Cedar County, Iowa

Multi-Jurisdictional Hazard Mitigation Plan

Effective January 2016

Developed by Cedar County with professional assistance from
AMEC Environment & Infrastructure, Inc.
Homeland Security and Emergency Management

SPECIAL THANKS AND ACKNOWLEDGEMENTS

Cedar County Hazard Mitigation Planning Committee

Jurisdictional Representatives

First	Last	Title	Department	Jurisdiction
Mike	Anderson	Fire Chief	Fire Department	Bennett
Orville	Randolph	Mayor/EMS Director	City Administration/EMS	Bennett
Sidney	Randolph	Assistant to Mayor	City Administration	Bennett
Mike	Shotwell	Director	Public Works	Bennett
Jeric	Armstrong	Mayor	City Administration	Clarence
Randy	Burken	Fire Chief	Fire Department	Clarence
Brian	Meyer	Police Chief	Police Department	Clarence
Kevin	Wenndt	Assistant Chief	Fire Department	Clarence
Deana	Cavin	City Clerk	City Administration	Durant
Allen	Olderos	Public Works Director/Supv.	Public Works	Durant
Kyle	Olderos	Assistant Chief	Fire Department	Durant
Dawn	Smith	Mayor	City Administration	Durant
Barry	Hoffmeier	Mayor	City Administration	Lowden
Joel	Brown	Trustee	City Administration	Mechanicasville
Larry	Butler	Mayor	City Administration	Mechanicasville
Tim	Horihan	Chief	Police Department	Mechanicasville
Linda	Coppess	City Clerk/Township Clerk	City Administration	Mechanicasville/ Fremont Township
Greg	Wagner	Mayor	City Administration	Stanwood
Brian	Brennen	Director	Public Works	Tipton
Roger	Dewolf	Public Works Official	Public Works	Tipton
Eldon Ray	Downs	Public Works Official	Public Works	Tipton
Lorna	Fletcher	City Clerk	City Administration	Tipton
Brian	Hudson	Employee	Electric	Tipton
Tawnya	Johnson	Employee	Electric	Tipton
Steve	Nash	Public Works Director/Supv.	Public Works	Tipton
Chris	Nosbisch	City Manager	City Administration	Tipton
Ken	Paul	Firefighter	Fire Department	Tipton
Sean	Paustian	1st Assistant	Fire Department	Tipton
Bradly	Peck	Officer	Police Department	Tipton
V.	Penrod		Gas Department	Tipton
Pamella	Spear	Council Member	City Council	Tipton
Melissa	Steffen	EMT	Ambulance	Tipton
Floyd	Taber	Electric Manager	Electric	Tipton
John	Walsh	Employee	Electric	Tipton
Mark	Wild	Water Operator	Water Department	Tipton
Leanne	Zearley	Council member	City Administration	Tipton
Mike	Horihan	Police Chief		West Branch
David	Hosier	Assistant Chief	Fire Department	West Branch
Alex	Koch	Officer	Police Department	West Branch
Kevin	Stoolman	Fire Chief	Fire Department	West Branch
Mark	Worrell	Mayor	City Administration	West Branch
Josh	Worrell	Assistant Chief	Fire Department	West Branch
Jon	Bell	Board Of Supv. Pro Tem	Board of Supervisors	Cedar County
Kirby	Blake	Staff	EOC	Cedar County
Bonnie	Butler	Preparedness Div. Mgr.	Health Department	Cedar County
Jane	Caes	Dir. Public Health	Public Health Department	Cedar County
Wayne	Deerberg	Board Of Supv. Chair	Board of Supervisors	Cedar County
Betty	Ellerhoff	Board Of Supv.	Board of Supervisors	Cedar County

First	Last	Title	Department	Jurisdiction
Brad	Gaul	Board Of Supv.	Board of Supervisors	Cedar County
Jeff	Kaufmann	Board Of Supv.	Board of Supervisors	Cedar County
Marcus	Larson	GIS Tech.	GIS Department	Cedar County
Tim	Malott	Coordinator	Emergency Management	Cedar County
Bev	Penningroth	Clerk	Auditor's Office	Cedar County
Brad	Ratliff	Assistant Director	Emergency Management	Cedar County
Jeffrey	Renander	Attorney Cedar County	Attorney's Office	Cedar County
Barbara	Smith	Clerk	Assessor's Office	Cedar County
Warren	Wethington	Sheriff	Sheriff's Department	Cedar County
David	Larson	Superintendent	School Administration	Bennett Community Schools
Ron	Fick	Maintenance Manager	Maintenance	Durant Community Schools
Mike	Cooper	Superintendent	School Administration	North Cedar Community Schools
Bob	Dohmen	Maintenance Director	Buildng	North Cedar Community Schools
Dick	Grimoskas	Superintendent	School Administration	Tipton Community Schools
Andy	Owen	Staff		Tipton Community Schools
Joey M.	Lande	Director of Operations	Operations	West Branch Community Schools

Stakeholder Representatives

First	Last	Title	Jurisdiction
Betty	Lett	Citizen	Citizen
Nichole	Malott	Citizen	Citizen
Laura	Twing	Citizen	Citizen
Tom	Schwartz	Director	Herbert Hoover Presidential Library & Museum
Sue	Hall	Reporter	N/A
Mark	Wild	Local Manager	Alliance Water
Bobby	Kaufmann	State Representative	State of Iowa
Steve	Agri	Trustee	Cass Township
Molly	Williams	Clerk	Cass Township
Dwain	Ford	Clerk	Center Township
David	Niermeyer	Clerk	Springfield Township

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The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. Cedar County and participating jurisdictions developed this multi-jurisdictional local hazard mitigation plan update to reduce future losses to the County and its communities resulting from hazard events. The plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 and to achieve eligibility for the Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance Grant Programs.

The Cedar County Multi-jurisdictional Hazard Mitigation Plan covers the following 14 jurisdictions that participated in the planning process:

- Unincorporated Cedar County
- City of Bennett
- City of Clarence
- City of Durant
- City of Lowden
- City of Mechanicsville
- City of Stanwood
- City of Tipton
- City of West Branch
- Bennett School District
- Durant School District
- North Cedar School District
- Tipton School District
- West Branch School District

There are several cities within Cedar County that have portions of their city limits in adjacent counties. These cities are treated in one of two ways for purposes of participation in this plan:

1) Official Plan Participants: The following cities are bi-county/multiple-county cities that have the majority of their corporate limits in Cedar County. These cities will be invited as official plan participants in the Cedar County plan. The Risk Assessment will include incorporation of analysis of building exposure/critical facilities of the entire city limits for these jurisdictions:

- City of Durant (portions in Muscatine and Scott Counties)
- City of West Branch (portions in Johnson County)

2) Stakeholder Participants: To provide a comprehensive analysis, the Risk Assessment includes incorporated areas of the City of Wilton which has a portion of their city limits in Cedar County, but is considered an official city of adjacent Muscatine County. The Risk Assessment will include analysis of building exposure/critical facilities ONLY for the portion of the incorporated area that is within the Cedar County boundary. Although this city is not an official participant of the *Cedar County Multi-jurisdictional Hazard Mitigation Plan*, they are stakeholders

in the planning process and as such, were invited to planning meetings and to comment on plan drafts.

Cedar County and the incorporated areas that participated in this plan update developed a Multi-jurisdictional Hazard Mitigation Plan that was approved by FEMA in January 2011 (hereafter referred to as the *2011 Cedar County Hazard Mitigation Plan*). Therefore, this current planning effort serves to update the previous plan.

The plan update process followed a methodology prescribed by FEMA, which began with the formation of a Hazard Mitigation Planning Committee (HMPC) comprised of representatives from Cedar County and participating jurisdictions. The HMPC updated the risk assessment that identified and profiled hazards that pose a risk to the Cedar County planning area, assessed the vulnerability to these hazards, and examined the capabilities in place to mitigate them. The planning area is vulnerable to several hazards that are identified, profiled, and analyzed in this plan. Riverine and flash flooding, winter storms, tornadoes and windstorms are among the hazards that can have a significant impact.

Based upon the risk assessment, the HMPC updated goals for reducing risk from hazards. The goals are listed below:

- Goal 1: Protect the Health and Safety of Residents
- Goal 2: Reduce Future Property Losses from Hazard Events
- Goal 3: Increase Public Awareness and Educate on the Vulnerability to Hazards
- Goal 4: Improve Emergency Management and Continuity of Operations Capabilities

To meet the identified goals, the recommended mitigation action details are in Chapter 4. The HMPC developed an implementation plan for each action, which identifies priority level, background information, ideas for implementation, responsible agency, timeline, cost estimate, potential funding sources, and more.

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. 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 D. A model resolution is provided.*

The following jurisdictions participated in the development of this plan and have adopted the multi-jurisdictional plan. Resolutions of Adoptions are included in Appendix D.

- Unincorporated Cedar County
- City of Bennett
- City of Clarence
- City of Durant
- City of Lowden
- City of Mechanicsville
- City of Stanwood
- City of Tipton
- City of West Branch
- Bennett School District
- Durant School District
- North Cedar School District
- Tipton School District
- West Branch School District

Model Resolution

Resolution # _____

Adopting the Cedar County Multi-Jurisdictional Local Hazard Mitigation Plan

Whereas, the (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) recognizes the threat that natural hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

Whereas, the U.S Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

Whereas, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments; and

Whereas, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, the (Name of Government/District/Organization) fully participated in the hazard mitigation planning process to prepare this Multi-Jurisdictional Local Hazard Mitigation Plan; and

Whereas, the Iowa Homeland Security and Emergency Management Division and the Federal Emergency Management Agency Region VII officials have reviewed the "Cedar County Multi-Jurisdictional Local Hazard Mitigation Plan," and approved it contingent upon this official adoption of the participating governing body; and

Whereas, the (Name of Government/District/Organization) desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Cedar County Multi-Jurisdictional Local Hazard Mitigation Plan; and

Whereas, adoption by the governing body for the (Name of Government/District/Organization) demonstrates the jurisdictions' commitment to fulfilling the mitigation goals outlined in this Multi-Jurisdictional Local Hazard Mitigation Plan

Whereas, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan;

Now, therefore, be it resolved, that the (Name of Government/District/Organization) adopts the "Cedar County Multi-Jurisdictional Local Hazard Mitigation Plan" as an official plan; and

Be it further resolved, the (Name of Government/District/Organization) will submit this Adoption Resolution to the Iowa Homeland Security and Emergency Management Division and Federal Emergency Management Agency Region VII officials to enable the plan's final approval.

Date: _____

Certifying Official: _____

1 INTRODUCTION AND PLANNING PROCESS

1.1 Purpose

Cedar County and the participating cities, and public school districts prepared this Multi-jurisdictional Hazard Mitigation Plan update to guide hazard mitigation planning to better protect the people and property of the planning area from the effects of hazard events.

This plan demonstrates the jurisdiction's commitments to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This plan was also developed to make Cedar County and the participating jurisdictions eligible for certain federal grant programs; specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Assistance (HMA) grants such as the Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program.

1.2 Background and Scope

Each year in the United States, disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of $4 in avoided future losses in addition to saving

lives and preventing injuries (National Institute of Building Science Multi-Hazard Mitigation Council 2005).

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are determined, prioritized, and implemented. Cedar County and the incorporated areas that participated in this plan update developed a Multi-jurisdictional Hazard Mitigation Plan that was approved by FEMA in January 2016 (hereafter referred to as the *2011 Cedar County Hazard Mitigation Plan*). Therefore, this current planning effort serves to update the previous plan.

This plan documents the hazard mitigation planning process undertaken by the Cedar County Hazard Mitigation Planning Committee (HMPC). It identifies relevant hazards and vulnerabilities in the planning area and sets forth an updated mitigation strategy to decrease vulnerability and increase resiliency and sustainability in Cedar County.

The Cedar County Multi-jurisdictional Hazard Mitigation Plan is a multi-jurisdictional plan that geographically covers the participating jurisdictions within Cedar County's boundaries (hereinafter referred to as the planning area). The following jurisdictions officially participated in the planning process:

- Unincorporated Cedar County
- City of Bennett
- City of Clarence
- City of Durant
- City of Lowden
- City of Mechanicsville
- City of Stanwood
- City of Tipton
- City of West Branch
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This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the *Federal Register* on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act.) While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288).

Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. The Cedar County planning area has been affected by hazards in the past and the participating jurisdictions are therefore committed to reducing future impacts from hazard events and becoming eligible for mitigation-related federal funding.

1.3 Plan Organization

This Cedar County Multi-jurisdictional Hazard Mitigation Plan update is organized as follows:

- Executive Summary, Special Thanks and Acknowledgements, Table of Contents, Prerequisites
- Chapter 1: Introduction and Planning Process
- Chapter 2: Planning Area Profile and Capabilities
- Chapter 3: Risk Assessment
- Chapter 4: Mitigation Strategy
- Chapter 5: Plan Implementation and Maintenance
- Appendices

This is the same general format that was used for the 2011 Multi-jurisdictional Cedar County Hazard Mitigation Plan except that the previous plan included separate sections at the end of the plan to record community profile information and jurisdictional information about hazards. In this update, Chapter 2 contains all community profiles and capabilities and the jurisdictional information about hazards is discussed within each hazard section in Chapter 3. This format provides for a more coordinated approach as well as the ability to clearly see how the hazards vary among each jurisdiction, where applicable.

1.4 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.

In March 2014, Cedar County contracted with AMEC Environment & Infrastructure, Inc. to facilitate the update of the multi-jurisdictional, local hazard mitigation plan. AMEC's role was to:

- Assist in establishing the Hazard Mitigation Planning Committee (HMPC) as defined by the Disaster Mitigation Act (DMA),
- Ensure the updated plan meets the DMA requirements as established by federal regulations and following FEMA's planning guidance,
- Facilitate the entire planning process,
- Identify the data requirements that HMPC participants could provide and conduct the research and documentation necessary to augment that data,
- Assist in facilitating the public input process,
- Produce the draft and final plan update documents, and
- Coordinate the Iowa Homeland Security and Emergency Management Division and FEMA plan reviews.

1.4.1 Multi-Jurisdictional Participation

44 CFR Requirement §201.6(a)(3): Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan.

Through AMEC, Cedar County Emergency Management invited the incorporated cities, public school districts, and various other stakeholders in mitigation planning (identified in Appendix B) to participate in the Cedar County Multi-jurisdictional Hazard Mitigation Plan update process. The jurisdictions that elected to participate in this plan are listed above in section 1.2. The DMA requires that each jurisdiction participate in the planning process must officially adopt the multi-jurisdictional hazard mitigation plan. Each jurisdiction that chose to participate in the planning process and development of the plan was required to meet plan participation requirements defined at the first planning meeting, which includes the following:

- Designate a representative to serve on the HMPC;
- Participate in at least one of the three HMPC planning meetings by either direct representation or authorized representation;
- Provide information to support the plan development by completing and returning the AMEC Data Collection Guide and validating/correcting critical facility inventories;
- Update existing mitigation actions and identify additional mitigation actions for the plan (at least one);
- Review and comment on plan drafts;
- Inform the public, local officials, and other interested parties about the planning process and provide an opportunity for them to comment on the plan;
- Provide documentation to show time donated to the planning effort (related to FEMA planning grant awarded to the County); and
- Formally adopt the mitigation plan.

All of the jurisdictions listed as official participants in this plan met all of these participation requirements. **Table 1.1** shows the representation of each participating jurisdiction at the planning meetings, provision of Data Collection Guides, and update/development of mitigation actions. Sign-in sheets are included in Appendix B: Planning Process Documentation.

Table 1.1. Jurisdictional Participation in Planning Process

Jurisdiction	Coordination Meeting	Kick-off Planning Meeting	Planning Meeting #2	Planning Meeting #3	Data Collection Guide	Update/Develop Mitigation Actions
Cedar County	x	x	x	x	x	x
City of Bennett	x	x	x	x	x	x
City of Clarence	x	x	x	x	x	x
City of Durant	x	x	x	x	x	x
City of Lowden	-	x	x	x	x	x
City of Mechanicsville	x	x	x	x	x	x
City of Stanwood	x	x	x	x	x	x
City of Tipton	x	x	x	x	x	x

Jurisdiction	Coordination Meeting	Kick-off Planning Meeting	Planning Meeting #2	Planning Meeting #3	Data Collection Guide	Update/Develop Mitigation Actions
City of West Branch	x	x	x	x	x	x
Bennett School District	-	-	x	x	x	x
Durant School District	-	-	-	x	x	x
North Cedar School District	-	x	x	x	x	x
Tipton School District	-	x	x	x	x	x
West Branch School District	-	x	x	x	x	x

1.4.2 The Planning Steps

AMEC and Cedar County worked together to establish the framework and process for this planning effort using FEMA's *Local Mitigation Planning Handbook* (March 2013). The plan update was completed utilizing the 9-task approach within a broad four-phase process:

1) Organize resources,
2) Assess risks,
3) Develop the mitigation plan, and
4) Implement the plan and monitor progress.

Into this process, AMEC integrated a detailed 10-step planning process adapted from FEMA's Community Rating System (CRS) and Flood Mitigation Assistance programs. Thus, the process used for this plan meets the funding eligibility requirements of the Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program, and Community Rating System. **Table 1.2** shows how the process followed fits into FEMA's original four-phase DMA process as well as the revised Nine Task Process outlined in the 2013 *Local Mitigation Planning Handbook* and the 10-step CRS process.

Table 1.2. Mitigation Planning Process Used to Develop the Cedar County Multijurisdictional Local Hazard Mitigation Plan

Phase	Community Rating System (CRS) Planning Steps (Activity 510)	Local Mitigation Planning Handbook Tasks (44 CFR Part 201)
Phase I	Step 1. Organize	Task 1: Determine the Planning Area and Resources
		Task 2: Build the Planning Team 44 CFR 201.6(c)(1)
	Step 2. Involve the public	Task 3: Create an Outreach Strategy y 44 CFR 201.6(b)(1)
	Step 3. Coordinate	Task 4: Review Community Capabilities 44 CFR 201.6(b)(2) & (3)
Phase II	Step 4. Assess the hazard	Task 5: Conduct a Risk Assessment 44 CFR 201.6(c)(2)(i) 44 CFR 201.6(c)(2)(ii) & (iii)
	Step 5. Assess the problem	
Phase III	Step 6. Set goals	Task 6: Develop a Mitigation Strategy 44 CFR 201.6(c)(3)(i); 44 CFR 201.6(c)(3)(ii); and 44 CFR 201.6(c)(3)(iii)
	Step 7. Review possible activities	
	Step 8. Draft an action plan	
Phase IV	Step 9. Adopt the plan	Task 8: Review and Adopt the Plan
	Step 10. Implement, evaluate, revise	Task 7: Keep the Plan Current
		Task 9: Create a Safe and Resilient Community 44 CFR 201.6(c)(4)

Phase I Organize Resources

Step 1: Organize the Planning Team (Handbook Tasks 1 & 2)

The planning process resulting in the preparation of this plan document officially began with a coordination meeting in Tipton, Iowa on April 10, 2014. Participants of the meeting included Cedar County Emergency Management officials, representatives from all incorporated cities with the exception of Lowden, and AMEC Mitigation Planning staff. The purpose of this meeting was to determine the jurisdictions and other stakeholders that would be invited to be participants of the HMPC (Step 1), set tentative planning meeting dates, identify GIS needs and resources, provide recommendations regarding the hazards to be included in the plan update, discuss options for the flood risk assessment methodology, develop an initial public participation strategy, and discuss the plan update format. Detailed meeting minutes are included in Appendix B.

An HMPC was created that includes representatives from each participating jurisdiction, departments of the County, and other local, state, and federal organizations responsible for making decisions in the plan and agreeing upon the final contents. In addition to the participating jurisdictions, the agencies and organizations that participated in the planning meetings included the following:

- Cass Township
- Center Township
- Farmington Township
- Fremont Township

- Alliance Water
- Iowa House of Representatives (State Representative, Bobby Kaufmann)
- Herbert Hoover Presidential Library & Museum
- Tipton Conservative Newspaper

After the coordination meeting, a formal Kick-off planning meeting was held on May 23, 2014 followed by two additional planning meetings held on August 5, 2014 and November 13, 2014. A complete list of all representatives of the agencies and organizations that participated on the Cedar County HMPC is provided in Appendix B.

The HMPC communicated during the planning process with a combination of face-to-face meetings, phone interviews, and email correspondence. The meeting schedule and topics are listed in **Table 1.3**. The meeting minutes for each of the meetings are included in Appendix B.

Table 1.3. Schedule of HMPC Meetings

Meeting	Topic	Date
Informational Meeting	General overview of planning process/requirements and schedule.	April 10, 2014
Kick-off Meeting	Introduction to DMA, the planning process, hazard identification and public input strategy. Distribution of data collection guide to jurisdictions. Preliminary hazard ranking results. Determine process to monitor, evaluate, and update plan.	May 23, 2014
Planning Meeting #2	Review of draft Risk Assessment, distribution of critical facility inventories for jurisdictions to validate/correct, development of plan goals.	August 5, 2014
Planning Meeting #3	Mitigation action update, development, and prioritization.	November 13, 2014

During the kick-off meeting, (see **Figure 1.1**) AMEC presented information on the scope and purpose of the plan, participation requirements of HMPC members, and the proposed project work plan and schedule. Plans for public involvement (Step 2) and coordination with other agencies and departments (Step 3) were discussed. AMEC also introduced hazard identification requirements and data needs. The HMPC discussed potential hazards as well as past events and impacts and refined the identified hazards to be relevant to Cedar County. The hazard ranking methodology utilized by Iowa Homeland Security and Emergency Management Division in the State Hazard Mitigation Plan was introduced and the HMPC made preliminary determinations of probability, magnitude, warning time, and duration for each hazard identified.

Participants were given the AMEC Data Collection Guide to facilitate the collection of information needed to support the plan, such as data on historic hazard events, values at risk, and current capabilities. Each participating jurisdiction completed and returned the worksheets in the Data Collection Guide to AMEC. AMEC integrated this information into the plan, supporting the development of Chapters 2 and 3.

Figure 1.1. Hazard Mitigation Planning Committee Kick-off Meeting

Step 2: Plan for Public Involvement (Handbook Task 3)

44 CFR Requirement 201.6(b): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

At the kick-off meeting, the HMPC discussed options for soliciting public input on the mitigation plan. To provide an opportunity for the public to comment during the drafting stage, the committee determined that the most effective method would be dissemination of a survey. In addition, a staff reporter for the *Tipton Conservative* attended the planning meetings and wrote several articles that informed the public of the plan update process (See **Figure 1.2**). Copies of all articles are included in Appendix B.

Figure 1.2. Newspaper Article in *The Tipton Conservative*, June 5, 2014

Multi-Jurisdictional Hazard Mitigation Plan holds planning meeting May 22

/14

by Sue Hall

Governmental entities and school districts in Cedar county were represented at the Tipton fire station safe room to begin the 5 year revision of the county multi-jurisdictional hazard mitigation plan process on May 22. There are also stakeholders that are not entities in the plan revision. These include the county business community, state agencies, the Hoover Presidential library, private/nonprofit organizations, and adjacent counties and communities. Their needs will be acknowledged in the plan.

Leading the county through this revision work is AMEC, a consulting firm from Topeka, Kan., paid with a $64,000 grant that Cedar county received from 75% federal money, 10% state money and 15% local soft match funding. The county's share is $9,000, which will come from participation in the work of information gathering. Time spent on the project is calculated at $27.60 per hour per person. Enough people attended the kick-off meeting to reach a third of the soft match at $3,000.

The effort, said AMEC project managers, produces a plan, which is the ticket to FEMA grants for mitigation (sustained action to reduce/eliminate) of potential natural disaster hazard risks. Such risks are evaluated from negligible to catastrophic in their likely or unlikely occurrence and probable severity.

Highest risk for Cedar county are river floods, tornado/windstorms, severe winter storms, a hazardous material spill, and a transportation incident. As climate changes, other risks reaching a higher level might be flash floods, and effects of lightning/hail and drought.

These hazards are costly with losses calculated through insurance payments. Property damage from flash flood has been $23,611 per year between 1996 and 2013, particularly in unincorporated areas. The best mitigation for flood is an ordinance that does not permit new construction in a floodplain. Flood insurance is scheduled to raise sharply in 4 years.

Thunderstorm/lightening/hail insurance payments amount to $1.6 million in damage coverage. Drought costs in insurance payments were $30 million. This data is suspected to be under reported. Hazards and declaration of disasters have increased because there is more population and, thus, more buildings and infrastructure.

The Plan will identify hazards that are a threat, assess their potential impact, and develop action goals and objectives to prioritize mitigation of these hazards. The process is charted on a Calculated Priority Risk Index (CPRI) and is based on probability, magnitude/severity, warning time, and duration.

There are $112 million in hazard mitigation assistance grant programs this fiscal year through the Flood Mitigation Assistance and Pre-Disaster mitigation grant programs. Flood Mitigation Assistance grants are available to eliminate flood damage risk to buildings insured under the National Flood Insurance Program. The intent is to focus on reducing or eliminating claims under NFIP by mitigating repetitive loss properties in buy-outs. Cedar county received nearly $2 million to purchase flood damaged properties and have them removed from the 2008 Cedar river flood.

The Pre-Disaster Mitigation grant program addresses projects prior to a disaster to avoid after-disaster declarations. This is a nationally competitive grant that gives one percent of available funding to each state in a 75%/25% match. The Tipton fire station safe room came out of this grant money.

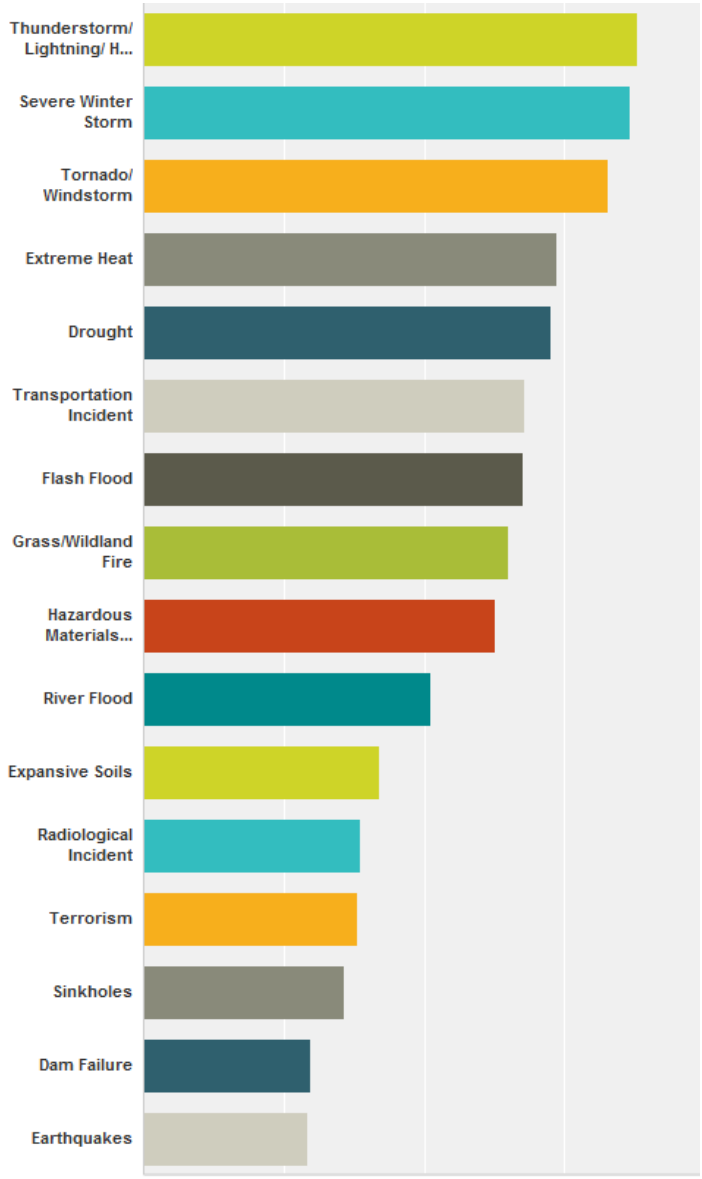
Communities and schools must provide data collection guide updates to AMEC by June 24. The next large group planning session is scheduled for Aug. 7 with AMEC.

The public survey was developed specific to the Cedar County Mitigation Plan that provided a brief plan summary as well as a questionnaire to capture public and stakeholder input. The survey is provided in Appendix B. A press release was issued announcing the availability of the survey at city halls and public libraries as well as online at SurveyMonkey.com. A notice with the survey link was published in the *West Branch Times*

In addition, committee members distributed the survey to members of the public and key stakeholders in their own jurisdiction. Additional details such as the press release that was issued are included in Appendix B.

In all, 98 surveys were completed. The survey asked the public and stakeholders to indicate their opinion on the likelihood for each hazard to impact their jurisdiction. They were asked to rate the probability of each hazard profiled in this plan as 1-unlikely, 2-occasional, 3-likely, and 4-highly likely. The summary results of this question are provided in **Figure 1.3.**

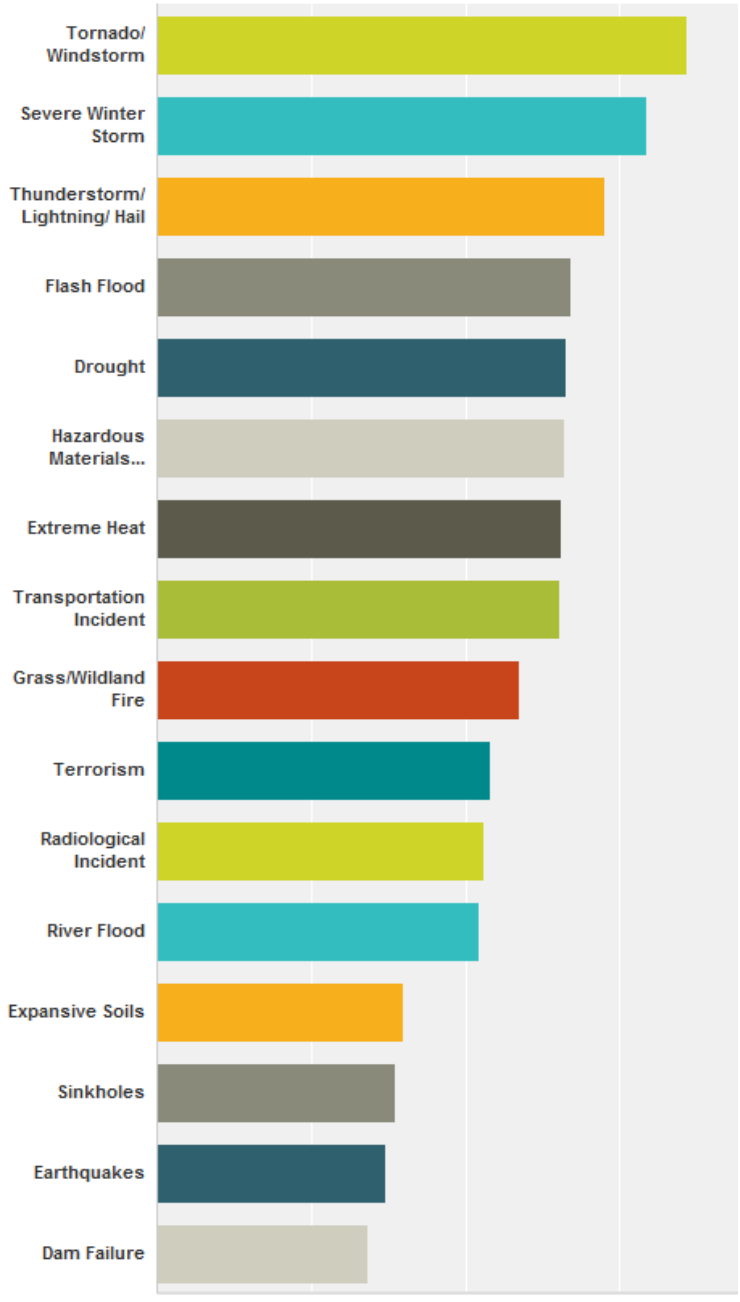
Figure 1.3. Survey Results—Probability of Hazards



Source: SurveyMonkey Results

The survey also asked the public and stakeholders to indicate their opinion on the potential magnitude of each hazard on their jurisdiction. They were asked to rate the probability of each hazard profiled in this plan as 1-negligible, 2-limited, 3-critical, and 4-catastrophic. The summary results of this question are provided in **Figure 1.4.**

Figure 1.4. Survey Results—Magnitude of Hazards



Source: SurveyMonkey Results

In the survey, the public was also asked to review 11 types of mitigation actions considered by the Iowa Homeland Security and Emergency Management Division for FEMA funding. The

Cedar County HMPC also considered these types of projects in the Cedar County Multi-jurisdictional Hazard Mitigation Plan. The survey asked the public to place a check next to the mitigation project types that they felt could benefit their community. **Figure 1.5** provides the compiled results of this question.

Figure 1.5. Survey Results—Types of Projects

Answer Choices	Responses
Structural Retrofitting of Existing Buildings to Add a Tornado Saferoom	75.27% 70
Minor Localized Flood Reduction Projects (stormwater management or localized flood control projects)	72.04% 67
New Tornado Safe Room Construction	68.82% 64
Electrical Utilities Infrastructure Retrofit	58.06% 54
Flood-prone Property Acquisition & Structure Demolition/Relocation	50.54% 47
Non-structural Retrofitting of Existing Buidings and Facilities from Wind Damage	44.09% 41
Flood-prone Structure Elevation	41.94% 39
Soil Erosion Stabilization	36.56% 34
Wildfire Mitigation	35.48% 33
Dry Floodproofing of Historical Residential Structures and/or Non-residential Structures	29.03% 27
Other (please specify) Responses	0.00% 0

Source: SurveyMonkey Results

The hazard ranking methodology utilized by the Iowa State Hazard Mitigation Plan was applied to the public opinions of probability and magnitude to provide a comparison of the public's opinion to that of the HMPC (See Chapter 3 for additional details of this methodology). The public was not surveyed about the elements of warning time and duration. Therefore, the HMPC scores for those elements were applied to the public ranking to allow for comparison. **Table 1.4** provides the comparison.

Table 1.4. Comparison of Hazard Ranking (Public vs. HMPC)

Public Survey Results		HMPC Results	
Hazard	**Weighted Score**	**Hazard**	**Weighted Score**
Severe Winter Storm	3.26	Tornado/Windstorm	3.25
Tornado/Windstorm	3.07	River Flood	3.25
Thunderstorm/Lightning/Hail	3.00	Severe Winter Storm	3.15
Transportation Incident	2.70	Hazardous Materials Incident	3.10
Drought	2.65	Transportation Incident	3.10
Hazardous Materials Incident	2.62	Flash Flood	2.80
Extreme Heat	2.56	Thunderstorm/Lightning/Hail	2.65
Flash Flood	2.42	Drought	2.50
Radiological Incident	2.33	Grass/Wildland Fire	2.35
Grass/Wildland Fire	2.13	Radiological Incident	2.35
River Flood	2.10	Terrorism	2.05
Terrorism	2.03	Extreme Heat	1.95
Sinkholes	1.81	Dam Failure	1.45
Earthquakes	1.67	Earthquakes	1.45
Dam Failure	1.65	Sinkholes	1.45
Expansive Soils	1.49	Expansive Soils	1.00

Source: SurveyMonkey Results, HMPC

It was noted by the planning committee that the public perception of some of the hazards such as river flood and flash flood seem to indicate that the public does not consider these hazards to be as much as a threat as the planning committee does. Reasons for this may be that the individuals that took the survey may not live in flood-prone areas. Overall, floodplains and flash-flood-prone areas are a relatively small percentage of the developed areas in Cedar County. So, although flooding does occur and does result in the need for evacuations, flood damages, and extensive recovery operations, the percentage of the general public that is affected is relatively low. In contrast, the weather-related hazards such as winter storm and tornadoes affect the entire population, as these hazards are not limited to certain geographic areas as floods are. These hazards were ranked high by both the committee and the public. Other similarities include the similar ranking of dam failure and the geographic hazards of earthquake, sinkholes/landslide, and expansive soils near the bottom.

The public was also asked to comment on any other issues that the Cedar County HMPC should consider in developing a strategy to reduce future losses caused by natural hazard events. Some of the additional issues the public indicated in need of attention are provided below:

”Toxic runoff from fields after rain affects other property landowners!”

”Bio-hazards such as grain and livestock contamination”

”safe rooms in schools”

”Transportation incident at UPRR and Hwy 30”

”Cedar Bridge at Rochester “

”Pipeline issues“

”High voltage transmission line Rock Island Clean Line (RICL)”

”The most hazardous situation to Mechanicsville which should be considered is potential derailment of a train causing a collision at the farm service in town.”

”Transportation-LP tank hit by train”

”Mass Notifications; and Cyber attack”

In addition Cedar County Emergency Management posted meeting minutes on its website throughout the plan update process.

The public was also given an opportunity to provide input on a draft of the complete plan prior to its submittal to the State and FEMA. The entire plan draft was made available on the County's website as a PDF document. In addition, hard copies were made available at the public libraries in the County.

Cedar County announced the availability of the entire final draft plan and the two-week final public comment period in the *West Branch Times* and *Tipton Conservative* newspapers. A copy of the announcement is provided in Appendix B. The final public comment period was from March 2, 2015 to March 16, 2015.

The HMPC invited other targeted stakeholders to comment on the draft plan via an e-mail letter, which is described in greater detail in Step 3: Coordinate with Other Departments and Agencies. Minor comments were received and incorporated.

Step 3: Coordinate with Other Departments and Agencies and Incorporate Existing Information (Handbook Task 3)

44 CFR Requirement 201.6(b): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process. (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

There are numerous organizations whose goals and interests interface with hazard mitigation in Cedar County. Coordination with these organizations and other community planning efforts is vital to the success of this plan. Cedar County invited neighboring counties, other local, state, and federal departments and agencies to planning meeting #2 to learn about the hazard mitigation planning initiative. In addition, the HMPC developed a list of additional stakeholders involved in hazard mitigation activities, to invite by e-mail letter to review and comment on the draft of the Cedar County Multi-jurisdictional Hazard Mitigation Plan prior to submittal to the State and FEMA. Those agencies were invited to meetings and/or comment on the plan draft included emergency management officials of adjacent counties, members of academic organizations such as the University of Iowa Flood Center, various state agencies such as the Iowa Department of Natural Resources, as well as various federal agencies, including FEMA. Appendix B includes a complete list of those organizations invited to participate in the planning

meetings as well as a copy of the e-mail letter that was sent providing a link to the draft plan during the final public comment period.

Integration of Other Data, Reports, Studies, and Plans

In addition, input was solicited from many other agencies and organizations that provided information but were not able to attend planning meetings. As part of the coordination with other agencies, the HMPC collected and reviewed existing technical data, reports, and plans. These included:

- Iowa Hazard Mitigation Plan (September 2013);
- Cedar County Hazard Mitigation Plan (January 2011);
- Cedar County, Iowa Land Use Plan (2006);
- West Branch Comprehensive Plan (2013);
- National Flood Insurance Program's Community Information System Reports;
- Digital Flood Insurance Rate Maps for all of Cedar County and corresponding Flood Insurance Study;
- Iowa Department of Natural Resources, Dam Safety Program Inventory of Dams for Cedar County;
- Available Dam Safety Inspection Reports from the Iowa Department of Natural Resources Dam Safety Program for High and Significant Hazard Dams;
- Wildland and Grass Fire Reports from the Iowa Department of Natural Resources, Wildland Fire Program;
- National Fire Incident Reporting System Fire Incident Data;
- Wildland/Urban Interface and Intermix areas from the SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin;
- Various local plans such as Comprehensive Plans, Economic Development Plans, Emergency Operations Plans, Capital Improvement Plans, etc. For a complete list of local plans that were reviewed and incorporated, see Chapter 2;
- US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics;

This information was used in the development of the hazard identification, vulnerability assessment, and capability assessment and in the formation of goals, objectives, and mitigation actions. These sources, as well as additional sources of information are documented throughout the plan and in Appendix A, References.

Phase 2 Assess Risk (Handbook Task 5)

Step 4: Assess the Hazard: Identify and Profile Hazards

AMEC assisted the HMPC in a process to identify the hazards that have impacted or could impact communities in Cedar County. At the kick-off meeting, the HMPC examined the history of disaster declarations in Cedar County, the list of hazards considered in the 2013 Iowa State Hazard Mitigation Plan, and the hazards identified in the previous hazard mitigation plan. The committee then worked through this list of all potential hazards that could affect the planning area. They discussed past hazard events, types of damage, and where additional information

might be found. The committee identified 16 natural and human-caused hazards that have the potential to impact the planning area. Additional information on the hazard identification process and which hazards were identified for each jurisdiction is provided in Chapter 3.

