: Chelsea's Critical Facilities

Clutier

Clutier'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. Clutier's assets are listed below.

1. Museum
2. Garbage service
3. Library
4. Post Office
5. Mark's
6. Nick's Ag
7. Pearson
8. Beauty Shop
9. Bank
10. H1S Cabinets
11. Cizek Manufacturing
12. Grain elevator
13. Grocery store
14. Bar
15. Antique store
16. Code Red
17. Rural water
18. Sewer infrastructure
19. ZCBJ Hall
20. Clutier House
21. Decox
22. Town jail
23. Park
24. Fun Day
25. Band concerts
26. Church
27. Legion Hall
28. Social Center
29. Fire Station

The city's critical facilities were also identified at this meeting but in a separate activity. Several of the city's assets were also considered critical facilities. The facilities that need to function immediately following a hazard event are listed below.

1. Fire Station
2. City Hall
3. Bank
4. Water tower
5. Lagoons
6. Grocery store
7. Bar
8. Legion House
9. Elevator (fuel)
10. Nick's Ag

All of these facilities are extremely important to Clutier during and after a hazard event. These ten facilities were chosen for many reasons of which some are very obvious. The Fire Station and City Hall are a command post for City operations and protect important equipment that will most likely be needed immediately following a hazard event. The local grocery store is a source of food as well as the local bar. The Legion Hall is a potential shelter space, and the grain elevator and Nick's Ag are sources for supplies. For the location of Clutier's critical facilities, refer to Figure 4.4.1.8.

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 4.4.1.8: Clutier's Critical Facilities

Dysart

Dysart'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. Dysart's assets are listed below.

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

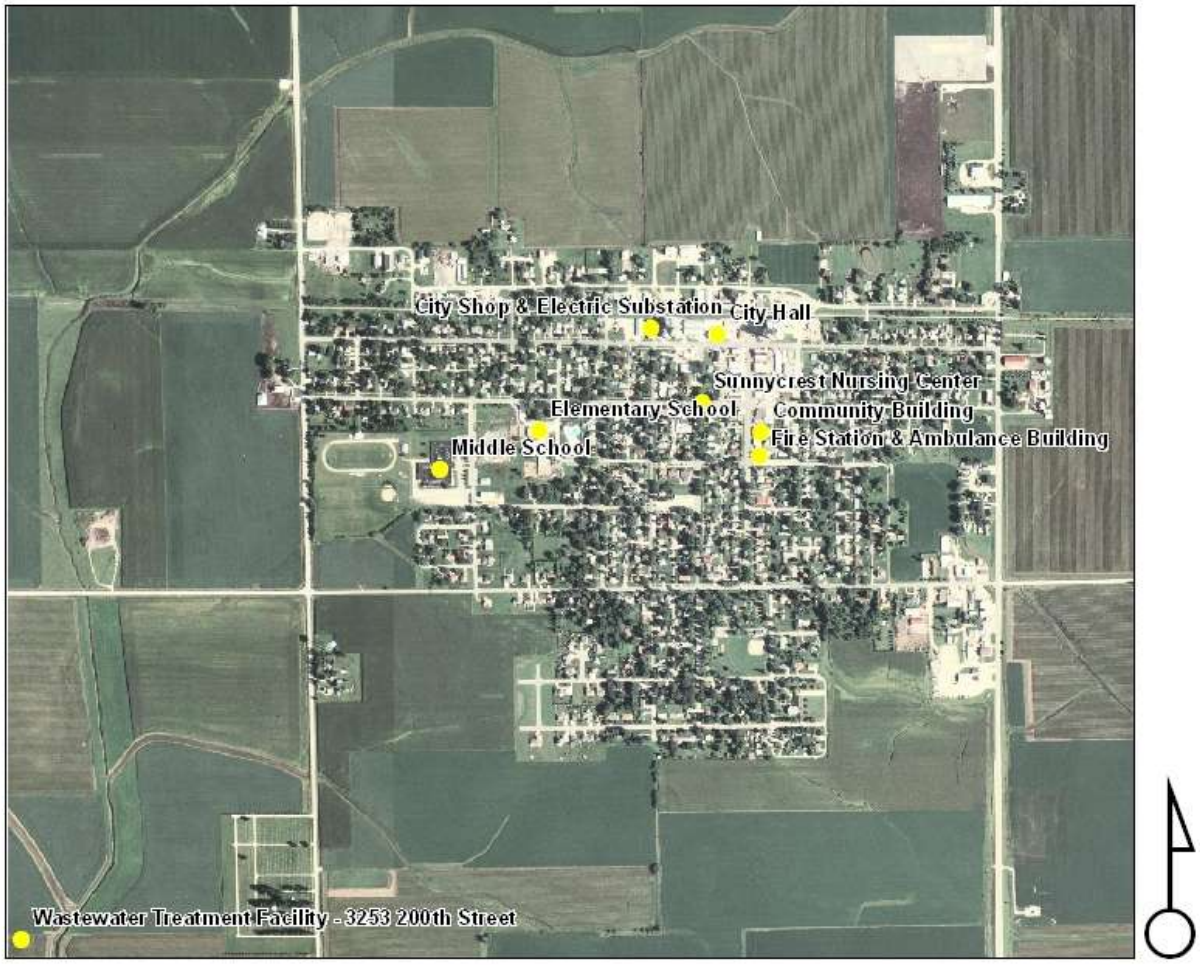
1. Dysart Fire Station & Ambulance Building
2. Dysart City Hall
3. Dysart Community Building/Police Dept.
4. Dysart City Shop & Electric Substation
5. Union Schools – Middle & Elementary
6. Wastewater Treatment Facility
7. Sunnycrest Nursing Center

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 4.4.1.9.

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 4.4.1.9: Dysart's Critical Facilities



Elberon

Elberon's representatives identified 21 major assets in the community. Some assets include infrastructure, natural features, and social groups like the Boy Scots so there are not just physical assets but also social assets in this community. The complete list of assets from the asset mapping activity is below.

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

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 4.4.1.10 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. Mama Hoyt's
7. Fareway in Tama
8. Keystone Savings Bank in Keystone
9. Benton Community Schools

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 4.4.1.10: Elberon's Critical Facilities*

Map by Alicia Rosman
Iowa DNRGIS
2/10/2010

***Numbers correspond with the list of critical facilities below.**

1. Fire/Rescue Station
2. Community Building/Library (w/generator)
3. Transportation facilities (bridges)
4. Water tower and lagoons
5. Kaloupek's Garage

Garwin

Thirteen major assets were identified in Garwin. These assets include both structural and social assets. Not just buildings but also 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, though, 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 4.4.1.11 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. Ambulance Facility
7. Community Center
8. Power generator

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 4.4.1.11: Garwin's Critical Facilities

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

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
11. Iowa Builders

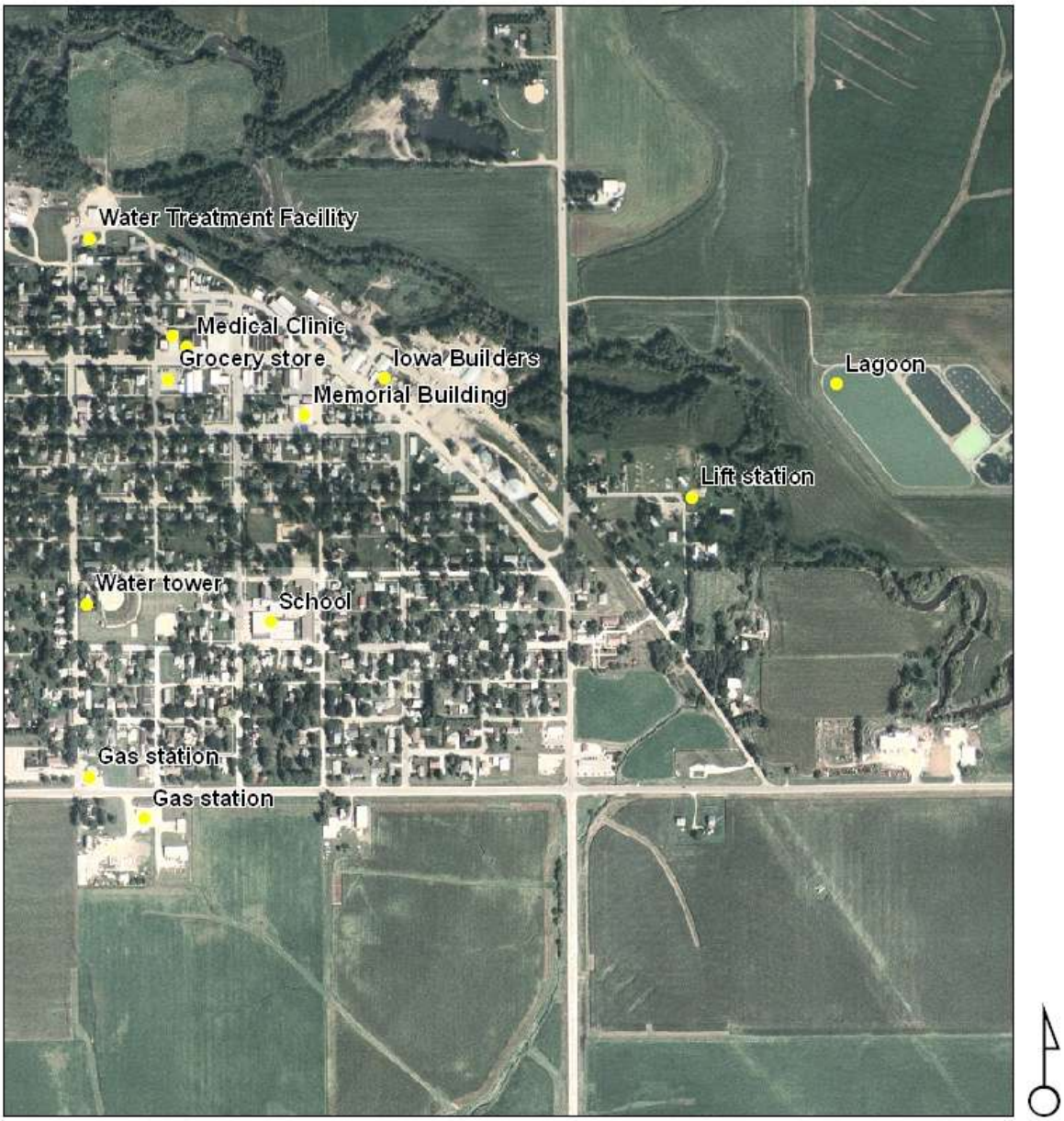
Since Gladbrook is a larger jurisdiction, its population is able to support basic services like a grocery store, gas station, and medical. These were identified as critical facilities for Gladbrook but they also serve surrounding communities that do not have these services.

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 4.4.1.12: Gladbrook's Critical Facilities



Map by Alicia Rosman
Iowa DNRGIS
2/10/2010

Lincoln

Lincoln'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. 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

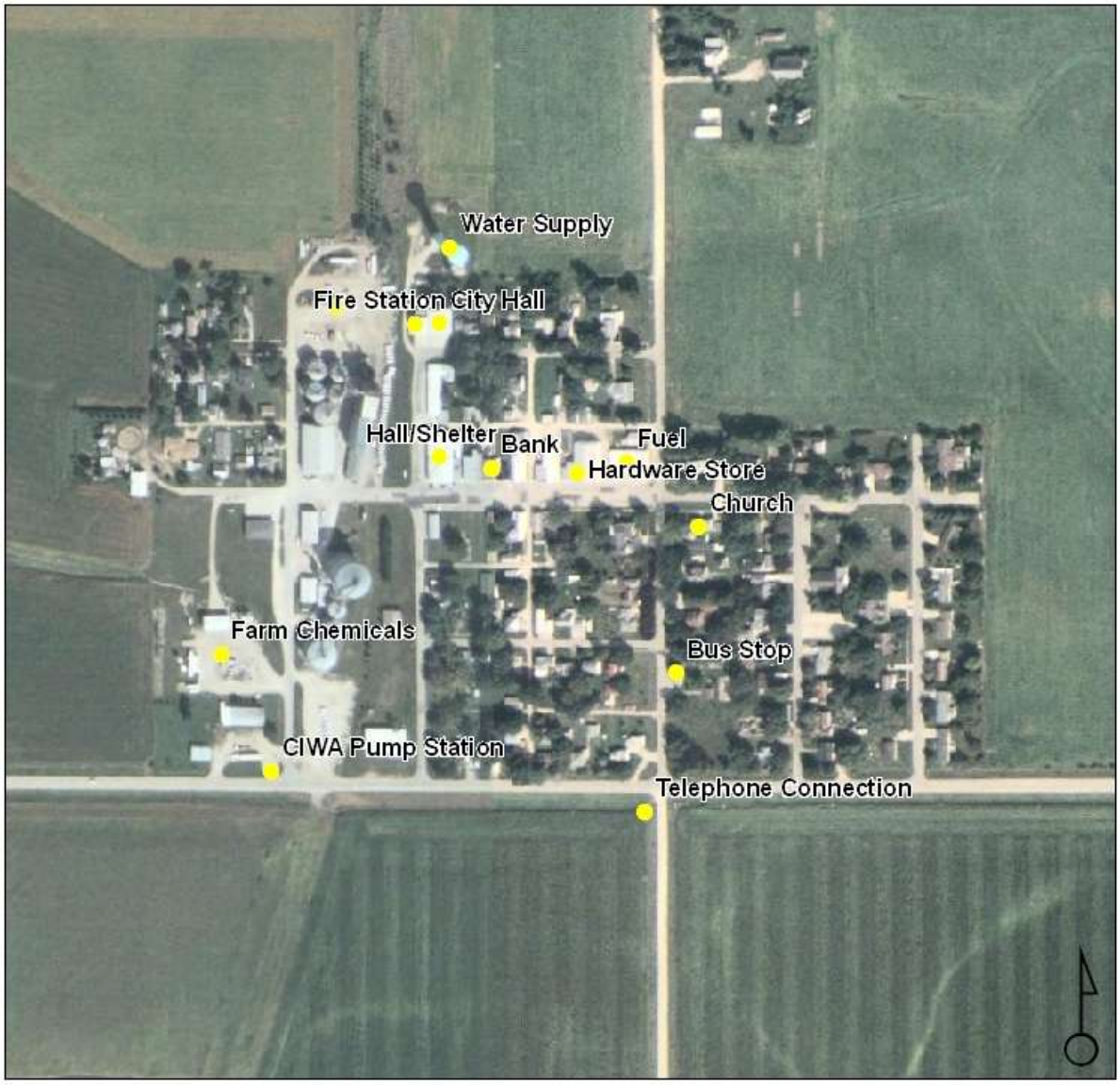
Quite a few of the commonly identified critical facilities are located in Lincoln even though it is a very small jurisdiction. Their critical facilities include a hardware store, bank, and fuel, but there is no ambulance service or a grocery store in the city. The full list of critical facilities is 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 4.4.1.13 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 4.4.1.13: Lincoln's Critical Facilities



Map by Alicia Rosman
ISU 2009 Orthophoto
02/11/2010

Montour

Several assets were identified in the Montour community by city representatives. These assets range from the environment to a well-known restaurant to city services and infrastructure. All of the identified assets for Montour are identified below.