During the kick-off meeting, the HMPC refined the list of hazards to make the analysis relevant to Cedar County, discussed past events and impacts and came to consensus on the preliminary probability, magnitude, warning time, and duration levels on a county-wide basis to contribute to the hazard ranking methodology utilized by the State. In addition, each jurisdiction completed a Data Collection Guide, including information on previous hazard events in their community. Utilizing the information from the Data Collection Guides as well as existing plans, studies, reports, and technical information as well as information available through internet research and GIS analysis, a profile was developed for each hazard identified. More information on the methodology and resources used to identify and profile the hazards can be found in Chapter 3.

Step 5: Assess the Problem: Identify Assets and Estimate Losses

Assets for each jurisdiction were identified through a combination of several resources. The Cedar County GIS Department provided access to datasets with parcel and building data as well as corporate boundaries and critical facilties. Population data was obtained from the U.S. Census Bureau. At Meeting #2, the critical facility data was provided to each jurisdiction for the facilities that fall within their jurisdictional boundaries for correction and validation. Methodologies and results of the analyses are provided in Chapter 3 and Appendix E.

Additional assets such as historic, cultural, and economic assets as well as specific vulnerable populations and structures were obtained from a variety of sources as described in Chapter 3.

The HMPC also analyzed development trends from data available from the U.S. Census Bureau as well as information obtained from each jurisdiction such as Comprehensive Plans and Future Development Plans. For each hazard, there is a discussion regarding future development and how it may impact vulnerability to that specific hazard.

After profiling the hazards that could affect Cedar County and identifying assets, the HMPC collected information to describe the likely impacts of future hazard events on the participating jurisdictions.

Existing mitigation capabilities were also considered in developing loss estimates. This assessment consisted of identifying the existing mitigation capabilities of participating jurisdictions. This involved collecting information about existing government programs, policies, regulations, ordinances, and plans that mitigate or could be used to mitigate risk from hazards. Participating jurisdictions collected information on their regulatory, personnel, fiscal, and technical capabilities, as well as previous and ongoing mitigation initiatives. This information is included in Chapter 2 Planning Area Profile and Capabilities.

Specific capabilities such as participation in the National Flood Insurance Program as well as designation as Fire Wise Communities or Storm Ready Communities and placement of storm sirens are incorporated in the vulnerability analysis discussions, where applicable.

Taking into consideration the vulnerability and capability assessments, and where sufficient information was available, a variety of methods was used to estimate losses for each profiled

hazard. For geographic hazards such as river flooding, hazardous materials (fixed facilities), and wildfire, specific assets/areas at risk and loss estimates were determined through GIS analysis. For the earthquake hazard, FEMA's loss estimation computer software, HAZUS-MH was utilized to estimate losses in the planning area. For other hazards such as weather-related hazards and hazardous materials, loss estimates were developed based on statistical analysis of historic events. For hazards such as dam failure of state-regulated dams, GIS data was not available to identify specific geographic boundaries at risk. Therefore, the risk assessment provides descriptions of the types of improvements located in approximated risk areas. For some human-caused hazards and the tornado hazard, loss estimates were scenario-based. The methodologies for each loss estimate are described in detail in Chapter 3. Within each hazard section, the text provides details on how the hazard varies by jurisdiction, where applicable. In addition, at the conclusion of each hazard section, a summary table indicates the specific probability, magnitude, warning time, and duration rating of the hazard for each jurisdiction is provided to show how the hazard varies. Where applicable, introductory text preceding the table highlights noted variables.

Results of the preliminary risk assessment were presented at Meeting #2 and the Draft Risk Assessment (Chapter 3) was provided to the HMPC for review and comment. Several comments, corrections, and suggestions were provided to AMEC and incorporated into the risk assessment as appropriate.

Phase 3 Develop the Mitigation Plan (Handbook Task 6)

Step 6: Set Goals

AMEC facilitated a discussion session with the HMPC during Meetings #2 to review and update goals. Common categories of mitigation goals were presented as well as the 2013 State Hazard Mitigation Plan goals.

This planning effort is an update to an existing hazard mitigation plan. As a result, the goals from the *2011 Cedar County Hazard Mitigation Plan* were reviewed. The planning committee made the following changes to the 2011 goals:

Goal 2—the word "property" was added.
Goal 4—the words "and continuity of operations" were added.
Goal 5 was deleted—"Pursue multi-objective opportunities whenever possible".

The revised goals for this plan update are provided below:

- Goal 1: Protect the Health and Safety of Residents
- Goal 2: Reduce Future Property Losses from Hazard Events
- Goal 3: Increase Public Awareness and Educate on the Vulnerability to Hazards
- Goal 4: Improve Emergency Management and Continuity of Operations Capabilities

Step 7: Review Possible Activities

The focus of Meeting #3 was to update the mitigation strategy by reviewing existing actions submitted in the previous mitigation plans as well as discuss relevant new actions considered

necessary as a result of the updated risk assessment. The HMPC reviewed the following: plan goals, previous actions from the 2011 plan, key issues from the risk assessment, Iowa Emergency Management and Homeland Security Division's HMA funding priorities, public opinion survey results on types of actions desired, and the availability of FEMA's Mitigation Action Ideas publication.

The group discussed the types of mitigation actions/projects that could be done by the jurisdictions in Cedar County. Consideration was given to the analysis results provided in the risk assessment and the anticipated success for each project type. Projects relating to emergency response were discussed, but participants were encouraged to focus on long-term mitigation solutions since response-related mitigation actions occur on a routine basis as requirements of other plans. Complex projects that would necessitate use of large numbers of county resources were also discussed. This opportunity to discuss a broad range of mitigation alternatives allowed the jurisdictions to understand the overall priorities of the committee and to allow for discussion of the types of project most beneficial to each jurisdiction. As part of this discussion, consideration was given to the potential cost of each project in relation to the anticipated future cost savings.

Since this plan is an update to the *2011 Cedar County Hazard Mitigation Plan*, the update of the mitigation strategy included review and update of the status of all actions included in the previous hazard mitigation plan. Jurisdictions were encouraged to maintain a focused approach and continue forward only those actions that are aimed at implementing long-term solutions to prevent losses from hazards. To facilitate the update of previous actions, a spreadsheet was provided to each jurisdiction prior to Meeting #3 with the actions they submitted in the previous mitigation plan. The jurisdictions were also provided instructions for completing the status of each of the previous actions as well as the details to provide for continuing and newly developed actions. A modified form of the STAPLEE prioritization tool was provided to assist jurisdictions in determining the prioritization that should be assigned to each action. Each participating jurisdiction prioritized the projects they submitted by indicating high, moderate, or low local priority. The completed spreadsheets with action details were returned to AMEC. The completed and deleted actions are provided in Appendix C. Chapter 4 provides additional details regarding the process undertaken to refine the mitigation strategy to make Cedar County and its jurisdictions more disaster resistant.

Step 8: Draft an Action Plan

A complete draft of the plan was made available online and in hard copy for review and comment by the public, other agencies and interested stakeholders. This review period was from March 2, 2015 to March 16, 2015. Methods for inviting interested parties and the public to review and comment on the plan were discussed in Steps 2 and 3, and materials are provided in Appendix B. Comments were integrated into a final draft for submittal to the Iowa Homeland Security and Emergency Management Division and FEMA.

Phase 4 Implement the Plan and Monitor Progress

Step 9: Adopt the Plan (Handbook Task 8)

To secure buy-in and officially implement the plan, the governing bodies of each participating jurisdiction adopted the plan. Scanned copies of resolutions of adoption are included in Appendix D of this plan.

Step 10: Implement, Evaluate, and Revise the Plan (Handbook Tasks 7 & 9)

The HMPC developed and agreed upon an overall strategy for plan implementation and for monitoring and maintaining the plan over time during Meeting #1. This strategy is described in Chapter 5, Plan Maintenance Process.

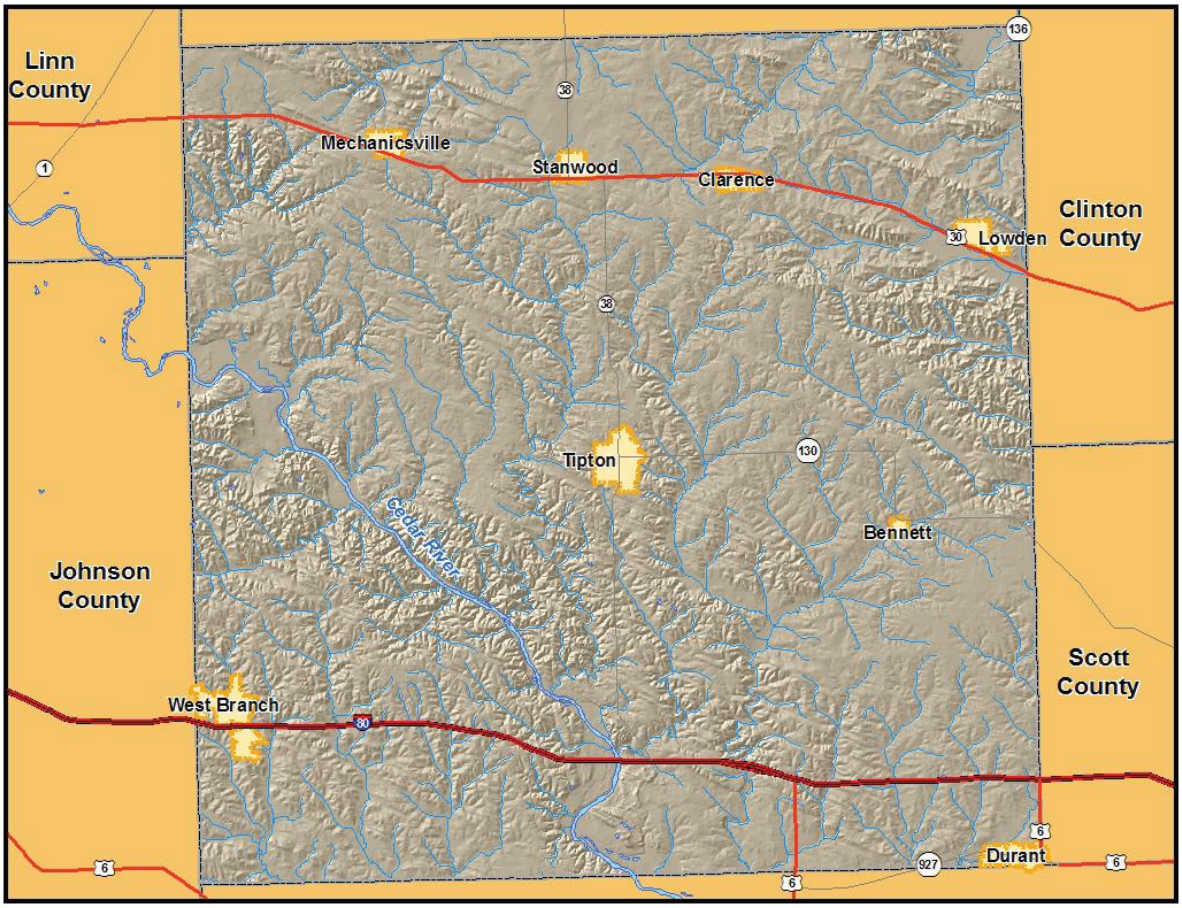
2 PLANNING AREA PROFILE AND CAPABILITIES

This chapter provides a general profile of Cedar County followed by individual sections for each participating jurisdiction. The sections for each jurisdiction provide an overview profile as well as details on existing capabilities, plans, and programs that enhance their ability to implement mitigation strategies.

2.1 Cedar County Planning Area Profile

Figure 2.1 provides a map of the Cedar County planning area. The planning area boundaries include the unincorporated areas of Cedar County as well as all portions (including portions in adjacent counties) of the city limits of the following incorporated cities: City of Bennett, City of Clarence, City of Durant, City of Lowden, City of Mechanicsville, City of Stanwood, City of Tipton, and City of West Branch. The planning area also includes the Cedar County portion only of the City of Wilton. Wilton is geographically located in Cedar and Muscatine Counties. The City of Wilton is not an official participant of the Cedar County Multi-jurisdictional Hazard Mitigation Plan as it is considered a City of Muscatine County (see the Muscatine County Hazard Mitigation Plan).

Figure 2.1. Cedar County Planning Area

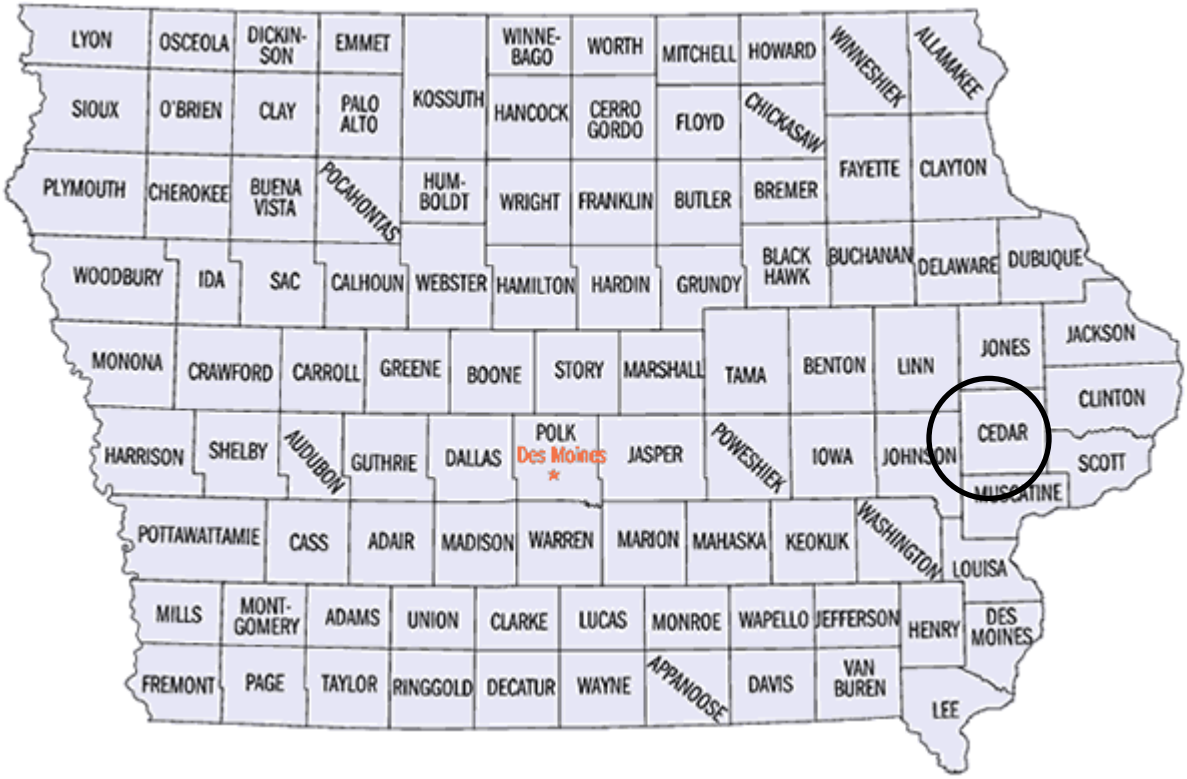


Source: 2011 Cedar County, Multi-jurisdictional Hazard Mitigation Plan

2.1.1 Geography and Topography

Cedar County, Iowa is located in east-central Iowa (see **Figure 2.2**). The county seat of Cedar County is the City of Tipton. Cedar County has 580 square miles of land area and 2.4 square miles of water area.

Figure 2.2. Location of Cedar County in the State of Iowa



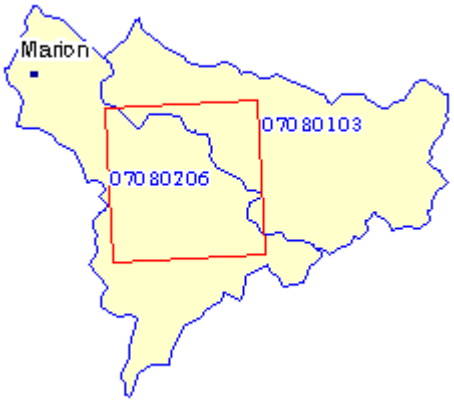
Source: 2009 Hazard Mitigation Plan

Much of Cedar County is still mostly rural with the primary land use being agriculture. Major streams in this area of the State have broad floodplains flanked by hills and ridges. Cedar County has two major rivers within its borders. The Cedar River enters along the west border just north of the town of Moscow. The Cedar River makes an interesting 90 degree turn to the southwest after leaving Cedar County because of a particularly hard outcropping of limestone along the border with Muscatine County. The Wapsipinicon River enters Cedar County in the extreme northeast part of the County from Jones County. It flows through Cedar County for only a few miles before it enters Clinton County. Cedar County crosses 2 watersheds. A list of these watersheds with the cities contained within each is provided below:

- 07080103 Lower Wapsipinicon—Clarence, Lowden, Mechanicsville, and Unincorporated County.
- 07080206 Lower Cedar—Bennett, Durant, Mechanicsville, Stanwood, Tipton, West branch, Wilton, and Unincorporated County.

Figure 2.3 shows the two watersheds in Cedar County.

Figure 2.3. Cedar County, Iowa Watersheds (Cedar County is red square)



Source: Environmental Protection Agency, http://cfpub.epa.gov/surf/county.cfm?fips_code=19031

The topography of this area is generally characteristic of the Kansan drift area. The terrain of the Kansan drift area is quite uneven with gently rolling areas as well as steep upland terrain and is deeply dissected in places by rivers and streams. The areas immediately north and south of the Cedar and Wapsipinicon Rivers are characterized by an intricate pattern of deep valleys and ravines that have steep slopes. Small streams extend into the uplands. The bottom lands along the Cedar and Wapsipinicon Rivers are nearly level. Stream terraces along the rivers are nearly level to undulating. Upland hills rise 100 to 200 feet from the level of the floodplains.

2.1.2 Climate

The climate of Cedar County typifies east-central Iowa with wide seasonal fluctuations in temperature and precipitation. The average annual temperature is 48.9 degrees Fahrenheit (F.) with an average high in July of 74.2 degrees F. and average low in January of 19.9 degrees F. The annual precipitation averages 35.5 inches. Of this, 23.8 inches fall during the growing season from April to September. An average of 30.7 inches of snowfall occurs each winter (Weatherbase, 2014, http://www.weatherbase.com/weather/weather.php3?s=662831&cityname=Clarence-Iowa-United-States-of-America).

2.1.3 Population/Demographics

The 2013 population estimate of Cedar County was 18,393. This is down from the 2010 census population of 18,499. According to the 2012 American Community Survey, the Cedar County median household income was $58,433. Cedar County median house value is $134,000.

Table 2.1 provides the populations for each city and the unincorporated county for 2000, 2010, and 2013 with the number and percent change from 2000 to 2013. The unincorporated areas population was determined by subtracting the populations of the incorporated areas from the overall county population. As a result, the unincorporated county populations are not

completely accurate since portions of some of the incorporated areas overlap into adjacent counties.

Table 2.1. Cedar County Population 2000-2013 by City

Jurisdiction	2000 Population	2010 Population	2013 Population Estimates	# Change 2000-2013	% Change 2000-2013
Iowa	2,926,324	3,046,355	3,090,416	164,092	5.61%
Cedar County	18,187	18,499	18,393	206	1.13%
Bennett	395	405	396	1	0.25%
Clarence	1,008	974	961	-47	-4.66%
Durant*	1,677	1,832	1,832	155	9.24%
Lowden	794	789	780	-14	-1.76%
Mechanicsville	1,173	1,146	1,129	-44	-3.75%
Stanwood	680	684	673	-7	-1.03%
Tipton	3,155	3,221	3,199	44	1.39%
West Branch*	2,188	2,322	2,326	138	6.31%
Unincorporated areas (est.)	7,117	7,126	7,097	-20	-0.28%

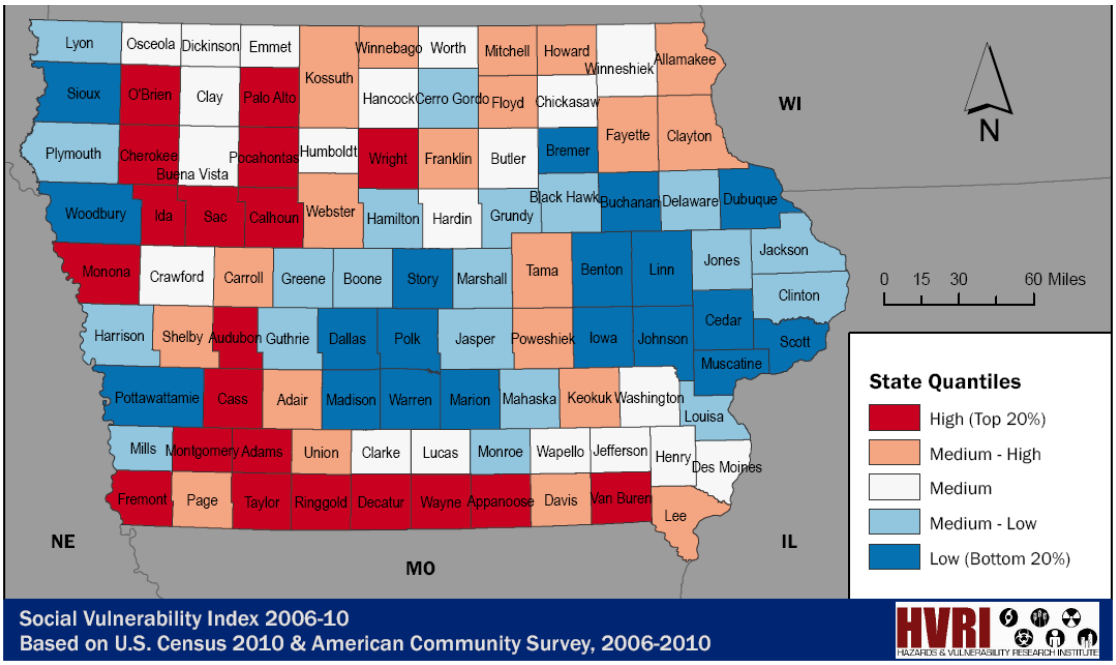
Source: U.S. Bureau of the Census, 2000 and 2010 data is from the Decennial Census, 2013 populating estimate data is from the Iowa State University of Science and Technology, Iowa Community Indicators Program; *population includes the portions of these cities in adjacent counties

According to the 2010 census, 6.1 percent of the population is under age 5 and 17.1 percent of the population is over age 65 in Cedar County. There were 7,511 households with an average household size of 2.42 people.

The Hazards and Vulnerability Research Institute at the University of South Carolina developed the Social Vulnerability Index (SoVI ®) to evaluate and rank the ability to respond to, cope with, recover from, and adapt to disasters. The index synthesizes 30 socioeconomic variables, which the research literature suggests contribute to reduction in a community's ability to prepare for, respond to, and recover from hazards. SoVI ® data sources include primarily those from the United States Census Bureau.

Figure 2.4 shows that Cedar County has a low Social Vulnerability Index of -1.9. The low index indicates that Cedar County is more able to cope and recover from disasters than counties with a higher index.

Figure 2.4. County Comparison Within the State for Social Vulnerability Index, 2006-2010



Source: Hazards and Vulnerability Research Institute, http://webra.cas.sc.edu/hvri/products/sovi2010_img/PDF/Iowa_0610.pdf

Table 2.2 provides additional demographic and economic indicators for Cedar County. The Cedar County values are for all of Cedar County, including the incorporated cities.

Table 2.2. Unemployment, Income, Poverty, and Education, Demographics, Cedar County, Iowa

Jurisdiction	Total in Labor Force	Percent of Population Unemployed	Median Household Income	Percent of Families Below the Poverty Level	Percentage of Population (High School graduate or higher)	Percentage of Population (Bachelor's degree or higher)
Iowa	1,651,480	5.6	$51,129	7.9	93.1	25.1
Cedar County, Iowa	10,375	4.1	$58,433	5.7	96.1	19.5
Bennett city, Iowa	270	6	$53,750	6.8	90.7	17.6
Clarence city, Iowa	416	9.1	$43,973	9.1	91.6	5.6
Durant city, Iowa	996	1.2	$54,609	12.1	94.8	20.2
Lowden city, Iowa	352	6.6	$38,500	6.9	95.1	24.4
Mechanicsville city, Iowa	585	4.8	$51,818	9.4	94.8	16.4
Stanwood city, Iowa	362	14.1	$48,750	6.9	98.5	13.8
Tipton city, Iowa	1,733	3	$47,974	4.5	95.5	8.4
West Branch city, Iowa	1,445	4.3	$60,556	2.6	98.6	36.7

Source: U.S. Census, 2012 American Community Survey, 5-year Estimates.

2.1.4 History

Cedar County is named for the Cedar River, which was originally called “Mos-wahwak-wah” (meaning red cedar) by the Native Americans because of the red cedar trees growing along the banks. Cedar County was created in 1837 by the Territorial Legislature. The county was formerly a part of Dubuque County. The first permanent European settlers arrived in the summer of 1836. In 1838, Rochester was considered the most important settlement and was made the county seat. In 1839, a petition was submitted to the Territorial Legislature to establish a more central location for the county seat. A commission of three men from outside the county was appointed to select a new site for the county seat. On March 14, 1840, after visiting many existing settlements, the commissioners arrived at the center of the county. One of the commissioners took a stake and drove it into the ground. On that stake the name of Tipton was written, in honor of General Tipton of Indiana. Since then, Tipton has remained the county seat of Cedar County. The abolitionist John Brown and the Underground Railroad played an important part in the history of Cedar County. John Brown first came to Cedar County in 1856 after learning that the Quakers in West Branch held strong anti-slavery views. From then on, many communities in Cedar County had stations on the Underground Railroad. Many of the known stops still exist and can still be seen in West Branch, Springdale, and Tipton and on farms along Sugar Creek. In 1857, John Brown returned to Cedar County with his group of followers. He and his followers spent the winter of 1857 and 1858 on the William Maxson farm north of Springdale, drilling and preparing for his attack on Harpers Ferry in Virginia (now West Virginia). This attack was a critical event leading up to the Civil War. A boulder with a bronze plaque marking the Maxson farm was placed in 1924 north of Springdale.

On August 10, 1874, Herbert Hoover, the 31st President of the United States of America, was born in West Branch. Herbert Hoover was the first United States President born west of the Mississippi River. West Branch is now home to the Herbert Hoover National Historic Site, Presidential Library, and Museum, which consists of 187 acres and is administered by the National Park Service. Herbert and Mrs. Hoover are buried on a hillside overlooking the President’s birthplace on the park grounds.

2.1.5 Occupations

Table 2.3 provides occupation statistics for the incorporated cities and the county as a whole.

Table 2.3. Occupation Statistics, Cedar County, Iowa

Place	Management, Business, Science, and Arts Occupations	Service Occupations	Sales and Office Occupations	Natural Resources, Construction, and Maintenance Occupations	Production, Transportation, and Material Moving Occupations
Iowa	33.7%	16.6%	24.1%	9.5%	16.1%
Cedar County, Iowa	29.1%	15.1%	24.1%	12.9%	18.8%
Bennett city, Iowa	20.7%	23.1%	20.7%	10.4%	25.1%
Clarence city, Iowa	26.2%	14.6%	18.3%	22.5%	18.5%
Durant city, Iowa	26.1%	18.3%	28.2%	6.9%	20.5%

Place	Management, Business, Science, and Arts Occupations	Service Occupations	Sales and Office Occupations	Natural Resources, Construction, and Maintenance Occupations	Production, Transportation, and Material Moving Occupations
Lowden city, Iowa	28.8%	16.9%	25.2%	11.0%	18.1%
Mechanicsville city, Iowa	25.1%	15.3%	21.9%	20.5%	17.2%
Stanwood city, Iowa	17.7%	24.8%	25.4%	16.4%	15.8%
Tipton city, Iowa	25.5%	19.1%	21.6%	10.1%	23.7%
West Branch city, Iowa	31.9%	19.2%	25.2%	9.8%	14.0%

Source: U.S. Census, 2012 American Community Survey, 5-year Estimates.

2.1.6 Agriculture

According to the Iowa State University, University Extension Agricultural Profile for Cedar County there were 1,036 farms in the County covering 336,885 acres of land (90 percent). Crop and livestock production are visible parts of the agricultural economy, but many related businesses contribute by producing, processing, and marketing farm and food products. These businesses generate income, employment and economic activity throughout the region. Farms on average are larger in Cedar County with the average size 325 acres. Sales per farm in 2009 were $191,160. Cedar County agriculture provides 9,163 jobs, representing 88 percent of the County's workforce of 10,375. Cedar County agriculture and economy contributions are summarized in **Table 2.4**.

Table 2.4. Cedar County Agriculture and the Economy

	Output(millions)	Jobs
Crop and livestock production	$231.20	1,695
Ag processing	$54.50	206
Ag support	$8.00	25
Total ag contribution	$293.70	1,926
Ag activity as percent of total activity	31.90%	21.00%
Household consumption and non-ag production	$626.10	7,237
Total economic activity	$919.70	9,163

Iowa State University, University Extension

2.1.7 FEMA Hazard Mitigation Assistance Grants in Planning Area

Since 1993, more than $1 Million in Federal Hazard Mitigation Assistance grants has been awarded to subgrantees in Cedar County (total project cost). **Table 2.5** provides details on the previous FEMA Hazard Mitigation Assistance Grants in the planning area.

Table 2.5. FEMA HMA Grants in Cedar County from 1993-2013

Project Type	Sub applicant	Award Date	Project Total
Mitigation Planning	Cedar County	11/26/2013	$64,400
Tornado Safe Room	Tipton	7/28/2011	$397,086
Mitigation Planning	Cedar County	12/21/2009	$48,000
Property Acquisition	Cedar County	12/21/2009	$1,378,413

Source: Iowa Homeland Security and Emergency Management Division, March. 2014

2.2 City/County Capabilities and Jurisdictional Profiles

This section summarizes the capabilities of each jurisdiction that relate to their ability to implement mitigation opportunities. The Unincorporated County is governed by a 5-member Board of Supervisors and each city is governed by a Mayor and 5-member City Council. This section begins with a general discussion of capabilities of the Unincorporated County followed by **Table 2.6** which provides a summary of the following capabilities in the County and each incorporated city: planning capabilities, policies/ordinances, programs, studies/reports/maps, staff resources, non-governmental organizations, and financial resources. **Table 2.7** that follows provides additional profile information for each participating jurisdiction including population, land area, government structure, and previous and ongoing mitigation capabilities, programs, and infrastructure.

2.2.1 Unincorporated Cedar County

The jurisdiction of Cedar County includes all unincorporated areas within the County boundaries. The Cedar County government structure is a County Board of Supervisors with five members. The Cedar County government includes the following departments and offices:

- Board of Supervisors
- Assessor's Office
- Attorney's Office
- Auditor's Office
- Case Management Office
- Central Point of Coordination Office
- Clerk of Court's Office
- Community Services Office
- Conservation Board Office
- Emergency Management Office
- Emergency Medical Services Office
- Engineer Office
- Environmental Health Office
- Geographic Information Systems Office
- Human Resources Office
- Medical Examiner's Office
- Mental Health Office
- Public Health Office
- Recorder's Office
- Sanitation Office
- Sheriff's Office
- Treasurer's Office
- Veteran's Affairs Office
- Zoning Office

Mitigation Initiatives/Capabilities

Chapter 29C of the Code of Iowa creates the State Emergency Management Division and the local Emergency Management Commissions. The Cedar County Emergency Management Commission is made up of the mayors of all of the jurisdictions in Cedar County, one member of the Cedar County Board of Supervisors, and the Sheriff. The Commission appoints an Emergency Management Coordinator to manage the agency and assist the Commission.

Additional mitigation initiatives/capabilities are discussed below.

- Implementation of previous floodprone property acquisition project;
- Ongoing training for fire and EMS staff; and
- Utilize Wireless Emergency Notification System (WENS) as a community warning system.

Table 2.6. Mitigation Capabilities for Cedar County and Incorporated Cities

CAPABILITIES	Cedar County	City of Bennett	City of Clarence	City of Durant	City of Lowden	City of Mechanicsville	City of Stanwood	City of Tipton	City of West Branch
Planning Capabilities									
Comprehensive Plan	Yes	No	Yes-Feb 2000-Comprehensive Land Use Plan	Yes-Feb 2014	No	No	No	Yes-Sept. 2002	Yes-April 2013
Builder's Plan	No	No	No	No	No	Yes-1993	No	No	Yes-April 2013, Chapter 6 of Comprehensive Plan
Capital Improvement Plan	No	Yes	No	No	No	No	No	Yes-Dec. 2013 (updated annually)	Yes-adopted February 2, 2015
Local Emergency Plan	N/A	No	No	No	No	No	No	No	Yes-April 2013, Chapter 10 of Comprehensive Plan
County Emergency Plan	Yes	N/A	N/A	N/A	Yes	Yes	Yes	Yes	N/A
Local Recovery Plan	N/A	No	No	No	No	No	No	No	No-under Development anticipated Nov. 2014
County Recovery Plan	No	N/A	N/A	N/A	N/A	N/A	No	No	No-under Development anticipated Nov. 2014
Local Mitigation Plan	N/A	Yes-2011	Yes-2011	Yes-2011	Yes-2011	Yes-2011	Yes	Yes-2011	Yes-2011 and April 2013, Chapter 10 of Comprehensive Plan
County Mitigation Plan	Yes-2011	Yes-2011	Yes-2011	Yes-2011	Yes-2011	Yes-2011	Yes	Yes-2011	Yes

CAPABILITIES	Cedar County	City of Bennett	City of Clarence	City of Durant	City of Lowden	City of Mechanicsville	City of Stanwood	City of Tipton	City of West Branch
Local Mitigation Plan (PDM)	No	No	No	No	No	No	No	No	No
County Mitigation Plan (PDM)	No	No	No	No	No	No	No	No	No
Debris Management Plan	No	No	No	No	No	No	No	No	No
Economic Development Plan	No	No	Yes-May 1993 Urban Renewal Plan	No	No	No	No	No	Yes-April 2013, Chapter 7, Comprehensive Plan
Transportation Plan	No	No	No	No	No	No	No	No	Yes-April 2013, Chapter 9, Comprehensive Plan
Land-use Plan	Yes	No	Yes-Feb 2000 in Comprehensive Land Use Plan	Yes-Feb 2014 in Comprehensive Plan	No	Yes-zoning	No	No	Yes-April 2013, Chapter 5, Comprehensive Plan
Flood Mitigation Assistance (FMA) Plan	No	No	Yes May 2013	No	No	No	No	No	No
Watershed Plan	No	No	No	No	No	No	No	No	Yes-July 2010, Hoover Creek Watershed NPS and Flood Reduction Project
Firewise or other fire mitigation plan	No	No	No	No	No	No	No	No	No
School Mitigation Plan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Critical Facilities Plan (Mitigation/Response/Recovery)	No	No	No	No	No	No	No	No	No

CAPABILITIES	Cedar County	City of Bennett	City of Clarence	City of Durant	City of Lowden	City of Mechanicsville	City of Stanwood	City of Tipton	City of West Branch
Policies/Ordinance									
Zoning Ordinance	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes, Chapter 165, City Code
Building Code	No	Yes	Not Reported	Iowa State Building Code	No	Not Reported	Not Reported	Yes-IBC 2009	Iowa State Building Code
Floodplain Ordinance	Yes	Yes	Yes	Yes	Yes-2013	Yes-May 2013	Yes	Yes-2013	Yes, Chapter 160, City Code
Subdivision Ordinance	Yes	Yes	No	Yes	Yes	Yes	Not Reported	Yes	Yes, Chapter 170, City Code
Tree Trimming Ordinance	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes, Chapter 151 City Code
Nuisance Ordinance	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes, Chapter 50, City Code
Storm Water Ordinance	No	No	No	No	No	Yes	No	No	Yes, Ordinance 716, Adopted September 2013
Drainage Ordinance	No	No	Yes	No	No	No	No	No	No
Site Plan Review Requirements	No	No	Yes	Yes	Yes	No	No	Yes	Yes, Chapter 173, City Code
Historic Preservation Ordinance	No	No	No	No	No	No-but Library Board has historic preservation duties	No	No	Yes, Chapter 26, City Code

CAPABILITIES	Cedar County	City of Bennett	City of Clarence	City of Durant	City of Lowden	City of Mechanicsville	City of Stanwood	City of Tipton	City of West Branch
Landscape Ordinance	No	No	No	No	Yes	Yes-part of mobile home ordinance	No	No	Yes, Chapter 173, City Code
Iowa Wetlands and Riparian Areas Conservation Plan	Yes-County-owned wetlands	No	No	No	No	No	No	No-however, City owns an identified wetland	No
Program									
Zoning/Land Use Restrictions	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes, Chapter 165, City Code
Codes Building Site/Design	No	No	No	Yes	No	No	No	Yes	No
National Flood Insurance Program (NFIP) Participant - Nondelegated	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NFIP Participant - Delegated	No	No	No	No	No	No	No	No	No
NFIP Community Rating System (CRS) Participating Community	No	No	No	No	No	No	No	No	Yes
Hazard Awareness Program	No	No	No	No	No	No	No	No	No
National Weather Service (NWS) Storm Ready	No	Yes	No	No	No	No	No	No	Yes
Building Code Effectiveness Grading (BCEGs)	No	No	No	No	No	No	No	No	6
ISO Fire Rating	Not Reported	Not Reported	7	Not Reported	7	5	Not Reported	5	5

CAPABILITIES	Cedar County	City of Bennett	City of Clarence	City of Durant	City of Lowden	City of Mechanicsville	City of Stanwood	City of Tipton	City of West Branch
Economic Development Program	Cedar County Economic Development Commission	Cedar County Economic Development Council	No	No	LEDCO	No	No	Yes	Main Street West Branch, CCEDCO, ICAD
Land Use Program	Yes	No	Yes	Yes	No	No	No	Yes	No
Public Education/Awareness	No	Yes-Fire, Ambulance, Libraries	No	No	No	Yes-website	No	No	No
Property Acquisition	Yes-2008 FEMA Project	No	No	No	No	No	Yes	No	No
Planning/Zoning Boards	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stream Maintenance Program	Yes	No	Yes	No	No	No	No	No	No
Tree Trimming Program	No	Yes	Yes	Yes	No	Yes	No	Yes	No
Engineering Studies for Streams (Local/County/Regional)	No	Yes	No	No	No	No	No	Yes-West Side Creek Study	Yes, Hoover Creek Watershed NPS and Flood Reduction Project, July 2010
Mutual Aid Agreements	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes, Law Enforcement, Fire and National Park Service (Trails, Fire and Law Enforcement)

CAPABILITIES	Cedar County	City of Bennett	City of Clarence	City of Durant	City of Lowden	City of Mechanicsville	City of Stanwood	City of Tipton	City of West Branch
Studies/Reports/Maps									
Hazard Analysis/Risk Assessment (Local)	N/A	Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes, 2011 HMP
Hazard Analysis/Risk Assessment (County)	Yes-2011 Hazard Mitigation Plan	N/A	N/A	N/A	Yes	Yes	Yes	Yes	Yes, 2011 HMP
Flood Insurance Maps	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEMA Flood Insurance Study (Detailed)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Evacuation Route Map	Yes	Not Reported	No	No	No	No	No	No	No
Critical Facilities Inventory	Yes	Yes	No	No	No	Yes	No	Yes	Yes, Chapter 12, Comprehensive Plan
Vulnerable Population Inventory	No	No	No	No	No	Yes	No	No	No
Land Use Map	Yes	No	No	Yes	No	Yes	No	Yes	Yes, May 2014
Staff/Department									
Building Code Official	No	No	Yes	Yes	Yes	No	No	Yes	Yes
Building Inspector	No	No	Yes	Yes	Yes	No	No	Yes	Yes
Mapping Specialist (GIS)	Yes	No-utilize County GIS	Yes	No	No	Yes	No	N-use county	No
Engineer	Yes	Yes	Yes	Contracted-MSA Professional Services	No	Yes	Yes	Contracted	Yes
Development Planner	No	No	Yes	No	No	No	No	Yes-City Mgr. is AICP Certified	No
Public Works Official	No	Yes	Yes	Yes	Yes	Yes	Yes	Y	Yes