1. Landscaping
2. Scenic bypass
3. Fire department and EMS
4. LEED certified contractor
5. Rube's Steakhouse
6. Church
7. Park
8. CDBG Flood Recovery Grant
9. Tax abatement
10. HUD housing
11. Riverside primitive camping

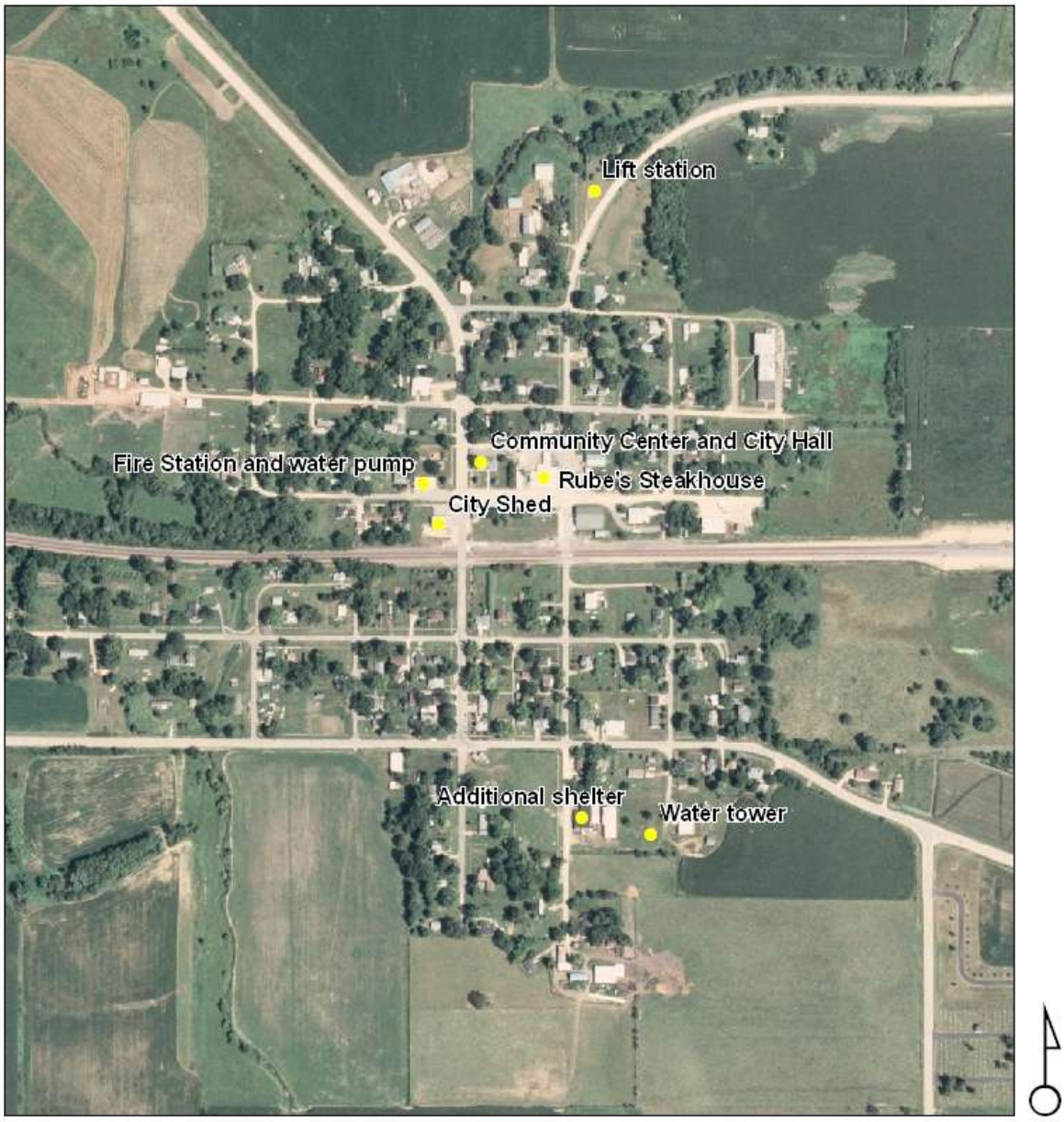
Quite a few services like a grocery store, medical clinic, and gas station are not available in Montour so these facilities were not identified. However, these services are located in neighboring jurisdictions and access to these services is extremely important when a hazard event occurs. All of the critical facilities located in Montour are below. Refer to Figure 4.4.1.14 for location.

1. Community Center and City Hall
2. Fire Station and water pump
3. City Shed
4. Lift station
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 and equipment. 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 4.4.1.14: Montour's Critical Facilities



Map by Alicia Rosman
Iowa DNRGIS
2/10/2010

Tama

Tama'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. Tama's assets are listed below.

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

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 4.4.1.15 for the location of facilities in Tama.

1. STC High School
2. STC Partnership Center
3. STC Administration Building
4. STC Bus Barn
5. Civic Center/City Hall
6. Mercy Medical Center
7. St. Patrick's Center
8. Sunny Hill Care Center
9. Greenville Terrace Apartments
10. Prairie Village Apartments
11. King Tower Café
12. Lincoln Savings Bank
13. Fuel stations
14. Alliant Energy infrastructure

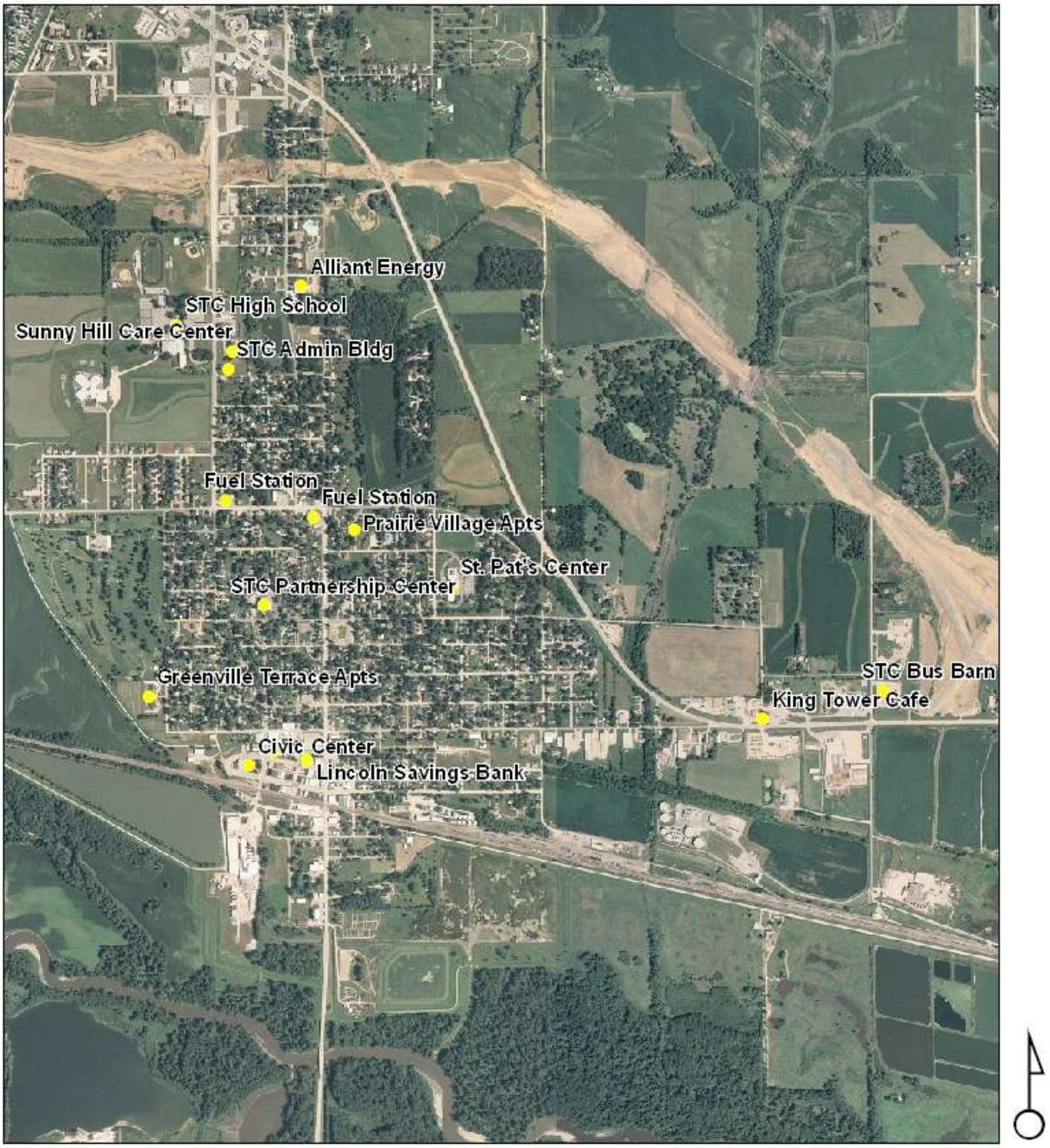
Tama has several potential shelter options following a hazard event including schools, the Civic Center, and church facilities. Keeping these buildings safe from damage and shelter-ready should be a high priority. Tama has a major advantage over other jurisdictions since it has several shelter options.

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. Greenville Terrace Apartments
3. Prairie Village Apartments
4. 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 4.4.1.15: Tama's Critical Facilities



Map by Alicia Rosman
Iowa DNRGIS
2/10/2010

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

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 4.4.1.16 for the location of Toledo's critical facilities.

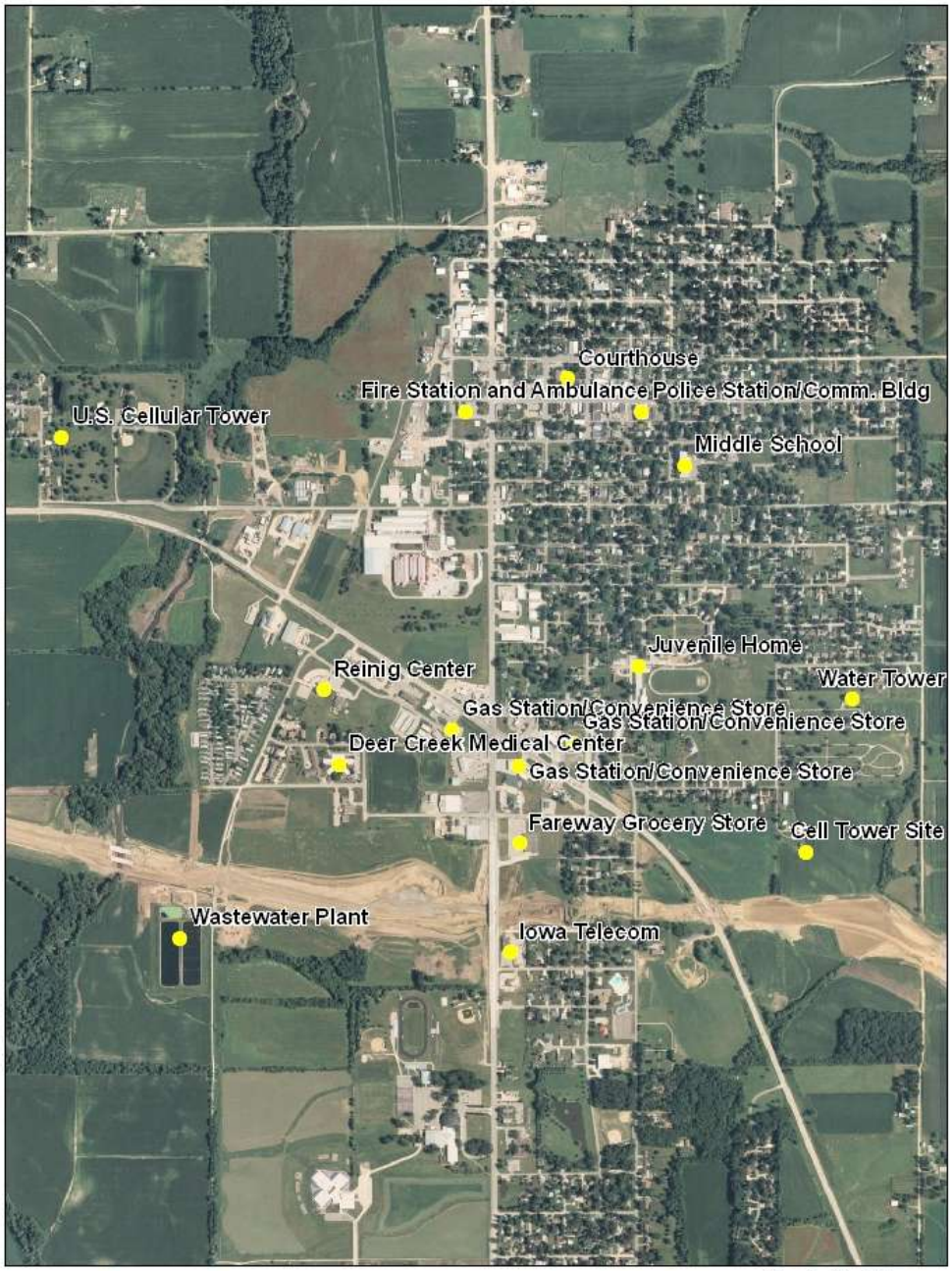
1. Fire Station/Emergency Medical Services
2. Courthouse, jail, Sheriff's Office, communication center, emergency operations
3. Community Building/Police Station
4. STC Middle School
5. Fareway grocery store
6. Fuel/convenience stores
7. Cell towers
8. Iowa Telecom
9. Water/sewer infrastructure
10. Juvenile 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 4.4.1.16: Toledo's Critical Facilities



Map by Alicia Rosman
ISU 2009 Orthophoto
02/10/2010

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. Vinings'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 4.4.1.17 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 4.4.1.17: Vining's Critical Facilities

Map by Alicia Rosman
ISU 2009 Orthophoto
02/10/2010

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 indentified in Tama County.

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

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.