CAPABILITIES	Cedar County	City of Bennett	City of Clarence	City of Durant	City of Lowden	City of Mechanicsville	City of Stanwood	City of Tipton	City of West Branch
Emergency Management Coordinator	Yes	No-utilize County EM	Yes	No	No	No-use County	Yes-County	N-use county	Yes
NFIP Floodplain Administrator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bomb and/or Arson Squad	No	No	No	No	No	No	No	No	No
Emergency Response Team	No	First Responders-fire, ambulance, sheriff	Yes	No	No	First Responders-fire, ambulance	Yes	Yes	No
Hazardous Materials Expert	No	No	Yes	No	No	Limited-fire, ambulance	No	No	No
Local Emergency Planning Committee	Yes	Yes	Yes	No	No	No	No	Yes-participant on County LEPC	No
County Emergency Management Commission	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sanitation Department	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No-contracted service
Transportation Department	Yes-Secondary Roads	No	Yes	Yes-Public Works	No	Yes	No	Yes	No
Economic Development Department	No-Cedar County Economic Development Council	No-Cedar County Economic Development Council	Yes	No	Yes	No	No	Yes	No
Housing Department	No	No	No	No	No	No	No	No	No
Planning Consultant	No	No	No	No	No	No	No	City Mgr.	No
Regional Planning Agencies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

CAPABILITIES	Cedar County	City of Bennett	City of Clarence	City of Durant	City of Lowden	City of Mechanicsville	City of Stanwood	City of Tipton	City of West Branch
Historic Preservation	Yes	No	No	No	No	No	No	No	Yes, West Branch Preservation Commission
Non-Governmental Organizations (NGOs)									
American Red Cross	No	Yes	Yes	Quad Cities	No	No	Yes	No	No
Salvation Army	No	No	Yes	Scott County	No	No	Yes	No	No
Veterans Groups	Yes	American Legion	Yes	American Legion and Sons of the Legion	Yes	Yes-American Legion and Auxiliary	No	Yes	Yes, American Legion Chauncey Butler Post 514
Environmental Organization	No	No	Yes	No	No	No	No	No	No
Homeowner Associations	Yes	No	No	No	No	No	No	Yes	Yes
Neighborhood Associations	No	No	No	No	No	No	No	Not Reported	No
Chamber of Commerce	Yes	No	No	Yes	Yes	No	No	Yes	No
Community Organizations (Lions, Kiwanis, etc.	Yes	Lions, Bennett Community	No	Lions	Yes	Yes	Yes	Yes-Lions, Rotary	Yes, Lions Club
Financial Resources									
Apply for Community Development Block Grants	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No, Do not meet low-moderate income requirements
Fund projects through Capital Improvements funding	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Authority to levy taxes for specific purposes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fees for water, sewer, gas, or electric services	No	Yes	Yes-water & sewer	Yes	Yes	Yes	Yes	Yes	Yes
Impact fees for new development	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes

CAPABILITIES	Cedar County	City of Bennett	City of Clarence	City of Durant	City of Lowden	City of Mechanicsville	City of Stanwood	City of Tipton	City of West Branch
Incur dept through general obligation bonds	Yes-none at this time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Incur debt through special tax bonds	Yes-none at this time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Incur debt through private activities	No	Yes	No	Yes	No	No	No	Unknown	Yes
Withhold spending in hazard prone areas	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes

Table 2.7. Additional Jurisdictional Capabilities

Jurisdiction	Land Area (square miles)	2013 Pop. Estimate	Mitigation-related Public Education Programs	Mitigation Programs	Tornado Shelters / Safe Rooms	Sirens	Other Warning system
Cedar County (unincorporated)	580.000	7,097	Ongoing training for fire and ambulance personnel	Working w/ FEMA Public Assistance to mitigate damages to Rochester Bridge.	No	None in uninc. county	WENS
City of Bennett	0.200	396	Fire Safety/EMS programs	Sewer upgrade project, storm spotters	No	Yes-1 Activated by Fire Department	None
City of Clarence	0.680	961	Monthly Fire Department Training/Exercises	Yearly walk-through/inspections of critical facilities	City Hall Basement-may not be constructed to FEMA standard	Yes-5 Activated by Fire Department	Code Red
City of Durant	1.151	1,832	None Reported	Stormwater system improvements	No	Yes-2 Activated by Fire	WENS-through county

Jurisdiction	Land Area (square miles)	2013 Pop. Estimate	Mitigation-related Public Education Programs	Mitigation Programs	Tornado Shelters / Safe Rooms	Sirens	Other Warning system
						Department and Public Works	
City of Lowden	1.019	780	None Reported	FEMA funds for Soil Erosion	No	Yes-1 Activated by Fire Department	None
City of Mechanicsville	0.830	1,129	Fire Prevention Week at Elementary School, "Are You Ready" link on website	Added 3/4 mile of storm sewer along Cedar Street	No	Yes-1 Activated by Fire Department	None
City of Stanwood	0.719	673	None Reported	None Reported	No	Yes-1 Activated by Fire Department	None
City of Tipton	2.089	3,199	Yearly fire safety at schools / DARE Program	Received FEMA grant for Safe Room in Fire Station, Stormwater infrastructure improvements, two planned overflows	Yes-Fire Station (FEMA funded out of HMGP)	Yes-3 Activated by Fire Department-Police Department also has capability	WENS, text, email and calling alerts
City of West Branch	3.189	2,326	Promoted WENS system in 8/2014 at Hoover's Hometown Days.	None Reported	Several Tornado Shelters-not constructed to FEMA Standards -Herbert Hoover National Historic Site Visitor Center -Herbert Hoover Presidential Library/Museum -West Branch United Methodist Church	Yes-2 Activated by Fire Department and Public Works	WENS

Jurisdiction	Land Area (square miles)	2013 Pop. Estimate	Mitigation-related Public Education Programs	Mitigation Programs	Tornado Shelters / Safe Rooms	Sirens	Other Warning system
					-West Branch Elementary/Middle School -West Branch Village Storm Shelter		

2.2.2 Public School District Profiles and Mitigation Capabilities

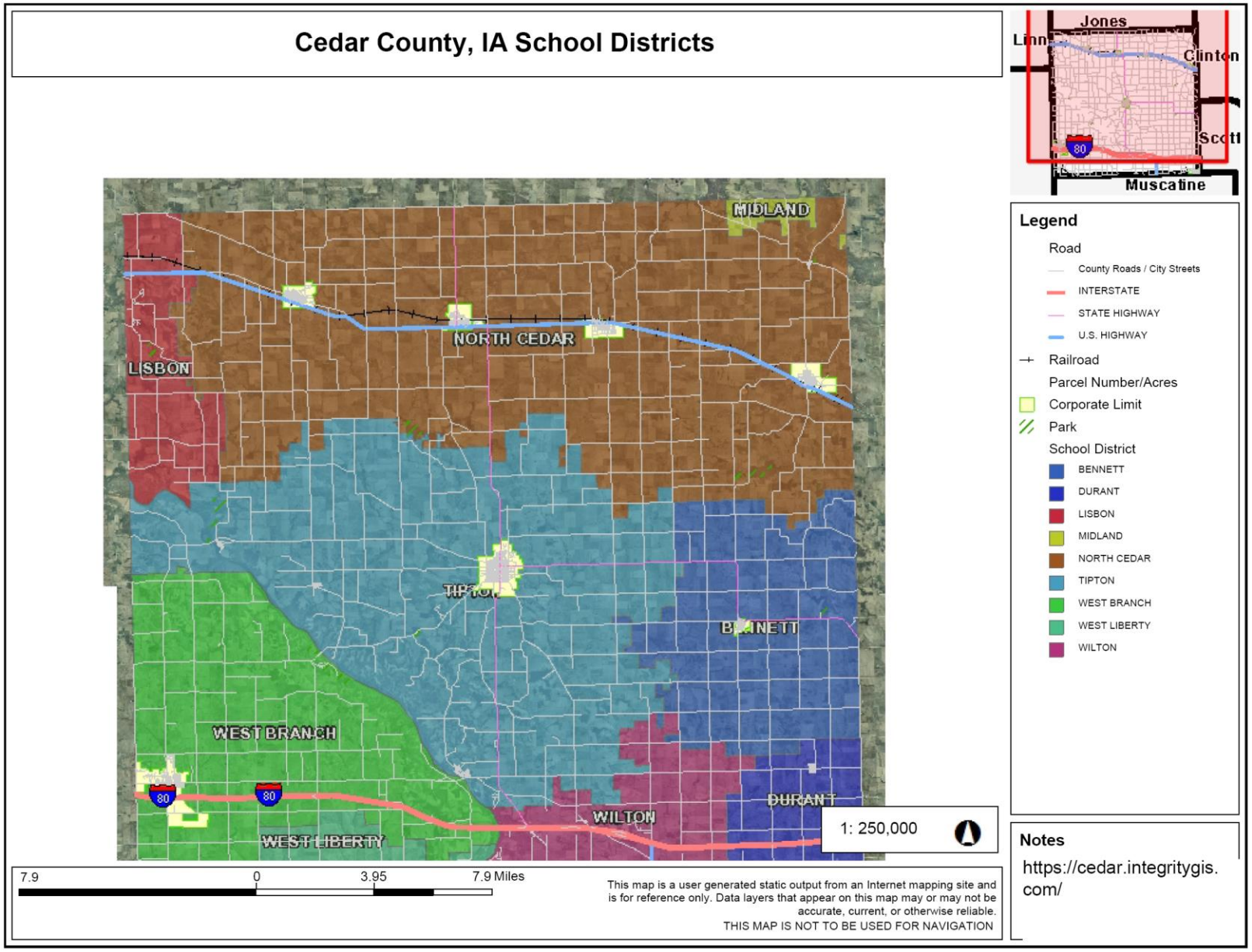
This section includes general profile information for five Cedar County school districts. The five school districts in the planning area are as follows.

- Bennett School District, #603
- Durant School District, #1926
- North Cedar School District, #3691
- Tipton School District, #6408
- West Branch School District, #6930

Figure 2.5 provides the boundaries of the school districts in Cedar County and **Table 2.8** that follows provides location and enrollment information for each school district. For school districts that are in more than one county, the school building and enrollment data is for the portion in Cedar County only.

Note: There are four school districts whose boundaries extend into Cedar County. However those school districts do not have any buildings in Cedar County and are not official participants in this plan. Those school districts are: Midland, Liberty, West Liberty, and Wilton.

Figure 2.5. Cedar County School District Boundaries



Source: Cedar County GIS, https://cedar.integritygis.com/

Table 2.8. Cedar County School Buildings and Enrollment Data, 2012-2013

District Name	Building Name	Building Total
Bennett	Bennett Elementary School	77
Durant	Durant High School	244
Durant	Durant Elementary School	275
Durant	Durant Middle School	198
North Cedar	North Cedar Middle School	266
North Cedar	North Cedar High School	274
North Cedar	North Cedar Lowden Elementary Center	123
North Cedar	North Cedar Mechanicsville Elem Ctr	174
Tipton	Tipton High School	280
Tipton	Tipton Middle School	276
Tipton	Tipton Elementary School	394
West Branch	West Branch High School	264
West Branch	West Branch Middle School	239
West Branch	Hoover Elementary School	365

Source: Iowa Department of Education, Bureau of Planning, Research and Evaluation
http://educateiowa.gov/index.php?option=com_content&view=article&id=346&Itemid=4439

Potential capabilities to implement mitigation programs and projects can vary among school districts. To determine mitigation capabilities, each of the participating school districts completed a Data Collection Guide to report planning, personnel, fiscal, and other capabilities related to implementation of mitigation programs and projects. **Table 2.9** provides a summary of the reported capabilities for each participating school district.

Table 2.9. Summary of Mitigation Capabilities, Cedar County Public School Districts

Capability	Bennett School District	Durant School District	North Cedar School District	Tipton School District	West Branch School District
Planning Elements					
Master Plan	No	Yes-2009/2010 School Year	No	Yes-current	Yes-8/15/2014
Capital Improvement Plan	Yes-7/13	Yes-updated monthly	Yes-2014	No	Yes-5/10/2014
School Emergency Plan	Yes-7/13	Yes-updated yearly	No	Yes-current	Yes Crisis Management Plan
Weapons Policy	Yes-7/09	Yes-2009/2010 School Year	Yes-2009	Yes-current	Yes-Board Policy
Personnel Resources					
Full-time building official	Yes-Principal/Superintendent	Yes-Elementary/High School Principals	Yes-Principals (3)	Yes-Superintendent	Yes-Building Administrators (5)
Emergency Manager	No	Yes-Superintendent	No	No	Yes-Superintendent
Grant Writer	No	No	No	No	No
Public Information Officer	No	No	No	NO	Yes-Superintendent
Financial Resources					
Capital Improvements project funding	Yes	Yes	Yes	Yes	Yes
Local funds	No	Yes	No	Yes	Yes
General obligation bonds	No	Yes	No	Yes	Yes
Bonds	No	Yes	No	Yes	Yes
Private activities/donations	No	Yes	No	Yes	Yes
State and federal funds	Yes	Yes	Yes	Yes	Yes
Other					
Public Address/Emergency Alert System	Yes, including fire and tornado bell warning systems	Yes-school-wide intercom	Not Reported	Yes	Utilize School Connects

Capability	Bennett School District	Durant School District	North Cedar School District	Tipton School District	West Branch School District
NOAA Weather Radios	Yes	Yes	Not Reported	Yes	Yes
Public Education Programs	Yearly fire and tornado drills conducted; ALICE training began 2013	School-wide ALICE training completed	None Reported	None Reported	Hazardous Materials training provided to staff
Mitigation Programs	Camera and motion detection, locked front door with buzz-in system	Insurance audits, school cameras	None Reported	None Reported	None Reported
Tornado Shelter/Saferoom	Yes-interior 1st floor rooms and basement areas - not certified to FEMA 361 standard	Yes-downstairs in locker room area - not certified to FEMA 361 standard	Not Reported	No	No
Campus Police	No	No	Not Reported	No	No

3 RISK ASSESSMENT

44 CFR Requirement §201.6(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 within Cedar County, Iowa to these hazards. The goal of the risk assessment is to estimate the potential loss in the planning area, including loss of life, personal injury, property damage, and economic loss, from a hazard event. The risk assessment process allows communities in the planning area to better understand their potential risk to the identified hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

The risk assessment for Cedar County and participating jurisdictions followed the methodology described in the 2013 FEMA *Local Mitigation planning Handbook*, which includes a four-step process:

Step 1—Describe Hazards
Step 2—Identify Community Assets
Step 3—Analyze Risks
Step 4—Summarize Vulnerability

This chapter is divided into six main parts:

- **Section 3.1 Hazard Identification** identifies the hazards that threaten the planning area and the methodology utilized to score or rank the hazards;
- **Section 3.2 Assets at Risk** provides the planning area's total exposure to natural hazards, considering critical facilities and other community assets at risk;
- **Section 3.3 Development Since 2011 Plan Update** discusses what changes in development have occurred since the previous Hazard Mitigation Plan;
- **Section 3.4 Future Land Use and Development** discusses areas of planned future development;
- **Section 3.5 Hazard Profiles and Vulnerability** for each hazard, this section is divided into two parts: 1) Hazard Profile discusses the threat to the planning area, the geographic location/extent at risk, previous occurrences of hazard events, and probability of future occurrence; and 2) Vulnerability Assessment further defines and quantifies populations, buildings, critical facilities, and other community assets at risk to natural hazards;
- **Section 3.6 Hazard Analysis Summary** provides a tabular summary of the hazard ranking for each jurisdiction in the planning area.

3.1 Hazard Identification

Requirement §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 16 hazards identified for this plan update are listed below in alphabetical order

- Dam Failure*
- Drought
- Earthquakes
- Expansive Soils
- Extreme Heat
- Flash Flood
- Grass/Wildland Fire
- Hazardous Materials Incident*
- Radiological Incident*
- River Flood
- Severe Winter Storm
- Sinkholes
- Terrorism*
- Thunderstorm/Lightning/Hail
- Tornado/Windstorm
- Transportation Incident

*denotes hazards added to this plan update that were not included in the 2011 *Cedar County Multi-jurisdictional Hazard Mitigation Plan*.

Sections 3.1.1 through 3.1.3 describe how these hazards were identified for this plan update.

3.1.1 Review of Existing Mitigation Plans

Prior to 2011, Hazard Mitigation Planning in Cedar County was accomplished on a jurisdictional basis. In January 2010, the unincorporated county and incorporated municipalities came together to coordinate multi-jurisdictional mitigation planning for the entire Cedar County planning area. This coordinated effort resulted in the *Cedar County, Iowa Multi-jurisdictional Hazard Mitigation Plan*, approved by FEMA in January 2011. To identify hazards to include in the Risk Assessment update, a comparison was performed of the hazard identification in the *2013 Iowa State Hazard Mitigation Plan*, and the *2011 Cedar County Multi-jurisdictional Hazard Mitigation Plan*. **Table 3.1** provides the details of the comparison.

Table 3.1. Hazard Comparison Chart

2013 Iowa State Hazard Mitigation Plan Hazards	*2011 Cedar County Hazard Mitigation Plan* Hazards
River Flooding	Flooding (Riverine and Flash)
Flash Flood	
Tornado/Windstorm	Tornadoes
Thunderstorm/Lightning/Hail	Severe Thunderstorms (Windstorms/Hailstorms/Thunder and Lightning)
Severe Winter Storm	Sever Winter Storm
Levee/Dam Failure	Not Included
Terrorism	Not Included
Animal/Plant/Crop Disease	Not Included
HAZMAT Incident	Not Included
Radiological Incident	Not Included
Drought	Drought
Human Disease	Not Included
Transportation Incident	Interstate/Highway Transportation Incident
	Railway Transportation Incident
Infrastructure Failure	Not Included
Extreme Heat	Extreme Heat
Grass/Wild Land Fire	Wildfires
Sinkholes	Sinkholes
Landslide	Not Included
Earthquake	Earthquake
Expansive Soils	Expansive Soils

After a review of the hazards, it was agreed that the hazards/hazard naming for this update will be consistent with the 2013 State Plan with the following exceptions:

- Levee Failure will not be included because there are no levees in Cedar County other than private agricultural levees that are not inventoried.
- Dam Failure will be included as a separate hazard. Although there are no high or moderate hazard dams within the county boundaries, there are dams upstream that could impact Cedar County in the unlikely event of failure. Therefore, this hazard has been added to address the upstream dams.
- Animal/Plant/Crop Disease will not be included. The agricultural community works with animal/plant/crop disease specialists routinely to address preventative steps that can be taken. This hazard is adequately addressed through other planning mechanisms.
- Human Disease will not be included. The County Health Department has a Public Health Plan that addresses this hazard.
- Infrastructure Failure will not be included as a separate hazard. The failure to infrastructure that can occur as a result of natural hazards will be discussed under each hazard.

Infrastructure failure as a result of human causes is not required for inclusion in Hazard Mitigation Plans.

- Landslide will not be included. The planning committee determined there have been no instances of landslides as a result of natural causes in the planning area.

3.1.2 Review Disaster Declaration History

Information utilized to identify hazards relevant for Cedar County was obtained by examining events that triggered federal disaster declarations. Federal and/or state declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. If the disaster is so severe that both the local and state governments' capacities are exceeded; a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

FEMA also issues emergency declarations, which are more limited in scope and do not include the long-term federal recovery programs of major disaster declarations. Determinations for declaration type are based on scale and type of damages and institutions or industrial sectors affected.

Table 3.2 lists federal disaster declarations that included Cedar County for the period from 1969 to 2013.

Table 3.2. FEMA Disaster Declarations that included Cedar County, Iowa, 1998-2014

Number	Declared	Incident Period	Description
4187	8/5/2014	6/26 to 7/7/2014	Severe Storms, Tornadoes, Straight-line Winds, and Flooding
4135	07/31/2013	06/21 to 06/28/2013	Severe Storms, Tornadoes, and Flooding
4119	05/31/2013	04/17 to 04/30/2013	Severe Storms, Straight-line Winds, and Flooding
1763	5/27/2008	5/25 to 8/13/2008	Severe Storms, Tornadoes and Flooding
1737	01/04/2008	12/10 to 12/11/2007	Severe Winter Storms
1688	03/14/2007	2/23 to 3/2/2007	Severe Winter Storms
1518	05/25/2004	5/19 to 6/24/2004	Severe Storms, Tornadoes, and Flooding

Source: Federal Emergency Management Agency, www.fema.gov/

U.S. Department of Agriculture's Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans (EM) to producers suffering losses in those counties and in counties that are contiguous to a designated county. In addition to EM eligibility, other emergency assistance programs, such as Farm Service Agency (FSA) disaster assistance programs, have historically used disaster designations as an eligibility requirement trigger.

Table 3.3 provides the USDA Secretarial disaster declarations that included Cedar County in 2012 and 2013. Cedar County was also included in Secretarial disaster declarations in 2008, 2009, 2010, and 2011. However, details of cause were not available for these declarations.

Table 3.3. USDA Secretarial Disaster Declarations Including Cedar Co. (2012-2013)

Number	Date	Cause					
		Drought	High Winds	Fire, Wildfire	Heat	Insects	Frost, Freeze
S361	2013	x	x	x	x	x	
S362	2012						x
S331	2012	x	x	x	x	x	

Source: U.S. Department of Agriculture

3.1.3 Research Additional Sources

Additional data on locations and past impacts of hazards in the planning area was collected from the following sources:

- Cedar County Digital Flood Insurance Rate Map, FEMA
- Cedar County Emergency Management
- Cedar County Flood Insurance Study, FEMA
- *Cedar County Multi-jurisdictional Hazard Mitigation Plan* (January 2011);
- Data Collection Guides completed by each jurisdiction
- Environmental Protection Agency
- Federal Emergency Management Agency (FEMA);
- Flood Insurance Administration
- Hazards US (HAZUS)
- Iowa Department of Agriculture and Land Stewardship, Division of Soil Conservation
- Iowa Department of Education, Bureau of Information and Analysis Services
- Iowa Department of Natural Resources;
- Iowa Department of Public Safety
- Iowa Department of Transportation, Office of Traffic and Safety
- Iowa Flood Center
- Iowa State Fire Marshal Division
- *Iowa State Hazard Mitigation Plan* (September 2013);
- Iowa Utilities Board
- National Drought Mitigation Center Drought Reporter;
- National Fire Incident Reporting System (NFIRS)
- National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center;
- Pipeline and Hazardous Materials Safety Administration
- SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin
- U.S. Army Corps of Engineers
- U.S. Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics;
- U.S. Department of Transportation
- United States Geological Survey
- Various articles and publications available on the internet (sources are indicated where data is cited).

3.1.4 Hazards Identified

Through the hazard identification review process, 16 natural and human-caused/technological hazards that have the potential to significantly affect the planning area were chosen for further analysis in the risk assessment. The hazards identified for this plan update are listed below in alphabetical order

- Dam Failure*
- Drought
- Earthquakes
- Expansive Soils
- Extreme Heat
- Flash Flood
- Grass/Wildland Fire
- Hazardous Materials Incident*
- Radiological Incident*
- River Flood
- Severe Winter Storm
- Sinkholes
- Terrorism*
- Thunderstorm/Lightning/Hail
- Tornado/Windstorm
- Transportation Incident

*denotes hazards added to this plan update that were not included in the 2011 *Cedar County Multi-jurisdictional Hazard Mitigation Plan*.

Although 16 hazards with the potential to significantly affect the planning area were identified and selected for additional analysis, not all hazards impact every jurisdiction. **Table 3.4** provides a summary of the jurisdictions impacted by each hazard. An “x” indicates the jurisdiction is impacted by the hazard. A "-" indicates the hazard is not applicable to that jurisdiction.

Table 3.4. Hazards Identified for Each Jurisdiction

Jurisdiction	Dam Failure	Drought	Earthquakes	Expansive Soils	Extreme Heat	Flash Flood	Grass/Wildland Fire	Hazardous Materials Incident	Radiological Incident	River Flood	Severe Winter Storm	Sinkholes	Terrorism	Thunderstorm/Lightning/Hail	Tornado/Windstorm	Transportation Incident
Cedar County	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
City of Bennett	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
City of Clarence	-	x	x	x	x	x	x	x	x	-	x	x	x	x	x	x
City of Durant	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
City of Lowden	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
City of Mechanicsville	-	x	x	x	x	x	x	x	x	-	x	x	x	x	x	x
City of Stanwood	-	x	x	x	x	x	x	x	x	-	x	x	x	x	x	x
City of Tipton	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
City of West Branch	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Bennett School District, #603	-	x	x	x	x	x	x	x	x	-	x	x	x	x	x	x
Durant School District, #1926	-	x	x	x	x	x	x	x	x	-	x	x	x	x	x	x
North Cedar School District, #3691	-	x	x	x	x	x	x	x	x	-	x	x	x	x	x	x
Tipton School District #6408	-	x	x	x	x	x	x	x	x	-	x	x	x	x	x	x
West Branch School District #6930	x	x	x	x	x	x	x	x	x	-	x	x	x	x	x	x

3.1.5 Multi-Jurisdictional Risk Assessment

For this multi-jurisdictional plan, the risks are assessed for each jurisdiction where they deviate from the risks facing the entire planning area. The planning area is fairly uniform in terms of climate and topography as well as building construction characteristics. Accordingly, the geographic areas of occurrence for weather-related hazards do not vary greatly across the planning area for most hazards. The more urbanized areas within the planning area have more assets that are vulnerable to the weather-related hazards and varied development trends impact the future vulnerability. Similarly, more rural areas have more assets (crops/livestock) that are vulnerable to drought. These differences are discussed in greater detail in the vulnerability sections of each hazard.

The hazards that have the potential to vary across the planning area in terms of geographic areas at risk include dam failure, hazardous materials incident, flash flood, grass or wildland fire, radiological incident, and river flood.

Bi-county Cities

There are several cities within Cedar County that have portions of their city limits in adjacent counties. These cities are treated in one of two ways for purposes of participation in this plan:

1) Official Plan Participants: The following cities are bi-county/multiple-county cities that have the majority of their corporate limits in Cedar County. These cities will be invited as official plan participants in the Cedar County plan. The Risk Assessment will include incorporation of analysis of building exposure/critical facilities of the entire city limits for these jurisdictions:

- City of Durant (portions in Muscatine and Scott Counties)
- City of West Branch (portions in Johnson County)

2) Stakeholder Participants: To provide a comprehensive analysis, the Risk Assessment includes incorporated areas of the City of Wilton which has a portion of their city limits in Cedar County, but is considered an official city of adjacent Muscatine County. The Risk Assessment will include analysis of building exposure/critical facilities ONLY for the portion of the incorporated area that is within the Cedar County boundary. Although this city is not an official participant of the *Cedar County Multi-jurisdictional Hazard Mitigation Plan*, they are stakeholders in the planning process and as such, were invited to planning meetings and to comment on plan drafts.

3.1.6 Hazard Scoring Methodology

To maintain reporting format consistent with the *2013 Iowa State Hazard Mitigation Plan*, the Cedar County Hazard Mitigation Planning Committee (HMPC) used the same methodology to score and prioritize the hazards. This prioritization was based on a hazard scoring system that considers four elements of risk: probability, magnitude/severity, warning time, and duration. **Table 3.5** provides definitions for each of the four elements along with associated rating levels.

Table 3.5. Hazard Score Element Definitions and Rating Scales

Element/Score	Definitions
Probability: Reflects the likelihood of the hazard occurring again in the future, considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year	
1—Unlikely	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is a possibility of its occurrence.
2—Occasional	Between 10% and 20% probability in any given year (up to 1 in 5 chance of occurring), history of events is greater than 10% but less than 20% or the event could possibly occur.
3—Likely	Between 20% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events is greater than 20% but less than 33% or the event is likely to occur.
4—Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely or the event is highly likely to occur.
Magnitude / Severity: Assessment of severity in terms of injuries and fatalities, personal property, and infrastructure and the degree and extent with which the hazard affects the jurisdiction.	
1—Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries /illnesses treatable with first aid.
2—Limited	10% to 25% of property severely damaged, shutdown of facilities and services for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3—Critical	25% to 50% of property severely damaged, shutdown of facilities and services for at least 2 weeks, and/or injuries/illnesses that result in permanent disability.
4—Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.
Warning Time: Rating of the potential amount of warning time that is available before the hazard occurs. This should be taken as an average warning time.	
1	More than 24 hours warning time
2	12 to 24 hours warning time
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)
Duration: A measure of the duration of time that the hazard will affect the jurisdiction.	
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than one week

Using the rating scales described in the table above, the formula used to determine each hazard's score, including weighting factors, is provided below:

(Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10) = SCORE

Based on the hazard's overall weighted score, the hazards are categorized as follows: High (3.0-4.0), Moderate (2.0-2.9), and Low (1.0-1.9).

These terms relate to the level of planning analysis to be given to the particular hazard in the risk assessment process and are not meant to suggest that a hazard would have only limited impact. In order to focus on the most critical hazards, those assigned a level of high or moderate were given more extensive attention in the remainder of the risk assessment (e.g., quantitative analysis or loss estimation), while those with a low planning significance were addressed in more general or qualitative ways.

The HMPC determined overview hazard ranking scores for the planning area as a whole. The results of this overview are provided below in **Table 3.6**. Additionally, the hazard ranking overview is provided at the beginning of each hazard profile and vulnerability section. A detailed hazard summary by jurisdiction is provided at the conclusion of each hazard profile and vulnerability section to provide a summary of how the hazard varies by jurisdiction.

Table 3.6. Cedar County Planning Area Hazard Ranking Results

Hazard	Probability	Magnitude	Warning Time	Duration	Weighted Score	Level
Tornado/Windstorm	4	3	3	1	3.25	High
River Flood	4	3	1	4	3.25	High
Severe Winter Storm	4	2	3	3	3.15	High
Hazardous Materials Incident	4	2	4	1	3.10	High
Transportation Incident	4	2	4	1	3.10	High
Flash Flood	4	2	2	1	2.80	Moderate
Thunderstorm/Lightning/Hail	4	1	3	1	2.65	Moderate
Drought	3	2	1	4	2.50	Moderate
Grass/Wildland Fire	4	1	1	1	2.35	Moderate
Radiological Incident	1	3	4	4	2.35	Moderate
Terrorism	1	3	4	1	2.05	Moderate
Extreme Heat	2	2	1	3	1.95	Low
Dam Failure	1	1	4	1	1.45	Low
Earthquakes	1	1	4	1	1.45	Low
Sinkholes	1	1	4	1	1.45	Low
Expansive Soils	1	1	1	1	1.00	Low

3.2 Assets at Risk

This section assesses the population, structures, critical facilities and infrastructure, and other important assets in the planning area that may be at risk to hazards.

3.2.1 Total Exposure of Population and Structures

3.2.1.1 Unincorporated County and Incorporated Cities

Table 3.7 shows the total population, building count, estimated value of buildings, estimated value of contents and estimated total exposure to parcels for the unincorporated county and each incorporated city. A recognized data limitation associated with utilizing parcel data with assessed values is the exclusion of tax exempt properties in the planning area. There are 556 parcels throughout the planning area that are tax exempt. The number of exempt parcels is also broken down by jurisdiction. However, structure values are not available for these properties.

Table 3.8 provides the building/improvement counts for the county and each city in the planning area broken down by usage type. Finally, **Table 3.9** provides the building/improvement dollar values for the county and each city in the planning area broken out by building usage types (residential, commercial, industrial, and agricultural).

The methodology employed to extract the summary of building/improvement counts and values from the parcel data is provided below:

- Parcel values that had an associated dwelling or improvement value were used as the structure file. Since building footprints and/or building counts per parcel were not available, the parcels with dwelling or improvement value were counted as one building/improvement;
- Parcel polygons were converted to points; and
- Parcel points were spatially joined to the political area (jurisdiction).

Population data is based on the 2013 population estimate from the Iowa State University of Science and Technology, Iowa Community Indicators Program. Building counts and building exposure values are based on parcel data provided by the Cedar County GIS Department, Johnson County GIS Department, Muscatine County GIS Department, and Scott County GIS Department. The contents exposure values were calculated by factoring a multiplier to the building exposure values based on usage type. The contents multipliers were derived from the HAZUS MH 2.1 and are defined below the table. Land values have been purposely excluded from the tables because land remains following disasters, and subsequent market devaluations are frequently short term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value (other than crop insurance). The assessed land value of parcels that do not have any associated structures (primarily agricultural) is $679,334,850. The assessed land value of parcels containing at least one structure is $322,530,144.

Table 3.7. Population and Building Exposure by Jurisdiction-Unincorporated County and Incorporated Cities

Jurisdiction	2013 Population Estimate	Exempt Parcels	Building Count	Building Exposure ($)	Contents Exposure ($)	Total Exposure ($)
Unincorporated County	7,097	292	3,906	$422,049,350	$317,725,085	$739,774,435
City of Bennett	396	16	170	$10,455,940	$5,662,435	$16,118,375
City of Clarence	961	27	462	$35,047,570	$20,982,280	$56,029,850
City of Durant*	1,832	20	774	$94,971,006	$65,306,966	$160,277,972
City of Lowden	780	27	400	$27,227,056	$15,339,926	$42,566,981
City of Mechanicsville	1,129	33	483	$39,365,410	$21,676,010	$61,041,420
City of Stanwood	673	30	330	$23,475,106	$14,536,271	$38,011,377
City of Tipton	3,199	54	1,397	$133,371,010	$85,004,280	$218,375,290
City of West Branch*	2,326	56	764	$141,927,556	$107,371,461	$249,299,017
City of Wilton**	N/A	1	1	$124,240	$62,120	$186,360
Total	**18,393**	**556**	**8,687**	**$928,014,244**	**$653,666,834**	**$1,581,681,078**

Sources: Population Estimate, Iowa State University of Science and Technology, Iowa Community Indicators Program; Exempt Parcels, Building/Improvement Count and Exposure, Cedar County GIS Department. Durant data is combination of data from Cedar, Muscatine, and Scott County GIS Departments and West Branch data is combination of data from Cedar and Johnson County GIS Departments; Contents Exposure derived by applying multiplier to Building Exposure based on HAZUS MH 2.1 standard contents multipliers per usage type as follows: Residential (50%), Commercial (100%), Industrial (150%), Agricultural (100%).

*Data is for entire incorporated area, including portion(s) in adjacent counties.

**Data is for Cedar County portion of incorporated area only.

Table 3.8. Building/Improvement Counts by Usage Type

Jurisdiction	Agricultural	Commercial	Industrial	Residential	Total
Unincorporated County	1,933	95	10	1,868	3,906
City of Bennett	0	19	1	150	170
City of Clarence	3	66	2	391	462
City of Durant*	2	87	14	671	774
City of Lowden	3	59	0	338	400
City of Mechanicsville	3	48	0	432	483
City of Stanwood	3	54	2	271	330
City of Tipton	9	221	13	1,154	1,397
City of West Branch*	6	113	8	637	764
City of Wilton**	0	0	0	1	1
Total	**1,962**	**762**	**50**	**5,913**	**8,687**

Source: Cedar County GIS Department. Durant data is combination of data from Cedar, Muscatine, and Scott County GIS Departments and West Branch data is combination of data from Cedar and Johnson County GIS Departments;
*Data is for entire incorporated area, including portion(s) in adjacent counties.
**Data is for Cedar County portion of incorporated area only.

Table 3.9. Building/Improvement and Contents Values by Usage Type

Jurisdiction	Agricultural Building/ Improvements ($)	Agricultural Contents ($)	Commercial Building/ Improvements ($)	Commercial Contents ($)	Industrial Building /Improvements ($)	Industrial Contents ($)	Residential Building/ Improvements ($)	Residential Contents ($)	Total Building /Improvements ($)	Total Contents ($)	Total Exposure ($)
Unincorporated County	$171,318,890	$171,318,890	$17,038,970	$17,038,970	$12,521,480	$18,782,220	$221,170,010	$110,585,005	$422,049,350	$317,725,085	$739,774,435
City of Bennett	$0	$0	$848,870	$848,870	$10,030	$15,045	$9,597,040	$4,798,520	$10,455,940	$5,662,435	$16,118,375
City of Clarence	$309,760	$309,760	$4,436,010	$4,436,010	$1,085,610	$1,628,415	$29,216,190	$14,608,095	$35,047,570	$20,982,280	$56,029,850
City of Durant*	$22,080	$22,080	$8,714,746	$8,714,746	$13,453,050	$20,179,575	$72,781,130	$36,390,565	$94,971,006	$65,306,966	$160,277,972
City of Lowden	$122,120	$122,120	$3,330,676	$3,330,676	$0	$0	$23,774,260	$11,887,130	$27,227,056	$15,339,926	$42,566,981
City of Mechanicsville	$25,430	$25,430	$3,961,180	$3,961,180	$0	$0	$35,378,800	$17,689,400	$39,365,410	$21,676,010	$61,041,420
City of Stanwood	$15,670	$15,670	$3,280,266	$3,280,266	$1,150,750	$1,726,125	$19,028,420	$9,514,210	$23,475,106	$14,536,271	$38,011,377
City of Tipton	$224,250	$224,250	$23,008,820	$23,008,820	$6,702,240	$10,053,360	$103,435,700	$51,717,850	$133,371,010	$85,004,280	$218,375,290
City of West Branch*	$156,350	$156,350	$42,415,776	$42,415,776	$15,121,620	$22,682,430	$84,233,810	$42,116,905	$141,927,556	$107,371,461	$249,299,017
City of Wilton**	$0	$0	$0	$0	$0	$0	$124,240	$62,120	$124,240	$62,120	$186,360
Total	**$172,194,550**	**$172,194,550**	**$107,035,314**	**$107,035,314**	**$50,044,780**	**$75,067,170**	**$598,739,600**	**$299,369,800**	**$928,014,244**	**$653,666,834**	**$1,581,681,078**

Source: Cedar County GIS Department. Durant data is combination of data from Cedar, Muscatine, and Scott County GIS Departments and West Branch data is combination of data from Cedar and Johnson County GIS Departments;

*Data is for entire incorporated area, including portion(s) in adjacent counties.

**Data is for Cedar County portion of incorporated area only.

3.2.1.2 Public School Districts

The enrolled number of students at the participating public school districts is provided in **Table 3.10** as well as the number of buildings, building values (building exposure) and contents value (contents exposure).

Table 3.10. Enrollment and Building Exposure by Jurisdiction-Public School Districts

Public School District	Enrollment	Building Count	Building Exposure ($)	Contents Exposure ($)	Total Exposure ($)
Bennett Community School	77	1 School Building 1 Garage	$8,940,626 $48,529	$1,328,051	$10,317,206
Durant Community Schools	717	3 School Buildings	$25,693,160	$3,701,557	$29,394,717
North Cedar CSD	837	4 School Buildings	$36,452,576	$4,537,187	$40,989,763
Tipton Community Schools	950	3 School Buildings	$29,000,000	$4,000,000	$33,000,000
West Branch Community Schools	868	3 School Buildings 1 Bus Barn/Maint	$17,600,000 $750,000	$5,300,000 $1,000,000	$24,650,000

Source: Enrollment Statistics from 2012-2013 Iowa Public School PreK-12 Enrollments by District – Iowa Department of Education, Bureau of Information and Analysis Services; Building Count and Exposure from Data Collection Guides from Public School Districts.; Exposure values from Data Collection Guides

3.2.2 Critical and Essential Facilities and Infrastructure

As part of the update to the *Cedar County Multi-jurisdictional Hazard Mitigation Plan*, participating jurisdictions assessed the vulnerability of the following types of facilities below:

- **Critical Facilities**: Those facilities that are essential in providing utility or direction either during the response to an emergency or during the recovery operation.
- **Essential Facilities**: Those facilities that if damaged, would have devastating impacts on disaster response and/or recovery.
- **High Potential Loss Facilities**: Those facilities that would have a high loss or impact on the community.
- **Transportation and Lifeline Facilities**: Those facilities and infrastructure that are critical to transportation, communications, and necessary utilities.

Table 3.11 is a summary of the inventory of xxx critical and essential facilities and infrastructure in the planning area. This list was compiled from an inventory of critical facilities that was developed by the County and incorporated cities as part of the 2011 Hazard Mitigation Plan. This inventory was revised with updates from the planning committee and an updated inventory of Tier II chemical facilities from the Iowa Department of Natural Resources.

At Meeting #2, each jurisdiction was provided with the inventory of their jurisdiction's critical and essential facilities for validation. Additions/deletions, and corrections were then noted by the individual jurisdictions and Cedar County GIS incorporated the changes in the inventory. The validated critical facility inventory for all jurisdictions was then utilized in analysis of geographic hazards, such as riverine flooding and fixed chemical facilities. The full list of critical and essential facilities, as well as tables indicating critical and essential facilities to the 1-percent annual chance floodplain and within ½ mile of chemical facilities, is provided in Appendix E.

The Critical Facility Inventory is “For Official Use Only”. To obtain access, contact the Cedar County Emergency Manager.