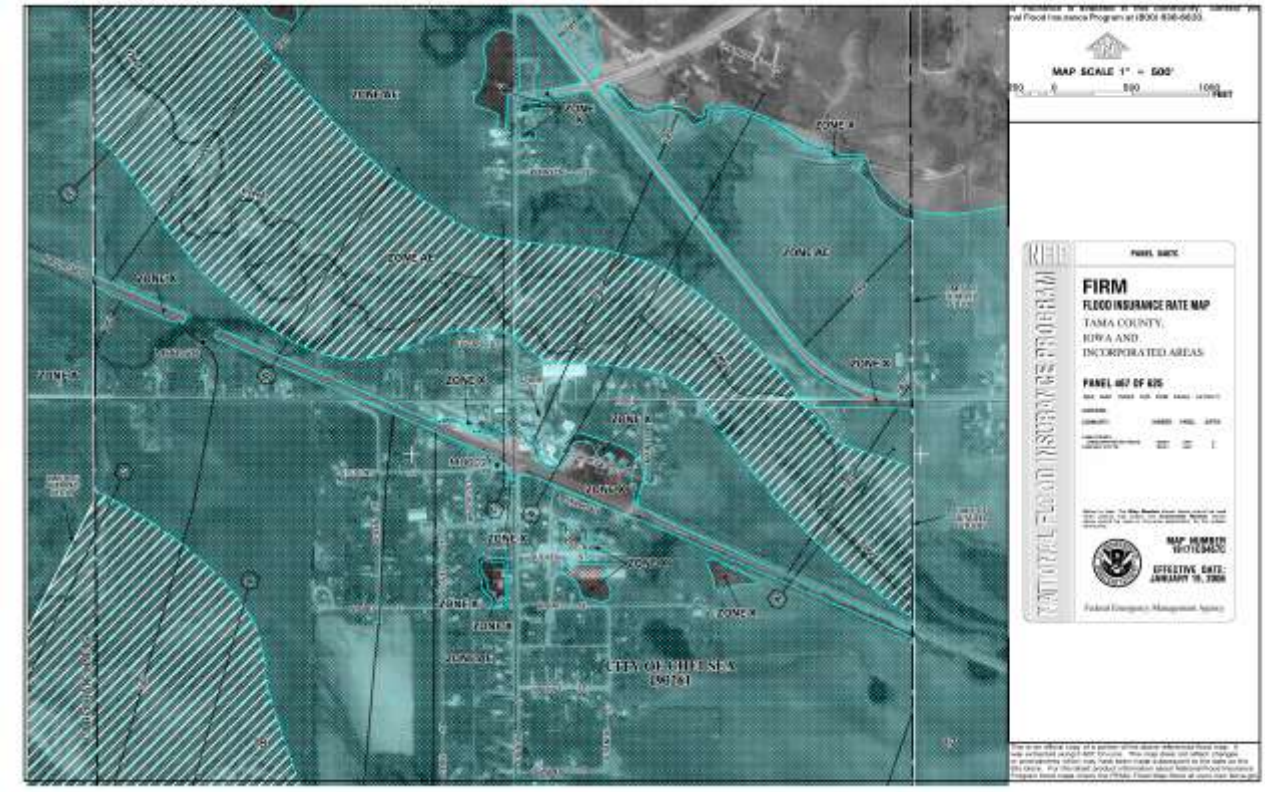
Vulnerable populations in unincorporated Tama County include most groups that were identified in the incorporated cities. The elderly and disabled individuals who live in their private homes are especially vulnerable when a hazard event occurs. Also, individuals with special medical needs are vulnerable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

4.4.3 Repetitive Loss Properties

44 CFR Requirement §201.6(c)(2)(ii): *[The risk assessment in all] plans approved after October 1, 2008 must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.*

Flooding is a 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. Refer to the map below.

Figure 4.4.3.1: Chelsea Floodplain



Source: FEMA Online Mapping Service, 2010

In Chelsea, there are approximately 25 repetitive loss properties, of which most are residential and just a few are businesses. An estimated $20,000 per structure was lost due to repetitive flood damage. This information was provided by the county floodplain manger and professionals who have aided the City in flood relief efforts in 1993, 2008, and the present.

Of the structures identified as a repetitive loss structure, four have been elevated to avoid further flood damage, and three have been acquired and are in the process of being demolished (Summer 2010). There are some obvious efforts to reduce the damages to structures in Chelsea, but there are still almost 20 structures that could sustain damage if another flood occurs.

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.*

Region 6 and the Task Force developed goals to provide direction for reducing hazard-related losses in Tama County. These were based on the results of the risk assessment and review of mitigation goals from other state and local plans, specifically the Iowa Hazard Mitigation Plan, 2007, and a past hazard mitigation plan for Tama County and certain communities in the county. The review was to ensure that this plan's mitigation strategy was integrated or aligned with existing plans and policies.

Initially, Region 6 created four goals for all of Tama County to serve as a baseline. With these goals, Task Force members either edited them to fit their jurisdiction's specific needs or disregarded them to form completely different goals that served their jurisdiction's needs. The four basic goals are:

1. Minimize losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority structures.
2. Protect the health and safety of 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.

Some Task Force members decided to completely omit certain goals to fit their needs. School districts are the main example because their needs differ quite a bit from cities. Unlike cities, Tama County had to keep a much broader view in forming their goals because their jurisdiction is large and varies.

At public hazard mitigation meetings in individual jurisdictions, the public was given the chance to voice their concerns and propose potential mitigation ideas for any hazard they deemed to be a concern. Also, at the first planning boundary-wide meeting, Task Force members shared mitigation ideas for each hazard that can affect their respective jurisdiction. The mitigation ideas from the meetings were compiled into a full list that could be used as a reference when choosing mitigation actions that fulfilled their jurisdiction's goals. This list complemented the results of the risk assessment, allowed idea sharing, and made sure that their community's ideas were considered. The list can be found in Appendix F.

Six types of mitigation actions were considered for this plan. The definition for mitigation action types is based on the definitions provided in the 2003 FEMA publication, *Developing the Mitigation Plan*. The six types of mitigation actions are:

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

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

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

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

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

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

In the following section, each jurisdiction's goals and mitigation actions along with their action plan will be listed and discussed. Several jurisdictions have similar goals and mitigation actions while others are unique to the jurisdiction's specific needs. The variance in hazard coverage, population, and structures require that each jurisdiction determine their own goals and actions rather than determining a set of goals and actions that blanket the entire planning area.

The STAPLEE Evaluation technique that was described in the process section of this plan was used to evaluate each of the mitigation actions identified for all the jurisdictions. The number in parentheses included next to each mitigation action is the STAPLEE score that each project received. The highest score a mitigation action could receive is 23, and the higher the mitigation action's score, the higher priority it will receive when all of the actions are prioritized.

The STAPLEE Evaluation considers not just political support and community acceptance but also the cost and benefits associated with the completion of a project. Some projects may have an intrinsic benefit to the community but the cost of the project may be too large to justify completion. The evaluation ensures that Task Force members consider the feasibility of the projects chosen for their community. Often times, the cost of a project are what pulls down its evaluation score.

Please note that in many cases, mitigation actions received the same score. Even those these actions are shown in a particular order in the jurisdiction's priorities, no action has more value than another. They are interchangeable at the discretion of the particular jurisdiction. Conditions change allowing one project to take precedence over another like new grant programs, disaster declarations, loss of funding, etc. Also, mitigation actions that receive a negative score should be reconsidered for inclusion in the plan by the jurisdiction during the implementation process.

All of the evaluation sheets for the mitigation actions are included in Appendix H.

Chelsea

Goal 1: Minimize losses to fire station, city hall, and other structures

Mitigation Action 1.1: Acquisition and elevation of structures (11)

Plan for implementation and administration:	Acquire or elevate structures that are damaged by flooding
Lead agency:	City of Chelsea
Partners:	Region 6 Planning Commission
Potential Funding Source:	FEMA HMPG
Total cost:	Over $100,000
Benefits (loss avoided):	Reduce flood damage
Completion Date:	October 2010

Mitigation Action 1.2: Maintain existing culverts and add new culverts (12)

Plan for implementation and administration:	Keep existing culverts in good condition and add new culverts where they are needed in the city
Lead agency:	City of Chelsea
Partners:	Engineering firm, others to be identified
Potential Funding Source:	FEMA HMGP, City of Chelsea, and others to be identified
Total cost:	The cost of a culvert varies on the location and type. Culverts in a ditch or under a driveway are usually around $1,000 while culverts under a road are $4,000 and higher depending on the size and type of road.
Benefits (loss avoided):	Reduces potential damages due to flash or river flooding
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.3: Purchase generators (11)

Plan for implementation and administration:	Purchase a generator for City use
Lead agency:	City of Chelsea
Partners:	To be identified
Potential Funding Source:	City of Chelsea, FEMA HMGP, and others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs also standby requires a permanent fuel source
Benefits (loss avoided):	Power generation to maintain the function of critical facilities
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.4: Construct a levee to protect the community from flood waters (15)

Plan for implementation and administration:	Construct levee protection for the community
Lead agency:	City of Chelsea
Partners:	Army Corps of Engineers, others to be identified
Potential Funding Source:	FEMA HMGP, others to be identified
Total cost:	Unknown but most likely very expensive
Benefits (loss avoided):	Protect city structures, infrastructure, and residents' homes and businesses
Completion Date:	1 year from when funding is secured or within time allotted by funding source

Goal 2: Protect the health and safety of residents and visitors

Mitigation Action 2.1: Construct a safe room (11)

Plan for implementation and administration:	Construct a safe room in Chelsea
Lead agency:	City of Chelsea
Partners:	To be identified
Potential Funding Source:	City of Chelsea, FEMA HMGP and PDM, CDBG, and others to be identified
Total 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 small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety for residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Chelsea Mitigation Action Prioritization

1. **Mitigation Action 1.4**: Construct a levee to protect the community from flood waters (15)
2. **Mitigation Action 1.2**: Maintain existing culverts and add new culverts (12)
3. **Mitigation Action 1.1**: Acquisition and elevation of structures (11) (Note: This project is already in progress, Summer 2010)
4. **Mitigation Action 1.3**: Purchase generators (11)
5. **Mitigation Action 2.1**: Construct a safe room (11)

Clutier

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: Add lift station (0)

Plan for implementation and administration:	Add a lift station to the City's sanitary sewer when and where it is needed.
Lead agency:	City of Clutier
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, City of Clutier, and others to be identified
Total cost:	Depending on the type and capacity of the lift station, approximately $120,000 to $500,000 plus operation and maintenance cost over the lift station's useful life
Benefits (loss avoided):	Eliminate potential sanitary sewer backups into structures
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.2: Add culverts (2)

Plan for implementation and administration:	Add culverts where needed in Clutier
Lead agency:	City of Clutier
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, City of Clutier, and others to be identified
Total cost:	The cost of a culvert varies on the location and type. Culverts in a ditch or under a driveway are usually around $1,000 while culverts under a road are $4,000 and higher depending on the size and type of road.
Benefits (loss avoided):	Reduces potential damages due to flash or river flooding
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.3: Elevate roads (0)

Plan for implementation and administration:	Elevate all City roads or those that are identified as problematic or critical during and immediately following flood events
Lead agency:	City of Clutier
Partners:	Iowa Department of Transportation, Tama County Engineer, others to be identified
Potential Funding Source:	FEMA HMGP, City of Clutier, and others to be identified
Total cost:	Unknown, most likely very expensive, need an engineering report to determine cost
Benefits (loss avoided):	Prevent road and vehicle damage and preserve the mobility of Clutier residents during and immediately following a flood event
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.4: Construct City Shed (2)

Plan for implementation and administration:	Construct a large shed for the City to store equipment and materials.
Lead agency:	City of Clutier
Partners:	To be identified
Potential Funding Source:	City of Clutier, FEMA HMGP, and others to be identified
Total cost:	Unknown, depends on materials and size of structure
Benefits (loss avoided):	The shed would protect equipment and materials critical to the City during and immediately following a hazard event.
Completion Date:	1 year after funds are secured or the time allotted by funding source

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

Mitigation Action 2.1: Construct safe room (8)

Plan for implementation and administration:	Construct a safe room in Clutier
Lead agency:	City of Clutier
Partners:	To be identified
Potential Funding Source:	City of Clutier, FEMA HMGP and PDM, CDBG, and others to be identified
Total 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 small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety for residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 2.2: Purchase generator (7)

Plan for implementation and administration:	Purchase a generator for City use
Lead agency:	City of Clutier
Partners:	To be identified
Potential Funding Source:	City of Clutier, FEMA HMGP, and others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs also standby requires a permanent fuel source
Benefits (loss avoided):	Power generation to maintain the function of critical facilities
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 2.3: Recruit firemen and first responders (7)

Plan for implementation and administration:	Recruit and train new firemen and EMTs among Clutier residents
Lead agency:	City of Clutier, Clutier Fire Department, and First Responders
Partners:	To be identified
Potential Funding Source:	City of Clutier, Assistance to Firefighters Grants, and others to be identified
Total cost:	Unknown
Benefits (loss avoided):	More firemen and EMTs to respond to emergencies, decreased response time
Completion Date:	Ongoing

Mitigation Action 2.4: New emergency siren (7)

Plan for implementation and administration:	Purchase and install a new warning siren with backup power
Lead agency:	City of Clutier
Partners:	To be identified
Potential Funding Source:	City of Clutier, FEMA HMGP, and others to be identified
Total cost:	Sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety of Clutier residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

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

Mitigation Action 3.1: Public education program (3)

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
Lead agency:	City of Clutier
Partners:	To be identified, possibly other Tama County jurisdictions
Potential Funding Source:	City of Clutier and others to be identified
Total cost:	Unknown, this project may be of little cost depending on the medium used
Benefits (loss avoided):	Life safety of Clutier residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

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

Mitigation Action 4.1: Create list of emergency contacts (2)

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.
Lead agency:	City of Clutier
Partners:	To be identified
Potential Funding Source:	None needed
Total cost:	None (printing costs may be an exception)
Benefits (loss avoided):	Quick response during and immediately following hazard events
Completion Date:	Ongoing

Clutier Mitigation Action Prioritization

1. **Mitigation Action 2.1:** Construct safe room (8)
2. **Mitigation Action 2.2:** Purchase generator (7)
3. **Mitigation Action 2.4:** New emergency siren (7)
4. **Mitigation Action 2.3:** Recruit firemen and first responders (7)
5. **Mitigation Action 3.1:** Public education program (3)
6. **Mitigation Action 1.4:** Construct City Shed (2)
7. **Mitigation Action 4.1:** Create list of emergency contacts (2)
8. **Mitigation Action 1.2:** Add culverts (2
9. **Mitigation Action 1.1:** Add lift station (0)
10. **Mitigation Action 1.3:** Elevate roads (0)

Dysart

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: Shutter city buildings and police station (13)

Plan for implementation and administration:	Purchase and install shutters on city buildings and police station windows
Lead agency:	City of Dysart
Partners:	To be identified
Potential Funding Source:	City of Dysart
Total cost:	Unknown, depends on the type, material, and amount of shutters
Benefits (loss avoided):	Prevent damage to windows and items inside City buildings
Completion Date:	Ongoing as funds allow

Mitigation Action 1.2: Purchase new rescue equipment for City Shop and Fire Department (15)

Plan for implementation and administration:	Update or replace substandard equipment for the City and Fire Department
Lead agency:	City of Dysart and Dysart Fire Department
Partners:	To be identified
Potential Funding Source:	Assistance to Firefighter Grants and others to be determined
Total cost:	Unknown
Benefits (loss avoided):	Quality equipment can afford higher quality work and rescue, help avoid equipment failure due to overuse or age
Completion Date:	Potentially ongoing, but also within the time allotted if funding is received from a grant source

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

Mitigation Action 2.1: Construct safe room (4)

Plan for implementation and administration:	Construct a safe room
Lead agency:	City of Dysart
Partners:	To be identified
Potential Funding Source:	City of Dysart, FEMA HMGP and PDM, CDBG, and others to be identified
Total 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 small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of residents and visitors
Completion Date:	Unknown

Mitigation Action 2.2: Update the City's Emergency Action Plan and complete training (16)

Plan for implementation and administration:	Make needed updates to the Dysart Emergency Action Plan and train City personnel and the public to make the updates effective
Lead agency:	City of Dysart
Partners:	All City of Dysart Departments, others to be indentified
Potential Funding Source:	City of Dysart
Total cost:	Unknown
Benefits (loss avoided):	Situations and issues not currently covered in the plan can be added
Completion Date:	Unknown

Mitigation Action 2.3: Purchase generators and pumps for storm sewers (19)

Plan for implementation and administration:	Purchase generators and pumps for storm sewers. The appropriate steps to ensure that the generators can be used will be completed.
Lead agency:	City of Dysart
Partners:	To be identified
Potential Funding Source:	City of Dysart, others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source. The cost of pumps will also vary depending on the type and capacity.
Benefits (loss avoided):	Prevent wastewater backups and flash flooding
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 2.4: Maintain Code Red Participation (17)

Plan for implementation and administration:	Maintain participation in the program and encourage Dysart residents to register and keep their contact information up to date
Lead agency:	City of Dysart
Partners:	Tama County Emergency Management
Potential Funding Source:	City of Dysart
Total cost:	Approximately $717 each year, rate is $0.55 per capita
Benefits (loss avoided):	Dysart residents can be kept up-to-date on hazards and other dangerous situations
Completion Date:	Ongoing

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 (6)

Plan for implementation and administration:	A flyer with storm procedures determined for the city will be distributed to all homes in Dysart
Lead agency:	City of Dysart
Partners:	Volunteer groups (help with distribution)
Potential Funding Source:	City of Dysart, others to be identified
Total cost:	Unknown, main cost will be printing
Benefits (loss avoided):	Prevent wastewater backups and flash flooding
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 3.2: Stage practice drills and town meetings to educate citizens (2)

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.
Lead agency:	City of Dysart
Partners:	Tama County Emergency Management, others to be indentified
Potential Funding Source:	City of Dysart, others to be identified
Total cost:	Unknown, project may be of little cost
Benefits (loss avoided):	Dysart City personnel and citizens will be informed and/or prepared for disaster situations
Completion Date:	Ongoing

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

Mitigation Action 4.1: Purchase new communication equipment (7)

Plan for implementation and administration:	Update or replace substandard communication equipment in all City departments
Lead agency:	City of Dysart
Partners:	Others to be indentified
Potential Funding Source:	City of Dysart, others to be identified
Total cost:	Unknown until equipment is assessed and new equipment is priced
Benefits (loss avoided):	Dysart City personnel will have better communication capabilities
Completion Date:	Possibly ongoing or 1 year from when funds are secured

Dysart Mitigation Action Prioritization

1. **Mitigation Action 2.3:** Purchase generators and pumps for storm sewers (19)
2. **Mitigation Action 2.4:** Maintain Code Red Participation (17)
3. **Mitigation Action 2.2:** Update the City's Emergency Action Plan and complete training (16)
4. **Mitigation Action 1.2:** Purchase new rescue equipment for City Shop and Fire Department (15)
5. **Mitigation Action 1.1:** Shutter city buildings and police station (13)
6. **Mitigation Action 4.1:** Purchase new communication equipment (7)
7. **Mitigation Action 3.1:** Prepare education flyers about storm procedures to go to all homes in Dysart (6)
8. **Mitigation Action 2.1:** Construct safe room (4)
9. **Mitigation Action 3.2:** Stage practice drills and town meetings to educate citizens (2)

Elberon

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

Mitigation Action 1.1: Construct safe room (-6)

Plan for implementation and administration:	Construct safe room in Elberon
Lead agency:	City of Elberon
Partners:	To be identified
Potential Funding Source:	City of Elberon, FEMA HMGP and PDM, CDBG, and others to be identified
Total 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 small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety for Elberon residents and visitors
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 1.2: Add new culverts (14)

Plan for implementation and administration:	Add culverts where needed in Elberon
Lead agency:	City of Elberon
Partners:	To be identified
Potential Funding Source:	City of Elberon, FEMA HMGP, others to be identified
Total cost:	The cost of a culvert varies on the location and type. Culverts in a ditch or under a driveway are usually around $1,000 while culverts under a road are $4,000 and higher depending on the size and type of road.
Benefits (loss avoided):	Reduces potential damages due to flash or river flooding
Completion Date:	1 year after funds are secured or the time allotted by funding source

Goal 2: Minimize losses to existing and future structures within hazard areas. Critical facilities and indentified assets are high priority.

Mitigation Action 2.1: Update County-owned bridges and inspect annually (12)

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
Lead agency:	City of Elberon
Partners:	Tama County Engineer, others to be indentified
Potential Funding Source:	City of Elberon, Tama County, others to be indentified
Total cost:	Unknown until county engineer assesses bridges
Benefits (loss avoided):	Avoid bridge failure that may cause loss of life and interrupt travel for an extended period of time
Completion Date:	Ongoing

Mitigation Action 2.2: Enforce building codes (8)

Plan for implementation and administration:	The City will work on improving enforcement of building codes throughout Elberon
Lead agency:	City of Elberon
Partners:	To be identified
Potential Funding Source:	To be identified, extra funding may not be needed
Total cost:	Unknown
Benefits (loss avoided):	Safer structures that can better withstand hazard events, prevention of structural failure
Completion Date:	Ongoing

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

Mitigation Action 3.1: Smoke detector program (13)

Plan for implementation and administration:	Create a program to encourage residents to use and maintain smoke detectors in their homes
Lead agency:	Fire Department
Partners:	City of Elberon, others to be indentified
Potential Funding Source:	Fire Department, City of Elberon, others to be indentified
Total cost:	Unknown
Benefits (loss avoided):	Prevent loss of life due to fire
Completion Date:	1 year from when funding is secured and the program is created but possible ongoing once the program is established

Mitigation Action 3.2: Educate residents about disaster kits and encourage them to build one (13)

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
Lead agency:	City of Elberon
Partners:	Tama County Emergency Management, Elberon Fire Department, others to be identified
Potential Funding Source:	To be indentified
Total cost:	Unknown, hosting an informational meeting would be of little cost
Benefits (loss avoided):	Elberon residents will be prepared for disasters
Completion Date:	1 year from when the program is created

Mitigation Action 3.3: Distribute NOAA All-Hazard Radios to all Elberon residents (10)

Plan for implementation and administration:	Create a program or secure funding to provide NOAA All-Hazard Radios to all Elberon residents
Lead agency:	City of Elberon
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Elberon, Tama County, Iowa Homeland Security, others to be identified
Total cost:	Unknown, depends on how much is spent on the radios or if they are only subsidized to encourage residents to purchase one
Benefits (loss avoided):	Elberon residents will be informed of approaching hazards and updates throughout a hazard event
Completion Date:	1 year from when funds are secured

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 (12)

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
Lead agency:	Elberon Fire Department
Partners:	City of Elberon, others to be identified
Potential Funding Source:	Assistance to Firefighters Grants, others to be indentified
Total cost:	The cost of a new fire station cannot be determined until architectural plans and cost estimates are developed. For generators, depending on wattage, fuel source, and type—standby or portable—it may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
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.
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 4.2: Create a plan for quick cleanup (14)

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
Lead agency:	City of Elberon
Partners:	Elberon Fire Department, Tama County Emergency Management, others to be indentified
Potential Funding Source:	City of Elberon
Total cost:	Unknown, planning may be at little or no cost
Benefits (loss avoided):	Shorter interruption of daily life
Completion Date:	To be indentified

Mitigation Action 4.3: Establish a command center (17)

Plan for implementation and administration:	Decide where a command center for the city will be located if a major disaster occurs
Lead agency:	City of Elberon
Partners:	To be identified
Potential Funding Source:	City of Elberon
Total cost:	Unknown, planning may be at little or no cost
Benefits (loss avoided):	No time will be lost in establishing a command center in the event of a disaster
Completion Date:	To be identified

Elberon Mitigation Action Prioritization

1. **Mitigation Action 4.3:** Establish a command center (17)
2. **Mitigation Action 1.2:** Add new culverts (14)
3. **Mitigation Action 4.2:** Create a plan for quick cleanup (14)
4. **Mitigation Action 3.1:** Smoke detector program (13)
5. **Mitigation Action 3.2:** Educate residents about disaster kits and encourage them to build one (13)
6. **Mitigation Action 4.1:** Construct new fire station with generators (12)
7. **Mitigation Action 3.3:** Distribute NOAA All-Hazard Radios to all Elberon residents (10)
8. **Mitigation Action 2.2:** Enforce building codes (8)
9. **Mitigation Action 1.1:** Construct safe room (-6)

Lincoln

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: Update structures with fire retardant materials, sprinkler systems, metal roofs, etc. (7)

Plan for implementation and administration:	Update City structures and critical facilities with materials that will help prevent or dampen a fire
Lead agency:	City of Lincoln
Partners:	Lincoln Fire Department, others to be identified
Potential Funding Source:	City of Lincoln, others to be indentified
Total cost:	Unknown until needs and cost estimates are developed
Benefits (loss avoided):	Protection for critical facilities to ensure that they can function during and following hazard events
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 1.2: Elevate structures and add lift stations (7)

Plan for implementation and administration:	Elevate infrastructure that is vulnerable to flooding and add lift stations where more capacity is needed.
Lead agency:	City of Lincoln
Partners:	To be identified
Potential Funding Source:	FEMA HMPG, City of Lincoln, others to be identified
Total cost:	For lift station addition, depending on the type and capacity of the lift station, approximately $120,000 to $500,000 plus operation and maintenance cost over the lift station's useful life
Benefits (loss avoided):	Preservation of infrastructure and prevention of wastewater backups
Completion Date:	1 year from when funding is secured or within the time allotted by funding source

Mitigation Action 1.3: Purchase road equipment for snow and debris removal (5)

Plan for implementation and administration:	Purchase equipment for snow and debris removal
Lead agency:	City of Lincoln
Partners:	To be indentified
Potential Funding Source:	City of Lincoln, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Shorter interruption of daily life following a hazard event
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

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

Mitigation Action 2.1: Purchases generators to run fire station and city hall (-1)

Plan for implementation and administration:	Purchase generators and install proper wiring to critical facilities and can be used when there is an electrical failure
Lead agency:	City of Lincoln
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, City of Lincoln, others to be indentified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Two major critical facilities will be able to function when there is a loss of power.
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 2.3: Update all fire equipment (1)

Plan for implementation and administration:	Update the Lincoln Fire Department's equipment
Lead agency:	Lincoln Fire Department
Partners:	City of Lincoln
Potential Funding Source:	Assistance to Firefighter Grants, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Quality equipment can afford higher quality rescue and response, help avoid equipment failure due to overuse or age
Completion Date:	Possibly ongoing, 1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 2.4: Update emergency siren (-1)

Plan for implementation and administration:	Update emergency siren, add backup power, and switch to remote triggering so that Tama County Emergency Management can activate the siren when appropriate
Lead agency:	City of Lincoln
Partners:	Tama County Emergency Management
Potential Funding Source:	City of Lincoln, others to be identified
Total cost:	New sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety for Lincoln residents and visitors, quicker and more reliable warning before a hazard occurs
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 2.5: Train a local citizen to be an EMT (2)

Plan for implementation and administration:	Recruit and train a new Emergency Medical Technician who is a Lincoln resident
Lead agency:	City of Lincoln
Partners:	Gladbrook Emergency Medical Response, others to be identified
Potential Funding Source:	City of Lincoln, others to be indentified
Total cost:	Unknown
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
Completion Date:	1 year from when a citizen volunteers and funds are secured

Mitigation Action 2.6: Remodel Amvet Hall for community shelter (6)

Plan for implementation and administration:	Create a community shelter by renovating the Amvet Hall so it has all the basic shelter amenities
Lead agency:	City of Lincoln
Partners:	To be indentified
Potential Funding Source:	City of Lincoln, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Life safety for Lincoln residents and visitors
Completion Date:	1 year from when funding is secured or within the time allotted by funding source

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. (6)

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.
Lead agency:	City of Lincoln
Partners:	All City Departments, Tama County Emergency Management, and others to be identified
Potential Funding Source:	City of Lincoln, other to be identified
Total cost:	Unknown, planning may be at little to no cost
Benefits (loss avoided):	No time lost in opening a shelter, residents will have access as soon as possible if the shelter is needed
Completion Date:	To be identified

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

Mitigation Action 4.1: 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
Lead agency:	City Lincoln
Partners:	Iowa Department of Transportation, Tama County Engineer, and others to be identified
Potential Funding Source:	City of Lincoln, FEMA HMGP, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent road and vehicle damage and preserve the mobility of Lincoln residents during and immediately following a flood event
Completion Date:	1 year after funds are secured or the time allotted by funding source

Mitigation Action 4.2: Install computer system and Internet for county communications (1)

Plan for implementation and administration:	Purchase a computer for City Hall and install Internet
Lead agency:	City of Lincoln
Partners:	None
Potential Funding Source:	City of Lincoln, others to be identified
Total cost:	Cost of computer which would be no more than $1,000 plus the cost of Internet service, which is usually $50 per month
Benefits (loss avoided):	The City will have better communication capabilities and quick access to more information during hazard events
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Lincoln Goal Prioritization

1. **Mitigation Action 1.1:** Update structures with fire retardant materials, sprinkler systems, metal roofs, etc. (7)
2. **Mitigation Action 1.2:** Elevate structures and add lift stations (7)
3. **Mitigation Action 2.6:** Remodel Amvet Hall for community shelter (6)
4. **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. (6)
5. **Mitigation Action 1.3:** Purchase road equipment for snow and debris removal (5)
6. **Mitigation Action 2.5:** Train a local citizen to be an EMT (2)
7. **Mitigation Action 2.3:** Update all fire equipment (1)
8. **Mitigation Action 4.2:** Install computer system and Internet for county communications (1)
9. **Mitigation Action 2.1:** Purchases generators to run fire station and city hall (-1)
10. **Mitigation Action 2.4:** Update emergency siren (-1)
11. **Mitigation Action 4.1:** Elevate roads (-1)

Garwin

Goal 1: Protect the health and safety of Garwin residents.