Table 3.11. Inventory of Critical/Essential Facilities and Infrastructure by Jurisdiction

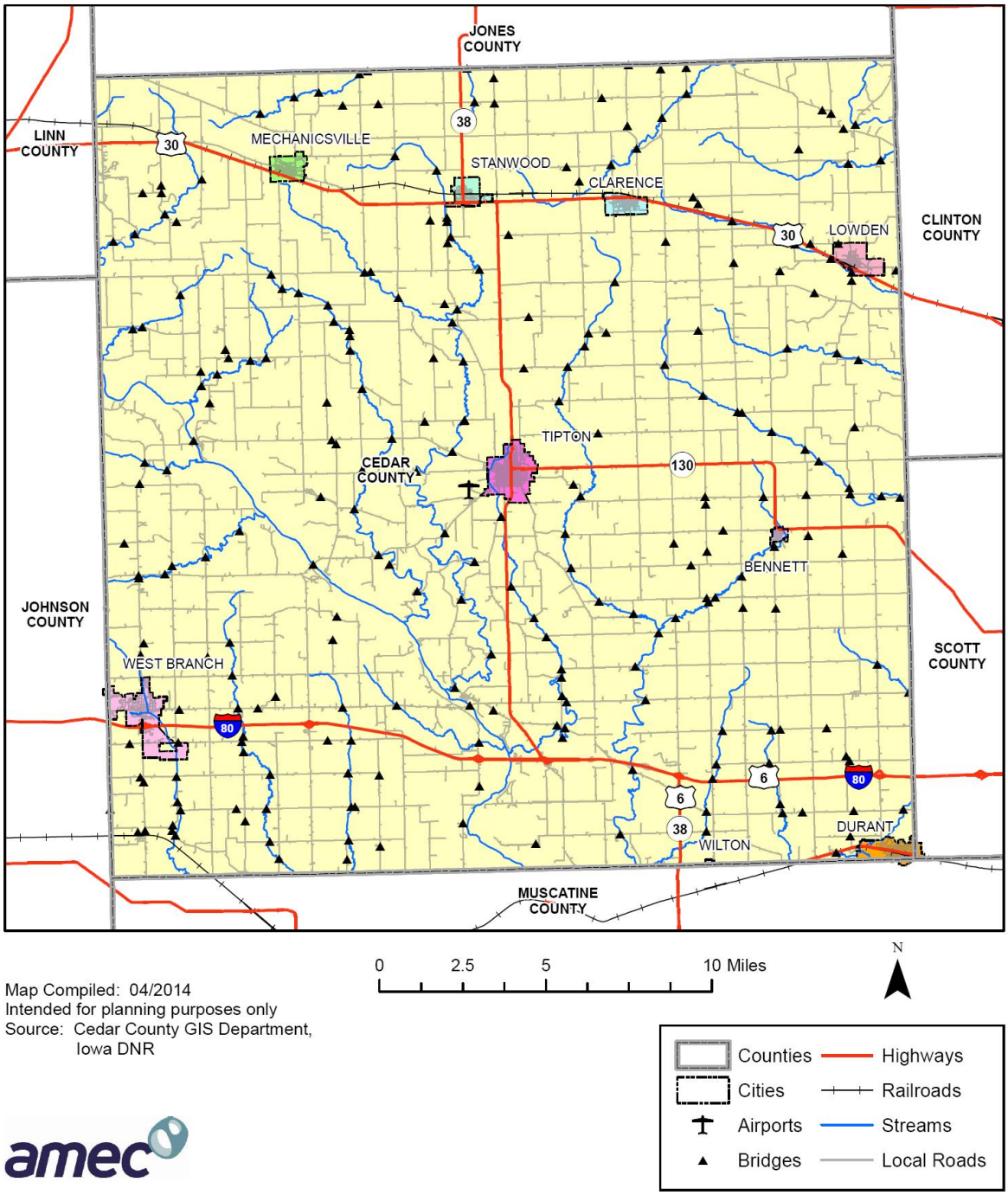
Jurisdiction	Facility Type	Facility Count
Bennett	Agricultural	1
	Ambulance	1
	Church	2
	Commercial	1
	Communications	2
	Community Group	1
	Fire Department	1
	Fuel	1
	Government	3
	Recreation	1
	School	1
	Wastewater	1
	Water	1
	Total	**17**
Clarence	Ambulance	1
	Chemical	1
	Church	2
	Communications	1
	Community Group	1
	Electrical	1
	Fire Department/Government	1
	Fuel	1
	Government	3
	Medical	1
	Nursing Home/Vulnerable Needs	2
	Recreation	1
	School	1
	Water	2
	Total	**19**
Durant	Ambulance	1
	Church	2
	Community Group	1
	Electrical	1
	Fire Department	1
	Fuel	2
	Government	2
	Medical	2
	Nursing Home/Vulnerable Needs	3
	Police Department/Public Works	1
	Recreation	4
	School	3
	Wastewater	2
	Water	4
	Total	**29**
Lowden	Chemical	1
	Church	2
	Communications	1
	Community Group	1
	Fire Department	1
	Fuel	3
	Government	5
	Nursing Home/Vulnerable Needs	2
	Recreation	2

Jurisdiction	Facility Type	Facility Count
	Wastewater	1
	Water	1
	Total	**20**
Mechanicsville	Chemical	1
	Communications	2
	Economic	1
	Electrical	1
	Fire Department	1
	Fire Department/Government	1
	Fuel	2
	Government	3
	Nursing Home/Vulnerable Needs	1
	School	1
	Transportation	1
	Wastewater	1
	Water	2
	Total	**18**
Stanwood	Agricultural	2
	Chemical	1
	Communications	2
	Electrical	1
	Fire Department/Government	1
	Fuel	6
	School	1
	Water	3
	Total	**17**
Tipton	Ambulance	1
	Chemical	6
	Communications	1
	Electrical	1
	Fire Department	1
	Fuel	1
	Government	2
	Medical	2
	Nursing Home/Vulnerable Needs	2
	Police Department	1
	School	1
	Water	4
	Total	**23**
West Branch	Chemical	2
	Fire Department/Police Department	1
	Government	2
	Nursing Home/Vulnerable Needs	1
	School	3
	Wastewater	2
	Water	5
	Total	**16**
Cedar County	Chemical	17
	Fuel	4
	Wastewater	3
	Total	**24**
Muscatine County	Wastewater*	1
	Total	**1**
	Grand Total	**184**

Source: Cedar County GIS Department

Figure 3.1 shows the locations of bridges in the planning area included in the National Bridge Inventory data set within HAZUS MH 2.1. For additional information on scour critical bridges, see **Section 3.5.6**, Flash Flooding.

Figure 3.1. Cedar County Bridges



3.2.3 Other Assets

Assessing the vulnerability of the planning area to disaster also involves inventorying the natural, historic, cultural, and economic assets of the area. This is important for the following reasons:

- The plan participants may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- If these resources are impacted by a disaster, knowing about them ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts is higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, such as wetlands and riparian habitat, which help absorb and attenuate floodwaters.
- Losses to economic assets (e.g., major employers or primary economic sectors) could have severe impacts on a community and its ability to recover from disaster.

In the planning area, specific assets include the following:

Threatened and Endangered Species: **Table 3.12** includes Federally Threatened, Endangered, Proposed and Candidate Species in Cedar County, Iowa.

Table 3.12. Threatened and Endangered Species in Cedar County

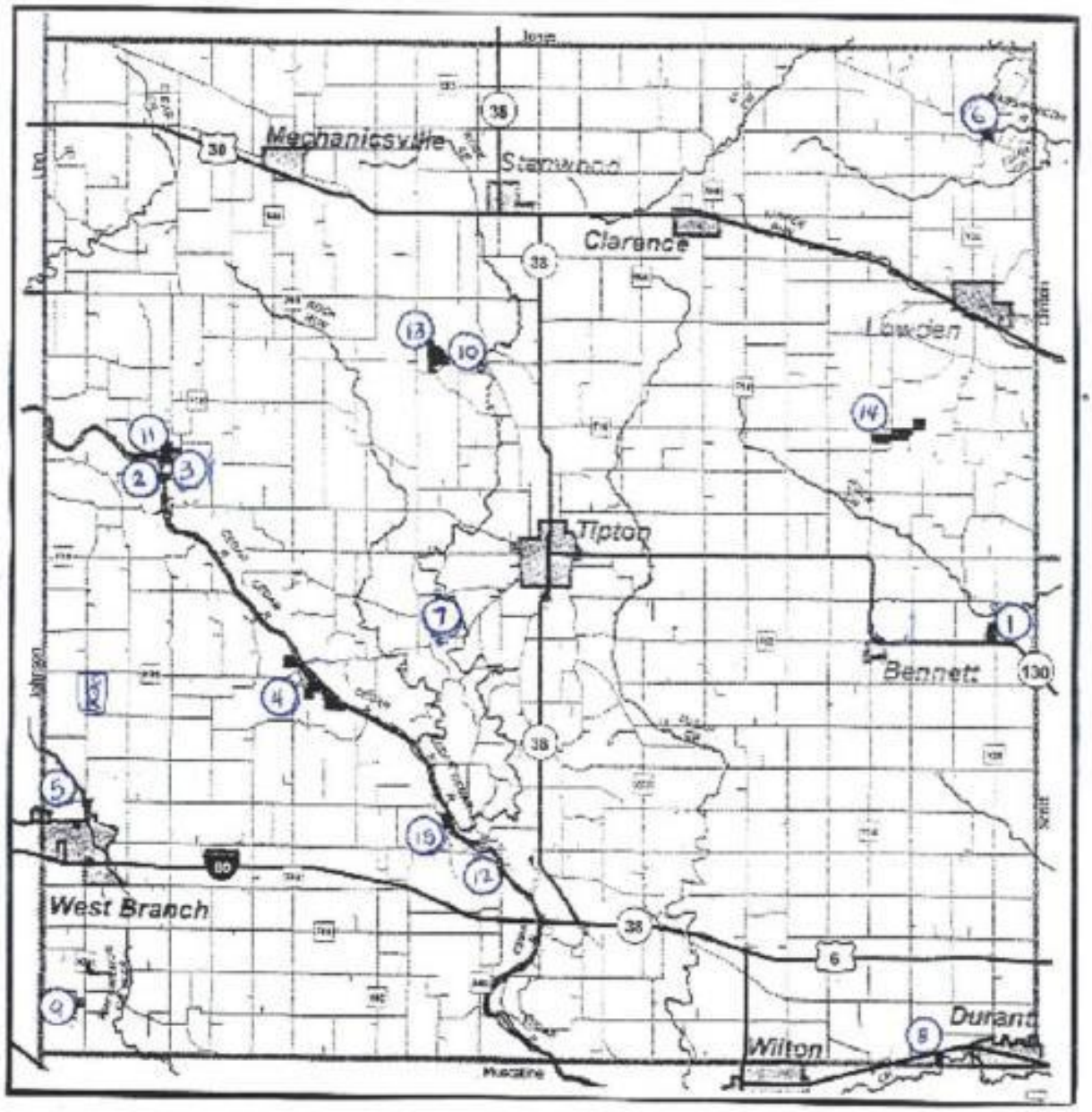
Common Name	Scientific Name	Status
Indiana bat	Myotis sodalis	Endangered
Northern long-eared bat	Myotis septentrionalis	Proposed as Endangered
Prairie bush clover	Lespedeza leptostachya	Threatened
Western prairie fringed orchid	Platanthera praeclara	Threatened

Source: U.S. Fish and Wildlife Service, http://www.fws.gov/midwest/endangered/lists/iowa_cty.html

Natural Resources: The Cedar County Conservation Board manages six parks and nine wildlife areas throughout the county. The parks and wildlife areas in Cedar County are listed below and shown in the map in **Figure 3.2**.

1. Bennett Park
2. Cedar Bluff Access
3. Cedar Bluff Wildlife Area
4. Cedar Valley Park
5. Hoover Nature Trail
6. Massillon Park
7. Mitzner Property
8. Norton Nature Area
9. Pioneer Park
10. Red Oak
11. River Valley Wetland
12. Rochester Park
13. Rock Creek Timber
14. Townsend Wildlife Area
15. West Rochester Sand Pit

Figure 3.2. Cedar County Parks and Natural Areas



Source: Cedar County Conservation board Website, http://cedarccb.org/Parks.html, accessed 4/2/2014

Historic Resources: The National Register of Historic Places is the official list of the Nation's cultural resources worthy of preservation. Authorized under the National Historic Preservation Act of 1966, the National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. The National Register is administered by the National Park Service under the Secretary of the Interior. Properties listed in the National Register include districts, sites, buildings, structures and objects that are significant in American history, architecture, archeology, engineering, and

culture. The properties in Cedar County that are on the National Register of Historic Places are identified in **Table 3.13.**

Table 3.13. Cedar County, Iowa Properties on the National Register of Historic Places

Location	Site Name	Address	Year Listed	Resource
Buchanan	Hall Hannah Morse Fowler House	Address Restricted	1998	Building
Clarence	Mill Creek Bridge	Plum St over Mill Creek	1998	Structure
Downey	Downey Savings Bank	Front St.	1976	Building
Durant	St. Paul's Episcopal Church and Parish Hall (St. Paul's Church)	206 6th Ave	1985	Building
Lowden	Kreinbring Phillips 66 Gas Station	200 Main St	2000	Building
Lowden	Cedar Lincoln Hotel	408 Main St.	1996	Building
Rochester	Green William House (Anderson Hall)	1709 Madison St	1999	Building
Tipton	Cedar County Sheriff's House and Jail	118 W. 4th St.	2003	Building
Tipton	John Christian and Bertha Landrock Reichert House	508 E. Fourth St.	1991	Building
Tipton	Tipton State Bank	501 Cedar St.	2000	Building
Tipton	Cedar Floral Hall	W of Tipton on Cedar County Fair Grounds.	1976	Building
Tipton	Hotel Tipton	524-527 Cedar St.	1998	Building
Tipton vicinity	Red Oak Grove Presbyterian Church & Cemetery	751 King Ave	2010	Building
West Branch	Herbert Hoover National Historic Site	Off I-80	1966	Building
West Branch	Gruwell and Crew General Store	109 W. Main St	1982	Building
West Branch	West Branch Commercial Historic District	W. Main & N. Downey Streets	1987-1995	District

Source: State Historical Society of Iowa, http://www.iowahistory.org/historic-preservation/national-register-of-historic-places/properties-in-iowa.html

Agriculture and the Economy: Agriculture plays an important role in the Cedar County economy. **Table 3.14** provides a summary of the agriculture-related jobs in Cedar County.

Table 3.14. Agriculture-Related Jobs in Cedar County

Activity	Jobs
Crop and livestock production	1,695
Ag processing	206
Ag support	25
Total Agricultural-related Jobs	**1,926**

Source: Iowa State University Extension, 2009, http://www.extension.iastate.edu/Publications/Pm2023-16.pdf

For additional information on the Cedar County economy, see Chapter 2.

3.3 Development Since 2011 Plan Update

This section provides information on development that has occurred since the 2011 Cedar County Multi-jurisdictional Hazard Mitigation Plan Update. Narrative development data is from the Cedar County Economic Development Council. Building permit data is from the U.S. Census Bureau (http://censtats.census.gov/bldg/bldgprmt.shtml).

2014

- Expansion of Sinclair Tractor in Durant: 156 by 55 foot addition expanded shop and office space, allowing additional space to hire more employees, 2375 Yankee Avenue, Durant
- Lowden Housing Addition: The City of Lowden approved preliminary plans for Fitzgerald, a new housing addition planned to be directly east of Schwarz Addition on 5th St. Place. The new housing addition will include 12 lots with cul-de-sac next to Yankee Avenue.
- Stanwood received a Community Development Block Grant to replace the existing dilapidated water main to eliminate water main breaks and provide a reliable supply of water to meet state standards.
- New Business in Tipton: In May, the City Council approved a resolution supporting an Iowa High Quality Jobs Program application for a manufacturing facility for David's Famous Gourmet Frozen Custard. If constructed, the facility would employ up to 35 people. A former agricultural implement building on West South Street in Tipton is the planned site for the new facility.
- 5 Building Permits Issued Jan-August 2014: 5 single family permits were issued county-wide during this period.
    - Bennett-0
    - Clarence-0
    - Durant-1
    - Lowden-0
    - Mechanicsville-0
    - Stanwood-0
    - Tipton-0
    - West Branch-0
    - Unincorporated Cedar County-4

2013

- New Sports Complex in Tipton: Heartland Sports Complex was constructed in Tipton at the southeast corner of Spruce and South Streets. The 100 by 176 foot building contains 2 full basketball courts, 4 volleyball courts, 2 batting cages, golf nets and a walking track.
- 43 Building Permits Issued: 42 single family and 1 two-family permits were issued county-wide during 2013.
    - Bennett-0
    - Clarence-2
    - Durant-1
    - Lowden-0
    - Mechanicsville-2
    - Stanwood-0
    - Tipton-7
    - West Branch-9
    - Unincorporated Cedar County-22

2012

- Wind Turbines Installed: ACCIONA Windpower installed two wind turbines in the County near Mechanicsville.
- 29 Building Permits Issued: 29 single family permits were issued county-wide during 2012.
    - Bennett-0
    - Clarence-1
    - Durant-2
    - Lowden-1
    - Mechanicsville-2
    - Stanwood-0
    - Tipton-6
    - West Branch-4
    - Unincorporated Cedar County-13

2011

- 28 Building Permits Issued: 28 single family permits were issued county-wide during 2011.
    - Bennett-0
    - Clarence-0
    - Durant-1
    - Lowden-0
    - Mechanicsville-0
    - Stanwood-0
    - Tipton-5
    - West Branch-8
    - Unincorporated Cedar County-14

3.4 Future Land Use and Development

According to the U.S. Census Bureau, the Cedar County population increased 1.13 percent from 2000 to 2013. **Table 3.15** provides the population growth statistics for all cities in Cedar County as well as the county as a whole. The unincorporated areas population was determined by subtracting the populations of the incorporated areas from the overall county population. As a result, the unincorporated county populations are not completely accurate since portions of some of the incorporated areas overlap into adjacent counties.

Table 3.15. Cedar County Population Growth, 2000-2012

Jurisdiction	2000 Population	2010 Population	2013 Population Estimates	# Change 2000-2013	% Change 2000-2013
Iowa	2,926,324	3,046,355	3,090,416	164,092	5.61%
Cedar County	18,187	18,499	18,393	206	1.13%
Bennett	395	405	396	1	0.25%
Clarence	1,008	974	961	-47	-4.66%
Durant*	1,677	1,832	1,832	155	9.24%
Lowden	794	789	780	-14	-1.76%
Mechanicsville	1,173	1,146	1,129	-44	-3.75%
Stanwood	680	684	673	-7	-1.03%
Tipton	3,155	3,221	3,199	44	1.39%
West Branch*	2,188	2,322	2,326	138	6.31%
Unincorporated areas (est.)	7,117	7,126	7,097	-20	-0.28%

Source: U.S. Bureau of the Census, 2000 and 2010 data is from the Decennial Census, 2013 populating estimate data is from the Iowa State University of Science and Technology, Iowa Community Indicators Program; *population includes the portions of these cities in adjacent counties

Table 3.16 provides the change in numbers of housing units in the planning area from 2000 to 2010.

Table 3.16. Change in Housing Units, 2000-2010

Jurisdiction	Housing Units 2010	Housing Units 2000	2000-2010 # Change	2000-2010 % change
Iowa	1,336,417	1,232,511	103,906	8.4%
Cedar County, Iowa	8,064	7,570	494	6.5%
Bennett city, Iowa	172	163	9	5.5%
Clarence city, Iowa	455	453	2	0.4%
Durant city, Iowa	783	702	81	11.5%
Lowden city, Iowa	371	359	12	3.3%
Mechanicsville city, Iowa	496	479	17	3.5%
Stanwood city, Iowa	295	297	-2	-0.7%
Tipton city, Iowa	1,510	1,404	106	7.5%
West Branch city, Iowa	990	876	114	13.0%

Source: U.S. Bureau of the Census, Decennial Census; Population Statistics are for entire incorporated areas as reported by the U.S. Census Bureau

The following sections provide details regarding future growth, land use and development. The information in this section comes from information provided by each of the participating jurisdictions as well as other sources, cited throughout. Where available, maps are provided to facilitate consideration of hazard areas in future development plans as well as potential growth area.

Cedar County

The 1980 Cedar County Comprehensive Plan was updated by combining the 2006 Cedar County, Iowa Land Use Plan with the County's 1994 Builder Plan, the 2000 Housing Needs Assessment, the 2001 Hazard Mitigation, the 2005 Pre-Disaster Mitigation Plan, and other County reports and data. These combined documents act as the Comprehensive Plan for Cedar County and are used as the official guidelines in making decisions and recommendations for rural development (2006 Cedar County, Iowa Land Use Plan, pg. 7).

According to the population projections for Cedar County between 2005 and 2030 the population is expected to have an average increase of 1.67 percent. See **Table 3.17**.

Table 3.17. Cedar County Population Projection, 2000-2030

2000	2005	2010	2015	2020	2025	2030
18,217	18,361	18,636	18,968	19,333	19,786	20,259
	+0.08%	+1.50%	+1.78%	+1.92%	+2.34%	+2.39%

Source: 2005 State Profile: Iowa, State Data Center of Iowa, Woods & Poole Economics, Inc.

Future Land Use Map Areas (see **Figure 3.3**)

1. Agricultural Area--The Agricultural Area is established for agricultural activities such as the various types of farming, as well as directly related commercial and industrial activities that support the farming community. The Agricultural Area covers the majority of the Land Use Map and reflects Cedar County's primary natural resource and economy.

2. Residential Area--The Residential Area is established to indicate generally suitable locations for residential development. The Residential Areas are located near incorporated cities, some rural unincorporated communities, and certain rural areas that have developed over time due to their location.

3. Commercial Area--The Commercial Area is established to indicate generally suitable locations for various types of commercial activities. The Commercial Areas are primarily located near a few cities and several key interchanges along Interstate 80.

4. Industrial Area--The Industrial Area is established to indicate generally suitable locations for industrial and manufacturing activities, and supporting activities such as warehousing and

trucking facilities. The industrial Areas are primarily located near cities and several key interchanges along Interstate 80.

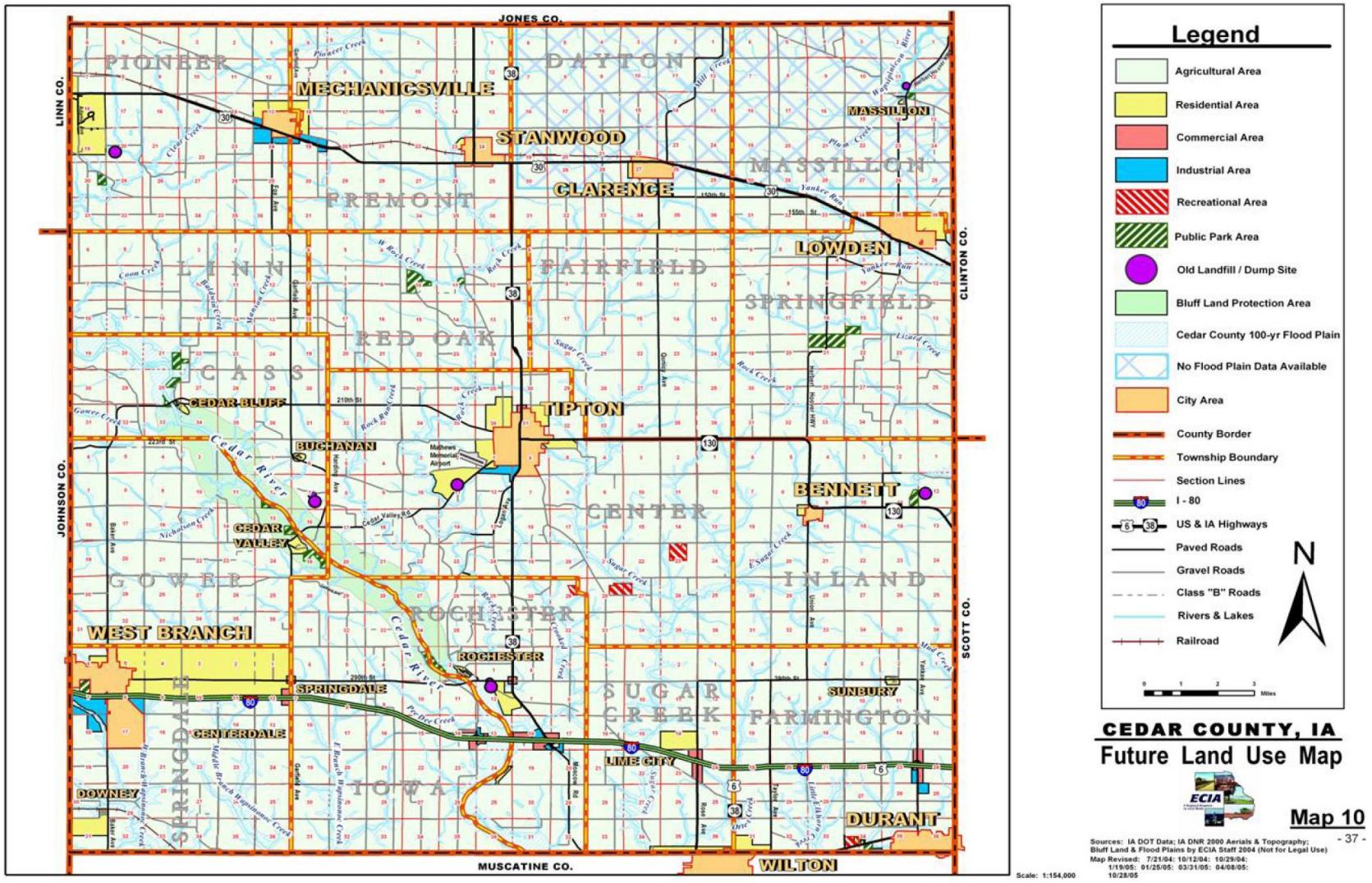
5. Recreational Area--The Recreational Area is established to indicate generally suitable locations for private recreational facilities such as golf courses. The Recreational Areas may be found in various locations across the County.

6. Public Park Area--The Public Park Area is established to indicate generally suitable locations for public parks. The Public Park Areas may be found in various locations across the County.

7. Bluff Land Protection Area--The Bluff Land Protection Area is established to indicate areas providing unique environmental character that require special protection in order to be preserved. Development is allowed within the Bluff Land Protection Area, but the location, height, or site improvement of such development may be limited. The Bluff Land Protection Area is located along the Cedar River between the unincorporated communities of Cedar Bluff and Rochester.

Other areas are also shown on the Future Land Use Map in the unincorporated areas of the County. These areas indicate Old Landfill / Dump sites and the 100-Year Flood Plain. Such areas are to be considered as constraints on future development and are to be avoided.

Figure 3.3. Cedar County Future Land Use Map



Source: Cedar County Land Use Plan, 2006

City of Bennett

The City of Bennett did not report any development trends or expected general growth areas. The City is planning to construct a new fire station in the near future.

City of Clarence

A new residential housing addition is planned at 11th Avenue and Bill Street. This addition will be called the Robinson Housing Addition.

City of Durant

The city of Durant has planned construction of a new water tower on the northeast side of the wastewater treatment facility as well as future stormwater system improvements.

City of Lowden

The City of Lowden did not report any development trends or expected general growth areas. However, there is potential for improvements of the wastewater treatment plant at an existing location east of the City.

City of Mechanicsville

The City of Mechanicsville did not report any development trends or expected general growth areas. However, there are discussions of projects to line the sewer pipes to reduce infiltration and inflow as well as replace water mains.

City of Stanwood

The City of Stanwood did not report any development trends or expected general growth areas. However, a new park shelter is planned for construction to replace the existing shelter.

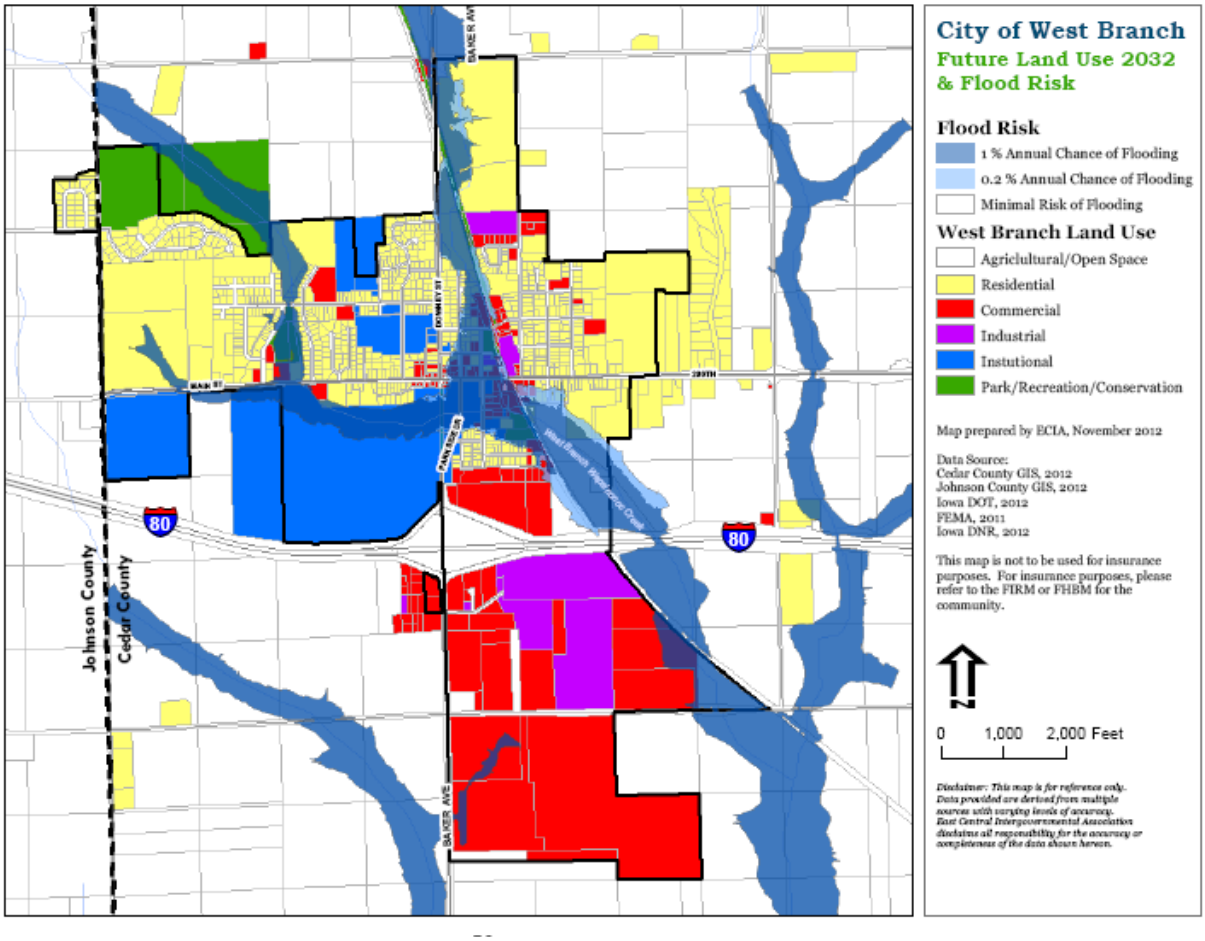
City of Tipton

The City of Tipton reports slight growth in non flood-prone areas of the City. Infrastructure improvements are also planned.

City of West Branch

The April 1, 2013 West Branch Comprehensive Plan details the City's plan for growth. Chapter 10 of the Comprehensive Plan is dedicated to discussion of Hazard Mitigation. The summary statement on land use states" there is adequate land outside of natural-hazard areas for development". Selected specific actions from the Hazard Mitigation Plan are detailed in the Comprehensive plan as a way of integrating these two plans. (See page 50 of the Comprehensive Plan). The map in **Figure 3.4** provides a comparison of future land use with the FEMA 2011 floodplain map.

Figure 3.4. West Branch Future Land Use with Flood Risk



Source: West Branch Comprehensive Plan, April 1, 2013

School Districts' Future Development

This section summarizes future development for the participating school districts:

Bennett School District

School enrollment is expected to remain about the same over the next five years. No planned future development reported.

Durant School District

School enrollment is expected decrease 10 to 15 percent over the next five years. Plans are in place to replace the middle and elementary school windows.

North Cedar School District

No planned future development reported.

Tipton School District

School enrollment is expected to increase by about 5 percent over the next five years. No planned future development reported.

West Branch School District

School enrollment is expected to remain about the same over the next five years. The school district has a comprehensive 15-year facilities improvement plan in place. The district is moving through Phase I of the 5-phase plan.

3.5 Hazard Profiles and Vulnerability

Hazard Profiles

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.

Each hazard identified in Section **3.1.4** is profiled individually in this section in alphabetical order.

The level of information presented in the profiles varies by hazard based on the information available. With each update of this plan, new information will be incorporated to provide for better evaluation and prioritization of the hazards that affect the planning area. Detailed profiles for each of the identified hazards include information categorized as follows:

Hazard Description

This section consists of a general description of the hazard and the types of impacts it may have on a community. It also includes the ratings assigned to the hazard relative to typical warning times and duration of hazard events as described in **Table 3.5**.

Geographic Location/Extent

This section describes the geographic location of the hazard in the planning area. Where available, maps are utilized to indicate the specific locations of the planning area that are vulnerable to the subject hazard. This section also provides information as to the extent of the hazard (i.e. the size or degree of impacts).

Previous Occurrences

This section includes information on historic incidents and their impacts.

Probability of Future Occurrence

The frequency of past events is used to gauge the likelihood of future occurrences. Where possible, the probability or chance of occurrence was calculated based on historical data. Probability was determined by dividing the number of events observed by the number of years and multiplying by 100. This gives the percent chance of the event happening in any given year. An example would be three droughts occurring over a 30-year period, which suggests a 10 percent chance of a drought occurring in any given year. For each hazard, the probability is assigned a rating as defined in **Table 3.5**.

Vulnerability Assessments

Requirement §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.

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

Requirement §201.6(c)(2)(ii)(B) :[The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Requirement §201.6(c)(2)(ii): (As of October 1, 2008) [The risk assessment] must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged in floods.

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

- Available GIS data sets such as DFIRM, parcel data, critical facilities, etc (all sourced when used);
- FEMA's HAZUS-MH loss estimation software;
- Written descriptions of assets and risks provided by participating jurisdictions;
- Existing plans and reports;
- Personal interviews with planning committee members and other stakeholders; and
- Other sources as cited.

Detailed profiles for each of the identified hazards include information categorized as follows:

Vulnerability Overview

This section consists of a general overview narrative of the planning area's vulnerability to the hazard. Within this section, the magnitude/severity of the hazard is discussed. The magnitude of the impact of a hazard event (past and perceived) is related directly to the vulnerability of the people, property, and the environment it affects. This is a function of when the event occurs, the

location affected, the resilience of the community, and the effectiveness of the emergency response and disaster recovery efforts.

For each hazard, the magnitude/severity is assigned a rating as defined in **Table 3.5**.

Potential Losses to Existing Development

This section provides the potential losses to existing development. Where data is available, this section provides estimated financial losses as well as the methodology used. For hazards with an overall "Low" rating, potential losses may not be discussed.

Future Development

This section provides information on how vulnerability to this hazard will be impacted by planned future development as well as information for jurisdictions to consider in planning future development.

Hazard Summary by Jurisdiction

For hazards that vary by jurisdiction, this section will provide an overview of how the hazard varies, followed by a table indicating the probability, magnitude, warning time, and duration rankings for each jurisdiction with the resulting hazard score and level.

3.5.1 Dam Failure

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
1	1	4	1	1.45	Low

Profile

Hazard Description

Many of Iowa's community settlements were founded along rivers and streams due to their reliance on water resources. Often, these streams or rivers later needed a dam for flood control or a reservoir for a constant water source. A dam is defined as a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. Dams are typically constructed of earth, rock, concrete, or mine tailings. Dam failure is the uncontrolled release of impounded water resulting in downstream flooding, affecting both life and property. Dam failure can be caused by any of the following: flooding; earthquakes; flow blockages; landslides; lack of maintenance; improper operation; poor construction; vandalism; or terrorism.

The thresholds for when a dam falls under State regulation are outlined in Iowa Administrative Code 567-71.3 and are listed below. The thresholds are primarily based on both dam height and water storage volumes. State regulated dams are those dams that meet the following:

In rural areas:

a. *Any dam designed to provide a sum of permanent and temporary storage exceeding 50 acre-feet at the top of dam elevation, or 25 acre-feet if the dam does not have an emergency spillway, and which has a height of 5 feet or more.*

b. *Any dam designed to provide permanent storage in excess of 18 acre-feet and which has a height of 5 feet or more.*

c. *Any dam across a stream draining more than 10 square miles.*

d. *Any dam located within 1 mile of an incorporated municipality, if the dam has a height of 10 feet or more, stores 10 acre-feet or more at the top of dam elevation, and is situated such that the discharge from the dam will flow through the incorporated area.*

In urban areas:

Any dam which exceeds the thresholds in 71.3 (1) "a", "b", or "d".

Low head dams:

Any low head dam on a stream draining 2 or more square miles in an urban area, or 10 or more square miles in a rural area.

Dams are classified by the State of Iowa into three categories based on the potential risk to people and property in the event of failure (see **Table 3.18**). The classification can change over

time due to changes in development downstream from the dam. In addition, older dams may not have been built to the standards of their updated classification when this occurs. The Iowa Department of Natural Resources performs annual inspections on all high hazard dams in the State.

Table 3.18. Dam Hazard Classification Definitions

Hazard Class	Definition
High	A structure shall be classified as high hazard if located in an area where failure may create a serious threat of loss of human life or result in serious damage to residential, industrial, or commercial areas, important public utilities, public buildings, or major transportation facilities.
Moderate (Significant)*	A structure shall be classified as moderate hazard if located in an area where failure may damage isolated homes or cabins, industrial or commercial buildings, moderately traveled roads or railroads, interrupt major utility services, but without substantial risk of loss of human life. In addition, structures where the dam and its impoundment are of themselves of public importance, such as dams associated with public water supply systems, industrial water supply or public recreation, or which are an integral feature of a private development complex, shall be considered moderate hazard for design and regulatory purposes unless a higher hazard class is warranted by downstream conditions.
Low	A structure shall be classified as low hazard if located in an area where damages from a failure would be limited to loss of the dam, loss of livestock, damages to farm outbuildings, agricultural lands, and lesser used roads, and where loss of human live is considered unlikely.

Source: Iowa Department of Natural Resources; *the term "moderate" is used by the Iowa Department of Natural Resources. However, the National Inventory of Dams uses the term "significant" to identify the same general hazard classification

Warning Time Score: 4—Minimal or no warning (up to 6 hrs. warning)

Duration Score: 1—Less than 6 hours

Geographic Location/Extent

Dams in Planning Area

There are only 2 regulated dams inside the county boundaries of Cedar County. Both state-regulated dams in the County are low-hazard dams.