Mitigation Action 1.1: Purchase generator (13)

Plan for implementation and administration:	Purchase a generator to use in critical facilities during power outages, generator hook up capabilities need to be installed in critical facilities
Lead agency:	City of Garwin
Partners:	Others to be identified
Potential Funding Source:	City of Garwin, FEMA HMGP, others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Continuation of critical facilities functions during a power outage
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 1.2: Purchase warning siren with backup power (13)

Plan for implementation and administration:	Purchase new warning siren with backup power capability
Lead agency:	City of Garwin
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Garwin, others to be identified
Total cost:	New sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost. Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Life safety of Garwin residents and visitors, use of siren even if there is a power outage
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 1.3: Construct a safe room (13)

Plan for implementation and administration:	Construct a safe room for Garwin residents and visitors to use during severe weather
Lead agency:	City of Garwin
Partners:	Others to be identified
Potential Funding Source:	City of Garwin, FEMA HMGP and PDM, CDBG, others to be identified
Total 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 small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of Garwin residents and visitors
Completion Date:	1 year from funding or within the time allotted by funding source

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 (18)

Plan for implementation and administration:	Establish and plan for a particular location to be Garwin's command center if a disaster were to occur
Lead agency:	City of Garwin
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Garwin
Total cost:	Unknown, planning may of little or no cost
Benefits (loss avoided):	No time lost in setting up a command center during disaster situation
Completion Date:	To be identified

Garwin Mitigation Action Prioritization

1. **Mitigation Action 2.1:** Establish a command center (18)
2. **Mitigation Action 1.1:** Purchase generator (13)
3. **Mitigation Action 1.2:** Purchase warning siren with backup power (13)
4. **Mitigation Action 1.3:** Construct a safe room (13)

Gladbrook

Goal 1: Minimize losses to infrastructure, critical facilities, and other assets

Mitigation Action 1.1: Purchase generators to help prevent critical site damage from freezing temperatures (5)

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
Lead agency:	City of Gladbrook
Partners:	To be identified
Potential Funding Source:	City of Gladbrook, FEMA HMGP, others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Prevent to damage to critical facilities
Completion Date:	1 year within securing funds or within the time allotted by funding source

Mitigation Action: 1.2: Water distribution system improvements (9)

Plan for implementation and administration:	Complete needed water distribution system improvements
Lead agency:	City of Gladbrook
Partners:	To be identified
Potential Funding Source:	City of Gladbrook, others to be indentified
Total cost:	Unknown
Benefits (loss avoided):	Prevent additional damage to existing system and damages to other structures that may result from failures in the system, preserve water quality
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 1.3: Grand Street bridge improvements (5)

Plan for implementation and administration:	Complete needed improvements for the Grand Street bridge
Lead agency:	City of Gladbrook
Partners:	Tama County Engineer, others to be identified
Potential Funding Source:	City of Gladbrook, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent structural failure, human loss, and extended interruption of traffic
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Goal 2: Protect the safety of Gladbrook resident and visitors.

Mitigation Action 2.1: Purchase generator for shelter(s) (7)

Plan for implementation and administration:	Purchase generator for use in a shelter
Lead agency:	City of Gladbrook
Partners:	To be identified
Potential Funding Source:	City of Gladbrook, FEMA HMGP, others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	The ability to power a shelter during a power outage
Completion Date:	1 year from when

Mitigation Action 2.2: Install shower facilities at shelter (4)

Plan for implementation and administration:	Install shower facilities at shelter so the facility can be used for an extended period of time by Gladbrook residents
Lead agency:	City of Gladbrook
Partners:	To be identified
Potential Funding Source:	City of Gladbrook, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Shelter can a long-term resource to residents if needed
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 2.3: Maintain Code Red participation and educate citizens (8)

Plan for implementation and administration:	Continue to participate in the Code Red program and educate citizens about its benefits and encourage them to keep their contact information up to date
Lead agency:	City of Gladbrook
Partners:	Tama County Emergency Management
Potential Funding Source:	City of Gladbrook
Total cost:	Approximately $559 each year, rate is $0.55 per capita
Benefits (loss avoided):	Gladbrook residents can be kept up-to-date on hazards and other dangerous situations
Completion Date:	Ongoing

Goal 3: Educate Gladbrook citizens about hazard dangers, preparations, and procedures.

Mitigation Action 3.1: Develop emergency procedures with assistance (4)

Plan for implementation and administration:	The City of Gladbrook will develop emergency procedures for the city with guidance of an emergency management professional
Lead agency:	City of Gladbrook
Partners:	Tama County Emergency Management, some sort of emergency management organization or consultant, others to be identified
Potential Funding Source:	City of Gladbrook, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	The City will be prepared for disasters
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 3.2: Procedure education (1)

Plan for implementation and administration:	Once procedures are developed, create a program to inform Gladbrook residents about their details and execution
Lead agency:	City of Gladbrook
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Gladbrook, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Gladbrook residents will be aware of city procedures
Completion Date:	1 year after the city emergency procedures are developed

Mitigation Action 3.3: Danger and preparation education (1)

Plan for implementation and administration:	Create a program to inform Gladbrook residents about the dangers of hazards and how they can be prepared
Lead agency:	City of Gladbrook
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Gladbrook, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Gladbrook residents will be informed and prepared
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 3.4: Youth-oriented hazard education (1)

Plan for implementation and administration:	Create a hazard education program that targets a youth audience
Lead agency:	City of Gladbrook
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Gladbrook, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Gladbrook youth will be educated about the dangers of hazards
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Goal 4: Minimize operations disruption

Mitigation Action 4.1: Water source research and potentially increase (15)

Plan for implementation and administration:	Research Gladbrook's water source and other sources for a potential increase of supply
Lead agency:	City of Gladbrook
Partners:	Iowa Department of Natural Resources, engineer firm, and others to be identified
Potential Funding Source:	City of Gladbrook, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent disruption of water distribution
Completion Date:	1 year from when funding is secured

Mitigation Action 4.2: Storm drainage improvements (12)

Plan for implementation and administration:	Complete storm drainage improvements
Lead agency:	City of Gladbrook
Partners:	To be identified
Potential Funding Source:	City of Gladbrook, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent flash flooding
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 4.3: Sewer improvements and purchase generator for backup (14)

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.
Lead agency:	City of Gladbrook
Partners:	To be identified
Potential Funding Source:	City of Gladbrook, FEMA HMGP, others to be identified
Total cost:	Unknown for sewer improvements, for generator, depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Prevent damages due to sewer backup
Completion Date:	One year from when funds are secured or within time allotted by funding source

Gladbrook Mitigation Action Prioritization

1. **Mitigation Action 4.1:** Water source research and potentially increase (15)
2. **Mitigation Action 4.3:** Update to I and I system and purchase generator for backup (14)
3. **Mitigation Action 4.2:** Storm drainage improvements (12)
4. **Mitigation Action: 1.2:** Water distribution system improvements (9)
5. **Mitigation Action 2.3:** Maintain Code Red participation and educate citizens (8)
6. **Mitigation Action 2.1:** Purchase generator for shelter(s) (7)
7. **Mitigation Action 1.1:** Purchase generators to help prevent critical site damage from freezing temperatures (5)
8. **Mitigation Action 1.3:** Grand Street bridge improvements (5)
9. **Mitigation Action 2.2:** Install shower facilities at shelter (4)
10. **Mitigation Action 3.1:** Develop emergency procedures with assistance (4)
11. **Mitigation Action 3.2:** Procedure education (1)
12. **Mitigation Action 3.3:** Danger and preparation education (1)
13. **Mitigation Action 3.4:** Youth-oriented hazard education (1)

Goal 1: Minimize losses to existing and future structures within hazard areas. Critical facilities and identified assets are high priority.

Mitigation Action 1.1: Purchase generators for critical points in infrastructure (10)

Plan for implementation and administration:	Purchase generators to power critical points in infrastructure during a power outage i.e. lift station
Lead agency:	City of Montour
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, City of Montour
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Minimal interruption in the operation of critical points in the city's infrastructure and prevention of damage that may be caused when certain points of infrastructure do not function
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 1.2: Create a sandbag committee (8)

Plan for implementation and administration:	Create a committee that is responsible for organizing sandbagging efforts when they are needed
Lead agency:	City of Montour or interested citizen
Partners:	Tama County Emergency management, others to be identified
Potential Funding Source:	City of Montour, others to be identified
Total cost:	Unknown, forming the committee may have little to no cost
Benefits (loss avoided):	A group of people who already know how to sandbag will be ready to assemble whenever sandbagging might be needed
Completion Date:	To be indentified

Goal 2: Protect Montour residents

Mitigation Action 2.1: Purchase generator for warning siren (10)

Plan for implementation and administration:	Purchase generator for warning siren and install hookup
Lead agency:	City of Montour
Partners:	To be indentified
Potential Funding Source:	FEMA HMGP, City of Montour, others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Life safety of Montour residents
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 2.2: Construct air-conditioned safe room (1)

Plan for implementation and administration:	Construct a safe room with air conditioning that will be open to the public during severe weather
Lead agency:	City of Montour
Partners:	To be identified
Potential Funding Source:	FEMA HMGP and PDM, City of Montour, CDBG, and others to be identified
Total 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 small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of Montour residents
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 2.3: Distribute NOAA All-Hazard Radios to residents (0)

Plan for implementation and administration:	Secure funding or create a program to distribute NOAA All-Hazard Radios to Montour residents
Lead agency:	City of Montour
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	To be identified
Total cost:	Unknown
Benefits (loss avoided):	Life safety of Montour residents
Completion Date:	1 year from when funds are secured

Goal 3: Educate Montour citizens about the dangers of hazards both natural and man-made.

Mitigation Action 3.1: Active safety committee (7)

Plan for implementation and administration:	Keep the newly formed safety committee active in the community
Lead agency:	City of Montour
Partners:	To be identified
Potential Funding Source:	City of Montour, others to be identified
Total cost:	Unknown, this effort may at little or no cost
Benefits (loss avoided):	Residents actively trying to make the community safer
Completion Date:	Ongoing

Mitigation Action 3.2: Maintain participation in Code Red (10)

Plan for implementation and administration:	Maintain participation in the program and encourage Montour residents to register and keep their contact information up to date
Lead agency:	City of Montour
Partners:	Tama County Emergency Management
Potential Funding Source:	City of Montour
Total cost:	Approximately $157each year, rate is $0.55 per capita
Benefits (loss avoided):	Dysart residents can be kept up-to-date on hazards and other dangerous situations
Completion Date:	Ongoing

Mitigation Action 3.3: Establish an area for posting information (10)

Plan for implementation and administration:	Establish a visible and easily accessible area for posting public information like shelter schedule, meeting announcements, events, etc.
Lead agency:	City of Montour
Partners:	To be identified
Potential Funding Source:	City of Montour
Total cost:	Unknown, most likely very small cost
Benefits (loss avoided):	All public information will be readily available
Completion Date:	1 year from when funds are secured

Goal 4: Maintain previously completed hazard mitigation work.

Mitigation Action 4.1: Maintain culverts (4)

Plan for implementation and administration:	Keep existing culverts in good condition through regular inspection and maintenance
Lead agency:	City of Montour
Partners:	To be identified
Potential Funding Source:	City of Montour, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent flooding due to inadequate culverts
Completion Date:	Ongoing

Mitigation Action 4.2: Regular debris removal from waterways (2)

Plan for implementation and administration:	Create a community wide or city government initiative to regularly inspect waterways and remove debris
Lead agency:	City of Montour
Partners:	Safety Committee, others to be indentified
Potential Funding Source:	City of Montour, volunteer labor
Total cost:	Unknown, may cost very little
Benefits (loss avoided):	Prevent flooding due to waterway blockage
Completion Date:	Ongoing

Mitigation Action 4.3: Annually inspect roads, culverts, creeks, and city facilities (13)

Plan for implementation and administration:	Annually inspect the City's physical and natural assets i.e. infrastructure, buildings, waterways, etc.
Lead agency:	City of Montour
Partners:	Safety Committee, Volunteers
Potential Funding Source:	City of Montour
Total cost:	Unknown
Benefits (loss avoided):	Ensure City's assets are properly functioning in order to avoid failures
Completion Date:	Ongoing

Montour Mitigation Action Prioritization

1. **Mitigation Action 4.3:** Annually inspect roads, culverts, creeks, and city facilities (13)
2. **Mitigation Action 1.1:** Purchase generators for critical points in infrastructure (10)
3. **Mitigation Action 2.1:** Purchase generator for warning siren (10)
4. **Mitigation Action 3.2:** Maintain participation in Code Red (10)
5. **Mitigation Action 3.3:** Establish an area for posting information (10)
6. **Mitigation Action 1.2:** Create a sandbag committee (8)
7. **Mitigation Action 3.1:** Active safety committee (7)
8. **Mitigation Action 4.1:** Maintain culverts (4)
9. **Mitigation Action 4.2:** Regular debris removal from waterways (2)
10. **Mitigation Action 2.2:** Construct air-conditioned safe room (1)
11. **Mitigation Action 2.3:** Distribute NOAA All-Hazard Radios to residents (0)

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: Bury power lines (-1)

Plan for implementation and administration:	Investigate the feasibility to bury all or the most vulnerable sections of power lines
Lead agency:	Alliant Energy
Partners:	City of Tama, others to be identified
Potential Funding Source:	City of Tama, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent loss of power due to severe weather than can damage overhead power lines
Completion Date:	1 year from when funds are secured or within time determined by Alliant

Mitigation Action 1.2: 28E Agreements with nearby cities for services (8)

Plan for implementation and administration:	The City of Tama will assess its needs and collaborate with other cities to form agreements
Lead agency:	City of Tama
Partners:	Tama County Emergency Management, other cities to be indentified
Potential Funding Source:	City of Tama, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Tama will have communities it can call upon when additional assistance is needed
Completion Date:	Ongoing

Mitigation Action 1.3: Community smoke detector program (8)

Plan for implementation and administration:	Create a program to encourage Tama residents to properly maintain smoke detectors in their homes
Lead agency:	Tama Fire Department
Partners:	City of Tama, others to be identified
Potential Funding Source:	Tama Fire Department, City of Tama, others to be identified
Total cost:	Unknown, could be a little cost
Benefits (loss avoided):	Life safety of Tama residents
Completion Date:	1 year from when funds are secured

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

Mitigation Action 2.1: Establish citywide evacuation plan (16)

Plan for implementation and administration:	Establish a citywide evacuation plan for situations when large scale evacuation is needed
Lead agency:	City of Tama
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Tama
Total cost:	Unknown
Benefits (loss avoided):	No time will be lost when large scale evacuation is needed
Completion Date:	1 year from when funds are secured

Mitigation Action 2.2: Purchase two new warning sirens (21)

Plan for implementation and administration:	Purchase two new warning sirens with backup power
Lead agency:	City of Tama
Partners:	To be identified
Potential Funding Source:	FEMA HMPG, City of Tama, others to be identified
Total cost:	Sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety of Tama residents and visitors
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

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 (23)

Plan for implementation and administration:	Fire Department and EMS update or complete additional training
Lead agency:	Tama Fire Department and EMS
Partners:	City of Tama, others to be identified
Potential Funding Source:	Assistance to Fire Fighter Grant, City of Tama, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Updated or additional training may afford better response and results
Completion Date:	1 year from when funding is secured or within the time allotted by funding source

Mitigation Action 3.2: Inform residents of evacuation plan for hazardous materials incident (23)

Plan for implementation and administration:	Create an informational campaign about the evacuation plan for a hazardous materials incident
Lead agency:	City of Tama
Partners:	Tama Fire Department, Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Tama, others to be identified
Total cost:	Unknown, may be of little cost
Benefits (loss avoided):	Less time will be lost when evacuation must occur
Completion Date:	1 year from when funding is secured or from when the campaign approach is determined

Goal 4: The continuity of county and local operations will not be significantly disrupted.