- Bennett Lake Dam—owned by Cedar County Conservation Board
- Worrel Dam—privately owned

Dams Upstream of Planning Area

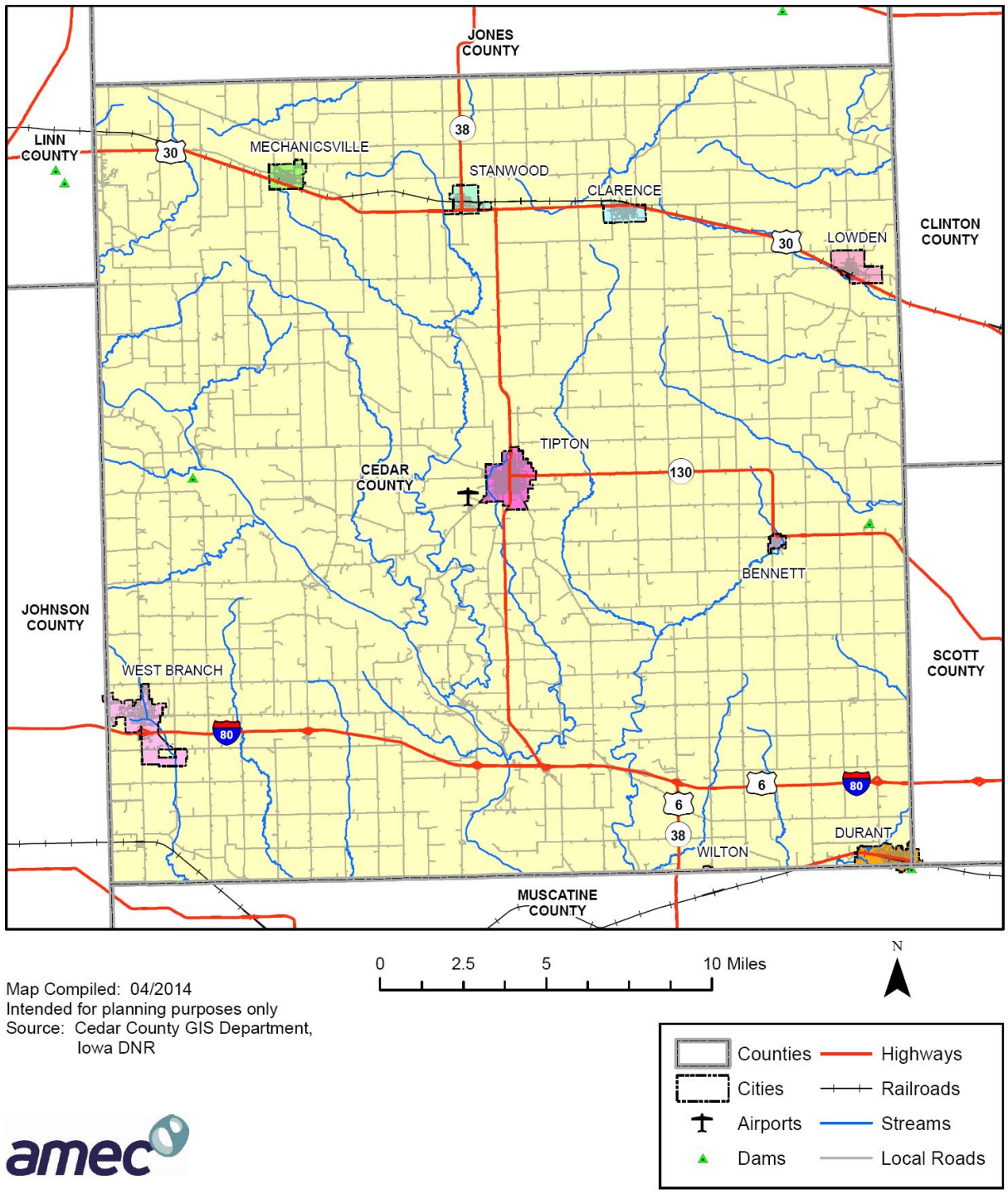
Dams upstream of the planning area were also considered as failure could potentially impact portions of Cedar County.

State-Regulated Dams: There are two dams located on a tributary of Spring Creek and one dam on the Wapsipinicon River that could potentially impact portions of the planning area in the unlikely event of failure. These three dams are also low-hazard dams indicating that failure would not pose risk to people or property other than agricultural use, and lesser roads. These dams are:

- Goldin Dam (Linn County)—privately owned

- South Lake Dam (Linn County)—privately owned
- Oxford Mill Dam (Jones County)—Jones County Conservation Board

Figure 3.5. State Regulated Dam Locations with Potential to Impact Cedar County



Source: Iowa Department of Natural Resources

Federal Dams Upstream of Planning Area: There are two new NRCS dams upstream in Johnson County that were mentioned by West Branch City officials. Details of size and inundation path were not available.

Previous Occurrences
To determine previous occurrences of dam failure within Cedar County, the *2011Cedar County Multi-jurisdictional Hazard Mitigation Plan*, the *Iowa State Hazard Mitigation Plan*, and the Stanford University's National Performance of Dams Program (**https://npdp.stanford.edu/**) were reviewed for historical dam failures. No record of dam failure within Cedar County boundaries was found.

Probability of Future Occurrence
There is an overall low probability of dam failures impacting Cedar County.

Probability Score: 1—Unlikely

Vulnerability

Overview
Dam failure is typically an additional or secondary impact of another disaster such as flooding or earthquake. Based on the hazard class definitions, since the dams in Cedar County and those in close proximity upstream of the County are all low hazard dams, damages from a failure would be limited to loss of the dam, loss of livestock, damages to farm outbuildings, agricultural lands, and lesser used roads. Significant loss of property and loss of human life is considered unlikely.

Magnitude/Severity Score: 1—Negligible

Potential Losses to Existing Development
Potential losses to existing development would be limited to loss of the dam, loss of livestock, damages to farm outbuildings, agricultural lands, and lesser used roads.

Future Development
Future development located downstream from dams in floodplains or inundation zones would increase vulnerability to this hazard.

Dam Failure Hazard Summary by Jurisdiction

Based on the locations of the dams, the only jurisdictions that appear to be vulnerable to dam failure are: unincorporated County, City of Durant, and City of West Branch.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	1	1	4	1	1.45	Low
City of Bennett	N/A	N/A	N/A	N/A	N/A	N/A
City of Clarence	N/A	N/A	N/A	N/A	N/A	N/A
City of Durant	1	1	4	1	1.45	Low
City of Lowden	N/A	N/A	N/A	N/A	N/A	N/A
City of Mechanicsville	N/A	N/A	N/A	N/A	N/A	N/A
City of Stanwood	N/A	N/A	N/A	N/A	N/A	N/A
City of Tipton	N/A	N/A	N/A	N/A	N/A	N/A
City of West Branch	1	1	4	1	1.45	Low
Bennett School District, #603	N/A	N/A	N/A	N/A	N/A	N/A
Durant School District, #1926	N/A	N/A	N/A	N/A	N/A	N/A
North Cedar School District, #3691	N/A	N/A	N/A	N/A	N/A	N/A
Tipton School District #6408	N/A	N/A	N/A	N/A	N/A	N/A
West Branch School District #6930	N/A	N/A	N/A	N/A	N/A	N/A

3.5.2 Drought

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
3	2	1	4	2.5	Moderate

Profile

Hazard Description

Drought is generally defined as a condition of moisture levels significantly below normal for an extended period of time over a large area that adversely affects plants, animal life, and humans. There are four types of drought conditions relevant to Iowa:

Meteorological drought is defined on the basis of the degree of dryness (in comparison to some "normal" or average amount) and the duration of the dry period. A meteorological drought must be considered as region-specific since the atmospheric conditions that result in deficiencies of precipitation are highly variable from region to region.

Hydrological drought is associated with the effects of periods of precipitation (including snowfall) shortfalls on surface or subsurface water supply (e.g., streamflow, reservoir and lake levels, ground water). The frequency and severity of hydrological drought is often defined on a watershed or river basin scale. Although all droughts originate with a deficiency of precipitation, hydrologists are more concerned with how this deficiency plays out through the hydrologic system. Hydrological droughts are usually out of phase with or lag the occurrence of meteorological and agricultural droughts. It takes longer for precipitation deficiencies to show up in components of the hydrological system such as soil moisture, streamflow, and ground water and reservoir levels. As a result, these impacts are out of phase with impacts in other economic sectors.

Agricultural drought focus is on soil moisture deficiencies, differences between actual and potential evaporation, reduced ground water or reservoir levels, and so forth. Plant water demand depends on prevailing weather conditions, biological characteristics of the specific plant, its stage of growth, and the physical and biological properties of the soil.

Socioeconomic drought refers to when physical water shortage begins to affect people.

The four different types of drought can all occur in Iowa. A meteorological drought is the easiest to determine based on rainfall data and is an easier drought to monitor from rain gauges and reports. A hydrological drought means that stream and river levels are low, which also has an impact for surface water and ground water irrigators. In addition, in-stream discharges that fall below a pre-required level also place the State in regulatory difficulty with U.S. Fish and Wildlife and with neighboring states over cross-border flowage rights. An agricultural drought represents difficulty for Iowa's agricultural-based economy and is also relatively easy to monitor based on crop viabilities for different regions.

The National Drought Mitigation Center (NDMC) located at the University of Nebraska in Lincoln provides a clearinghouse for information on the effects of drought, based on reports from media,

observers and other sources. NDMC's website is found at http://www.drought.unl.edu/. Specific drought impacts by county are recorded at http://droughtreporter.unl.edu/.

The NDMC categorizes impacts of drought as economic, environmental, or social. Many economic impacts occur in agriculture and related sectors, including forestry and fisheries, because of the reliance of these sectors on surface and subsurface water supplies. In addition to obvious losses in yields in both crop and livestock production, drought is associated with increases in insect infestations, plant disease and wind erosion. Droughts also bring increased problems with insects and disease to forests and reduce growth. The incidence of forest and range fires increases substantially during extended droughts, which in turn places both human and wildlife populations at higher levels of risk. Income loss is another indicator used in assessing the impacts of drought because so many sectors are affected.

Although drought is not predictable, long-range outlooks may indicate an increased chance of drought, which can serve as a warning. A drought period can last for months, years, or even decades. It is rarely a direct cause of death, though the associated heat, dust and stress can all contribute to increased mortality.

Warning Time Score: 1—24+ Hours

Duration Score: 4—more than 1 week

Geographic Location/Extent

The entire planning area in Cedar County is at risk to drought and 90 percent of the surface land in the county is for agriculture purposes.

According to the High Plains Regional Climate Center, the planning area received an average of 33.51 inches of rainfall per year from 1893 to 2010. In average years, this represents enough rainfall to prevent drought; however, it is the result of successive years of below-average rainfall that cause drought impacts in the planning area.

Previous Occurrences

Drought occurs periodically in Iowa with the most severe in historical times occurring in the 1930's. Other major droughts, usually characterized by deficient rainfall combined with unusually high summer temperatures, occurred in 1886, 1893-1894, 1901, 1954-1956, 1976–1977, 1988–1989, 1999, 2000, 2003, 2005, 2006, 2012-2013. Historically droughts cause more economic damage to the State than all other weather events combined.

According to the National Drought Mitigation Center's Drought Impact Reporter, during the 10-year period from March 2005 thru March 2014, Cedar County was included in 289 listed drought impacts. 160 of these impacts reported affect the entire State of Iowa. The following are the categories and reported number of impacts. Note: some impacts have been assigned to more than one category:

- Agriculture – 171
- Business & Industry – 33
- Energy – 5
- Fire – 19

- Plant & Wildlife – 38
- Relief, Response & Restrictions – 70
- Society & Public Health – 40
- Tourism & Recreation – 6
- Water Supply & Quality – 71

Impacts of recent drought periods in Iowa that affected Cedar County are provided below. Unless otherwise indicated, these impacts are from the Drought Impact Reporter.

- **October 15, 2013**—Bur oak blight and emerald ash borer have made considerable progress in damaging Iowa's ash and bur oak trees due to drought in 2012, which weakened trees and made them more susceptible to pests and disease. The emerald ash borer has been found in Des Moines, Cedar, Allamakee and Jefferson counties in 2013 and is expected to continue spreading throughout the State.
- **September 5, 2013**—Drought conditions are worsening across the State and spreading across the State. **Figure 3.6** is a photo of cornfields that are prematurely crisp because of expanding drought conditions.

Figure 3.6. Cornfields in Cedar County, Iowa

Source: Photo by Dean Borg

- **November 11, 2012**— Drought drove corn prices to record highs this year. As a result, Ethanol producers in the U.S. lost $0.36 per gallon produced compared to sales the year before.
- **October 12, 2012**—Iowa State University agriculture experts advised farmers to test forages for quality this fall because variable nutrient levels and high nitrate levels can occur in forages grown during drought.
- **September 25, 2012**—the U.S. Drought Monitor on this date shows the severity of the statewide drought conditions. Cedar County was in Severe Drought conditions.

- **July 26, 2012**—The Governor issued a disaster emergency proclamation that allowed for the suspension of state laws and regulations affecting the transportation of hay and straw. In the statement, it says, "the drought has destroyed or depleted sources of these products that are necessary for livestock production and feed."
- **July 1-30, 2012**—Very warm and dry weather that began in the spring continued into the summer. Rainfall was in short supply across the State. Much of the State recorded less than 50 percent of normal rainfall for July. Rapid deterioration of the corn and soybean crop took place with several periods of temperatures in excess of 100 degrees. By the end of July, officials estimated that 32 percent of the corn yield had been lost to the drought. At the current price, the loss total was in excess of $4.5 billion state-wide.
- **2012**—Governor Branstad created a website dedicated to the Iowa Drought 2012, https://governor.iowa.gov/drought/ as a resource for all Iowans. This year's drought damages surpassed that of 1988.
- **September 15, 2006 to October 20, 2006**—Agriculture Secretary Mike Johanns lengthened the time allowed for emergency livestock grazing on land in the Conservation Reserve Program (CRP) in 30 states including Iowa for farmers and livestock owners who were affected by drought.
- **July 31, 2006**—The statewide average precipitation for the May through July period was only 8.28 inches or 4.83 inches less than normal. This ranks 2006 as 8th driest among 134 years of record for this time period with only 1988 being drier in the most recent 70 years.
- **June-September 2005**—Severe to extreme drought continued across the eastern third of Iowa. By the end of August the governor of Iowa had requested areas south and east of a line from Dubuque, to Independence, to Ottumwa be declared an agricultural disaster area. Soybean crop losses generally were estimated at a 10-15 percent reduction in yield across eastern Iowa.
- **August 2003**—Dry conditions that began in September 2002 continued through 2003, manifesting into a moderate to severe drought at the start of August 2003 which is a crucial time for soybean development and corn in filling out the ears with large kernels. According to the Iowa State Climatologist, August 2003 was the driest on record with a statewide average of only 0.96 inches of rainfall which was 3.23 inches below the normal for August.
- **August & September 2000**—According to National Climatic Data Center (NCDC), crops were stressed with the warm temperatures and lack of rainfall. Livestock deaths occurred because of the daytime heat and warm overnight temperatures.

Table 3.19 provides the recorded low precipitation in Tipton, Iowa from 1893 to 2010 according to the NOAA Regional Climate Center, (http://www.hprcc.unl.edu).

Table 3.19. Lowest Precipitation and Year Occurred, 1893-2010 from Tipton, IA Station

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Low
Lowest Precip. (in.)	0.00	0.01	0.08	0.45	0.61	0.46	0.26	0.60	0.19	0.00	0.05	0.30	20.95
Year	1902	1995	1918	1942	1992	1910	1906	1941	1979	1952	1914	1976	2005

Source: http://www.hprcc.unl.edu/cgi-bin/cli_perl_lib/cliMAIN.pl?ia8266

Table 3.20 below provided by the U.S. Drought Monitor, summarizes the historical drought conditions for Iowa by intensity and percent area from 2004 through 2013. As you can see, a portion of the State was in exceptional drought intensity in 2012 and 2013 during this 10-year timeframe.

Table 3.20. Historic Drought Intensity (Percent Area) Iowa 2004-2014

Drought Intensity	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2004-2013
None	62.16	76.29	22.94	69.51	81.32	24.41	100.00	71.05	25.97	27.55	56.12
D0 Abnormally Dry	17.03	18.74	20.81	24.61	15.01	16.77	0.00	14.58	12.51	18.97	15.90
D1 - Moderate	10.07	2.85	30.71	5.44	3.18	29.59	0.00	8.28	13.24	27.15	13.05
D2 - Severe	7.65	1.50	20.30	0.44	0.50	28.38	0.00	6.09	24.53	17.99	10.74
D3 - Extreme	3.09	0.62	5.24	0.00	0.00	0.86	0.00	0.00	23.11	8.11	4.10
D4 - Exceptional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.64	0.24	0.09

Source: U.S. Drought Monitor, http://droughtmonitor.unl.edu/MapsAndData/DataTables.aspx

According to the USDA's Risk Management Agency, payments for insured crop losses in Cedar County as a result of drought conditions occurred in all ten years from 2004-2013 and totaled $30,231,703 (see **Table 3.21**). With the extensive drought conditions during the years of 2012 and 2013, 83 percent of the 10-year crop losses came from those two years alone.

Table 3.21. Crop Insurance Claims Paid From Drought, 2004-2013

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2005	Corn	Drought	$4,092,307
2005	Hybrid Corn Seed	Drought	$51,784
2005	Soybeans	Drought	$419,607
2006	Corn	Drought	$29,510
2006	Soybeans	Drought	$14,212
2007	Corn	Drought	$7,525
2008	Corn	Drought	$17,902
2008	Soybeans	Drought	$37,755
2011	Corn	Drought	$182,235
2011	Hybrid Corn Seed	Drought	$144,629
2011	Popcorn	Drought	$35
2011	Soybeans	Drought	$41,179
2012	Corn	Drought	$133,056
2012	Corn	Drought	$6,783
2012	Corn	Drought	$8,884,173
2012	Corn	Drought	$406,288
2012	Corn	Drought	$3,983
2012	Hybrid Corn Seed	Drought	$237,266
2012	Soybeans	Drought	$22,179
2012	Soybeans	Drought	$389,798
2012	Soybeans	Drought	$19,954
2012	Soybeans	Drought	$153
2013	Corn	Drought	$104,360
2013	Corn	Drought	$12,964,651
2013	Corn	Drought	$530,866
2013	Corn	Drought	$200,374

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2013	Hybrid Corn Seed	Drought	$12,853
2013	Soybeans	Drought	$33,483
2013	Soybeans	Drought	$1,241,475
2013	Soybeans	Drought	$1,328
Total			**$30,231,703**

Source: USDA Risk Management Agency Crop Insurance Payment FOIA Request; USDA Risk Management Agency Iowa Crop Insurance Profile, http://www.rma.usda.gov/pubs/2012/stateprofiles/iowa11.pdf

Probability of Future Occurrence

NOAA's National Climatic Data Center uses the U.S. Palmer Drought Indices and the Standardized Precipitation Index to monitor and predict drought conditions. Lack of precipitation for a given area is the primary contributor to drought conditions. Since precipitation levels cannot be predicted in the long term, the following indices can be used to determine the probability of future occurrences of drought.

The following are the indices:

- **Palmer Z Index** monitors short-term monthly moisture conditions when depart from normal,
- **Palmer Drought Severity Index** measures the duration and intensity of the long-term (meteorological) drought patterns,
- **Palmer Hydrological Drought Index** measures long-term (hydrological) drought and wet conditions reflecting groundwater and reservoir levels.
- **Standardized Precipitation Index** is a probability index that considers only precipitation. This is important to farmers to estimate soil moisture.

In the past 30 years, there have been nine years of recorded damages from drought conditions in Cedar County resulting in a probability rating of 30 percent. The Cedar County Hazard Mitigation Planning Team believes that the current trend of warmer climate conditions will continue and that the probability rating is "Likely"

Probability Score: 3—Likely

Vulnerability

Overview

Cedar County jurisdictions are impacted by drought because it is an expensive weather disaster; it reduces agricultural productivity and causes a strain on urban water supplies. In Cedar County, farmers bear the most direct stress from drought as wells may run dry; crops wilt and die, and forage for livestock becomes scarce and costly.

Cedar County has 955 farms in the County that cover 312,457 acres of land. This translates to 90 percent of the surface land in the County being used for agriculture. Therefore, the planning area has a high exposure to this hazard. Aside from agricultural impacts, other losses related to drought include increased costs of fire suppression and damage to roads and structural foundations due to the shrink dynamic of expansive soils during excessively dry conditions. Drought also presents hazards to public health in extreme cases, where drinking water production cannot keep up with demand. Water wells become less productive during drought

and a failure of remaining productive wells (due to power outage, etc.) can cause public drinking water supplies to become compromised.

According to the *2013 Iowa Hazard Mitigation Plan*, of the 8 hazards for which data was available to estimate annualized losses, drought ranked 2nd with $424 million in annualized losses based on data spanning an 18-year period. Although losses associated with this hazard can be very high, particularly associated with agriculture; crop insurance coverage mitigates the adverse economic impacts somewhat. Considering the planning area's capabilities to withstand a portion of the impacts associated with drought, the magnitude was determined to be "Limited".

Magnitude Score: 2—Limited

Potential Losses to Existing Development

Areas associated with agricultural use are vulnerable to drought conditions which could result in a decrease in crop production or a decrease in available grazing area for livestock. Drought has no real effect on houses and buildings. The impacts would be minimal in terms of landscaping. Rationing water supplies would most likely be the worst case scenario impact.

According to the ten year period from USDA's Risk Management Agency, the amount of claims paid for crop damage as a result of drought in Cedar County was $30,231,703. According to the 2013 Iowa Crop Insurance Profile from USDA's Risk Management Agency, 90.5 percent of the insurable crops in Iowa are insured with USDA Crop Insurance. To factor in estimated losses to insurable crops that are not insured, the 90.5 percent crop insurance coverage was factored in to provide an adjusted estimate of losses. According to this calculation, estimated annualized losses total $3,340,520 (see **Table 3.22**).

Considering the value of crops from the 2012 Census of Agriculture as baseline crop exposure, the estimated annual losses from drought was determined minimal compared to the value of the insurable crops.

Table 3.22. Estimated Insurable Annual Crops Lost Resulting From Drought

10-Year Drought Insurance Paid	Adjusted 10-Year Drought Losses (considering 90.5% insured)	Estimated Annualized Losses	2012 Value of Crops
$30,231,703	$33,405,197	$3,340,520	$219,282,000

Source: Crop value is from USDA 2012 Census of Agriculture; Crop Insurance Paid is from the USDA's Risk Management Agency for 2004-2013.; Crop Insurance Coverage is from USDAs 2013 State Crop Insurance Profile for Iowa
Note: This includes insurable crops that are insured

Future Development

Increases in acreage planted with crops would increase the exposure to drought-related agricultural losses. In addition, increases in population add additional strain on water supply systems to meet the growing demand for treated water.

Drought Hazard Summary by Jurisdiction

The magnitude determinations discussed in the vulnerability overview sections were factored into the following hazard summary table to show how this hazard varies by jurisdiction. As discussed in the drought previous occurrences and vulnerability sections, the majority of the

damages from drought are to crops and other agriculture-related activities. In the cities, the drought conditions would be the same, but the magnitude would be less with lawns and local gardens affected, and leading to expansive soil problems around foundations. The magnitude score is lower for the cities and school districts.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	3	2	1	4	2.5	Moderate
City of Bennett	3	1	1	4	2.2	Moderate
City of Clarence	3	1	1	4	2.2	Moderate
City of Durant	3	1	1	4	2.2	Moderate
City of Lowden	3	1	1	4	2.2	Moderate
City of Mechanicsville	3	1	1	4	2.2	Moderate
City of Stanwood	3	1	1	4	2.2	Moderate
City of Tipton	3	1	1	4	2.2	Moderate
City of West Branch	3	1	1	4	2.2	Moderate
Bennett School District, #603	3	1	1	4	2.2	Moderate
Durant School District, #1926	3	1	1	4	2.2	Moderate
North Cedar School District, #3691	3	1	1	4	2.2	Moderate
Tipton School District #6408	3	1	1	4	2.2	Moderate
West Branch School District #6930	3	1	1	4	2.2	Moderate

3.5.3 Earthquakes

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
1	1	4	1	1.45	Low

Profile

Hazard Description

An earthquake is a sudden motion or trembling that is caused by a release of energy accumulated within or along the edge of Earth's tectonic plates. Earthquakes occur primarily along fault zones, tears in the Earth's crust, along which stresses build until one side of the fault slips, generating compressive and shear energy that produces the shaking and damage to the built environment. Heaviest damage generally occurs nearest the epicenter which is that point on the Earth's surface directly above the point of fault movement. The composition of geologic materials between these points is a major factor in transmitting the energy to buildings and other structures on the Earth's surface.

Warning Time Score: 4—less than 6 hours

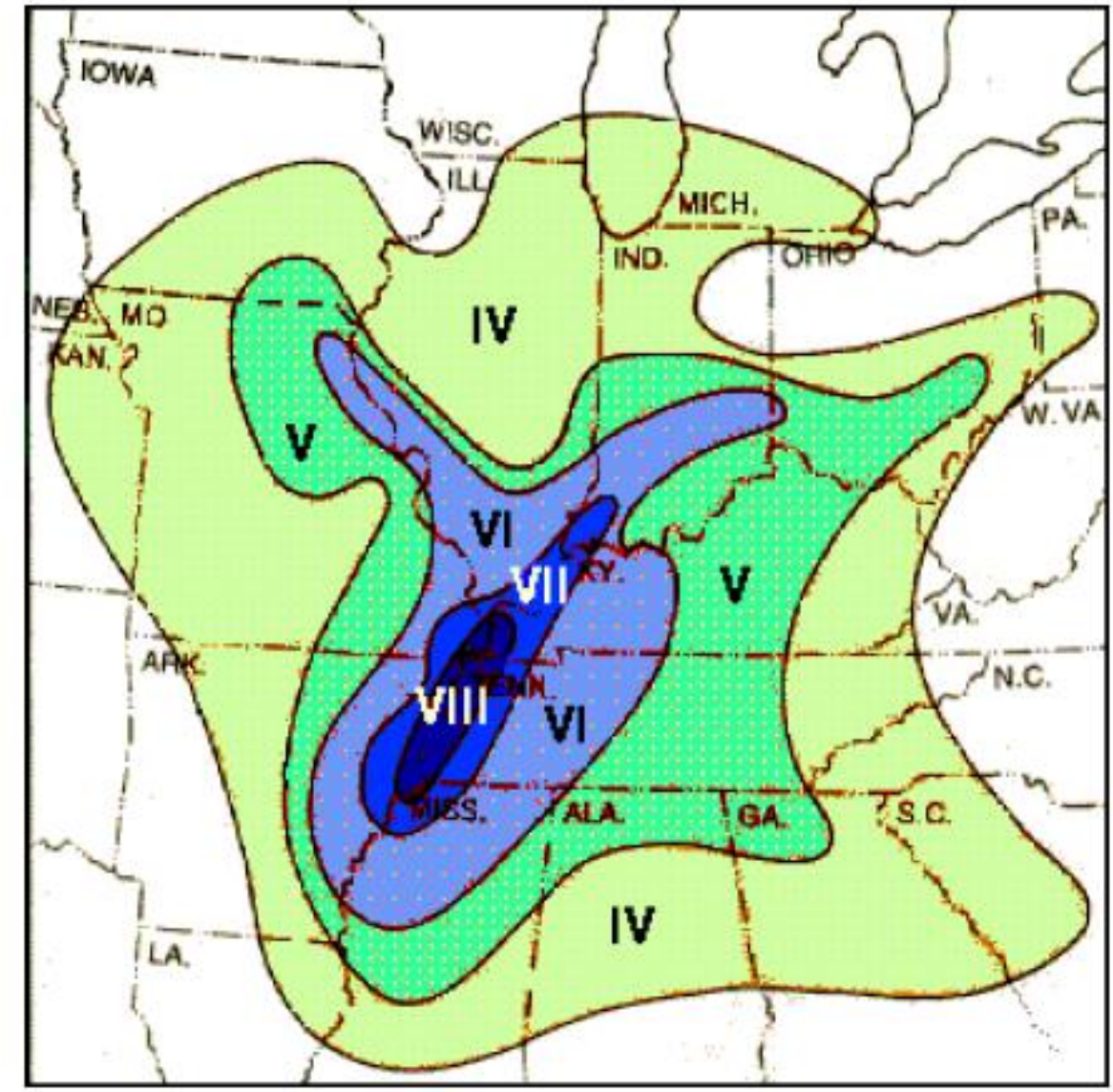
Duration Score: 1—less than 6 hours

Geographic Location/Extent

While geologists often refer to the Midwest as the "stable midcontinent," because of its lack of major crustal movements, there are two regions of active seismicity, the Nemaha Ridge and the New Madrid Fault Zone. The Nemaha Ridge in Kansas and Nebraska, associated with the Humboldt Fault, is characterized by numerous small earthquakes that release stresses before they build to dangerous levels. The fault is not considered a threat to Iowa. The New Madrid Fault Zone, on the other hand, has greater destructive potential. It is located along the valley of the Mississippi River, from its confluence with the Ohio River southward, and includes portions of Illinois, Kentucky, Tennessee, Missouri, Arkansas, and Mississippi. The Earth's crust in the midcontinent is older, and therefore thicker, cooler, and more brittle than that in California for example. Consequently, earthquake shock waves travel faster and farther in the Midwest, making quakes here potentially more damaging than similar sized events in other geologic settings.

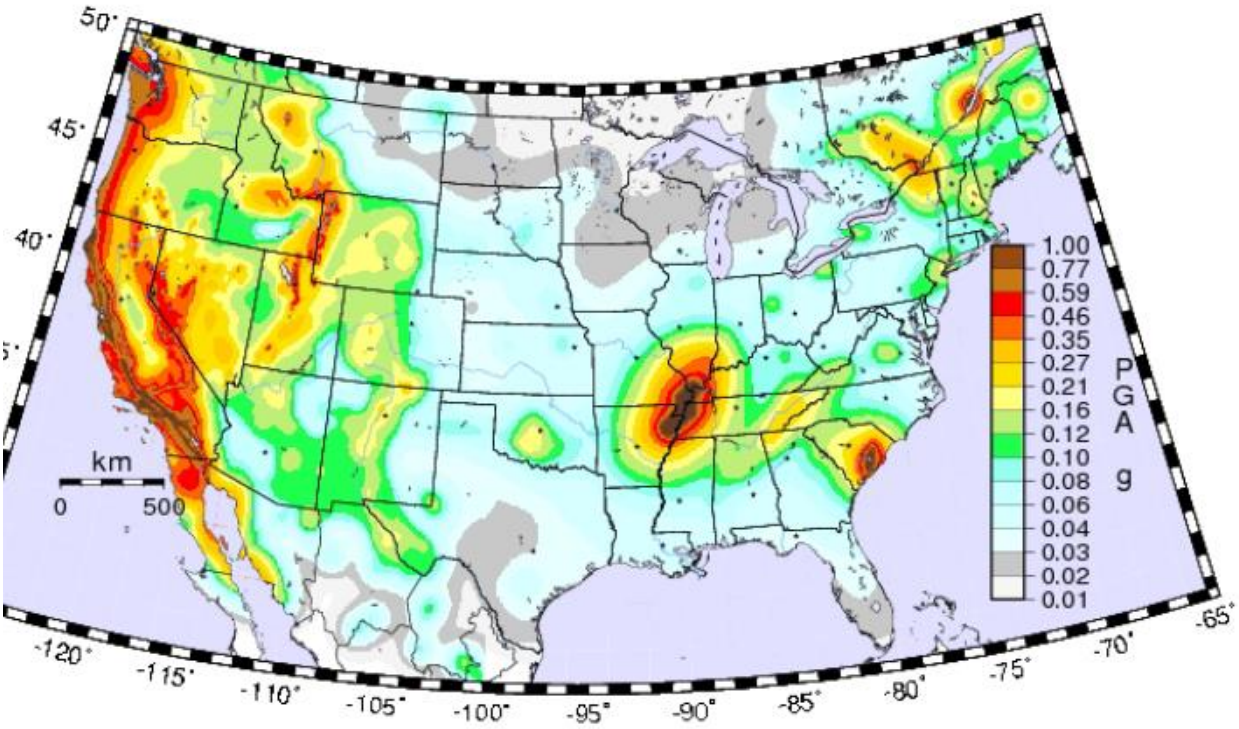
Iowa counties are located in low risk zones as a whole. The southeastern part of the State is more at risk to earthquake effects from the New Madrid Fault Zone. **Figure 3.7** shows the estimated effects of a 6.5 Richter magnitude earthquake scenario along the New Madrid Fault Zone. It suggests that Iowans in four southeast counties could experience trembling buildings, some broken dishes and cracked windows, movement and falling of small unstable objects, abrupt openings or closing doors, and liquids spilling from open containers. About 29 other counties, from Page to Cedar to Muscatine, could experience vibrations similar to the passing of a heavy truck, rattling of dishes and windows, creaking of walls, and swinging of suspended objects. These effects will vary considerably with differences in local geology and construction techniques. **Figure 3.8** shows the Seismic Hazard Map for the U.S. showing the peak ground acceleration of 10 percent in a 50 year timeframe.

Figure 3.7. 6.5 Richter Magnitude Earthquake Scenario, New Madrid Fault Zone



Source: http://www.igsb.uiowa.edu/Browse/quakes/quakes.htm

Figure 3.8. United States Seismic Hazard Map



Source: United States Geological Survey, http://earthquake.usgs.gov/hazards/products/conterminous/2008/maps/

The extent or severity of earthquakes is generally measured in two ways: 1) Magnitude Measurement utilizes the Richter Magnitude Scale and 2) Severity Measurement utilizes the Modified Mercalli Intensity Scale.

Richter Magnitude Scale

The Richter Magnitude Scale was developed in 1935 by Charles F. Richter of the California Institute of Technology as a mathematical device to compare the size of earthquakes. The magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded by seismographs. Adjustments are included for the variation in the distance between the various seismographs and the epicenter of the earthquakes. On the Richter Scale, magnitude is expressed in whole numbers and decimal fractions. For example, a magnitude 5.3 might be computed for a moderate earthquake, and a strong earthquake might be rated as magnitude 6.3. Because of the logarithmic basis of the scale, each whole number increase in magnitude represents a tenfold increase in measured amplitude; as an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value.

Modified Mercalli Intensity Scale

The effect of an earthquake on the Earth's surface is called the intensity. The intensity scale consists of a series of certain key responses such as people awakening, movement of furniture,

damage to chimneys, and finally - total destruction. Although numerous *intensity scales* have been developed over the last several hundred years to evaluate the effects of earthquakes, the one currently used in the United States is the Modified Mercalli (MM) Intensity Scale. It was developed in 1931 by the American seismologists Harry Wood and Frank Neumann. This scale, composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. It does not have a mathematical basis; instead it is an arbitrary ranking based on observed effects.

The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the nonscientist than the magnitude because intensity refers to the effects actually experienced.

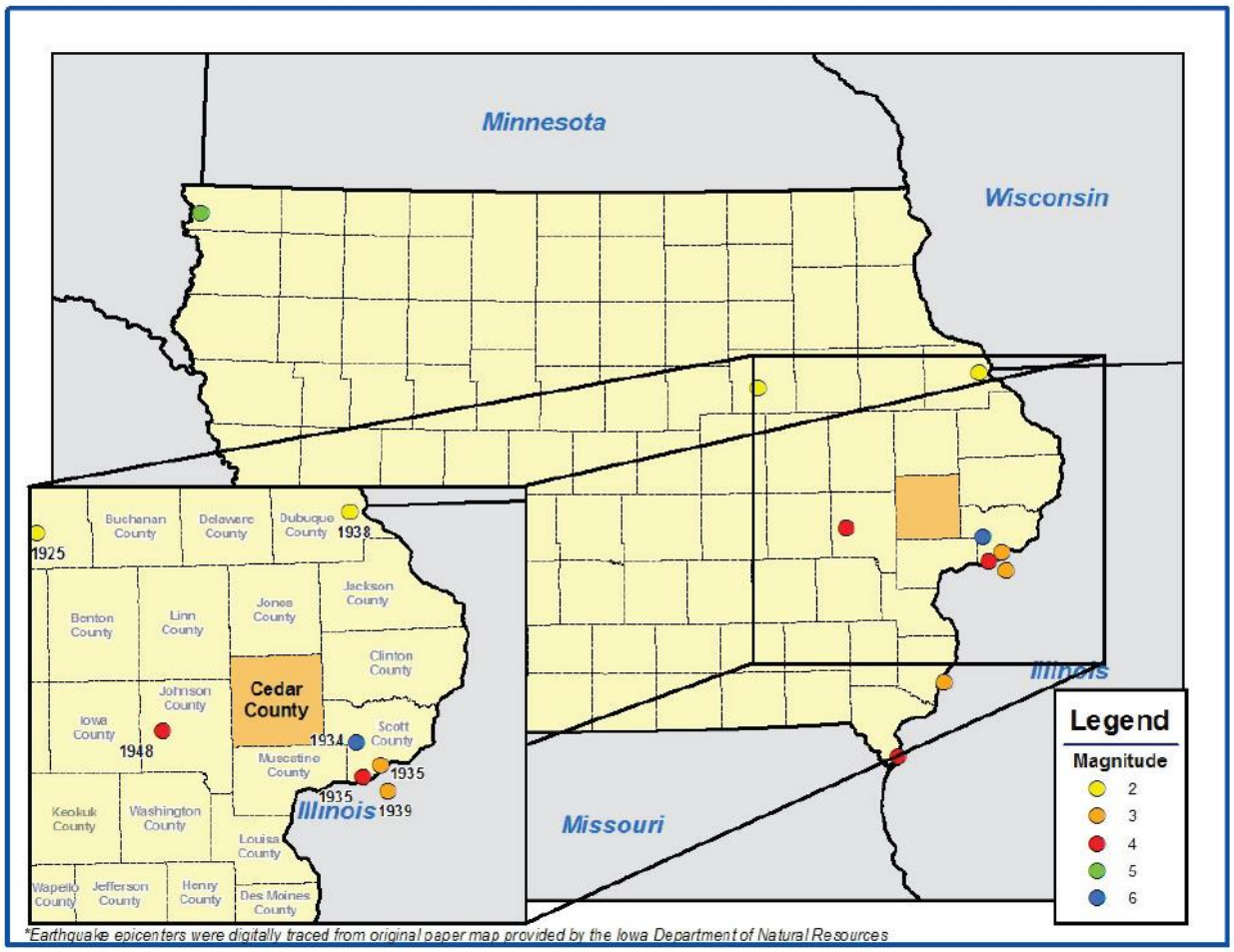
The **lower** numbers of the intensity scale generally deal with the manner in which the earthquake is felt by people. The **higher** numbers of the scale are based on observed structural damage. Structural engineers usually contribute information for assigning intensity values of VIII or above.

Previous Occurrences

Iowa has experienced little effects from only a few earthquakes in the past 175 years. The epicenters of 13 earthquakes have been located in the State with the majority along the Mississippi River. The strongest earthquake in Iowa occurred in Davenport in 1934 and resulted in only slight damage. (Source: *State of Iowa Hazard Mitigation Plan*, 2010).

There have been no recorded earthquakes in Cedar County. Neighboring Johnson (southwest) and Scott (southeast) Counties experienced earthquakes that registered on the Richter scale (2.0-4.0) from 1934 to 1948. **Figure 3.9** below displays historical occurrences of earthquakes around Cedar County and the State of Iowa. The information displayed was digitally traced from paper maps provided by the Iowa Department of Natural Resources.

Figure 3.9. Historical Earthquakes Near Cedar County Iowa

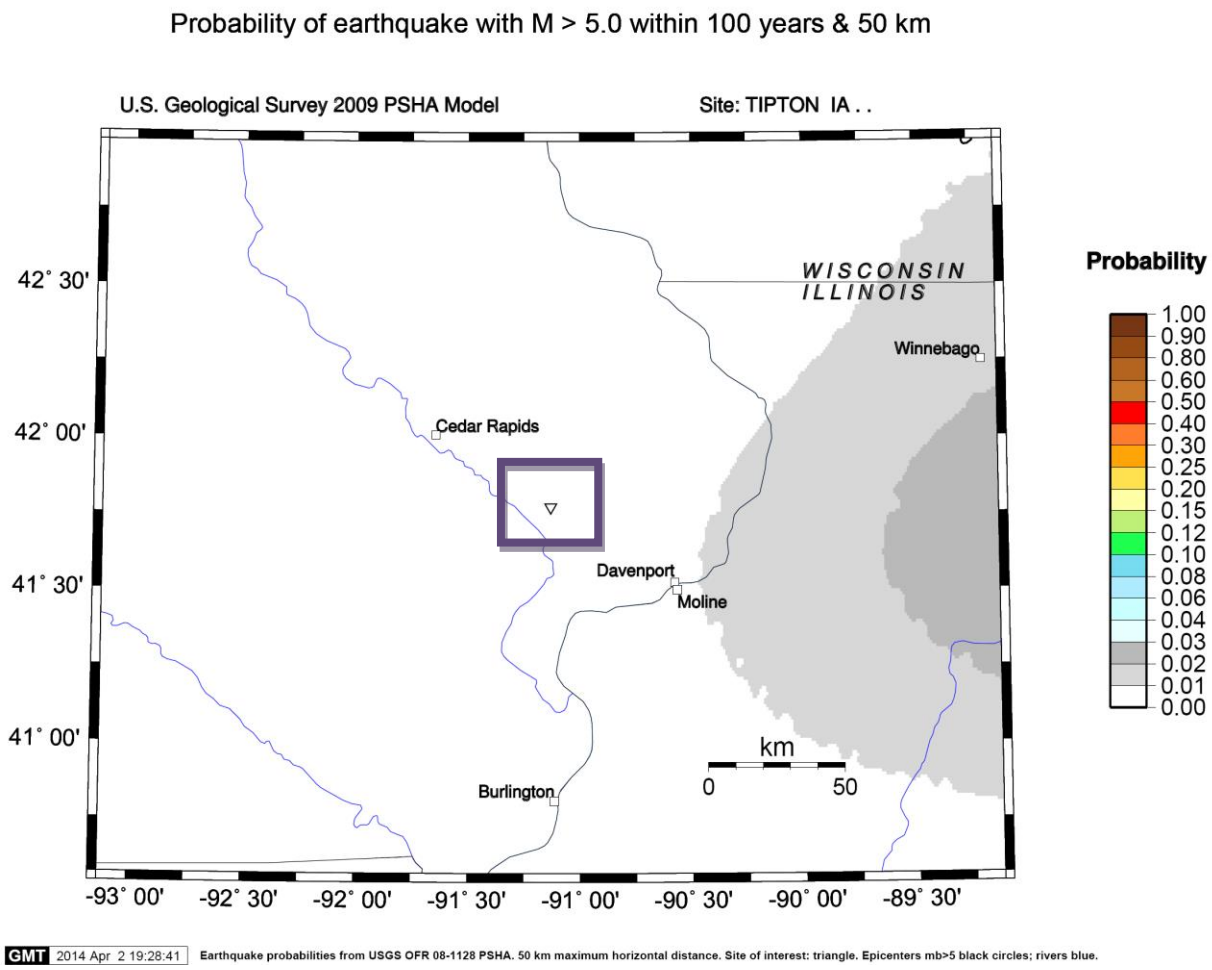


Source: *2011 Cedar County Multi-jurisdictional Hazard Mitigation Plan*

Probability of Future Occurrence

Figure 3.10 demonstrates the probability of an earthquake with a magnitude greater than 5.0 in the Cedar County in a 100 year time period. The purple square shows the approximate Cedar County boundary. As shown in this graphic, the probability of a 5.0 Magnitude or greater earthquake in the next 100 years is 0.00 percent. The probability converts to an estimated maximum recurrence interval of 5,000 years. The probability of a significant earthquake in any given year is unlikely.