Mitigation Action 4.1: Establish community building as communications station (23)

Plan for implementation and administration:	Identify and complete the necessary steps to establish the community building as a communications station during a disaster
Lead agency:	City of Tama
Partners:	To be identified
Potential Funding Source:	City of Tama
Total cost:	Unknown
Benefits (loss avoided):	Prevent loss of communications during and immediately following a hazard
Completion Date:	1 year from when funding is secured or when the necessary steps are determined

Tama Mitigation Action Prioritization

1. **Mitigation Action 3.1:** Training for fire department and emergency medical services (23)
2. **Mitigation Action 3.2:** Inform residents of evacuation plan for hazardous materials incident (23)
3. **Mitigation Action 4.1:** Establish community building as communications station (23)
4. **Mitigation Action 2.2:** Purchase two new warning sirens (21)
5. **Mitigation Action 2.1:** Establish citywide evacuation plan (16)
6. **Mitigation Action 1.2:** 28E Agreements with nearby cities for services (8)
7. **Mitigation Action 1.3:** Community smoke detector program (8)
8. **Mitigation Action 1.1:** Bury power lines (-1)

Toledo

Goal 1: Minimize losses by consciously incorporating hazard mitigation in design, location, maintenance, and upgrade decision making.

Mitigation Action 1.1: Demolish current structures in Deer Creek flood hazard area (12)

Plan for implementation and administration:	Limit and gradually reduce the amount of development in the Deer Creek flood hazard area
Lead agency:	City of Toledo
Partners:	To be identified
Potential Funding Source:	City of Toledo
Total cost:	Unknown, this initiative may bit at little cost
Benefits (loss avoided):	Prevent repetitive flood loss
Completion Date:	To be identified

Goal 2: Protect the health and safety of all Toledo residents and visitors.

Mitigation Action 2.1: Construct safe room for combined mobile home park, Reinig Center, and daycare (-1)

Plan for implementation and administration:	Construct a safe room near the mobile home park, Reinig Center, and daycare
Lead agency:	City of Toledo
Partners:	To be identified
Potential Funding Source:	FEMA HMGP and PDM, City of Toledo, CDBG, and others to be identified
Total 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 small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of Toledo residents and vulnerable populations
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Goal 3: Educate the population about hazards and actions they can take or refrain from during a hazard event.

Mitigation Action 3.1: Subsidize individual purchase of NOAA All-Hazard radios (5)

Plan for implementation and administration:	Create a program to help Toledo residents purchase radios at a discount or with a rebate
Lead agency:	City of Toledo
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Toledo, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Toledo residents will be informed before and during a hazard event
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 3.2: Establish monthly publicity to remind residents of seasonal hazards (6)

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.
Lead agency:	City of Toledo
Partners:	Tama County Emergency Management (could possibly be countywide program)
Potential Funding Source:	City of Toledo, Tama County, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Toledo residents will regularly be kept aware of the dangers of hazards and how they can be prepared
Completion Date:	1 year from when fund are secured and the program is developed

Goal 4: Maintain continuity of critical services: food, fuel, law enforcement, emergency medical services, utilities, transportation, etc.

Mitigation Action 4.1: Purchase generators for water/sewer plant and Reinig Center (1)

Plan for implementation and administration:	Purchase generator for critical facilities and complete needed steps to make generator use possible in these facilities
Lead agency:	City of Toledo
Partners:	Tama County Economic Development, others to be identified
Potential Funding Source:	FEMA HMGP, City of Toledo, others to be identified
Total cost:	Unknown
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
Completion Date:	1 year from when funding is secured or within the time allotted by funding source

Mitigation Action 4.2: Purchase portable generation equipment and wiring for critical facilities like gas stations and grocery store (0)

Plan for implementation and administration:	Purchase portable generation equipment and wiring for critical facilities like gas stations and grocery store
Lead agency:	City of Toledo
Partners:	Critical facilities wanting to participate
Potential Funding Source:	Private businesses
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Critical facilities can avoid losses from power outage and Toledo residents and people from surrounding areas will be able to use these critical services
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Toledo Mitigation Action Prioritization

1. **Mitigation Action 1.1:** Demolish current structures in Deer Creek flood hazard area (12)
2. **Mitigation Action 3.2:** Establish monthly publicity to remind residents of seasonal hazards (6)
3. **Mitigation Action 3.1:** Subsidize individual purchase of NOAA All-Hazard radios (5)
4. **Mitigation Action 4.1:** Purchase generators for water/sewer plant and Reinig Center (1)
5. **Mitigation Action 4.2:** Purchase portable generation equipment and wiring for critical facilities like gas stations and grocery store (0)
6. **Mitigation Action 2.1:** Construct safe room for combined mobile home park, Reinig Center, and daycare (-1)

Traer

Goal 1: Protect health and safety of residents.

Mitigation Action 1.1: Construct a shelter at the school (9)

Plan for implementation and administration:	Construct a shelter facility at the school
Lead agency:	North Tama Community School District
Partners:	City of Traer
Potential Funding Source:	North Tama Community School District, City of Traer, others to identified
Total cost:	Unknown
Benefits (loss avoided):	A shelter facility will be available to Traer residents and people living in the surrounding area
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 1.2: Require formal emergency plans for vulnerable populations (9)

Plan for implementation and administration:	Require and create emergency plans for vulnerable populations in Traer
Lead agency:	City of Traer
Partners:	Organizations serving vulnerable populations, Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Traer, organizations, others to be identified
Total cost:	Unknown, cost may be little
Benefits (loss avoided):	Vulnerable populations will be prepared for hazard events
Completion Date:	1 year from when funding is secured or which populations are required to have a plan

Mitigation Action 1.3: Replace Mill Street bridge for public safety north of Traer (10)

Plan for implementation and administration:	Replace bridge
Lead agency:	City of Traer
Partners:	Tama County Engineer, DOT, others to be identified
Potential Funding Source:	City of Traer, Others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent human loss and traffic interruption
Completion Date:	1 year from when funds are secured or within time allotted by funding source

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 (3)

Plan for implementation and administration:	Purchase generator for critical facilities and complete needed steps to make generator use possible in these facilities
Lead agency:	City of Traer
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, City of Traer, others to be identified
Total cost:	Depending on wattage and fuel source, a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Prevent complete loss of power to critical facilities
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 2.2: Construct safe room (6)

Plan for implementation and administration:	Construct safe room for local government operations and Traer residents
Lead agency:	City of Traer
Partners:	To be identified
Potential Funding Source:	FEMA HMGP and PDM, City of Traer, CDBG, and others to be identified
Total 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 small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of Traer residents, protection for local government operations, and minimal interruption
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 2.3: Purchase additional emergency equipment i.e. fire, ambulance, etc. (6)

Plan for implementation and administration:	Assess City's Departments' needs and purchase additional equipment i.e. emergency equipment for fire and ambulance
Lead agency:	City of Traer
Partners:	All City Departments
Potential Funding Source:	Assistance to Firefighter Grants, FEMA HMPG, City of Traer, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Fulfill equipment needs that may improve response or avoid failure of old equipment
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 2.4: Create Police Department (10)

Plan for implementation and administration:	Create a City of Traer Police Department
Lead agency:	City of Traer
Partners:	Tama County Sherriff's Department, others to be indentified
Potential Funding Source:	City of Traer
Total cost:	Unknown
Benefits (loss avoided):	Local protection with more frequent patrol and quicker response time
Completion Date:	To be identified

Goal 3: Minimize loss to structures.

Mitigation Action 3.1: Flood protection for sewer lift station and levees (-5)

Plan for implementation and administration:	Identify and construct flood protection for critical sewer infrastructure and levees
Lead agency:	City of Traer
Partners:	Engineering firm, others to be identified
Potential Funding Source:	FEMA HMPG, City of Traer, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent the loss of critical infrastructure and the damages associated with their loss
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 3.2: Upgrade capacity and backup sewer lift station (4)

Plan for implementation and administration:	Increase sewer lift station capacity and add backup power
Lead agency:	City of Traer
Partners:	Engineering firm, others to be identified
Potential Funding Source:	City of Traer, others to be identified
Total cost:	For adding a new lift station, depending on the type and capacity of the lift station, approximately $120,000 to $500,000 plus operation and maintenance cost over the lift station's useful life
Benefits (loss avoided):	Avoid damages due to overloaded lift stations and loss of power
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 3.3: Replace fire and ambulance buildings with buildings are that are storm safe (6)

Plan for implementation and administration:	Replace the existing fire and ambulance building that are also safe rooms
Lead agency:	City of Traer
Partners:	Fire and Ambulance Departments
Potential Funding Source:	FEMA HMGP, Assistance to Firefighter Grants, City of Traer, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Protection of critical rescue equipment, communication capabilities, and Traer residents
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Traer Mitigation Action Prioritization

1. **Mitigation Action 1.3:** Replace Mill Street bridge for public safety north of Traer (10)
2. **Mitigation Action 2.4:** Create Police Department (10)
3. **Mitigation Action 1.1:** Construct a shelter at the school (9)
4. **Mitigation Action 1.2:** Require formal emergency plans for vulnerable populations (9)
5. **Mitigation Action 2.2:** Construct safe room (6)
6. **Mitigation Action 2.3:** Purchase additional emergency equipment i.e. fire, ambulance, etc. (6)
7. **Mitigation Action 3.3:** Replace fire and ambulance buildings with buildings are that are storm safe (6)
8. **Mitigation Action 3.2:** Upgrade capacity and backup sewer lift station (4)
9. **Mitigation Action 2.1:** Purchase portable generators (3)
10. **Mitigation Action 3.1:** Flood protection for sewer lift station and levees (-5)

Goal 1: Educate Vining residents about the dangers of hazards and how to be prepared.

Mitigation Action 1.1: Hold Red Cross first aid classes and encourage attendance (12)

Plan for implementation and administration:	Coordinate with the Red Cross to hold first aid classes for the public and encourage the public to attend
Lead agency:	City of Vining
Partners:	Local Red Cross Chapter, others to be identified
Potential Funding Source:	City of Vining, others to be identified
Total cost:	This project may be of very little cost
Benefits (loss avoided):	Vining residents will be more prepared for certain medical emergencies and may be able to assist each other
Completion Date:	1 year from when the project specifics are identified

Mitigation Action 1.2: Send letter to residents explain where shelter is located and when it will be open (10)

Plan for implementation and administration:	Write a letter with shelter information to distribute to all homes in Vining
Lead agency:	City of Vining
Partners:	Tama County Emergency Management, local volunteers, others to be identified
Potential Funding Source:	City of Vining
Total cost:	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
Completion Date:	3 months from when informational letter is written

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

Mitigation Action 2.1: Construct safe room (12)

Plan for implementation and administration:	Construct a safe room in Vining for residents and visitors to use during severe weather
Lead agency:	City of Vining
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	FEMA HMGP and PDM, City of Vining, CDBG, and others to be identified
Total 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 small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of Vining residents and visitors
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 2.2: Purchase generators (9)

Plan for implementation and administration:	Purchase generators and install the capability to be used in critical facilities
Lead agency:	City of Vining
Partners:	To be identified
Potential Funding Source:	FEMA HMPG, City of Vining
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Prevent interruption of the use of critical facilities
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 2.3: Create call list for checking on vulnerable populations (12)

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
Lead agency:	City of Vining
Partners:	Local volunteers, others to be identified
Potential Funding Source:	City of Vining
Total cost:	This project will be of little cost
Benefits (loss avoided):	Vulnerable populations may have needs met quicker
Completion Date:	Before plan update

Goal 3: Minimize losses to critical facilities.

Mitigation Action 3.1: Upgrade fire department equipment (9)

Plan for implementation and administration:	Identify the Fire Department's specific needs and make the needed upgrades
Lead agency:	Vining Fire Department
Partners:	City of Vining
Potential Funding Source:	Assistance to Firefighter Grants, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Equipment upgrades may afford better response and avoid failure of old equipment
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 3.2: Crown and grade streets (15)

Plan for implementation and administration:	Make needed street improvements
Lead agency:	City of Vining
Partners:	Engineering firm, others to be identified
Potential Funding Source:	To be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent existing streets from washing away and restricting access to residents and emergency vehicles
Completion Date:	1 year from when funds are secured or time allotted by funding source

Mitigation Action 3.3: Establish and enforce a burn ban (14)

Plan for implementation and administration:	Enforce a burn ban during dry weather
Lead agency:	Vining Fire Department
Partners:	City of Vining, Tama County Emergency Management
Potential Funding Source:	Vining Fire Department and City of Vining
Total cost:	Unknown, this project may be of little cost
Benefits (loss avoided):	Prevent grass fires
Completion Date:	Ongoing

Goal 4: The continuity of city operations will not be disrupted by disaster.

Mitigation Action 4.1: Replace culverts (9)

Plan for implementation and administration:	Replace or improve existing culverts with new culverts
Lead agency:	City of Vining
Partners:	To be identified
Potential Funding Source:	FEMA HMPG, City of Vining, others to be identified
Total cost:	The cost of a culvert varies on the location and type. Culverts in a ditch or under a driveway are usually around $1,000 while culverts under a road are $4,000 and higher depending on the size and type of road.
Benefits (loss avoided):	Prevent damages and flash flooding caused by inadequate culverts
Completion Date:	1 year from when funds are secured or within the time allotted by funding source

Mitigation Action 4.2: Encourage residents to have a battery-operated radio (6)

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
Lead agency:	City of Vining
Partners:	To be identified
Potential Funding Source:	City of Vining
Total cost:	Unknown, this project may be of little cost
Benefits (loss avoided):	Vining residents will be informed during times of power loss
Completion Date:	Before plan update

Mitigation Action 4.3: Switch to a remote triggered warning siren (10)

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
Lead agency:	City of Vining
Partners:	Tama County Emergency Management
Potential Funding Source:	City of Vining, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Immediate triggering of warning siren during severe weather
Completion Date:	1 year from when funding is secured or within time allotted by funding source

Vining Mitigation Action Prioritization

1. **Mitigation Action 3.2:** Crown and grade streets (15)
2. **Mitigation Action 3.3:** Establish and enforce a burn ban (14)
3. **Mitigation Action 1.1:** Hold Red Cross first aid classes and encourage attendance (12)
4. **Mitigation Action 2.1:** Construct safe room (12)
5. **Mitigation Action 2.3:** Create call list for checking on vulnerable populations (12)
6. **Mitigation Action 1.2:** Send letter to residents explain where shelter is located and when it will be open (10)
7. **Mitigation Action 4.3:** Switch to a remote triggered warning siren (10)
8. **Mitigation Action 2.2:** Purchase generators (9)
9. **Mitigation Action 3.1:** Upgrade fire department equipment (9)
10. **Mitigation Action 4.1:** Replace culverts (9)
11. **Mitigation Action 4.2:** Encourage residents to have a battery-operated radio (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 (12)

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
Lead agency:	Tama County Planning and Zoning
Partners:	Tama County Emergency Management, Tama County Supervisors
Potential Funding Source:	Tama County
Total cost:	Unknown, this project may be of little cost
Benefits (loss avoided):	Prevent unnecessary damage to buildings during hazard events
Completion Date:	1 year from when political and public support is leveraged

Mitigation Action 1.2: Acquisition and elevation of structures (2)

Plan for implementation and administration:	If needed, acquire or elevate flood prone structures
Lead agency:	Tama County
Partners:	Homeowners
Potential Funding Source:	FEMA HMGP, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Avoid repetitive flood damage to homes
Completion Date:	Within the time allotted by funding source

Mitigation Action 1.3: Add/repair flood mitigation structures (-1)

Plan for implementation and administration:	Where needed, add or repair vital flood mitigation structures
Lead agency:	Tama County
Partners:	To be identified
Potential Funding Source:	FEMA HMGP, Tama County, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Reduce or prevent flooding in the county
Completion Date:	Within the time allotted by funding source

Mitigation Action 1.4: Elevate roads (-4)

Plan for implementation and administration:	Where needed, elevate roads
Lead agency:	Tama County
Partners:	Tama County Engineer, others to be identified
Potential Funding Source:	FEMA HMPG, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent road damage and closures due to flooding
Completion Date:	Within the time allotted by funding source

Mitigation Action 1.5: Implementation of burn bans (16)

Plan for implementation and administration:	Improve the implementation of burn bans throughout the county
Lead agency:	Tama County Emergency Management
Partners:	Fire Chiefs throughout the county
Potential Funding Source:	Tama County, local fire departments, others to be identified
Total cost:	Unknown, project may be of little cost
Benefits (loss avoided):	Prevent grass fires during very dry weather
Completion Date:	Ongoing

Mitigation Action 1.6: Install steel roofs on government buildings to protect from hail and other hazards (9)

Plan for implementation and administration:	Systematically replace county building roofs with steel or another durable material to protect them from hail and other hazards
Lead agency:	Tama County
Partners:	To be identified
Potential Funding Source:	Tama County, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Protect the contents and functions of county buildings from hail and other hazards
Completion Date:	Once plan is established, within the timeline in the plan

Mitigation Action 1.7: Inspect and maintain levees (12)

Plan for implementation and administration:	Ensure that levees are inspected and maintained regularly
Lead agency:	Tama County
Partners:	Corps of Engineers, Tama County Engineer, others to be identified
Potential Funding Source:	Tama County, others to be identified
Total cost:	Unknown, collaborating with other agencies to ensure that the levees are maintained may be of little cost
Benefits (loss avoided):	Prevent levee failure
Completion Date:	Ongoing

Mitigation Action 1.8: Create list of disaster supplies and suppliers (20)

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
Lead agency:	Tama County Emergency Management
Partners:	Suppliers, others to be identified
Potential Funding Source:	Tama County
Total cost:	Unknown, this project may be of little cost
Benefits (loss avoided):	Cities and residents will be able to access supplies quickly following a disaster
Completion Date:	1 year from plan adoption

Mitigation Action 1.9: Update zoning in critical areas (6)

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.
Lead agency:	Tama County
Partners:	To be identified
Potential Funding Source:	Tama County
Total cost:	Unknown
Benefits (loss avoided):	Prevent undesirable land uses that can lead to unnecessary damages, increased runoff, etc.
Completion Date:	1 year from when political and public support is leveraged

Mitigation Action 1.10: Maintenance of vegetation near power lines (14)

Plan for implementation and administration:	Maintain proper distance between vegetation and power lines to help avoid damages to both the vegetation and electrical infrastructure
Lead agency:	Electric companies and Tama County
Partners:	To be identified
Potential Funding Source:	Tama County, electric companies, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent power outage and damage to electrical infrastructure
Completion Date:	Ongoing

Mitigation Action 1.11: Flood assessment requirement for building permit (12)

Plan for implementation and administration:	Establish a requirement for a flood assessment before a building permit is issued
Lead agency:	Tama County
Partners:	Tama County Planning and Zoning, others to be identified
Potential Funding Source:	Tama County, others to be identified
Total cost:	Unknown, project may be of little cost
Benefits (loss avoided):	Improve flood research in county and avoid undesirable development in the floodplain and flood-prone areas
Completion Date:	Begin implementing program 1 year from when political support is leveraged

Mitigation Action 1.12: Improve capital improvements planning process (14)

Plan for implementation and administration:	Improve the capital improvements planning process for the county and also increase public awareness of this type of planning
Lead agency:	Tama County
Partners:	All county departments, others to be identified
Potential Funding Source:	Tama County
Total cost:	Unknown, may be of little cost
Benefits (loss avoided):	Needs can better be incorporated into the county budget and the public is aware of upcoming and current county expenditures
Completion Date:	Ongoing

Mitigation Action 1.13: Improve regular assessment and maintenance on county structures (19)

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
Lead agency:	Tama County Engineer
Partners:	Other Tama County departments, others to be identified
Potential Funding Source:	Tama County
Total cost:	Unknown
Benefits (loss avoided):	Life safety, public knowledge
Completion Date:	Ongoing

Mitigation Action 1.14: Create fire extinguisher and fire alarm safety program (18)

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
Lead agency:	Tama County Emergency Management
Partners:	Local fire chiefs, Sheriff's Department, others to be identified
Potential Funding Source:	Tama County
Total cost:	Unknown
Benefits (loss avoided):	Life safety of Tama County residents, and preservation of structures
Completion Date:	1 year from when the program is created and the funding is secured

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 (10)

Plan for implementation and administration:	Create a program or incentives for emergency responders to be trained in search and rescue in structural failure situations
Lead agency:	Tama County Emergency Management
Partners:	Tama County Sherriff's Department, local emergency responders, others to be identified
Potential Funding Source:	Assistance to Firefighters Grant, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Quick and proper response in structural failure situations
Completion Date:	1 year from when funding is secured or within time allotted by funding source

Mitigation Action 2.2: Establish cooling centers (6)

Plan for implementation and administration:	Establish one or multiple cooling centers to be located throughout the county
Lead agency:	Tama County Emergency Management
Partners:	Local city government, others to be identified
Potential Funding Source:	Tama County, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent heat-related illness and death
Completion Date:	1 year from when cooling center location, operation, and funding is secured or within time allotted by funding source

Mitigation Action 2.3: Train fire departments for grass fires and maintain needed equipment (16)

Plan for implementation and administration:	Create a program or incentives for firemen to be trained for grass fires and purchase or maintain the needed equipment
Lead agency:	Tama County Emergency Management
Partners:	Tama County Sherriff's Department, city fire departments, others to be identified
Potential Funding Source:	Assistance to Firefighters Grant, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Quick and proper response in grass fire situations
Completion Date:	1 year from when funding is secured or within time allotted by funding source

Mitigation Action 2.4: Establish community shared shelters (6)

Plan for implementation and administration:	Explore the option of creating or consolidating shelters to be shared between communities
Lead agency:	Tama County Emergency Management
Partners:	City governments, others to be identified
Potential Funding Source:	To be identified
Total cost:	Unknown, may be more cost-effective than each community maintaining separate shelters especially when the communities are within close proximity
Benefits (loss avoided):	When services are shared, the service is usually more cost-effective and may be better quality overall
Completion Date:	If a shared shelter is found to be an option, 1 year from when funds are secured

Mitigation Action 2.5: Construct safe rooms in communities and recreational areas (5)

Plan for implementation and administration:	Where needed most, construct safe rooms in Tama County communities and recreational areas
Lead agency:	Tama County Emergency Management
Partners:	Tama County Conservation, city governments, others to be identified
Potential Funding Source:	FEMA HMGP and PDM, Tama County, city governments, CDBG, and others to be identified
Total 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 small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of Tama County residents and visitors
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 2.6: Establish advance warning system for recreational areas (6)

Plan for implementation and administration:	Establish an advanced warning system for recreational areas that is effective in warning people who are outdoors
Lead agency:	Tama County Emergency Management
Partners:	Tama County Conservation, others to be identified
Potential Funding Source:	FEMA HMGP, Tama County, others to be identified
Total cost:	Sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety of people using Tama County's recreational areas
Completion Date:	1 year from when funds are secured and the system is established or within time allotted by funding source

Mitigation Action 2.7: Require and enforce maintenance of vegetation near traffic signs (17)

Plan for implementation and administration:	Make requirements and enforce maintenance of vegetation near traffic signs
Lead agency:	Tama County Zoning
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	Tama County, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Traffic safety, reduce accidents
Completion Date:	1 year from when strategy is determined and political support is received

Mitigation Action 2.8: Improve fire code enforcement (12)

Plan for implementation and administration:	Identify how fire code enforcement can be improved and implement the improvements
Lead agency:	Tama County Emergency Management
Partners:	City fire chiefs, fireman, others to be identified
Potential Funding Source:	To be identified
Total cost:	Unknown
Benefits (loss avoided):	Prevent fires in Tama County structures
Completion Date:	1 year from when improvements are identified and funding is secured

Mitigation Action 2.9: Establish communication between emergency management and vets regarding animal/crop/plant diseases (18)

Plan for implementation and administration:	Establish communication between emergency management and vets regarding animal/crop/plant diseases
Lead agency:	Tama County Emergency Management
Partners:	Veterinarians throughout Tama County
Potential Funding Source:	To be identified
Total cost:	Unknown, this project may be of little cost
Benefits (loss avoided):	Information sharing
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 (13)

Plan for implementation and administration:	Create a program to publicize information about extreme heat, severe weather, and other hazards through flyers, PSAs, information on the county website, etc.
Lead agency:	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
Total cost:	Unknown, this project may be a of little cost
Benefits (loss avoided):	Public education
Completion Date:	Possibly ongoing, 1 year from when program is established and funding is secured or within time allotted by funding source

Mitigation Action 3.2: Public education program about general fire prevention and prevention of grass and wildland fires (14)

Plan for implementation and administration:	Create a separate program to educate the public about grass fires
Lead agency:	Tama County Emergency Management
Partners:	Tama County Conservations, city fire departments, others to be identified
Potential Funding Source:	Tama County, city fire departments, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Grass fire prevention
Completion Date:	Possibly ongoing, 1 year from when program is established and funding is secured

Mitigation Action 3.3: Encourage farmers to invest in crop insurance (12)

Plan for implementation and administration:	Through education or some sort of incentive program, encourage Tama County farmers to invest in crop insurance
Lead agency:	Tama County
Partners:	Tama County departments, others to be identified
Potential Funding Source:	Tama County, others to be identified
Total cost:	Unknown, public education would be more cost effective than an incentive program
Benefits (loss avoided):	Protection of farmers' investment
Completion Date:	1 year from when strategy is established and funding is secured

Mitigation Action 3.5: Education on dangers of highway transportation incidents and how to avoid collisions (14)

Plan for implementation and administration:	Initiate some sort of special education program about the dangers of highway transportation incidents and how to avoid collisions
Lead agency:	Tama County Emergency Management
Partners:	Tama County Sherriff's Department, DOT, others to be identified
Potential Funding Source:	Tama County, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Public education, prevention of collisions resulting in injury, death, and property damage
Completion Date:	Possibly ongoing, 1 year from when program is established and funding is secured

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 (14)

Plan for implementation and administration:	Complete government continuity planning for all Tama County departments
Lead agency:	Tama County Emergency Management and Board of Supervisors
Partners:	All county departments, some sort of consultant to possibly assist, others to be identified
Potential Funding Source:	Tama County
Total cost:	Unknown
Benefits (loss avoided):	Protect Tama County government assets and prevent major disruption of operations
Completion Date:	1 year from when funding is secured

Mitigation Action 4.2: Establish an impact assessment form for communities (19)

Plan for implementation and administration:	Establish an information gathering/impact assessment form for Tama County cities to use immediately following a disaster
Lead agency:	Tama County Emergency Management
Partners:	Tama County cities, disaster relief-related organizations
Potential Funding Source:	Tama County
Total cost:	Unknown, this project may be of little cost
Benefits (loss avoided):	Expedite the data gathering process
Completion Date:	1 year from plan adoption

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
Lead agency:	Tama County Emergency Management
Partners:	Other Tama County departments
Potential Funding Source:	FEMA HMPG, Tama County, others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs also standby requires a permanent fuel source
Benefits (loss avoided):	Avoid loss of critical facilities' function and prevent damages to critical facilities and other structures associated with an extended power outage
Completion Date:	1 year from when funding is secured or within time allotted by funding source

Mitigation Action 4.4: Bury utility lines (8)

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
Lead agency:	Power providers and Tama County Emergency Management
Partners:	Tama County Engineer, others to be identified
Potential Funding Source:	Power provider, others to be identified
Total cost:	Approximately $10 or more per foot of power line
Benefits (loss avoided):	Prevent costly power outages due to damage to above ground electrical infrastructure
Completion Date:	Possibly ongoing, 1 year from when areas for burial are identified and funds are secured

Mitigation Action 4.5: Budget and plan for communication failures (14)

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
Lead agency:	Tama County Emergency Management
Partners:	Other Tama County departments
Potential Funding Source:	Tama County, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	No loss of 911 PSAP functions
Completion Date:	1 year from when plan is created and funding is secured

Mitigation Action 4.6: Establish procedure for community to notify Tama County Emergency Management after Energy failure occurs (20)

Plan for implementation and administration:	Establish procedure for community to notify Emergency Management after Energy failure occurs
Lead agency:	Tama County Emergency Management
Partners:	City governments
Potential Funding Source:	Tama County
Total cost:	Unknown, project be of little cost
Benefits (loss avoided):	Consolidate information if outage occurs in more than one community, quicker and more direct contact with power provider
Completion Date:	1 year from plan adoption