Figure 3.10. Probability of Magnitude 5.0 or greater within 100 Years – Cedar County



Source: United States Geological Survey, http://geohazards.usgs.gov/eqprob/2009/ Note: Purple square is approximate location of Cedar County, IA

Probability Score: 1—Unlikely

Vulnerability

Overview

As discussed under the probability section, the probability of a 5.0 Magnitude or greater earthquake in the next 100 years is 0.00 percent. Although a damaging event is unlikely, the potential impacts could be costly in the more urban areas of the County. Most structures in Cedar County are not built to withstand earthquake shaking, but because of the relatively low magnitude of a possible quake, property damage would likely be very minor damage.

The main impacts to Cedar County from a New Madrid Earthquake would be related to incoming evacuees from areas more heavily damaged by the event. This could result in a shortage of short-term lodging, such as hotel rooms and extended stay establishments. Depending on the magnitude of the earthquake, shelters may be designated in Cedar County as

evacuee shelter locations. If this occurred, assistance would be coordinated through the Emergency Management Assistance Compact (EMAC) between the State of Iowa and State governments of impacted areas.

Magnitude Score: 1—Negligible

Potential Losses to Existing Development

FEMA's loss estimation software, HAZUS was utilized to analyze a worst-case, probabilistic, 2,500 year, 6.7 magnitude scenario event. The HAZUS Earthquake module reports earthquake damage by census tract. As a result, it is not possible to separate the resulting damage amounts by incorporated area, as the census tract boundaries are not the same as the incorporated area boundaries. **Table 3.23** below provides the results of the HAZUS analysis for Cedar County. This analysis estimates that the total direct structural damage would be just over $2.63 Million. The combined building, contents and related economic losses such as lost wages, rental, and relocation costs calculated to be nearly $12.61 Million.

Table 3.23. Cedar County, Iowa Estimated Economic Losses—2,500 Year 6.7 Magnitude Earthquake Event (In Millions of Dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.00	0.05	0.48	0.04	0.05	0.62
	Capital-Related	0.00	0.02	0.41	0.03	0.02	0.48
	Rental	0.19	0.12	0.30	0.02	0.02	0.66
	Relocation	0.71	0.13	0.44	0.08	0.25	1.60
	Subtotal	**0.90**	**0.31**	**1.64**	**0.16**	**0.34**	**3.36**
Capital Stock Losses							
	Structural	1.23	0.22	0.54	0.18	0.46	2.63
	Non_Structural	3.11	0.51	0.77	0.31	0.41	5.11
	Content	0.63	0.09	0.34	0.19	0.20	1.45
	Inventory	0.00	0.00	0.02	0.05	0.02	0.08
	Subtotal	**4.97**	**0.82**	**1.66**	**0.72**	**1.09**	**9.26**
	Total	**5.87**	**1.13**	**3.30**	**0.88**	**1.43**	**12.61**

Source: HAZUS-MH 2.1, April 2014

Table 3.24 provides the anticipated numbers of buildings by type and damage category that would result according to the HAZUS analysis. The estimated building types and counts are from the HAZUS damage outputs utilizing census block data.

Table 3.24. Expected Building Damage by Building Occupancy Type—2,500 Year 6.7 Magnitude Earthquake Event

Use Type	None	Slight	Moderate	Extensive	Complete
Agricultural	244	32	18	4	0
Commercial	427	55	27	5	0
Education	16	2	1	0	0
Government	17	2	1	0	0
Industrial	144	19	10	2	0
Other Residential	2,041	273	112	12	1
Religious	44	6	3	1	0
Single Family	5,180	530	133	14	1
Total	**8,113**	**919**	**305**	**38**	**2**

Source: HAZUS-MH 2.1, April 2014.

Based on an estimated 1,076 damaged single-family and other residential buildings and an average household size of 2.42 people, the impacted population is estimated to be 2,647 people. When considering just the residential structures estimated to have moderate or extensive damage (271), the impacted population would be 656 people.

Future Development

Overall the planning area has a low vulnerability to earthquake risk. Future development is not expected to increase the risk other than contributing to the overall exposure of what could become damaged as a result of an unlikely event.

Earthquake Hazard Summary by Jurisdiction

The following hazard summary table shows that this hazard does not significantly vary by jurisdiction. Although damage amounts would be higher in the more urban areas, damage ratios would be relatively the same.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	1	1	4	1	1.45	Low
City of Bennett	1	1	4	1	1.45	Low
City of Clarence	1	1	4	1	1.45	Low
City of Durant	1	1	4	1	1.45	Low
City of Lowden	1	1	4	1	1.45	Low
City of Mechanicsville	1	1	4	1	1.45	Low
City of Stanwood	1	1	4	1	1.45	Low
City of Tipton	1	1	4	1	1.45	Low
City of West Branch	1	1	4	1	1.45	Low
Bennett School District, #603	1	1	4	1	1.45	Low
Durant School District, #1926	1	1	4	1	1.45	Low
North Cedar School District, #3691	1	1	4	1	1.45	Low
Tipton School District #6408	1	1	4	1	1.45	Low
West Branch School District #6930	1	1	4	1	1.45	Low

3.5.4 Expansive Soils

Hazard Score Calculation					
Probability	**Magnitude/Severity**	**Warning Time**	**Duration**	**Weighted Score**	**Level**
1	1	1	1	1.00	Low

Profile

Hazard Description

A relatively widespread geologic hazard for Iowa is the presence of soils that expand and shrink in relation to their water content. Expansive soils can cause physical damage to building foundations, roadways, and other components of the infrastructure when clay soils swell and shrink due to changes in moisture content. The effects of expansive soils are most prevalent in regions of moderate to high precipitation where prolonged periods of drought are followed by long periods of rainfall. These conditions exist in Cedar County from time to time.

Warning Time Score: 1—24 + hours

The warning time for expansive soils is consistent with other geologic hazards that occur slowly overtime.

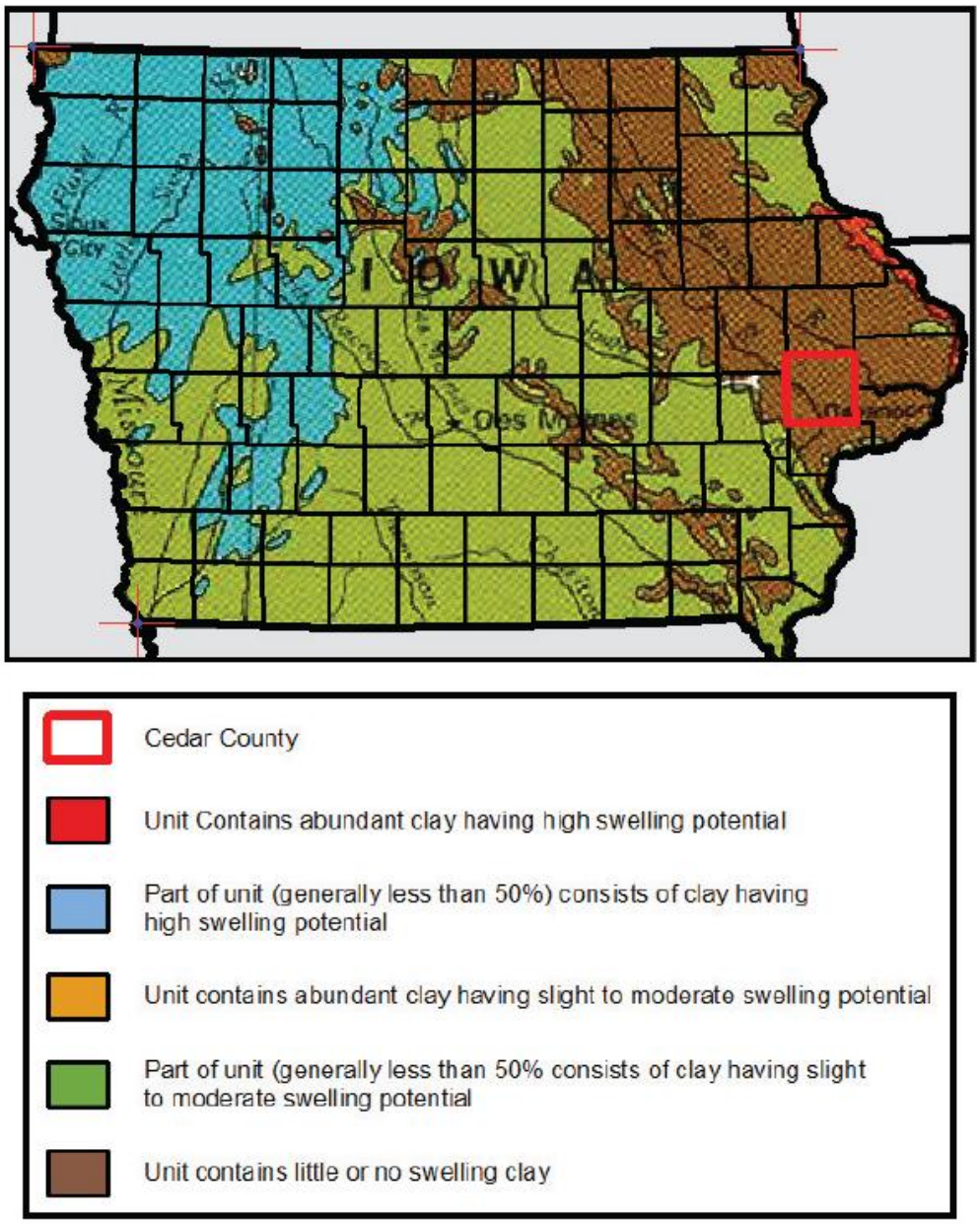
Duration Score: 1—Less than 6 hours

The duration of response to this hazard is limited in the State of Iowa. Although prolonged periods of drought are a primary indicator of risk followed by forecasted periods of precipitation, the response to expansive soils in Iowa is limited and is in large part coupled with response to flash flooding and river flooding.

Geographic Location/Extent

Figure 3.11 shows a map of the swelling potential of soils in Iowa. Cedar County is located in areas with little or no swelling clay (brown shading). This hazard affects all participating jurisdictions.

Figure 3.11. U.S. Geological Survey Swelling Clays Map of Iowa



Source: U.S. Geological Survey publication "Swelling Clays Map of the Conterminous United States" by W.W. Olive, A.F. Chleborad, C.W. Frahme, Julius Schlocker, R.R. Schneider, and R.L. Shuster, 1989

Previous Occurrences

Streets and parking lots throughout the County are damaged every year by the effects of expansive soils as well as underground water lines that are damaged as the soil expands and contracts at varying levels along a water line. The frequency of damage from expansive soils can be associated with the cycles of drought and heavy rainfall, which reflect changes in moisture content. Damages occur with isolated incidents and affected property owners, local governments, and businesses generally make any necessary repairs.

Probability of Future Occurrence

Although there will continue to be some damage to paved areas and foundations in Cedar County due to swelling soils, it is unlikely that these damages will become greater in the future unless new development occurs in areas where the hazard is more severe. Certain buildings and construction practices could be put in place to lessen these impacts. The HMPC determined that noticeable damage to assets in the planning area as a result of expansive soils has a 1 in 10 chance of occurring in any given year.

Probability Score: 1—Unlikely

Vulnerability

Overview

The HMPC has determined that while the entire planning area is vulnerable to some structural damage as a result of shrinking and expanding soils, there is no data available to determine damage estimates for this hazard and as a whole, the planning area does not have soils with high swelling potential. In most cases, individual property owners, local governments, and businesses pay for repairs to damages caused by this hazard. The HMPC felt that underground utility lines such as water and sewer pipes may be at risk to damages associated with expansive soils. However, there is no data to support damages and costs associated with this hazard at this time. The vulnerability of people to this hazard is negligible as this hazard does not impact human safety.

Magnitude Score: 1—Negligible

Potential Losses to Existing Development

Existing development will continue to be vulnerable to expansive soils.

Future Development

Additional future development in the planning area will also be vulnerable to this hazard.

Expansive Soils Hazard Summary by Jurisdiction

The following hazard summary table shows that this hazard does not vary by jurisdiction.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	1	1	1	1	1.00	Low
City of Bennett	1	1	1	1	1.00	Low
City of Clarence	1	1	1	1	1.00	Low
City of Durant	1	1	1	1	1.00	Low
City of Lowden	1	1	1	1	1.00	Low
City of Mechanicsville	1	1	1	1	1.00	Low
City of Stanwood	1	1	1	1	1.00	Low
City of Tipton	1	1	1	1	1.00	Low
City of West Branch	1	1	1	1	1.00	Low
Bennett School District, #603	1	1	1	1	1.00	Low
Durant School District, #1926	1	1	1	1	1.00	Low
North Cedar School District, #3691	1	1	1	1	1.00	Low
Tipton School District #6408	1	1	1	1	1.00	Low
West Branch School District #6930	1	1	1	1	1.00	Low

3.5.5 Extreme Heat

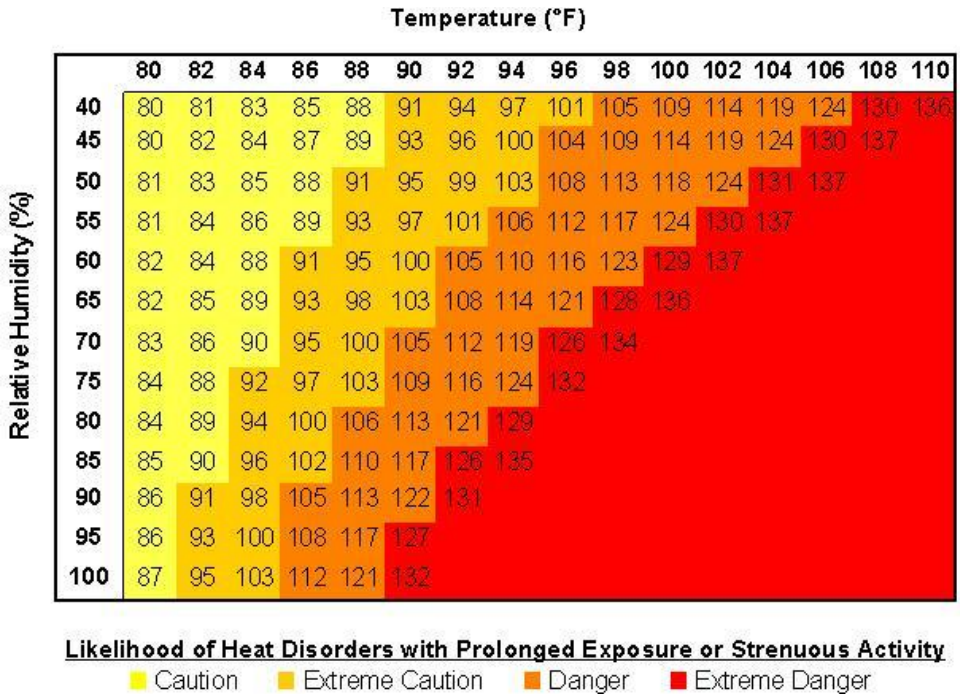
Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
2	2	1	3	1.95	Low

Profile

Hazard Description

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Ambient air temperature is one component of heat conditions, with relative humidity being the other. The relationship of these factors creates what is known as the apparent temperature. The Heat Index Chart in **Figure 3.12** uses both of these factors to produce a guide for the apparent temperature or relative intensity of heat conditions.

Figure 3.12. Heat Index (HI) Chart



Source: National Weather Service (NWS)

Note: Exposure to direct sun can increase Heat Index values by as much as 15°F. The shaded zone above 105°F corresponds to a HI that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

During these conditions, the human body has difficulties cooling through the normal method of the evaporation of perspiration. Health risks rise when a person is over exposed to heat.

According to the National Weather Service, in 2013, 92 people died as a result of extreme heat, down from 155 fatalities in 2012 in the U.S. In 2013, the most dangerous place to be was in a permanent home, likely with little or no air conditioning. Those at greatest risk for heat-related illness include people 65 years of age and older, people who are overweight, and people who

are ill or on certain medications. However, even young and healthy individuals are susceptible if they participate in strenuous physical activities during hot weather. In agricultural areas, the exposure of farm workers, as well as livestock, to extreme heat is a major concern.

Table 3.25 lists typical symptoms and health impacts of exposure to extreme heat.

Table 3.25. Typical Health Impacts of Extreme Heat

Heat Index (HI)	Disorder
80-90° F (HI)	Fatigue possible with prolonged exposure and/or physical activity
90-105° F (HI)	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and/or physical activity
105-130° F (HI)	Heatstroke/sunstroke highly likely with continued exposure

Source: National Weather Service Heat Index Program, www.weather.gov/os/heat/index.shtml

The National Weather Service has a system in place to initiate alert procedures (advisories or warnings) when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. A common guideline for issuing excessive heat alerts is when the maximum daytime Heat Index is expected to equal or exceed 105 degrees Fahrenheit (°F) and the night time minimum Heat Index is 80°F or above for two or more consecutive days. A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees.

Warning Time Score: 1—More than 24 hours warning time

Duration Score: 3—Less than one week

Geographic Location/Extent

The entire planning area is subject to extreme heat and all participating jurisdictions are affected.

Previous Occurrences

According to information obtained from the National Weather Service for Cedar County, Iowa on the Iowa Environmental Mesonet, Iowa State University Department of Agronomy website, (http://mesonet.agron.iastate.edu/vtec/search.php), there have been 3 heat-related watches, 5 heat-related warnings and 22 heat-related advisories between 2005 and April 2014.

Table 3.26. National Weather Service Issuances for Extreme Heat in Cedar County, IA

Phenomena	Significance	Number Issued between 2005 and April 2014
Heat	Watches	3
Heat	Warnings	5
Heat	Advisories	22
Total		**30**

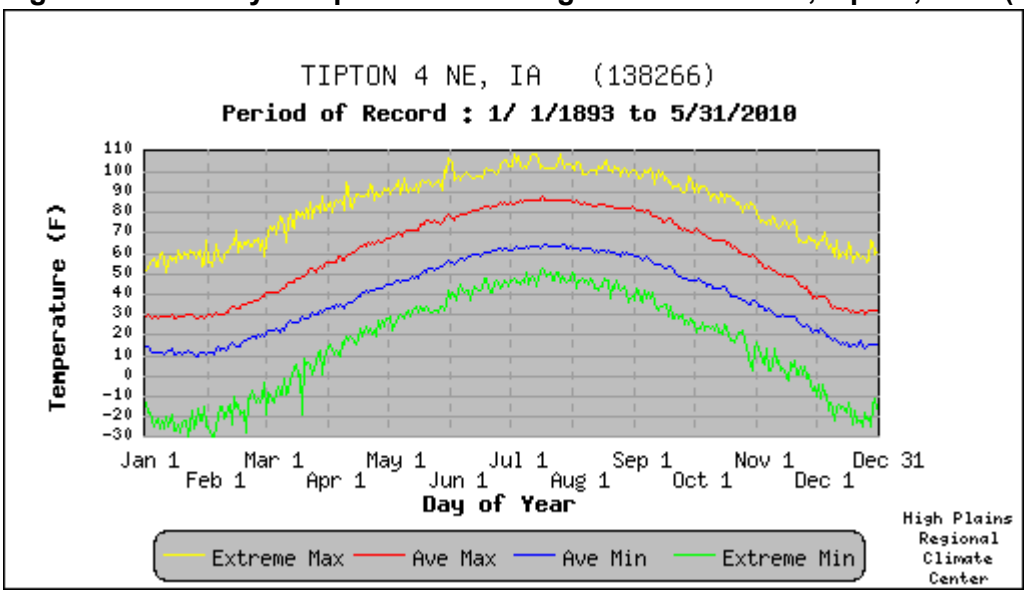
Source: Environmental Mesonet, Iowa State University Department of Agronomy website, http://mesonet.agron.iastate.edu/vtec/search.php

The planning committee identified 41 days that had temperatures above 100 °F between 1950 and 2013. Years when temperatures exceeded 100 during an event were 1953, 1955, 1956,

1974, 1983, 1987, 1988, and 2012. The highest recorded temperature in Tipton, Iowa during this time period was 103 °F which was reached in 1955, 1988, and 2012. The months of the year with the highest temperatures are generally July and August. The average temperature for July is 74.2 °F and August is 72.0 °F for the planning area.

Figure 3.13 provides the daily temperature averages and extremes for the Tipton, Iowa weather station for the period of record from 1893 to 2010 from the High Plains Regional Climate Center. This data shows that a temperature of 108 °F was reached in 1911 as the highest recorded temperature during the 118 year timeframe.

Figure 3.13. Daily Temperatures Averages and Extremes, Tipton, Iowa (1893 – 2010)



- Extreme Max. is the maximum of all daily maximum temperatures recorded for the day of the year.
- Ave. Max. is the average of all daily maximum temperatures recorded for the day of the year.
- Ave. Min. is the average of all daily minimum temperatures recorded for the day of the year.
- Extreme Min. is the minimum of all daily minimum temperatures recorded for the day of the year.

Source: High Plains Regional Climate Summary,
http://www.hprcc.unl.edu/data/historical/index.php?state=ia&action=select_state&submit=Select+State

The National Climatic Data Center reported four regional excessive heat events in and around Cedar County plan area from 1996 to March 2014. Those occurred in July 1997, July 1999, July 2012, and August 2013.

According to the USDA's Risk Management Agency, insured payments in Cedar County for damages to crops as a result of heat from 2004-2013 totaled $481,507. **Table 3.27** shows the insurable crop insurance claims paid in Cedar County as a result of heat.

Table 3.27. Claims Paid in Cedar County for Crop Loss as a Result of Heat (2004-2013)

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid ($)
2007	Soybeans	Heat	$310

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid ($)
2011	Corn	Heat	$4,638
2011	Hybrid Corn Seed	Heat	$163,408
2011	Soybeans	Heat	$17,405
2012	Corn	Heat	$279,467
2012	Hybrid Corn Seed	Heat	$4,098
2012	Soybeans	Heat	$10,994
2013	Soybeans	Heat	$1,187
Total			**$481,507**

Source: Crop Insurance Paid is from the USDA's Risk Management Agency for 2004-2013;
Note: This includes insurable crops that are insured

Probability of Future Occurrence

Based on historical data from the NWS station at Tipton, Iowa there were 30 heat-related watches, warnings and advisories issued during the 9.3 year period. This translates to a 31 percent chance probability of an extreme heat event occurring in the planning area in any given year. Most of these extreme heat events last for less than a week and then temperatures change and become milder. Although extreme heat events, by definition, occur almost every year for a short timeframe, the HMPC determined that damaging events occur less often and determined that the Probability Score for this hazard should be occasional, with a 10 to 20 percent likelihood of a damaging extreme heat event in any given year.

Probability Score: 2—Occasional

Vulnerability

Overview

Those at greatest risk for heat-related illness and deaths include people 65 years of age and older, people who are overweight, and people who are ill or on certain medications. To determine jurisdictions within the planning area with populations that may be more vulnerable to extreme heat, demographic data was obtained from the 2010 Census on numbers of people in each jurisdiction that are over the age of 65 are seen in **Table 3.28.** Data was not available for overweight individuals and those on certain medications.

Overall, Iowa is already older than the country as a whole. About 15 percent of its population is over 65, compared with 13 percent nationally. Cedar County, however, is slightly older than the U.S. as a whole, with 16.7 percent of the population over 65. The participating jurisdictions with the highest percent of adults 65 and over in descending order are: Clarence, Lowden, and Tipton

Table 3.28. Cedar County Population 65 years and Over, 2010 Census Data

Jurisdiction	Population 65 yrs and over	Percent 65 yrs and over
Cedar County	3,093	16.7%
City of Bennett	68	16.8%
City of Clarence	244	25.1%
City of Durant	312	17.0%
City of Lowden	186	23.6%
City of Mechanicsville	212	18.5%
City of Stanwood	110	16.1%

Jurisdiction	Population 65 yrs and over	Percent 65 yrs and over
City of Tipton	671	20.8%
City of West Branch	313	13.5%

Source: U.S. Census Bureau, 2010

Magnitude Score: 2—Limited

Estimated Losses to Existing Development

According to the ten year period from USDA's Risk Management Agency, the amount of claims paid for crop damages as a result of heat was $481,507. According to the 2013 Iowa Crop Insurance Profile Report issued by the USDA's Risk Management Agency, 90 percent of Iowa insurable crops were insured. To factor in estimated losses to insurable crops that are not insured, the 90 percent crop insurance coverage was factored in to provide an adjusted estimate of losses. According to this calculation, estimated annualized losses total $53,500 (see **Table 3.29**).

Considering the value of crops from the 2012 Census of Agriculture as baseline crop exposure, the estimated annual losses from heat was determined minimal compared to the value of the insurable crops.

Table 3.29. Estimated Insurable Annual Crops Lost Resulting From Heat

10-Year Drought Insurance Paid	Adjusted 10-Year Drought Losses (considering 90% insured)	Estimated Annualized Losses	2012 Value of Crops
$481,507	$535,007	$53,500	$219,282,000

Source: Crop value is from USDA 2012 Census of Agriculture; Crop Insurance Paid is from the USDA's Risk Management Agency for 2004-2013.; Crop Insurance Coverage is from USDAs 2013 State Crop Insurance Profile for Iowa
Note: This includes insurable crops that are not insured

Extreme heat can also cause a strain on electricity delivery infrastructure which can be overloaded during peak use of electricity to power air conditioning during extreme heat events. Another type of infrastructure damage that can occur as a result of extreme heat is road damage. When asphalt is exposed to prolonged extreme heat, it can cause buckling of asphalt-paved roads, driveways, and parking lots.

Future Development

Since Cedar County is not experiencing large population growth, the number of people vulnerable to extreme heat is not increasing.

Extreme Heat Hazard Summary by Jurisdiction

Extreme heat is a regional hazard and impacts all jurisdictions in the planning area.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	2	2	1	3	1.95	Low
City of Bennett	2	2	1	3	1.95	Low
City of Clarence	2	2	1	3	1.95	Low
City of Durant	2	2	1	3	1.95	Low
City of Lowden	2	2	1	3	1.95	Low
City of Mechanicsville	2	2	1	3	1.95	Low
City of Stanwood	2	2	1	3	1.95	Low
City of Tipton	2	2	1	3	1.95	Low
City of West Branch	2	2	1	3	1.95	Low
Bennett School District, #603	2	2	1	3	1.95	Low
Durant School District, #1926	2	2	1	3	1.95	Low
North Cedar School District, #3691	2	2	1	3	1.95	Low
Tipton School District, #6408	2	2	1	3	1.95	Low
West Branch School District, #6930	2	2	1	3	1.95	Low

3.5.6 Flash Flooding

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
4	2	2	1	2.80	Moderate

Profile

Hazard Description

A flash flood is an event that occurs when water levels rise at an extremely fast rate as a result of intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil or impermeable surfaces.

Ice jam flooding is a form of flash flooding that occurs when ice breaks up in moving waterways, and then stacks on itself where channels narrow. This creates a natural dam, often causing flooding within minutes of the dam formation.

Riverine Flooding is discussed separately in **Section 3.5.10** and flooding caused by dam failure is discussed in **Section 3.5.7** respectively.

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 waters move at very fast speeds and can move 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.

In some cases, flooding may not be directly attributable to a river, stream, or lake overflowing its banks. Rather, it may simply be the combination of excessive rainfall or snowmelt, saturated ground, and inadequate drainage. With no place to go, the water will find the lowest elevations– areas that are often not in a floodplain. This type of flooding, often referred to as sheet flooding, is becoming increasingly prevalent as development outstrips the ability of the drainage infrastructure to properly carry and disburse the water flow.

In certain areas, aging storm sewer systems are not designed to carry the capacity currently needed to handle the increased storm runoff. Typically, the result is water backing into basements, which damages mechanical systems and can create serious public health and safety concerns. This combined with rainfall trends and rainfall extremes all demonstrate the high probability, yet generally unpredictable nature of flash flooding in the planning area.

Although flash floods are somewhat unpredictable, there are factors that can point to the likelihood of flash floods occurring. Weather surveillance radar is being used to improve monitoring capabilities of intense rainfall. This, along with knowledge of the watershed characteristics, modeling techniques, monitoring, and advanced warning systems increases the warning time for flash floods.

Warning Time Score: 2—12-24 hours warning time. This refers to the period of time prior to the event with heightened awareness that a flash flood could occur, not the issuance of a "flash flood warning" by the National Weather Service.

Duration Score: 1—Less than 6 hours

Geographic Location/Extent

Cedar County has a gently rolling to steep upland terrain, deeply dissected in places by rivers and streams. The areas immediately north and south of the Cedar and Wapsipinicon Rivers are characterized by an intricate pattern of deep valleys and ravines that have steep slopes. Small streams extend into the uplands. The bottomlands along the Cedar and Wapsipinicon Rivers are nearly level. Stream terraces along the rivers are nearly level to undulating. Upland hills rise 100 to 200 feet from the level of the flood plains. The northern one fourth of Cedar County has a gently undulating topography that is called the Iowan Erosion Surface. A broad dissected plain that makes up the largest part of Cedar County separates the Cedar and Wapsipinicon Rivers. It is characterized by slopes of less than nine percent.

Flash flooding occurs in those locations of the planning area that are low-lying and/or do not have adequate drainage to carry away the amount of water that falls during intense rainfall events. According to NCDC, the following jurisdictions have a history of flash flooding events: unincorporated Cedar County, City of Stanwood, City of Tipton, City of Mechanicsville, and the City of Lowden.

Specific areas reported in NCDC flash flood narratives or provided by planning committee members are provided by jurisdiction below:

- Unincorporated Cedar County
  - King Avenue south of Stanwood,
  - Highway 38 south of Tipton,
  - Highway 30 between Mechanicsville and Stanwood.

- City of Mechanicsville
  - Intersection of E. Cedar Street and S. Cherry Street

- City of Lowden
  - Harding Avenue between Highway 30 and 5th Street
  - Intersection of Harding Avenue and Main Street
  - Intersection of Washington Avenue and 1st Street
  - City Public Works Building 618 Main Street

The National Weather Service has various flash flooding products that are issued to the public to provide information regarding upcoming and current flash flood threats (see **Table 3.30**).

Table 3.30. National Weather Service Flash Flooding Products

Product	What It Means	You Should...
Hazardous Weather Outlook	Will there be any threat of flash flooding in the next several days?	If there is a threat of flash flooding, check back later for updated forecasts and possible watches and warnings. Latest Hazardous Weather Outlook
Flash Flood Watch	There is a threat of flash flooding within the next 48 hours, either as a result of heavy rain, ice jams, or the threat of a dam break.	Monitor weather conditions closely, especially if you live in an area prone to flash flooding.
Flash Flood Warning	There is an immediate threat for flash flooding in the warned area, especially in low-lying and poor drainage areas. These warnings are updated frequently with Flash Flood Statements.	If you live in an area susceptible to flash flooding, be prepared to evacuate and head to higher ground. Be very cautious when driving in the warned area, especially at night or while it is still raining. You may not be able to see a flooded road until it is too late!
A *Flash Flood Emergency* may be declared when a severe threat to human life and catastrophic damage from a flash flood is imminent or ongoing. The declaration of a *Flash Flood Emergency* would typically be found in either a Flash Flood Warning or Flash Flood Statement. People are strongly encouraged to avoid the geographic area of concern in a *Flash Flood Emergency*. The *Flash Flood Emergency* wording is used very rarely and is reserved for exceptionally rare and hazardous events.		
Areal Flood Warning	The threat of flash flooding is over, but there is still significant standing water in the affected area.	Areal flood warnings will typically list locations and roads impacted by the flooding. Try to avoid these locations until the water has receded.

Source: National Weather Service, website accessed 8/26/2013 http://www.crh.noaa.gov/dmx/?n=prepareflоodproducts

Previous Occurrences

Table 3.31 provides details regarding the flashflood and areal flood watches and warnings issued for Cedar County and the Cedar County forecast zone by the Quad Cities National Weather Service office. Areal flooding is a type of flash flooding that is generally over a large area usually due to the amount and duration of rainfall.

Table 3.31. Flash Flood-Related National Weather Service Watches and, Warnings Issued for Cedar County and, Cedar County, Iowa Forecast Zone (April 2005 – April 2014)

Year	NWS Product	# of Times Issued
2006	Areal Flood Watch	1
2007	Flash Flood Watch	7
2007	Areal Flood Watch	3
2008	Flash Flood Watch	15
2008	Flash Flood Warning	4
2008	Areal Flood Watch	4
2009	Flash Flood Watch	6
2009	Flash Flood Warning	6
2009	Areal Flood Watch	1
2009	Areal Flood Warning	3
2010	Flash Flood Watch	22

Year	NWS Product	# of Times Issued
2010	Flash Flood Warning	5
2011	Flash Flood Watch	2
2012	Flash Flood Watch	2
2012	Flash Flood Warning	1
2013	Flash Flood Watch	6
2013	Flash Flood Warning	7
2013	Areal Flood Warning	2
2014	Areal Flood Watch	1

Source: Iowa State University Department of Agronomy http://mesonet.agron.iastate.edu/vtec/search.php

As discussed in the Description Section, flash flooding can be caused by intense rainfall over a brief period. **Table 3.32** provides the top 30 rainfall events at the Tipton Weather Station from January 1, 1950 to December 31, 2013.

Table 3.32. Top 30 Rainfall Events, Tipton Weather Station, 1950 to 2013

Date	Precipitation (inches)
6/24/2013	6.8
4/17/2013	4.73
11/17/1952	4.58
6/16/1990	4.52
7/29/1970	4.5
9/17/1970	4.3
9/18/1977	4.3
7/19/2002	4.2
8/4/1965	4.1
6/22/2007	4.1
6/7/1967	3.98
8/16/1977	3.6
9/26/1981	3.56
7/14/1979	3.5
9/13/1961	3.48
6/15/1982	3.43
8/21/1987	3.41
8/17/1990	3.38
10/10/1954	3.35
9/12/1961	3.34
5/10/1996	3.25
10/13/1960	3.15
12/15/1971	3.15
4/29/1974	3.1
9/13/1955	3
10/31/1960	3
8/8/1967	3
7/18/1972	3
8/8/1977	3
7/25/1960	2.9

Source: Iowa State University Department of Agronomy http://mesonet.agron.iastate.edu/request/coop/fe.phtml

Information from the NCDC was obtained from 1996 to December 2013 to determine previous occurrences for flash flood in the planning area. During this time-frame, there were no injuries or deaths reported. Additionally, there were no damages reported to crops. **Table 3.33** provides a summary of the NCDC data.

Table 3.33. NCDC Cedar County, Iowa Flash Flood Events Summary, 1996 to December 2013

Location	Date	Time	Type	Property Damage
Countywide	2/20/1997	16:00	Flash Flood	$0
Countywide	6/13/2000	22:08	Flash Flood	$0
Stanwood	6/19/2009	16:30	Flash Flood	$100,000
Lime City	6/19/2009	17:10	Flash Flood	$50,000
Tipton	7/10/2009	11:13	Flash Flood	$0
Mechanicsville	6/15/2010	11:20	Flash Flood	$25,000
Lowden	8/23/2011	7:00	Flash Flood	$0
Mechanicsville	4/17/2013	10:30	Flash Flood	$250,000
Mechanicsville	6/24/2013	4:00	Flash Flood	$0
Totals:				**$425,000**

Source: NCDC, data accessed 3/24/2014

Descriptions of notable flash flood events are provided below in reverse chronological order:

- **June 24, 2013 (FEMA-4119-DR-IA**—Widespread heavy rain fell across Cedar County from the early morning hours into the mid morning. The cooperative observer in Lowden reported 6.25 inches, while broadcast media reported 6.75 inches of rain in Clarence. There was also a public report from 1 mile east of Lowden with 6.25 inches of rain. Other reports included: 2 feet of water flowing over the road near Mechanicsville; a road and bridge were washed out near Lowden; water was over Highway 30 between Mechanicsville and Stanwood; water was up to the first floor windows at several homes in Lowden—three homes were destroyed and many had water in the basements. The Lowden Wastewater Treatment Plant office flooded and the collection system was over capacity. The county road south of town was also closed for several months as the roadway washed out. Overall, the Cedar County Engineer reported 2 dozen roads closed across the County due to flash flooding. In The City of Bennett, basements flooded, pumps were damaged, and roads closed. Mechanicsville had to constantly monitor lift station pumps to prevent excess water from over-flowing and a storm drain washed out at E. First Street. Damages exceeded $2,000.

Figure 3.14. Flooding in Lowden, Iowa—June 24, 2013

Source: wate.com, accessed 7/10/2014, http://www.wate.com/category/266438/flash-flooding-in-lowden-ia-62413-slideshow

- **April 17, 2013 (FEMA-4135-DR-IA)**—Several rounds of heavy rains resulted in flash flooding across much of Cedar County from mid morning April 17 through the early morning

April 18**.** In Mechanicsville, the lift station flooded and caused back-up in basements. Damages exceeded $1,700

- **March 2012**—the City of Clarence reported a flash flood event.
- **August 23, 2011**—A thunderstorm moving through Cedar County produced heavy rain of between 3.5 to 4 inches in less than an hour causing severe flooding in Cedar County. Several streets were flooded with cars stalled. A number of residents reported flooding in their basements.
- **June 15, 2010**—Heavy rains resulted in flash flooding of parts of Mechanicsville and Lowden during the afternoon of June 15. Flood waters covered the intersection of E Cedar Street and S Cherry Street in Mechanicsville. A basement was flooded in Lowden. In addition, a gravel road was washed out about 2 miles east of Sutiff, IA.
- **July 10, 2009**—Heavy rains resulted in some flash flooding just south of Tipton, IA during the afternoon of July 10. Flood waters covered about half of Highway 38 just south of town.
- **June 19, 2009**—Heavy rains resulted in flash flooding of several streets in Durant and Stanwood. The flood waters were deep enough to stall cars in town in Durant and up to a foot deep in Stanwood. In addition, water was flowing over a road east of Highway 38.
- **June 13, 2000**—Creek flooding washed a bridge out 2 miles south of Sunbury in Cedar County. King Avenue south of Stanwood was closed due to high water, while street flooding was also observed in Tipton.
- **February 20, 1997**—Heavy rains fell over the area while soils were still partially frozen. One-to-three inch rains came as area rivers and streams were running high from snowmelt during the previous week. Numerous streams and rivers went out of their banks, leaving standing water for several days.

The US Army Corps of Engineers, Cold Regions Research and Engineering Laboratory (CRREL) maintains a database of historic ice jams. According to a query of that database from 1950 to the present, there were no recorded ice jams in Cedar County. Ice jams may have occurred in the planning area during this time, but were not observed or recorded in the ice jam database.

Probability of Future Occurrence

The frequency of past events is used to gauge the likelihood of future occurrences. The events from NCDC that occurred on the same day were combined to determine the total number of eight flash flooding events in the planning area over the 18-year period from 1996 to 2013. This translates to a 44 percent likelihood of flash flooding somewhere in the planning area in any given year.

Probability Score: 4—Highly Likely

Vulnerability

Vulnerability Overview

Water over low-lying roads and bridges are the most frequent types of impacts associated with flash flooding that has occurred in the planning area. This can cause wash out of bridge abutments and erosion/scour damage on roads. There is potential for loss of life if motorists drive into moving water. However, public education campaigns have helped to educate citizens

about not driving through moving water. Building damage is generally limited to water in basements where rain is too intense for drainage systems and natural drainage to carry water away from the structure. In addition, when combined storm/sanitary sewer systems are overloaded, this can result in sewer back-up. Generally, flash-flooding is short in duration and government services and business operations are not impacted.