Mitigation Action 4.7: Create emergency fuel supply and map other sources (11)

Plan for implementation and administration:	Create a small emergency fuel supply for county vehicles and map other sources of fuel
Lead agency:	Tama County Emergency Management
Partners:	Tama County departments
Potential Funding Source:	Tama County
Total cost:	Unknown
Benefits (loss avoided):	Prevent loss of fuel for vehicles that are critical
Completion Date:	1 year from when supply strategy is established and funds are secured

Tama County Mitigation Action Prioritization

1. **Mitigation Action 1.8:** Create list of disaster supplies and suppliers (20)
2. **Mitigation Action 4.6:** Establish procedure for community to notify Tama County Emergency Management after Energy failure occurs (20)
3. **Mitigation Action 1.13:** Improve regular assessment and maintenance on county structures (19)
4. **Mitigation Action 4.2:** Establish an impact assessment form for communities (19)
5. **Mitigation Action 1.14:** Create fire extinguisher and fire alarm safety program (18)
6. **Mitigation Action 2.9:** Establish communication between emergency management and vets regarding animal/crop/plant diseases (18)
7. **Mitigation Action 2.7:** Require and enforce maintenance of vegetation near traffic signs (17)
8. **Mitigation Action 1.5:** Implementation of burn bans (16)
9. **Mitigation Action 2.3:** Train fire departments for grass fires and maintain needed equipment (16)
10. **Mitigation Action 1.10:** Maintenance of vegetation near power lines (14)
11. **Mitigation Action 1.12:** Improve capital improvements planning process (14)
12. **Mitigation Action 3.2:** Public education program about general fire prevention and prevention of grass and wildland fires (14)
13. **Mitigation Action 3.5:** Education on dangers of highway transportation incidents and how to avoid collisions (14)
14. **Mitigation Action 4.1:** Complete government continuity planning (14)
15. **Mitigation Action 4.5:** Budget and plan for community failures (14)
16. **Mitigation Action 3.1:** Extreme heat, severe weather, pipeline safety, thunderstorms and lightning, etc. info, PSAs, and information on County website (13)
17. **Mitigation Action 1.1:** Enhance building codes (12)
18. **Mitigation Action 1.7:** Inspect and maintain levees (12)
19. **Mitigation Action 1.11:** Flood assessment requirement for building permit (12)
20. **Mitigation Action 2.8:** Improve fire code enforcement (12)
21. **Mitigation Action 3.3:** Encourage farmers to invest in crop insurance (12)
22. **Mitigation Action 4.3:** Purchase generators for critical facilities (11)
23. **Mitigation Action 4.7:** Create emergency fuel supply and map other sources (11)
24. **Mitigation Action 2.1:** Train emergency responders in search and rescue for structural failure situations (10)
25. **Mitigation Action 1.6:** Install steel roofs on government buildings to protect from hail and other hazards (9)
26. **Mitigation Action 4.4:** Bury utility lines (8)
27. **Mitigation Action 1.9:** Update zoning in critical areas (6)
28. **Mitigation Action 2.2:** Establish cooling centers (6)
29. **Mitigation Action 2.4:** Establish community shared shelters (6)
30. **Mitigation Action 2.6:** Establish advance warning system for recreational areas (6)
31. **Mitigation Action 2.5:** Construct safe rooms in communities and recreational areas (5)
32. **Mitigation Action 1.2:** Acquisition and elevation of structures (2)
33. **Mitigation Action 1.3:** Add/repair flood mitigation structures (-1)
34. **Mitigation Action 1.4:** Elevate roads (-4)

Goal 1: Protect the health and safety of Union students, employees, and visitors

Mitigation Action 1.1: Construct a safe room (16)

Plan for implementation and administration:	Construct safe room on school grounds for students, faculty, and possibly the public to use during the severe weather
Lead agency:	Union Community School District
Partners:	Tama County, city, others to be identified
Potential Funding Source:	FEMA HMPG and PDM, Tama County, city, school district, CDBG, and others to be identified
Total 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 small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of students, staff, and possibly nearby citizens and visitors
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 1.2: Improve communication systems (12)

Plan for implementation and administration:	Identify and implement ways to improve the district's communication systems
Lead agency:	Union Community School District
Partners:	To be identified
Potential Funding Source:	Union Community School District, others to be identified
Total cost:	Unknown until improvements are identified
Benefits (loss avoided):	Better communication
Completion Date:	1 year from when improvements are identified and funds are secured

Mitigation Action 1.3: Complete crisis planning (12)

Plan for implementation and administration:	Complete crisis planning for the entire school district
Lead agency:	Union Community School District
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
Total cost:	Unknown, depends on who handles plan development and writing
Benefits (loss avoided):	Quick and efficient response to crises
Completion Date:	1 year from when approach is established and funding is secured

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
Lead agency:	Union Community School District
Partners:	To be identified
Potential Funding Source:	Union Community School District, others to be identified
Total cost:	Unknown until roofs are assessed
Benefits (loss avoided):	Prevent further costly damage to structures, protect structure contents, maintain value of property
Completion Date:	1 year from when roofs are assess and funding is secured

Goal 3: Educate Union students about the dangers of hazards and how to be prepared.

Mitigation Action 3.1: Crisis planning and drills (12)

Plan for implementation and administration:	Complete practice drills based on crisis planning for the school district
Lead agency:	Union Community School District
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, others to be identified
Total cost:	Unknown
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
Completion Date:	Ongoing

Mitigation Action 3.2: Safety education (12)

Plan for implementation and administration:	Create and implement a safety education program to teach students about many different safety issues
Lead agency:	Union Community School District
Partners:	Organizations with expertise in certain safety issues, local fire, law enforcement, and emergency response personnel
Potential Funding Source:	Union Community School District, others to be identified
Total cost:	Unknown, some organizations do presentation for little or no cost
Benefits (loss avoided):	Youth education
Completion Date:	Ongoing

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

Mitigation Action 4.1: Purchase generators (10)

Plan for implementation and administration:	Purchase generators and install hookups for school district buildings
Lead agency:	Union Community School District
Partners:	Tama County Emergency Management
Potential Funding Source:	FEMA HMPG, Union Community School District, others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Prevent major disruptions
Completion Date:	1 year from when funding is secured or within time allotted by funding source

Union Community School District Mitigation Action Prioritization

1. **Mitigation Action 1.1:** Construct a safe room (16)
2. **Mitigation Action 1.2:** Improve communication systems (12)
3. **Mitigation Action 1.3:** Complete crisis planning (12)
4. **Mitigation Action 3.1:** Crisis planning and drills (12)
5. **Mitigation Action 3.2:** Safety education (12)
6. **Mitigation Action 4.1:** Purchase generators (10)
7. **Mitigation Action 2.1:** Roof improvements (8)

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 (7)

Plan for implementation and administration:	Build a safe room for students, staff, and community members
Lead agency:	North Tama Community School District
Partners:	City and Tama County
Potential Funding Source:	FEMA HMPG and PDM, North Tama County Community School District, city, county, CDBG, and others to be identified
Total 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 small safe room in a house the minimum cost is approximately $2,500-$6,000. For a large community shelter, the cost usually ranges from $250,000 to over $1 million depending on the size.
Benefits (loss avoided):	Life safety of students, staff, and community
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 1.2: Develop evacuation plan for the K-12 school building (12)

Plan for implementation and administration:	Develop evacuation plan for the K-12 school building
Lead agency:	North Tama County Community School District
Partners:	Local fire, law enforcement, and emergency response personnel
Potential Funding Source:	North Tama County Community School District
Total cost:	Unknown, planning may be of little cost if a consultant is not used for plan development and writing
Benefits (loss avoided):	Students and staff will be prepared to quickly evacuate the building if it is needed
Completion Date:	1 year from when funding is secured

North Tama Community School District Mitigation Action Prioritization

1. **Mitigation Action 1.2:** Develop evacuation plan for the K-12 school building (12)
2. **Mitigation Action 1.1:** Build a safe room for students, staff, and community members (7)

Goal 1: Protect the health and safety of South Tama students and staff.

Mitigation Action 1.1: Early warning system (sirens) enhancements in Tama (10)

Plan for implementation and administration:	Make enhancements to the early warning system in Tama
Lead agency:	City of Tama and South Tama County Community School District
Partners:	Tama County Emergency Management, others to be identified
Potential Funding Source:	City of Tama, school district, possibly FEMA HMGP
Total cost:	Sirens can cost up to $25,000, used sirens are sometimes available for purchase, which helps reduce the cost
Benefits (loss avoided):	Life safety of students, staff, and community members
Completion Date:	1 year from when funding is secured or within time allotted by funding source

Goal 2: Timely and accurate communications with the public and parents.

Mitigation Action 2.1: Purchase generator (9)

Plan for implementation and administration:	Purchase generator to power school buildings
Lead agency:	South Tama County Community School District
Partners:	Tama County Emergency Management, City of Tama
Potential Funding Source:	FEMA HMGP, school district, city, county
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Avoid major disruptions
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Mitigation Action 2.2: Communicate crisis plan to parents, officials, and the public (15)

Plan for implementation and administration:	Establish a program to teach parents, officials, and the public about the school's crisis plan
Lead agency:	South Tama County Community School District
Partners:	To be identified
Potential Funding Source:	South Tama County Community School District
Total cost:	Unknown, this project may be of little cost
Benefits (loss avoided):	Parents, officials, and the public would be aware of the school's plan
Completion Date:	1 year from when program is established and funding is secured

Goal 3: Timely and safe reunification of students with their families and minimize loss to structural assets to minimize disruption of educational services.

Mitigation Action 3.1: Improve vehicle access to Elementary School (11)

Plan for implementation and administration:	Make improvements to allow better vehicle access to the Elementary School
Lead agency:	South Tama County Community School District
Partners:	To be identified
Potential Funding Source:	School district, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Vehicles, including emergency response, will have better access to the school
Completion Date:	1 year from when funds are secured

South Tama Community School District Mitigation Action Prioritization

1. **Mitigation Action 2.2:** Communicate crisis plan to parents, officials, and the public (15)
2. **Mitigation Action 3.1:** Improve vehicle access to Elementary School (11)
3. **Mitigation Action 1.1:** Early warning system (sirens) enhancements in Tama (10)
4. **Mitigation Action 2.1:** Purchase generator (9)

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

Mitigation Action 1.1: Regular, proper building maintenance (19)

Plan for implementation and administration:	Create a strategy for improving regular building maintenance
Lead agency:	Gladbrook-Reinbeck School District administration and maintenance staff
Partners:	To be identified
Potential Funding Source:	School district, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Avoid unnecessary damage from hazard events due to lack of maintenance
Completion Date:	Ongoing

Mitigation Action 1.2: Improve early warning system (12)

Plan for implementation and administration:	Assess early warning system and determine a strategy for completing necessary improvements
Lead agency:	Gladbrook-Reinbeck School District
Partners:	To be identified
Potential Funding Source:	School district, others to be identified
Total cost:	Unknown until improvements are identified
Benefits (loss avoided):	Better warning to keep students and staff safe before and during hazard events
Completion Date:	1 year from when improvements are identified and funding is secured or within time allotted by funding source

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

Mitigation Action 2.1: Establish cooling center in school (20)

Plan for implementation and administration:	Establish an area as a cooling center for the public to use during periods of extreme heat
Lead agency:	Gladbrook-Reinbeck School District
Partners:	City of Gladbrook, Tama County, others to be identified
Potential Funding Source:	School district, others to be identified
Total cost:	Unknown
Benefits (loss avoided):	Avoid heat-related illnesses
Completion Date:	1 year from when location, scheduling, and funding is determined

Mitigation Action 2.2: Create a back up water supply and maintain non-perishable food items (23)

Plan for implementation and administration:	Determine a strategy for creating a backup supply of food and other necessary supplies
Lead agency:	Gladbrook-Reinbeck Community School District
Partners:	Possibly City of Gladbrook, Tama County, others to be identified
Potential Funding Source:	School district, others to be identified
Total cost:	Unknown until all supplies are identified
Benefits (loss avoided):	Students and possibly the public will have the basic necessities following a major hazard event
Completion Date:	1 year from when strategy is determined and funding is secured

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

Mitigation Action 3.1: Create a public education program (13)

Plan for implementation and administration:	Create a public education program about hazards, which involves determining the media and which hazards will be a focus
Lead agency:	Gladbrook-Reinbeck School District
Partners:	Possibly City of Gladbrook and Tama County EMC
Potential Funding Source:	School district, others to be identified
Total cost:	Unknown until media and hazards are determined
Benefits (loss avoided):	The public and students will be better informed
Completion Date:	1 year from when strategy is determined and funding is secured, possible ongoing

Mitigation Action 3.2: Increase student education on fire safety (19)

Plan for implementation and administration:	Determine how to increase fire safety education efforts in schools
Lead agency:	Gladbrook-Reinbeck School District
Partners:	Local fire departments, Tama County EMC and Sheriff, others to be identified
Potential Funding Source:	School district, Tama County, others to be identified
Total cost:	Unknown until strategy is determined
Benefits (loss avoided):	Less fire incidents involving children and young adults
Completion Date:	Possibly ongoing, 1 year from when strategy is determined and funding is secured, or within time allotted by funding source

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

Mitigation Action 4.1: Complete crisis planning (10)

Plan for implementation and administration:	Complete crisis planning for the entire school district
Lead agency:	Gladbrook-Reinbeck Community School District
Partners:	To be identified
Potential Funding Source:	School district, others to be identified
Total cost:	Unknown
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
Completion Date:	Ongoing

Mitigation Action 4.2: Purchase generators for facilities (10)

Plan for implementation and administration:	Purchase generators for facilities that are most critical
Lead agency:	Gladbrook-Reinbeck School District
Partners:	To be identified
Potential Funding Source:	School district, others to be identified
Total cost:	Depending on wattage, fuel source, and type—standby or portable—a generator may cost from $500 to $15,000 plus wiring and switch installation costs - standby requires a permanent fuel source
Benefits (loss avoided):	Avoid major disruptions
Completion Date:	1 year from when funds are secured or within time allotted by funding source

Gladbrook-Reinbeck Community School District Mitigation Action Prioritization

1. **Mitigation Action 2.2:** Create back up water supply and maintain non-perishable food items (23)
2. **Mitigation 2.1:** Establish cooling center in school (20)
3. **Mitigation Action 1.1:** Regular, proper building maintenance (19)
4. **Mitigation Action 3.2:** Increase student education on fire safety (19)
5. **Mitigation Action 1.2:** Improve early warning system (12)
6. **Mitigation Action 3.1:** Create a public education program (13)
7. **Mitigation Action 4.1:** Complete crisis planning (10)
8. **Mitigation Action 4.2:** Purchase generators for facilities (10)

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.

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.