Magnitude Score: 2—Limited. The magnitude was determined to be limited.

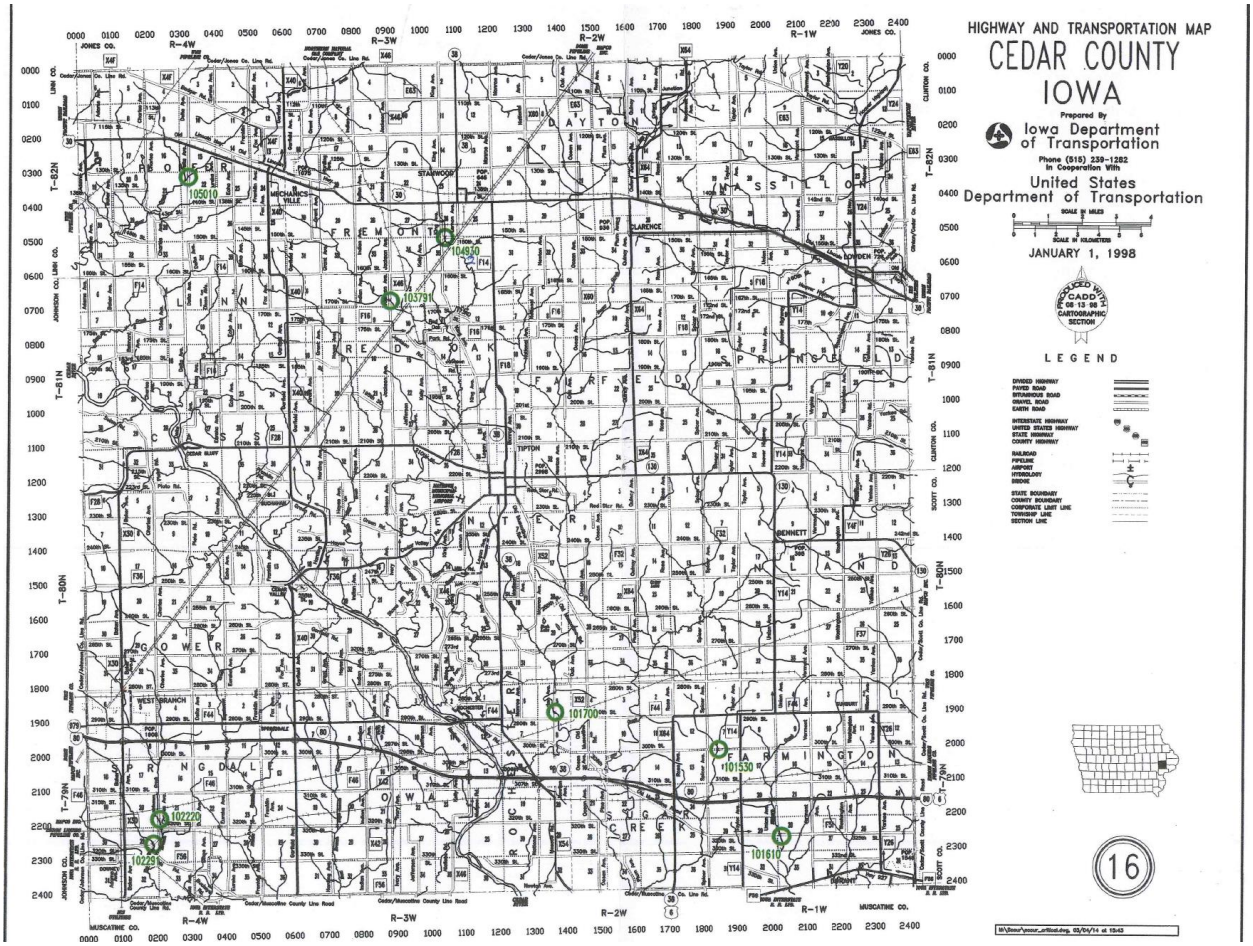
Potential Losses to Existing Development

When roads and bridges are inundated by water, damage often occurs as the water scours materials around bridge abutments and gravel roads. According to the Iowa Department of Transportation's 1998 survey, there were eight "scour critical" bridges as follows:

- Bridge 101530-scour critical
- Bridge 101610-moderate risk
- Bridge 101700-scour critical
- Bridge 102220-moderate risk
- Bridge 102291-scour critical
- Bridge 103791-high risk
- Bridge 104930-scour critical
- Bridge 105010-scour critical

Figure 3.15 provides the locations of the "scour critical" bridges.

Figure 3.15. Scour Critical Bridges in Cedar County



Source: Iowa Department of Transportation via the Cedar County Engineer; scour critical bridges are identified by green circle

The water can also cause erosion undermining road beds. In some instances, steep slopes that are saturated with water may cause mud or rock slides onto roadways. These damages can cause costly repairs for state, county, and city road/bridge maintenance departments. When sewer back-up occurs, this can result in costly clean-up for home and business owners as well as present a health hazard.

Based on loss estimates reported by NCDC, property losses averaged $23,611 per year over the 18-year period from 1996 to 2013.

Future Development

In planning future development, jurisdictions in the planning area should avoid development in low-lying areas near rivers and streams or where interior drainage systems are not adequate to provide drainage during heavy rainfall events. Future development should also take into consideration the impact of additional impervious surfaces to water run-off and drainage capabilities during heavy rainfall events.

Flash Flood Hazard Summary by Jurisdiction

For the jurisdictions indicated in previous flash flood events reported to NCDC, or mentioned in the episode narrative, the magnitude was determined to be “limited” (2) and the probability “highly likely” (4). For the remaining jurisdictions, the probability was determined to be “occasional” (2) and the magnitude was determined to be “negligible” (1) due to the small number of reported flash flooding events or no flash flooding events reported for these areas. For the school districts, the levels of the cities were applied.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	4	2	2	1	2.8	Moderate
City of Bennett	2	1	2	1	1.6	Low
City of Clarence	2	1	2	1	1.6	Low
City of Durant	2	1	2	1	1.6	Low
City of Lowden	4	2	2	1	2.8	Moderate
City of Mechanicsville	4	2	2	1	2.8	Moderate
City of Stanwood	4	2	2	1	2.8	Moderate
City of Tipton	4	2	2	1	2.8	Moderate
City of West Branch	2	1	2	1	1.6	Low
Bennett School District, #603	2	1	2	1	1.6	Low
Durant School District, #1926	2	1	2	1	1.6	Low
North Cedar School District, #3691	4	2	2	1	2.8	Moderate
Tipton School District #6408	4	2	2	1	2.8	Moderate
West Branch School District #6930	2	1	2	1	1.6	Low

3.5.7 Grass or Wildland Fire

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
4	1	1	1	2.35	Moderate

Profile

Hazard Description

Iowa's urban/rural interface (areas where development occurs within or immediately adjacent to wildland, near fire-prone trees, brush, and/or other vegetation), is growing as metro areas expand into natural forest, prairies and agricultural areas that are in permanent vegetative cover through the Conservation Reserve Program (CRP). The State has the largest number of CRP contracts in the nation, totaling over 1.5 million acres. Most of this land is planted in cool and warm season grass plantings, tree plantings and riparian buffer strips. There is an additional 230,000 acres in federal ownership and conservation easements.

Wildfires are frequently associated with lightning and drought conditions, as dry conditions make vegetation more flammable. As new development encroaches into the wildland/urban interface more and more structures and people are at risk. On occasion, ranchers and farmers intentionally set fire to vegetation to restore soil nutrients or alter the existing vegetation growth. Also, individuals in rural areas frequently burn trash, leaves and other vegetation debris. These fires have the potential to get out of control and turn into wildfires.

The risk of wildfires is a real threat to landowners across the State. The National Weather Service monitors the conditions supportive of wildfires in the State on a daily basis so that wildfires can be predicted, if not prevented.

The risk factors considered are:

- High temperature
- High wind speed
- Fuel moisture (greenness of vegetation)
- Low humidity
- Little or no cloud cover

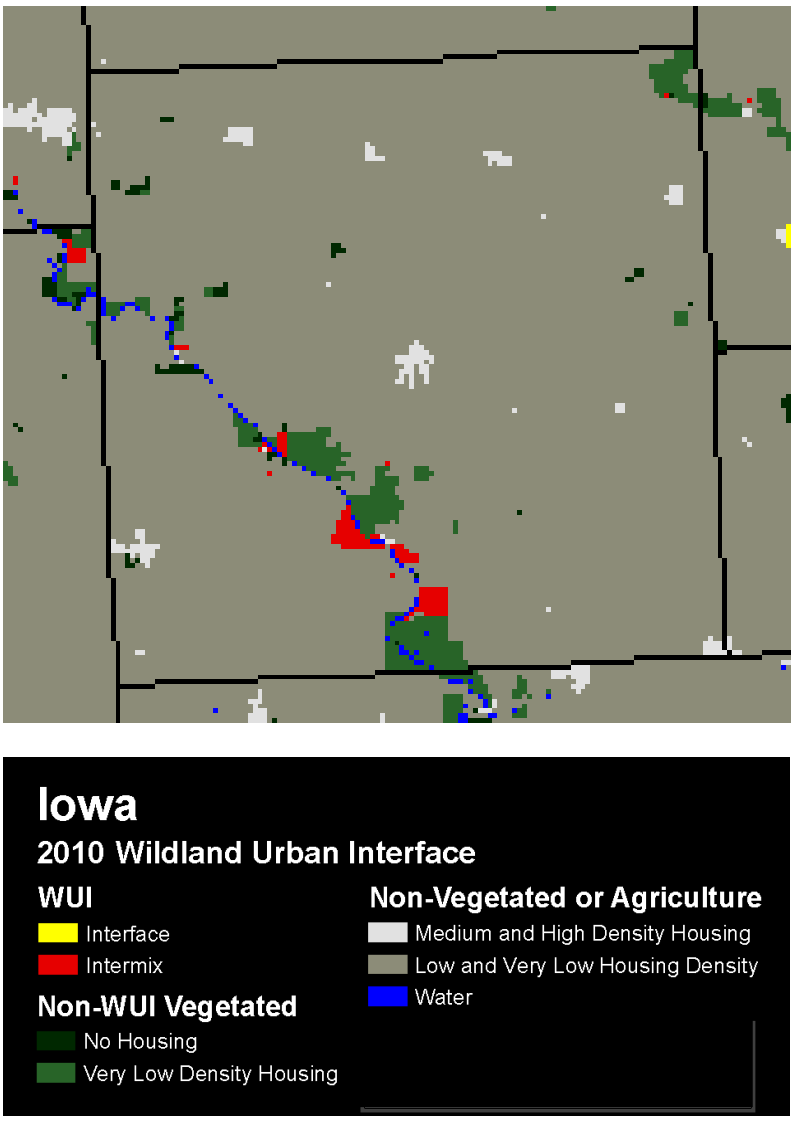
Warning Time Score: 1—More than 24 hours warning time. Although individual wildland/grass fires can ignite with very little warning, the warning time for the hazard condition is generally more than 24 hours.

Duration Score: 1—Less than 6 hours

Geographic Location/Extent

Wildland/Grass fires are most likely to occur in the Wildland Urban Interface (WUI). This is the area where houses meet or intermingle with undeveloped wildland vegetation. Within the WUI, there are two specific areas identified: 1) Interface and 2) Intermix. The interface areas are those areas that abut wildland vegetation and the Intermix areas are those areas that intermingle with wildland areas. As can be seen in **Figure 3.16**, Cedar County has very few areas of WUI Intermix and no WUI Interface areas. All of the Intermix areas are along the Cedar River.

Figure 3.16. Cedar County Wildland Urban Interface, 2010



Source: SILVIS Lab, Department of Forest Ecology and management, University of Wisconsin-Madison; WUI 2010, http://silvis.forest.wisc.edu/maps/wui/state10, accessed 4/2/2014

In addition, members of the planning committee discussed vulnerability of the Herbert Hoover Presidential Library and Museum in the City of West Branch due to new wildland areas adjacent to the facility.

Previous Occurrences

Data was obtained from the Iowa Department of Public Safety, State Fire Marshal Division to provide information on previous occurrences of grass/wildland fires in the planning area. Through the National Fire Incident Reporting System (NFIRS), the Iowa State Fire Marshal's Office collects and reports fire incidents throughout the State. NFIRS is a repository of statistical data reported by participating fire departments. Although this is the best available statistical data for grass and wildland fires, there are some data limitations.

- Not all fire departments report all fires to NFIRS;
- Fires outside Cedar County may be included in the data if a Cedar County-based Fire Department responded to the fire; and
- Fires inside Cedar County may not be included in the data if a Fire Department based outside Cedar County responded to the fire.

To report previous events of grass or wildland fires in the planning area, statistics were gathered from Fire Departments based in Cedar County for 2010-April 2014 for six categories: 1) Natural Vegetation Fires, 2) Forest, Woods or Wildland Fire, 3) Brush or Brush and Grass Mixture Fires, 4) Grass Fires, 5), cultivated grain or crop fire, and 6) cultivated vegetation, crop fire. **Table 3.34** provides the details of the number of fires in each of these categories by year and fire department. The first column provides the number of total reports received for each year. This column demonstrates that some fire departments do not report to the system. Therefore, there are likely additional fires that occur, but are not reported.

During this 4.25-year period, the total number of reported wildland/grass fires was 179 for an annual average of 42 fires. The data included associated property and contents losses, where available.

Table 3.34. Cedar County Grass and Wildland Fires Reported to the Iowa Fire Marshal Division Office 2010-2014

Fire Department	Total Fire Reports Received	Natural Vegetation Fire	Brush or Brush-and-Grass Mixture Fires	Forest, Woods, or Wildland Fire	Grass Fires	cultivated grain or crop fire	cultivated vegetation, crop fire	Total All Categories of Wildland/Grass Fires
2014—as of 4/22/2014								
Bennett Fire Department	0	0	0	0	0	0	0	0
Clarence Fire Department	0	0	0	0	0	0	0	0
Durant Fire Department	0	0	0	0	0	0	0	0
Lowden Fire Department	0	0	0	0	0	0	0	0
Mechanicsville Fire Department	26	0	3	0	4	1	0	8
Stanwood Fire Department	0	0	0	0	0	0	0	0
Tipton Fire Department	27	0	0	0	9	0	0	9
West Branch Fire Department	30	1	0	0	11	0	0	12
Total-2014 as of 4/22	**83**	**1**	**3**	**0**	**24**	**1**	**0**	**29**
2013								
Bennett Fire Department	31	0	0	0	4	0	1	5
Clarence Fire Department	23	0	0	0	0	0	0	0
Durant Fire Department	0	0	0	0	0	0	0	0
Lowden Fire Department	24	0	0	0	0	0	0	0
Mechanicsville Fire Department	48	1	1	0	2	3	1	8
Stanwood Fire Department	0	0	0	0	0	0	0	0
Tipton Fire Department	88	0	1	0	4	0	1	6
West Branch Fire Department	86	1	0	1	15	0	1	18
Total-2013	**300**	**2**	**2**	**1**	**25**	**3**	**4**	**37**
2012								
Bennett Fire Department	21	0	0	0	2	0	1	3
Clarence Fire Department	18	0	0	0	1	0	2	3
Durant Fire Department	0	0	0	0	0	0	0	0
Lowden Fire Department	3	0	0	0	0	0	0	0
Mechanicsville Fire Department	91	5	8	0	6	2	1	27
Stanwood Fire Department	9	0	0	0	0	0	0	0
Tipton Fire Department	74	0	0	0	6	1	1	8
West Branch Fire Department	114	1	1	0	28	0	0	30
Total-2012	**330**	**6**	**9**	**0**	**43**	**3**	**5**	**66**
2011								
Bennett Fire Department	0	0	0	0	0	0	0	0
Clarence Fire Department	26	0	0	0	2	0	0	2
Durant Fire Department	0	0	0	0	0	0	0	0
Lowden Fire Department	26	0	1	0	0	0	0	1

Fire Department	Total Fire Reports Received	Natural Vegetation Fire	Brush or Brush-and-Grass Mixture Fires	Forest, Woods, or Wildland Fire	Grass Fires	cultivated grain or crop fire	cultivated vegetation, crop fire	Total All Categories of Wildland/Grass Fires
Mechanicsville Fire Department	0	0	0	0	0	0	0	0
Stanwood Fire Department	4	0	0	0	0	0	0	0
Tipton Fire Department	77	1	2	3	6	1	0	13
West Branch Fire Department	94	0	1	0	9	0	1	11
Total-2011	**227**	**1**	**4**	**3**	**17**	**1**	**1**	**27**
2010								
Bennett Fire Department	0	0	0	0	0	0	0	0
Clarence Fire Department	0	0	0	0	0	0	0	0
Durant Fire Department	0	0	0	0	0	0	0	0
Lowden Fire Department	28	0	0	0	1	1	0	2
Mechanicsville Fire Department	0	0	0	0	0	0	0	0
Stanwood Fire Department	2	0	0	0	0	0	0	0
Tipton Fire Department	52	3	0	0	2	0	1	6
West Branch Fire Department	96	0	2	1	6	2	1	12
Total-2010	**178**	**3**	**2**	**1**	**9**	**3**	**2**	**20**
Total 2010-4/22/2014	**1,118**	**13**	**20**	**5**	**118**	**11**	**12**	**179**

Source: Iowa Department of Public Safety, State Fire Marshal Division, April 2014

Probability of Future Occurrence

Available data documents at least 42 wildland/grass fires per year in the planning area. It is anticipated that similar occurrences will continue in the future.

Probability Score: 4—Highly Likely

Vulnerability

Overview

Most wildland-type fires that have occurred in the planning area are smaller scale grass/brush fires. The fire departments in the County are equipped to handle this type of smaller-scale wildland fire. As such, these smaller-scale brush/grass fires are well within the existing firefighting capabilities and are generally extinguished before much damage occurs. Areas that are most vulnerable to wildfire are agricultural areas where land is burned, rural areas where trash and debris are burned, and the wildland-urban interface areas.

To demonstrate how vulnerability to this hazard varies by jurisdiction, the 2010 spatial data indicating acreage of Wildland Urban Interface/Intermix areas from the SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin-Madison was compared against the corporate boundary layer for the planning area. **Table 3.35** provides the results of this analysis.

Table 3.35. Wildland Urban Intermix/Interface Acreage by Jurisdiction

Jurisdiction	Intermix (Acreage)	Interface (Acreage)
Unincorporated Cedar County	2,679	0
City of Bennett	0	0
City of Clarence	0	0
City of Durant	0	0
City of Lowden	0	0
City of Mechanicsville	3	0
City of Stanwood	0	0
City of Tipton	0	0
City of West Branch	0	0
City of Wilton	0	0
Total	**2,682**	**0**

Source: SILVIS Lab, Department of Forest Ecology and management, University of Wisconsin-Madison; Corporate Boundary layer from the Cedar County GIS Department.

As shown in the table above, nearly all of the Wildland Urban Intermix areas are in the unincorporated portions of Cedar County. These areas are comprised of the tree line and brushy areas that border the Cedar River. There is also a small 3-acre are of WUI intermix in the City of Mechanicsville. There are no WUI interface areas in the planning area.

These WUI intermix areas are the primary locations where larger wildfires might occur. As evidenced by previous wildland-type fires in the planning area, they have historically been the smaller brush/grass fires that can occur anywhere that has open grassy areas. As the previous

events show, the number of wildland-type fires increases during periods of severe drought. 2012 was one of the worst years of drought in recent history in the planning area.

Potential Losses to Existing Development

Wildfires can be responsible for extensive damage to crops, the environment and occasionally residential or business facilities. Homes built in rural areas are more vulnerable since they are in closer proximity to land that is burned and homeowners are more likely to burn trash and debris in rural locations. The vulnerability of structures in rural areas is exacerbated due to the lack of hydrants in these areas for firefighting and the distance required for firefighting vehicles and personnel to travel to respond. Potential losses to crops and rangeland are additional concerns.

Utilizing the data available from the Fire Marshal Division as summarized in **Table 3.34**, there was an annual average of 42 grass and wildland fires, causing an annual average of $71,329 in property damages during the 4.25-year period. Note: only reporting fire departments are listed.

Table 3.36. Summary of Grass and Wildland Fire Property and Contents Losses (2010-4/22/2014)

Responding Fire Department	# of Incidents	Property Loss	Content Loss	Total Losses
2014 Grass and Wildland Fires Reported				
Mechanicsville Fire Department	8	$0	$0	$0
Tipton Fire Department	9	$0	$0	$0
West Branch Fire Department	12	$0	$3,500	$3,500
Total-2014 as of 4/22	**29**	$0	**$3,500**	**$3,500**
2013 Grass and Wildland Fires Reported				
Bennett Fire Department	5	$5,000	$0	$5,000
Mechanicsville Fire Department	8	$0	$0	$0
Tipton Fire Department	6	$50	$11,000	$11,050
West Branch Fire Department	18	$0	$0	$0
Total-2013	**37**	**$5,050**	**$11,000**	**$16,050**
2012 Grass and Wildland Fires Reported				
Bennett Fire Department	3	$0	$0	$0
Clarence Fire Department	3	$0	$1,400	$1,400
Mechanicsville Fire Department	27	$0	$0	$0
Tipton Fire Department	8	$0	$0	$0
West Branch Fire Department	30	$276,000	$5,000	$281,000
Total-2012	**66**	**$276,000**	**$6,400**	**$282,400**
2011 Grass and Wildland Fires Reported				
Clarence Fire Department	2	$0	$0	$0
Lowden Fire Department	1	$0	$0	$0
Tipton Fire Department	13	$1,200	$0	$1,200
West Branch Fire Department	11	$0	$0	$0
Total-2011	**27**	**$1,200**	**$0**	**$1,200**
2010 Grass and Wildland Fires Reported				
Lowden Fire Department	2	$0	$0	$0
Tipton Fire Department	6	$0	$0	$0
West Branch Fire Department	12	$0	$0	$0
Total-2011	**20**	**$0**	**$0**	**$0**
Total-2010 to 4/22/2014	**179**	**$0**	**$0**	**$303,150**

Magnitude Score: 1—Negligible

Future Development

Future development in the wildland-urban interface/intermix areas would increase vulnerability to this hazard.

Grass or Wildland Fires Hazard Summary by Jurisdiction

The unincorporated portions of Cedar County are more vulnerable to the larger wildland/grass fires as a result of the WUI intermix areas along the Cedar River. Therefore the magnitude for the unincorporated portions of the County was determined to be a 2. Additionally due to the new wildland areas adjacent to the Herbert Hoover Presidential Library and Museum, the magnitude for the City of West Branch was also determined to be a 2. Although the magnitude would not be as great, numerous small-scale grass/brush fires have occurred in the other incorporated areas as well. There is less potential for wildland/grass fires to impacting schools due to general locations away from Wildland Urban Interface/Intermix Areas. If a wildland/grass fire were to occur near school buildings, the magnitude would be lower due to close proximity to firefighting services.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	4	2	1	1	2.65	Moderate
City of Bennett	4	1	1	1	2.35	Moderate
City of Clarence	4	1	1	1	2.35	Moderate
City of Durant	4	1	1	1	2.35	Moderate
City of Lowden	4	1	1	1	2.35	Moderate
City of Mechanicsville	4	1	1	1	2.35	Moderate
City of Stanwood	4	1	1	1	2.35	Moderate
City of Tipton	4	1	1	1	2.35	Moderate
City of West Branch	4	2	1	1	2.65	Moderate
Bennett School District, #603	1	1	1	1	1.00	Low
Durant School District, #1926	1	1	1	1	1.00	Low
North Cedar School District, #3691	1	1	1	1	1.00	Low
Tipton School District #6408	1	1	1	1	1.00	Low
West Branch School District #6930	1	1	1	1	1.00	Low

3.5.8 Hazardous Materials Incident

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
4	2	4	1	3.10	High

Profile

Hazard 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 increasing types and quantities. Each year over 1,000 new synthetic chemicals are introduced and as many as 500,000 products pose physical or health hazards and can be defined as "hazardous chemicals". Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous material incidents generally affect a localized area.

Fixed Hazardous Materials Incident

A fixed hazardous materials incident is the accidental release of chemical substances or mixtures during production or handling at a fixed facility.

Transportation Hazardous Materials Incident

A transportation hazardous materials incident is the accidental release of chemical substances or mixtures during transport. Transportation Hazardous Materials Incidents in Cedar County can occur during rail transport or highway transport. Accidents involving rail shipments of hazardous materials typically fall into four general categories: track deterioration, equipment failures, human error, and other causes. Highway accidents involving hazardous materials pose a great potential for public exposures. Both nearby populations and motorists can be impacted and become exposed by accidents and releases. Generally speaking, the volume of hazardous materials transported is greater in rail transport than highway transport due to the higher capacity in rail cars.

Pipeline Incident

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

Warning Time Score: 4—Less than six hours warning time

Duration Score: 1—Less than 6 hours

Geographic Location/Extent

This section provides geographic locations within Cedar County impacted by each type of potential hazardous materials incident.

Fixed Hazardous Materials Incident

According to the Iowa Department of Natural Resources, as of 2014, there were 29 sites in Cedar County that because of the volume or toxicity of the materials on site were designated as Tier II Facilities under the Superfund Amendments and Reauthorization Act. Of these 29 facilities, 14 reported materials on site that are considered to be "Extremely Hazardous Substances" (EHS).

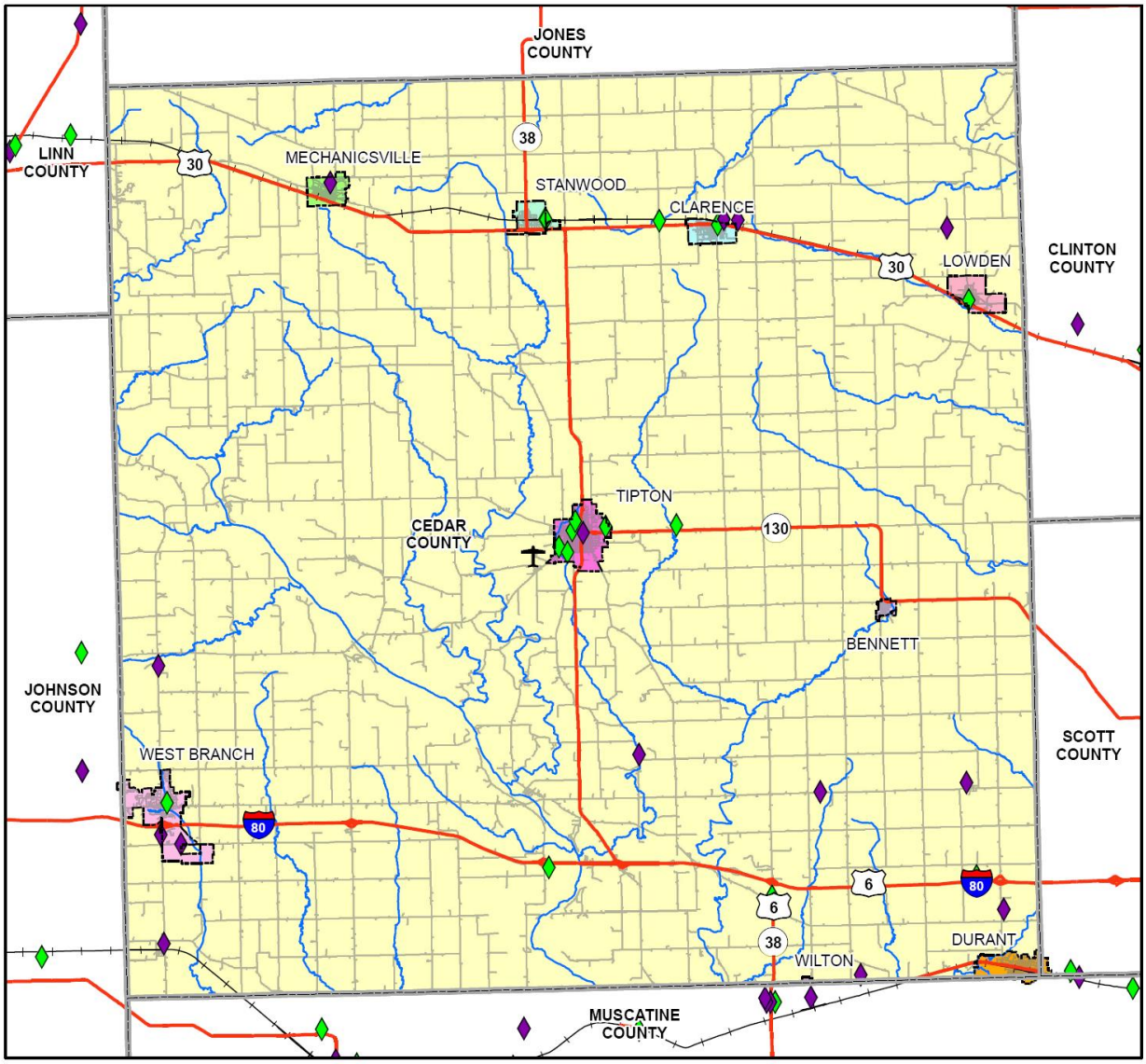
Table 3.37 provides the number of Tier II Facilities, as well as the number with EHS for each jurisdiction in the planning area. The locations of the facilities were overlaid with the corporate boundaries provided by the Cedar County GIS Department to determine the number of facilities in each jurisdiction. **Figure 3.17** that follows is a map showing the locations of Tier II Facilities, including those with EHS.

Table 3.37. Number of Tier II Facilities and EHS Facilities by Jurisdiction

Jurisdiction	Tier II Facilities	EHS Facilities
Unincorporated Cedar County	17	11
City of Bennett	0	0
City of Clarence	1	0
City of Durant	0	0
City of Lowden	1	0
City of Mechanicsville	1	1
City of Stanwood	1	0
City of Tipton	6	1
City of West Branch	2	1
City of Wilton	0	0
Total	29	14

Source: Iowa Department of Natural Resources; Cedar County GIS Department

Figure 3.17. Tier II Facilities in Cedar County



Map Compiled: 04/2014
Intended for planning purposes only
Source: Cedar County GIS Department, Iowa DNR

Transportation Hazardous Materials Incident

The transport of hazardous materials in Cedar County occurs via trucks on the highways/roads, trains on the railroads in the county, as well as via airplanes. A Commodity Flow Study, including Cedar County in the study area was under development at the time of this plan update. This study is targeted for completion by December 2015. After completion of the study, a gap analysis will be completed indentifying shortfalls in resources in identified high vulnerability areas. The county has a goal to obtain identified resources by December 2018. Information regarding identified vulnerable areas for transportation hazardous materials incidents identified in the Commodity Flow Study will be added to the next hazard mitigation plan update.

Truck Transport

Hazardous materials can be transported on any of the roads in Cedar County. I-80, a federal interstate crosses east/west over the southern portion of the County and is the main conduit for hazardous materials that are transported through the County. U.S. Highway 30 crosses east/west over the northern portion of the County and Iowa State Highway 38 bisects the County from north to south. These highways are also main arteries for transport of materials through the County. Iowa Highway 130 runs east/west from Tipton into Scott County, making it a route for materials originating or terminating in Tipton.

Agriculture is important to the economy of Cedar County and 90 percent of the land in the County is designated as agricultural use. As a result, chemicals utilized in agriculture are frequently transported along county and local roadways.

Rail Transport

Railroads pass through the following jurisdictions in the planning area:

- Unincorporated Cedar County
- City of Clarence
- City of Durant
- City of Lowden
- City of Mechanicsville
- City of Stanwood

Since rail cars generally have larger capacity to transport goods, a rail car hazardous materials incident can be much more devastating.

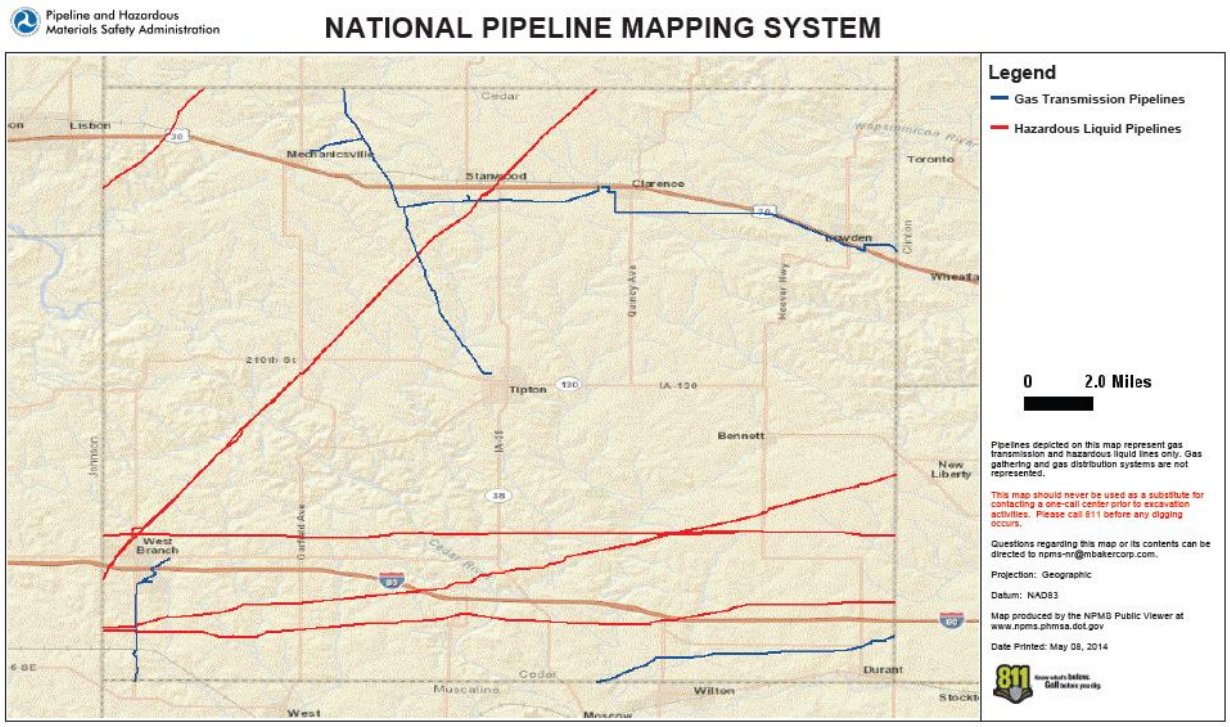
Air Freight

There is one public airport in Cedar County just west of the city of Tipton, the Mathews Memorial Airport. The primary risk of air-related hazardous materials incidents is related to crop-dusting. Crop dusters carry insecticides, fertilizer, fungicides and herbicides to spray on crops. A crash or other incident involving one of these plans could also be hazardous.

Pipeline Incident

Figure 3.18 provides the locations of pipelines in Cedar County. The data for this map consists of gas transmission pipelines and hazardous liquid trunklines. It does not contain gathering or distribution pipelines, such as lines which deliver gas to a customer's home. Therefore, not all pipelines in the County will be visible.

Figure 3.18. Pipelines in Cedar County



Source: Pipeline and Hazardous Materials Safety Administration, National Pipeline Mapping System, https://www.npms.phmsa.dot.gov/PublicViewer/ retrieved on 5/8/2014

Previous Occurrences

In Iowa, hazardous materials spills are reported to the Department of Natural Resources. According to Iowa Administrative Code Chapter 131, *Notification of Hazardous Conditions*, any person manufacturing, storing, handling, transporting, or disposing of a hazardous substance must notify the Department of Natural Resources and the local police department or the office of the sheriff of the affected county of the occurrence of a hazardous condition as soon as possible but not later than six hours after the onset of the hazardous condition or the discovery of the hazardous condition. The Department of Natural Resources maintains a database of reported spills.

According to the DNR database, from May 2005 to May 2014 (10 years), there have been 75 hazardous materials spills reported in Cedar County. Of the 75 spills, 21 were air releases, 3 affected ground water, 51 were on land, and 4 affected surface water. Please note: some spills had multiple mediums of release. **Table 3.38** provides a summary of the reported spills during this time period for each jurisdiction indicated in the database.

Table 3.38. Cedar County Hazardous Materials Spills Reported to Iowa DNR, May 2005-May 2014

Location	Reported Spills
Unincorporated County	2
Bennett	9
Clarence	2
Durant	6
Lowden	3
Mechanicsville	3
Stanwood	6
Tipton	16
West Branch	20
Wilton	8
Total	**75**

Source: Iowa Department of Natural Resources, http://www.iowadnr.gov/InsideDNR/RegulatoryLand/EmergencyPlanningEPCRA/SpillReporting.aspx, retrieved 4/22/2014

Another source consulted to report previous Hazardous Materials Incidents is the Environmental Protection Agency's Toxics Release Inventory (TRI). This inventory tracks the management of over 650 toxic chemicals that pose a threat to human health and the environment. U.S. facilities in certain industry sectors that manufacture, process, or otherwise use these chemicals in amounts above established levels must report how each chemical is managed through recycling, energy recovery, treatment, and releases to the environment. A "release" of a chemical means that it is emitted to the air or water, or placed in some type of land disposal. The information submitted by facilities to the EPA and states is compiled annually as the Toxics Release Inventory or TRI, and is stored in a publicly accessible database in Envirofacts.

TRI data are available for all facilities that have submitted a Form R or Form A to EPA since the program began in 1987. TRI facilities are legally required to report to EPA by July 1st of each year**. Table 3.39** provides the TRI on-site and off-site reported disposed of or otherwise released report for industries in Cedar County that have TRI reporting requirements for 2008-2012.

Table 3.39. TRI On-site and Off-site Reported Disposed of or Otherwise Released (in pounds), for All Industries, for All Chemicals, Cedar County, Iowa, 2008-2012

Chemical	Total On-site Disposal or Other Releases	Total Off-site Disposal or Other Releases	Total On- and Off-site Disposal or Other Releases
2012			
Ammonia	18,900	.	18,900
Copper Compounds	.	.	.
Dimethyl Phthalate	.	.	.
Manganese Compounds	.	.	.
Styrene	137,360	.	137,360
Zinc Compounds	18	.	18
2011			
Ammonia	20,175	.	20,175
Copper Compounds	.	.	.
Manganese Compounds	.	.	.
Styrene	119,160	.	119,160
Zinc Compounds	0	.	0
2010			
Ammonia	17,100	.	17,100
Copper Compounds	.	.	.
Manganese Compounds	.	.	.
Styrene	95,080	.	95,080
Zinc Compounds	0	.	0
2009			
Ammonia	16,255	.	16,255
Copper Compounds	.	.	.
Manganese Compounds	.	.	.
Styrene	93,936	.	93,936
Zinc Compounds	0	.	
2008			
Ammonia	11,805	.	11,805
Copper Compounds	.	.	.
Manganese Compounds	.	.	.
Styrene	147,780	.	147,780
Zinc Compounds	0	.	0

Source: Environmental Protection Agency Toxics Release Inventory (TRI), http://iaspub.epa.gov/triexplorer/tri_release.chemical, retrieved 5/8/2014

TRI data reflect releases and other waste management activities of chemicals, not whether (or to what degree) the public has been exposed to those chemicals. Release estimates alone are not sufficient to determine exposure or to calculate potential adverse effects on human health and the environment. TRI data, in conjunction with other information, can be used as a starting point in evaluating exposures that may result from releases and other waste management activities which involve toxic chemicals. The determination of potential risk depends upon many factors, including the toxicity of the chemical, the fate of the chemical, and the amount and duration of human or other exposure to the chemical after it is released.

Pipelines

The U.S. Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration maintains a database of pipeline incidents and mileage reports. According to the "Significant Incidents Listing", there have been no significant pipeline incidents in Cedar County from 2003-May 2014.

Probability of Future Occurrence

Based on the annual average of 7.5 spills per year reported to Iowa DNR since May 2005 (75 reported from May 2005 to May 2014-10 years), the probability of future occurrence of hazardous materials incidents is determined to be "Highly Likely".

Probability Score: 4—Highly Likely

Vulnerability

Vulnerability Overview

A hazardous materials incident can occur almost anywhere. So, all jurisdictions are considered to have at least some vulnerability to this hazard. People, pets, livestock, and vegetation in close proximity to facilities producing, storing, or transporting hazardous substances are at higher risk. Populations downstream, downwind, and downhill of a released substance are particularly vulnerable. Depending on the characteristics of the substance released, more people, in a larger area may be in danger from explosion, absorption, injection, ingestion, or inhalation.

Most of the hazardous materials incidents are localized and are quickly contained or stabilized. Depending on the characteristic of the hazardous material or the volume of product involved, the affected area can be as small as a room in a building or as large as 5 square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the product contaminates the municipal water supply or water system such as river, lake, or aquifer. The previous hazardous materials incidents in the planning area have been generally localized and quickly contained or stabilized. However, spills are costly to clean up due to the specialized equipment and training, and disposal sites that are necessary. With these factors in mind, magnitude was determined to be "limited". It is noted that it is possible for a larger scale event to occur in the planning area, especially due to the major highways that traverse the County.

Magnitude Score: 2—Limited

Potential Losses to Existing Development

The impact of this type of disaster will likely be localized to the immediate area surrounding the incident. The initial concern will be for people, then the environment. If contamination occurs, the spiller is responsible for the cleanup actions and will work closely with responders in the local jurisdiction, the Iowa Department of Natural Resources, and the Environmental Protection Agency to ensure that cleanup is done safely and in accordance with federal and state laws.

As mentioned, it is difficult to determine the potential losses to existing development because of the variable nature of a hazardous materials spill. For example, a spill of a toxic airborne

chemical in a populated area could have greater potential for loss of life. By contrast a spill of a very small amount of a chemical in a remote rural area would be much less costly and possibly limited to remediation of soil.

According to the Pipelines and Hazardous Materials Safety Administration in the Department of Transportation, the overall average per-gallon response cost for crude oil, gasoline, and other fuels is $1,270 per gallon. To determine the potential cost for future hazardous materials spills in Cedar County, the average number of gallons spilled in incidents with a material type indicated as "petroleum" was calculated. From May 2005 to May 2014, there were 32 incidents that involved "petroleum" material with a total 947 spilled for an average of 29.6 gallons per spill. At $1,270 per gallon, this translates to a cleanup cost of $37,592 per spill. During the 10 year reporting period, there was a total of 947 gallons of petroleum type hazardous materials spilled for a total estimated cleanup cost of $1,202,690 for the entire 10-year period and an average annual cost of $120,269.

To analyze critical facilities at risk in the planning area, the planning committee compiled an inventory of 184 critical and essential facilities and infrastructure in the planning area. A comparison was made with the locations of Tier II Facilities to determine those critical/essential facilities that are within ½ mile of Tier II fixed chemical facilities. This analysis revealed 80 critical or essential facilities within ½ mile of fixed chemical facilities with the Tier II reporting requirement. Appendix E contains the results of analysis. This Appendix is "For Official Use Only". To obtain access for official use, contact the Cedar County Emergency Manager.

Future Development

Interstate 80 is one of the United States' most important freight corridors for east/west movements. This Interstate is projected to experience substantial growth in freight traffic over the coming years. Interstate 80 is perhaps one of the most significant roadways in the United States connecting many major cities including New York, Cleveland, Chicago, Salt Lake City and San Francisco.

The number and types of hazardous chemicals stored and transported through Cedar County will likely continue to increase. As populations grow, this also increases the number of people vulnerable to the impacts of hazardous materials spills. Population and business growth along major transportation corridors increases the vulnerability to transportation hazardous materials spills.

Hazardous Materials Hazard Summary by Jurisdiction

Transportation Hazardous Materials Incidents can, and have, occurred in all cities and the unincorporated county. Therefore all are considered to have some probability for transportation hazardous materials incidents. All cities with the exception of Bennett have pipelines near them. Fixed facility incidents at Tier II facilities are limited to those jurisdictions that have these facilities. Of the cities in the planning area, Bennett, Durant, and Wilton (Cedar County portion) do not have any Tier II Facilities. Since all jurisdictions have exposure through at least one source for potential hazardous materials incidents and since records indicate spills have occurred in all cities and the unincorporated county, the probability for all was determined to be 4, Highly Likely. For the schools, the probability was determined to be 1. The magnitude was determined to be slightly variable based on the presence of major highways, railroads, fixed facilities, and pipelines. If 3 or more are present, the magnitude was determined to be 2-limited, if 2 or fewer were present, the magnitude was determined to be 1-negligible. The magnitude for the School Districts was determined to be 1 for those with no buildings in the ½ mile buffer zone of Tier II Facilities. If a building is in the ½ mile buffer zone, the magnitude was determined to be a 2.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	4	2	4	1	3.10	High
City of Bennett	4	1	4	1	2.80	Moderate
City of Clarence	4	2	4	1	3.10	High
City of Durant	4	2	4	1	3.10	High
City of Lowden	4	2	4	1	3.10	High
City of Mechanicsville	4	2	4	1	3.10	High
City of Stanwood	4	2	4	1	3.10	High
City of Tipton	4	2	4	1	3.10	High
City of West Branch	4	2	4	1	3.10	High
Bennett School District, #603	1	1	4	1	1.45	Low
Durant School District, #1926	1	1	4	1	1.45	Low
North Cedar School District, #3691	1	1	4	1	1.45	Low
Tipton School District #6408	1	1	4	1	1.45	Low
West Branch School District #6930	1	1	4	1	1.45	Low

3.5.9 Radiological Incident

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
1	3	4	4	2.35	Moderate

Profile

Hazard Description

A radiological incident is an occurrence resulting in the release of radiological material at a fixed facility (such as power plants, hospitals, laboratories, etc) or in transit.

Radiological incidents related to transportation are described as an incident resulting in a release of radioactive material during transportation. Transportation of radioactive materials through Iowa over the interstate highway system is considered a radiological hazard. The transportation of radioactive material by any means of transport is licensed and regulated by the federal government. As a rule, there are two categories of radioactive materials that are shipped over the interstate highways:

1. Low level waste consists of primarily of materials that have been contaminated by low level radioactive substances, but pose no serious threat except through long term exposure. These materials are shipped in sealed drums within placarded trailers. The danger to the public is no more than a wide array of other hazardous materials.
2. High level waste, usually in the form of spent fuel from nuclear power plants, is transported in specially constructed casks that are built to withstand a direct hit from a locomotive.

Warning Time Score: 4—less than six hours warning time

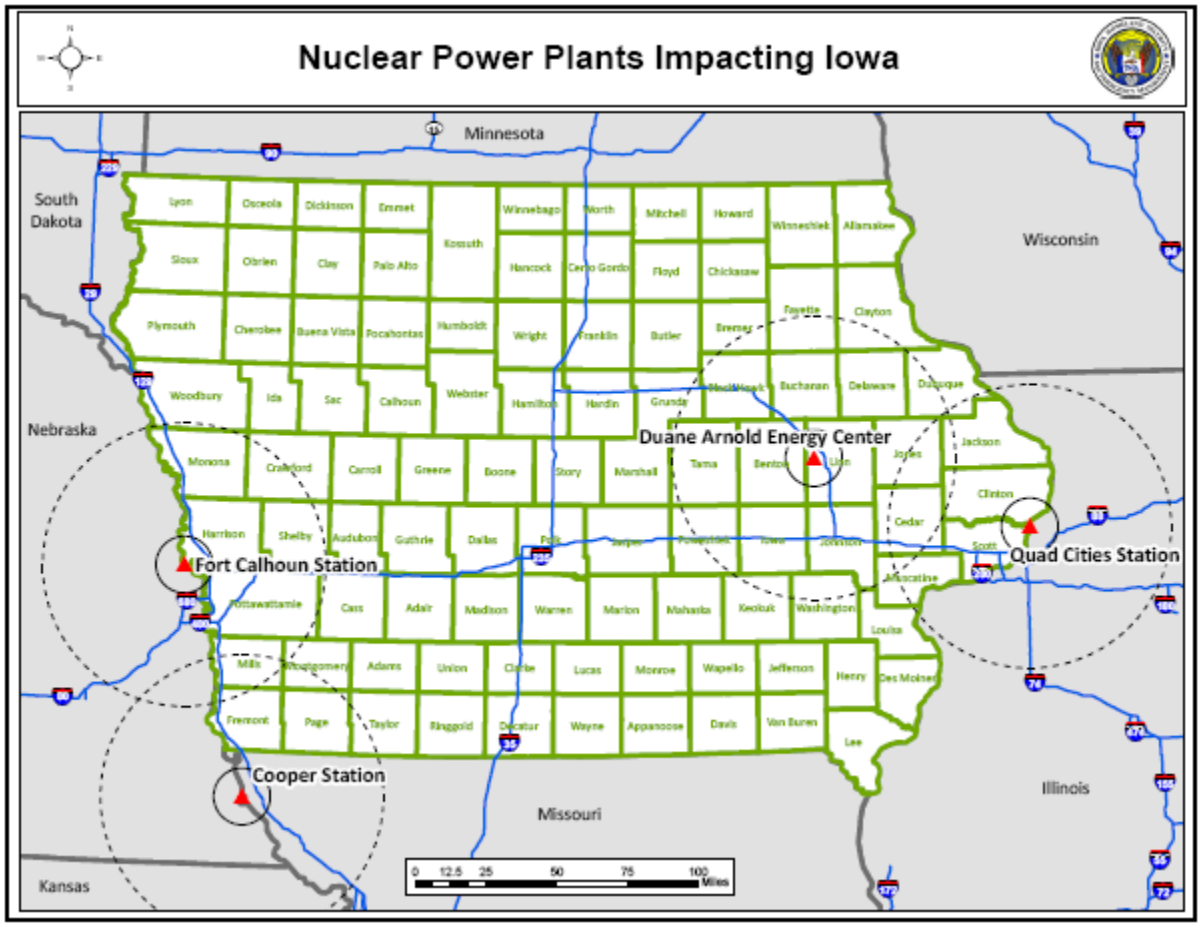
Duration Score: 4—More than 1 week

Geographic Location/Extent

Fixed Facilities

An incident resulting in a release of radiological material at a fixed facility is a fixed radiological incident. There is one nuclear power plant located within Iowa: the Duane Arnold Energy Center near Palo in Linn County. There are three additional nuclear facilities in adjacent states with planning buffer zones that cross into Iowa. Cedar County is in the 50-mile planning buffers of Duane Arnold Energy Center and Quad Cities Station in Illinois (see **Figure 3.19**).

Figure 3.19. Map of Nuclear Power Plants Impacting Iowa



Source: Iowa Homeland Security and Emergency Management

According to the Iowa Department of Public Health, there are no licensed radioactive material facilities in Cedar County. The Cedar County Health Department does not maintain any special radiological plans outside this plan and the County Emergency Operations Plan.

Transportation Radiological Incidents

There is potential for the transport of low-level radioactive waste in all jurisdictions within Cedar County. For high-level waste, Interstate 80 has been identified as a potential transportation route for nuclear waste material. In Cedar County, I-80 traverses the jurisdictions of: unincorporated Cedar County and West Branch.

Previous Occurrences

The U.S. Regulatory Commission has emergency classifications divided into four categories. Each level has a certain response requirement from the plant and government. The following are the emergency classifications from least to most severe:

- Unusual Event

- Alert
- Site Area Emergency
- General Emergency

Since 1990, the following emergency classifications have occurred for the two nuclear plants that Cedar County is in the 50-mile planning buffer.

- Duane Arnold Energy Center has had seven Unusual Events, one Alert, and no Site Area Emergencies or General Emergencies.
- Quad Cities Nuclear Power Plan has had 18 Unusual Events, seven Alerts, and no Site Area Emergencies or General Emergencies.

According to the Iowa State Hazard Mitigation Plan, 2013, there have been no occurrences of a radiological transportation incident in Iowa since 1990.

Probability of Future Occurrence
Based on the minor number of previous occurrences for this hazard and the relatively few locations within the county that house radioactive material, the probability of future occurrences of radiological incidents is “Unlikely”.

Probability Score: 1—Unlikely

Vulnerability

Vulnerability Overview
In general, danger to the public in the planning area is less than a wide array of other hazardous materials. Those working with or near sources of radiation are at a greater risk than the general citizens in the planning area. Those responding to a radiological incident should be trained in recognizing a radiological incident and minimize exposure to radioactive materials.

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

Magnitude Score: 3—Critical

Potential Losses to Existing Development
Responding to the effects of a radiological incident in the planning area would be extensive and would require resources and assistance from several state and federal agencies to determine and evaluate the threat to life and the environment. Due to the variable nature of this hazard, it is not possible to quantify potential losses.

Future Development
Increased development near fixed facilities that house radioactive materials and along transportation corridors would increase the number of people vulnerable to this hazard in the planning area.

Radiological Incident Hazard Summary by Jurisdiction

The whole planning area is considered moderate risk for a radioactive incident since the whole county is within the 50-mile planning buffers of either the Duane Arnold Energy Center or Quad Cities Station.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	1	3	4	4	2.35	Moderate
City of Bennett	1	3	4	4	2.35	Moderate
City of Clarence	1	3	4	4	2.35	Moderate
City of Durant	1	3	4	4	2.35	Moderate
City of Lowden	1	3	4	4	2.35	Moderate
City of Mechanicsville	1	3	4	4	2.35	Moderate
City of Stanwood	1	3	4	4	2.35	Moderate
City of Tipton	1	3	4	4	2.35	Moderate
City of West Branch	1	3	4	4	2.35	Moderate
Bennett School District, #603	1	3	4	4	2.35	Moderate
Durant School District, #1926	1	3	4	4	2.35	Moderate
North Cedar School District, #3691	1	3	4	4	2.35	Moderate
Tipton School District #6408	1	3	4	4	2.35	Moderate
West Branch School District #6930	1	3	4	4	2.35	Moderate

3.5.10 River Flooding

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
4	3	1	4	3.25	High

Profile

Hazard Description

Flooding has been a major problem for many of the communities in Cedar County. Many of the communities were settled and developed largely because of their proximity to water resources. A flood is partial or complete inundation of normally dry land areas. Heavy precipitation can cause flooding either in the region of precipitation or in areas downstream. Heavy accumulations of ice or snow can also cause flooding during the melting stage. These events are complicated by the freeze/thaw cycles characterized by moisture thawing during the day and freezing at night. There are two main types of flooding in the planning area: riverine flooding and flash flooding which includes ice jam flooding. Flash flooding is discussed separately in **Section 3.5.6.**

Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt or ice melt. The areas adjacent to rivers and stream banks that carry excess floodwater during rapid runoff are called floodplains. A floodplain is defined as the lowland and relatively flat area adjoining a river or stream. The terms “base flood” and “100-year flood” refer to the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year. Floodplains are part of a larger entity called a basin, which is defined as all the land drained by a river and its branches.

Flooding caused by dam failure is discussed in **Section 3.5.1**

Warning Time Score: 1—More than 24 hours warning time

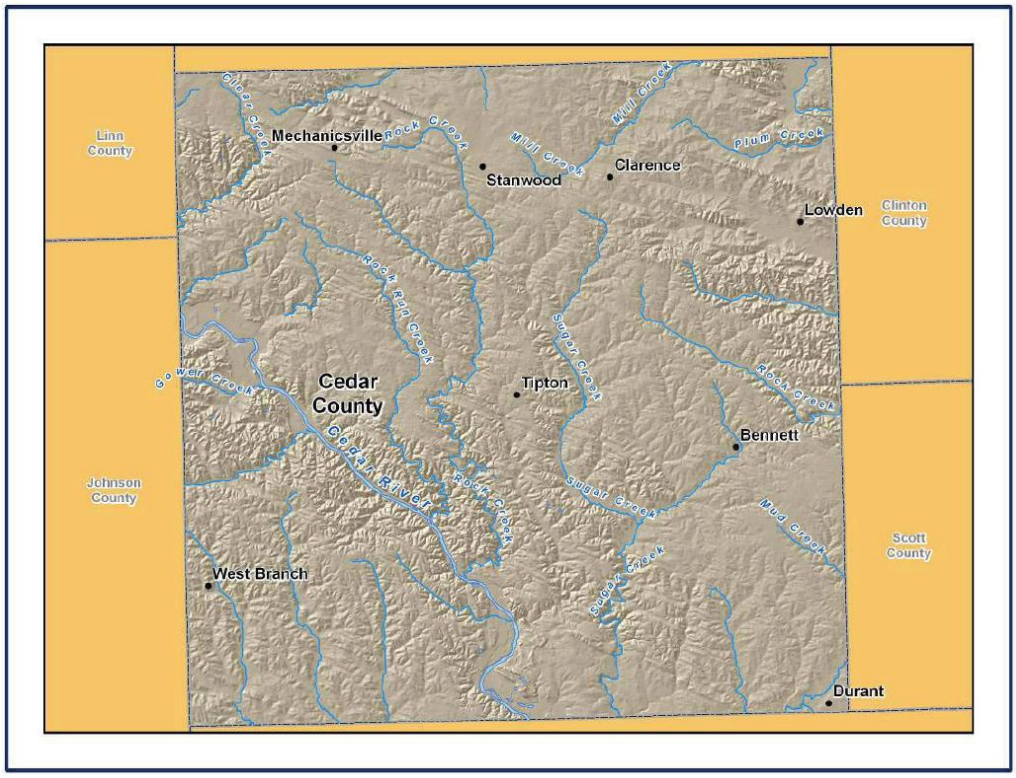
Duration Score: 4—More than 1 week

Geographic Location/Extent

Cedar County has two major rivers within its borders. The Cedar River enters along the west border with Johnson County. The river then flows in a southeast direction and exits on the southern border just north of the town of Moscow. The Cedar River makes an interesting 90 degree turn to the southwest after leaving Cedar County due to a particularly hard outcropping of limestone along the border with Muscatine County. The Wapsipinicon River enters Cedar County in the extreme northeast part of the county from Jones County. It flows through Cedar County for only a few miles before it enters Clinton County.

Cedar County has a gently rolling to steep upland terrain, deeply dissected in places by rivers and streams. The areas immediately north and south of the Cedar and Wapsipinicon Rivers are characterized by an intricate pattern of deep valleys and ravines that have steep slopes. Small streams extend into the uplands. The bottom lands along the Cedar and Wapsipinicon rivers are nearly level. Stream terraces along the rivers are nearly level to undulating. Upland hills rise 100 to 200 feet from the level of the floodplains. The northern one-fourth of Cedar County has a gently undulating topography that is called the Iowan Erosion Surface. A broad dissected plain that makes up the largest part of Cedar County separates the Cedar and Wapsipinicon Rivers. **Figure 3.20** below displays the river system and shaded topographic relief of Cedar County.

Figure 3.20. Cedar County Shaded Relief Map



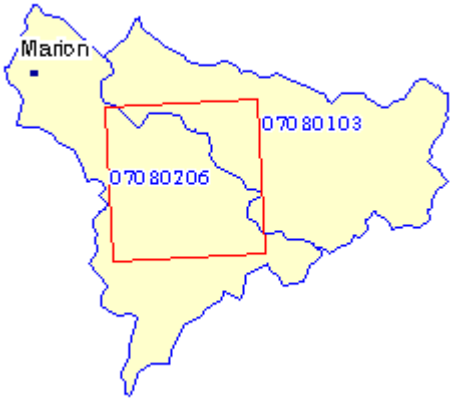
Source: 2011 *Cedar County Multi-jurisdictional Hazard Mitigation Plan*

Cedar County crosses two watersheds. A list of these watersheds with the cities contained within each is provided below:

- 07080103 Lower Wapsipinicon—Clarence, Lowden, Mechanicsville, Unincorporated County
- 07080206 Lower Cedar—Bennett, Durant, Mechanicsville, Stanwood, Tipton, West Branch, Wilton, and Unincorporated County

Figure 3.21 shows the two watersheds in Cedar County.

Figure 3.21. Cedar County, Iowa Watersheds (Cedar County is red square)



Source: Environmental Protection Agency, http://cfpub.epa.gov/surf/county.cfm?fips_code=19031

For purposes of this hazard profile and vulnerability analysis, the geographic location/extent for river flooding will be considered as those areas at risk to the 100-year flood (also known as the 1-percent annual chance flood). The 1-percent annual chance flood has been adopted by FEMA as the base flood for floodplain management purposes.

Determining "Best Available Data" To Depict the 1-Percent Annual Chance Flood

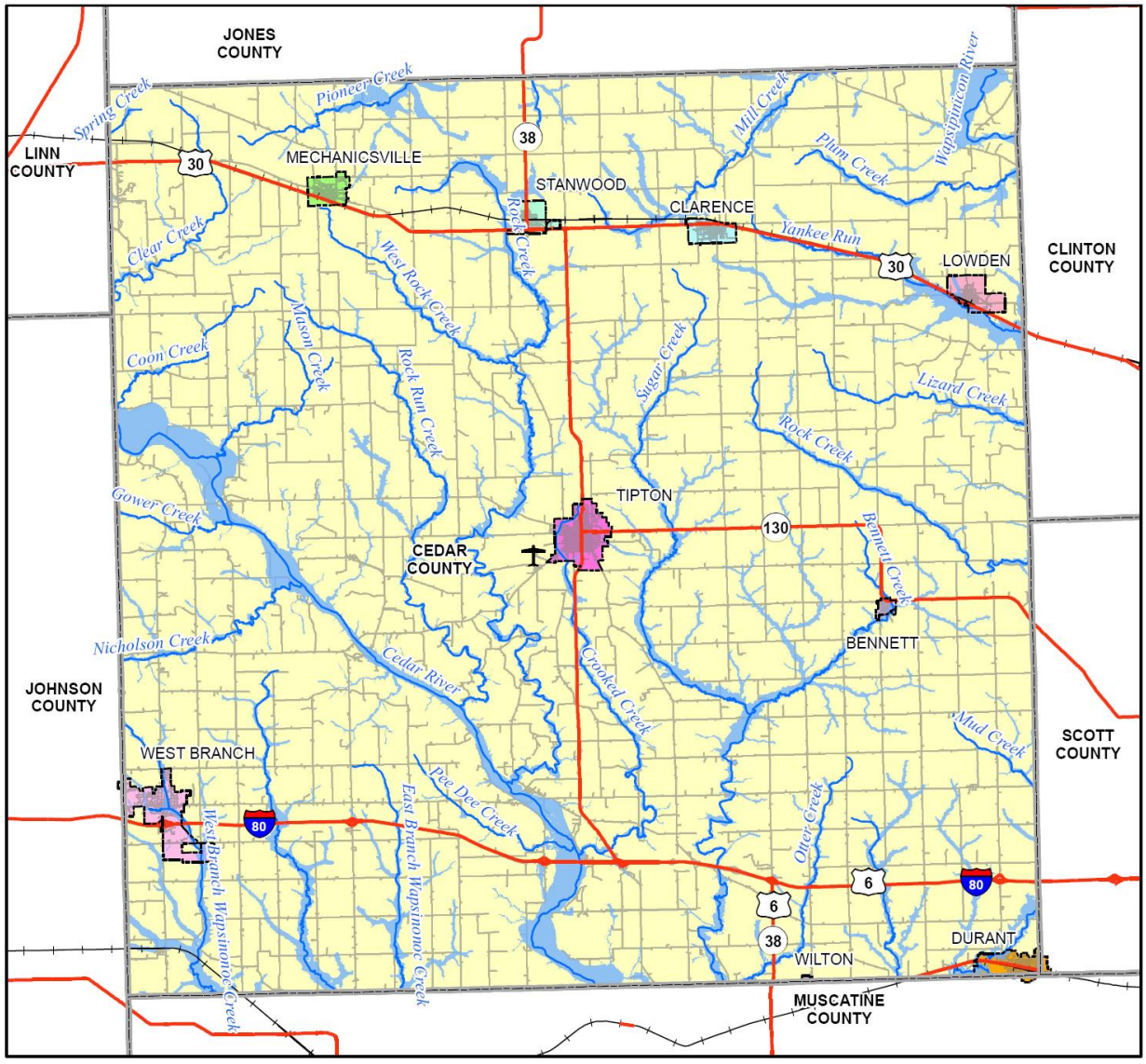
With the availability of a Digital Flood Insurance Rate Map (DFIRM) as well as detailed parcel data with assessed values, analysis of these two layers was determined to be the preferred approach for the Flood Risk Assessment. This will allow for analysis of actual structures and values by type that fall within the boundaries of the regulatory floodplain. A Level I HAZUS analysis, which can provide loss estimates according to the depth-damage function is considered to be less accurate since census block data is used and aggregated and the HAZUS approximated floodplain considers only those streams that drain 10 square miles or more.

Jurisdictional Flood Hazard Maps

Figure 3.22 to **Figure 3.30** provide the DFIRM 1-percent annual chance floodplain for all jurisdictions in the planning area. The county-level map is provided first and the remaining maps are provided in alphabetical order by city. Appendix E provides locations of available

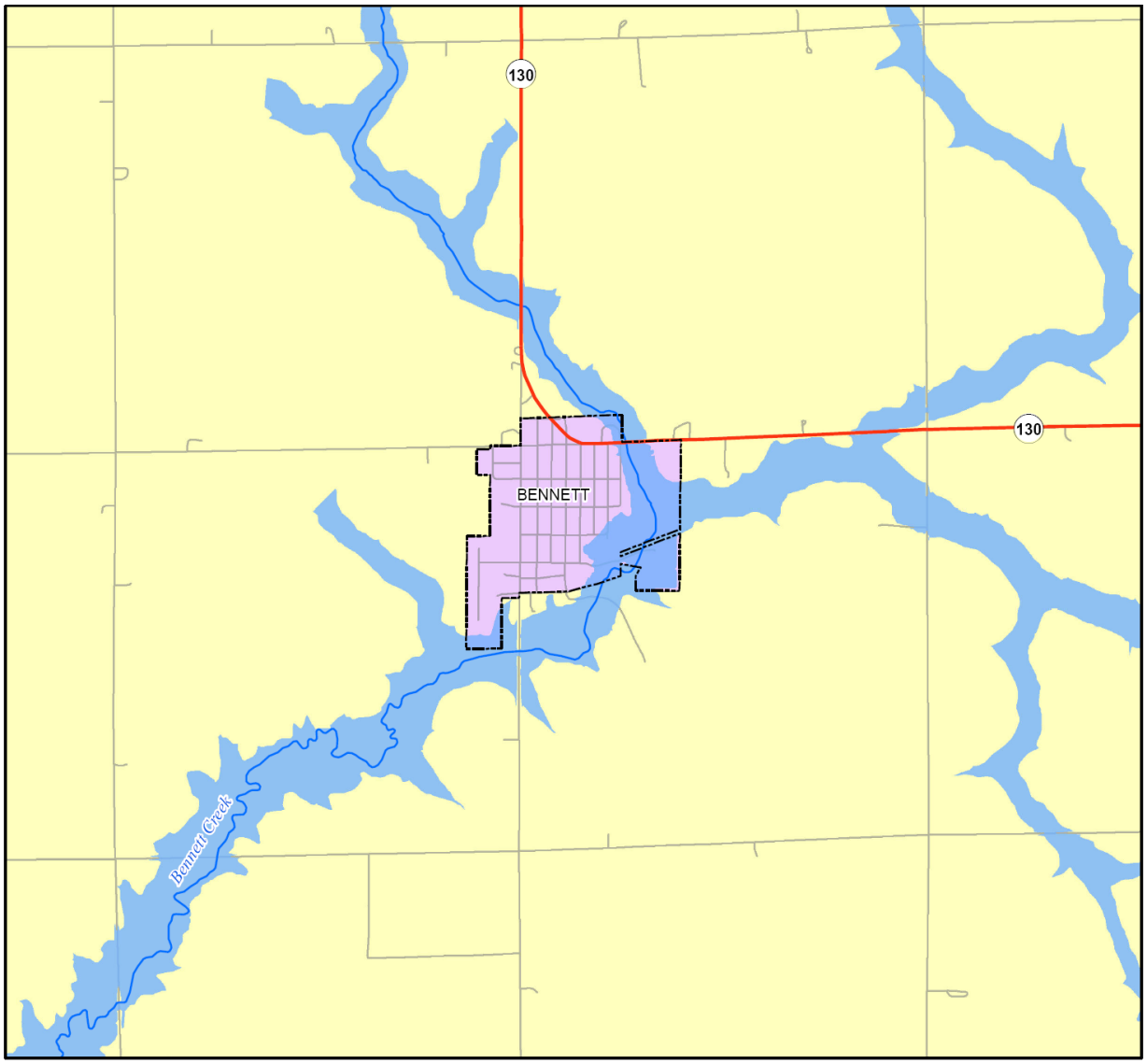
critical facilities in relation to the 1-percent annual chance floodplain. This will be discussed in greater detail in the vulnerability section. Please Note: The City of Clarence has “no special flood hazard areas identified”. Additionally, there is no Flood Map for the small portion of the City of Wilton that is in Cedar County as the City of Wilton was not included in the DFIRM for Cedar County. See the separately published Muscatine County Flood Insurance Report and Flood Insurance Rate Map as well as the Muscatine County Multi-jurisdictional Hazard Mitigation Plan for additional flood risk details for the City of Wilton.

Figure 3.22. Cedar County DFIRM 1-Percent Annual Chance Floodplain (100-Year Floodplain



Map Compiled: 04/2014
Intended for planning purposes only
Source: Cedar County GIS Department, Iowa DNR, FEMA

Figure 3.23. City of Bennett DFIRM 1-Percent Annual Chance Floodplain (100-Year Floodplain



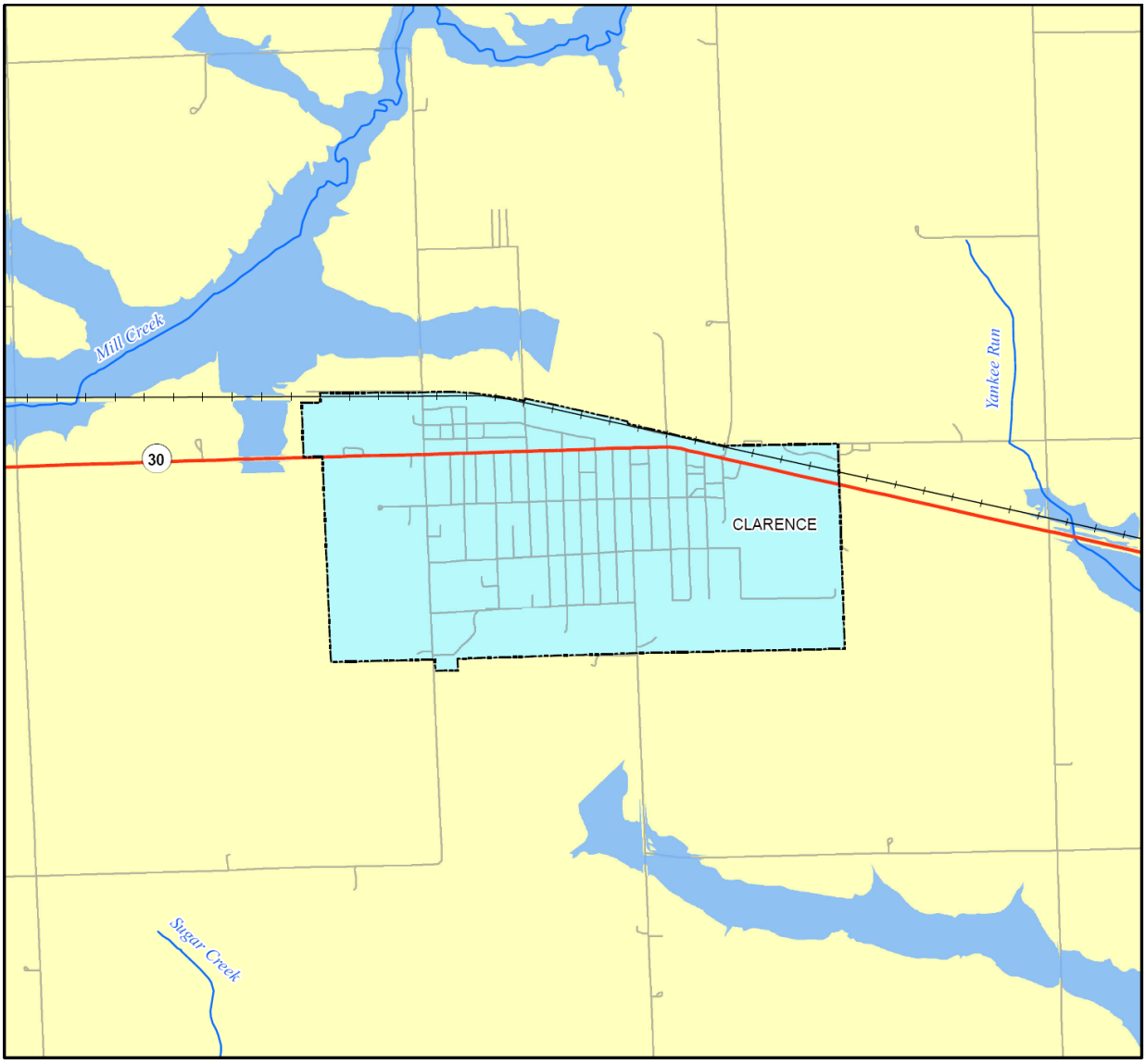
0 0.25 0.5 1 Miles

N

Map Compiled: 04/2014
Intended for planning purposes only
Source: Cedar County GIS Department, Iowa DNR, FEMA

Counties
Cities
Airports
100 Year Floodplain
Highways
Railroads
Streams
Local Roads

Figure 3.24. City of Clarence DFIRM 1-Percent Annual Chance Floodplain (100-Year Floodplain



Map Compiled: 04/2014
Intended for planning purposes only
Source: Cedar County GIS Department, Iowa DNR, FEMA

Figure 3.25. City of Durant DFIRM 1-Percent Annual Chance Floodplain (100-Year Floodplain

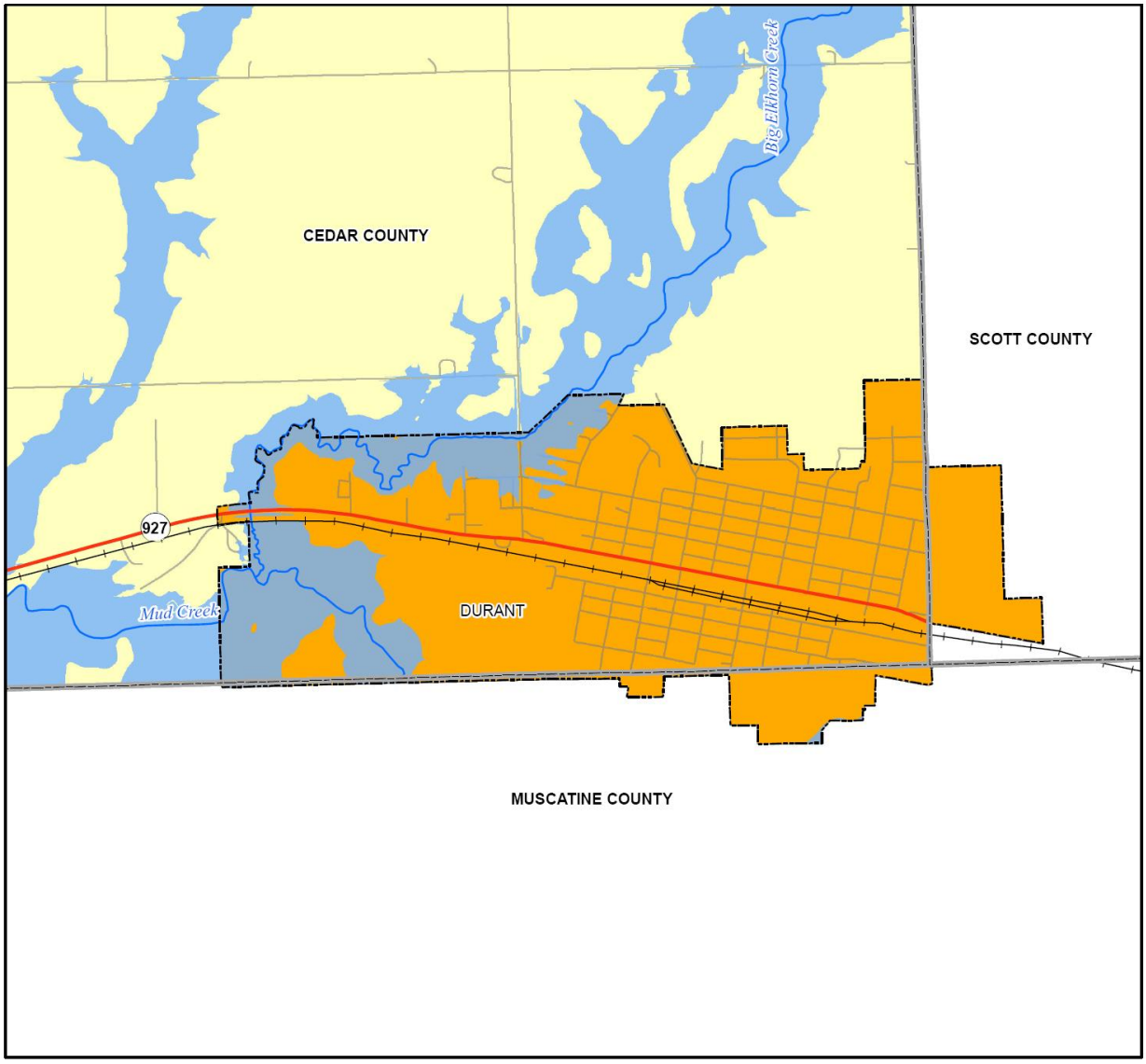


Figure 3.26. City of Lowden DFIRM 1-Percent Annual Chance Floodplain (100-Year Floodplain

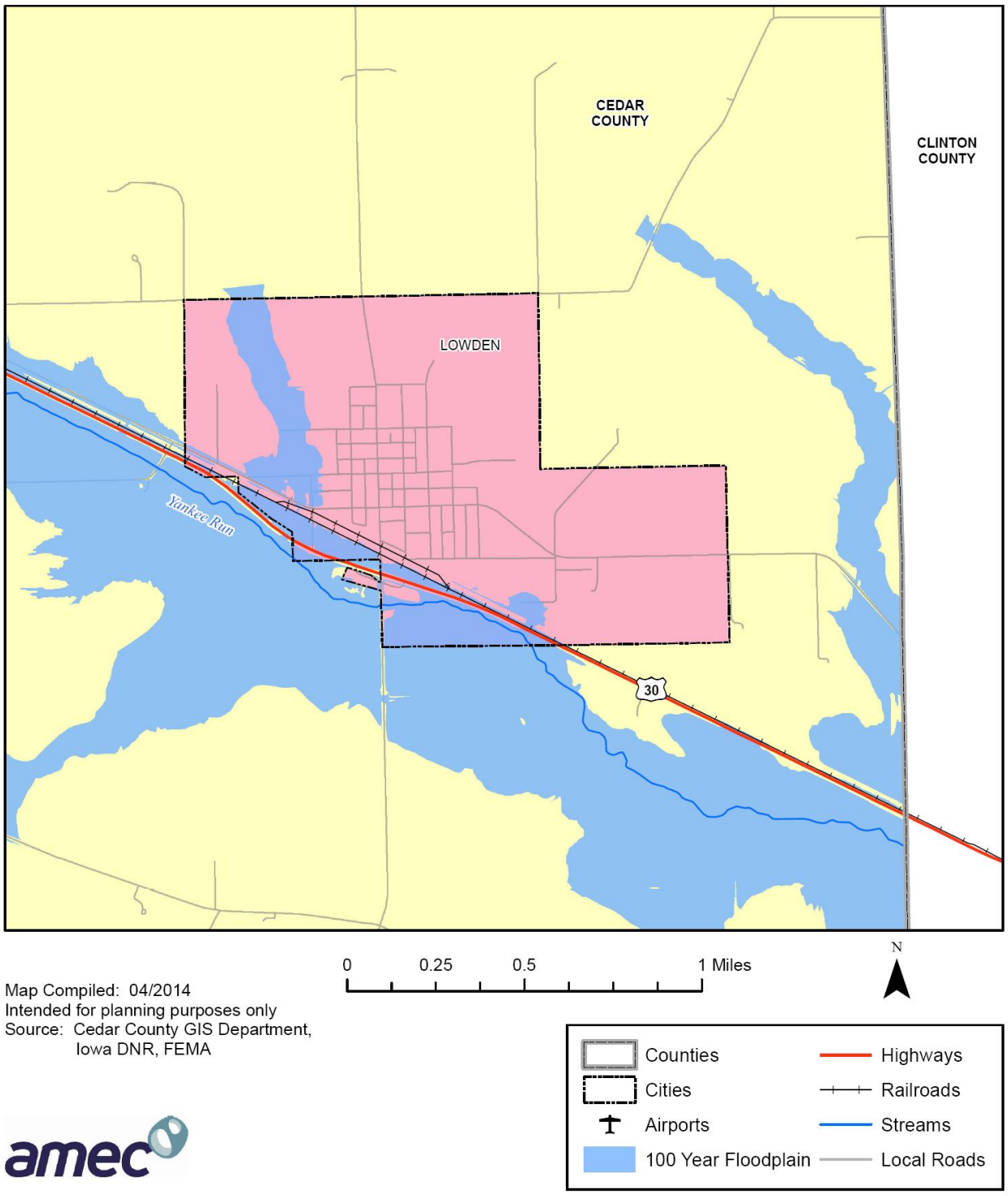
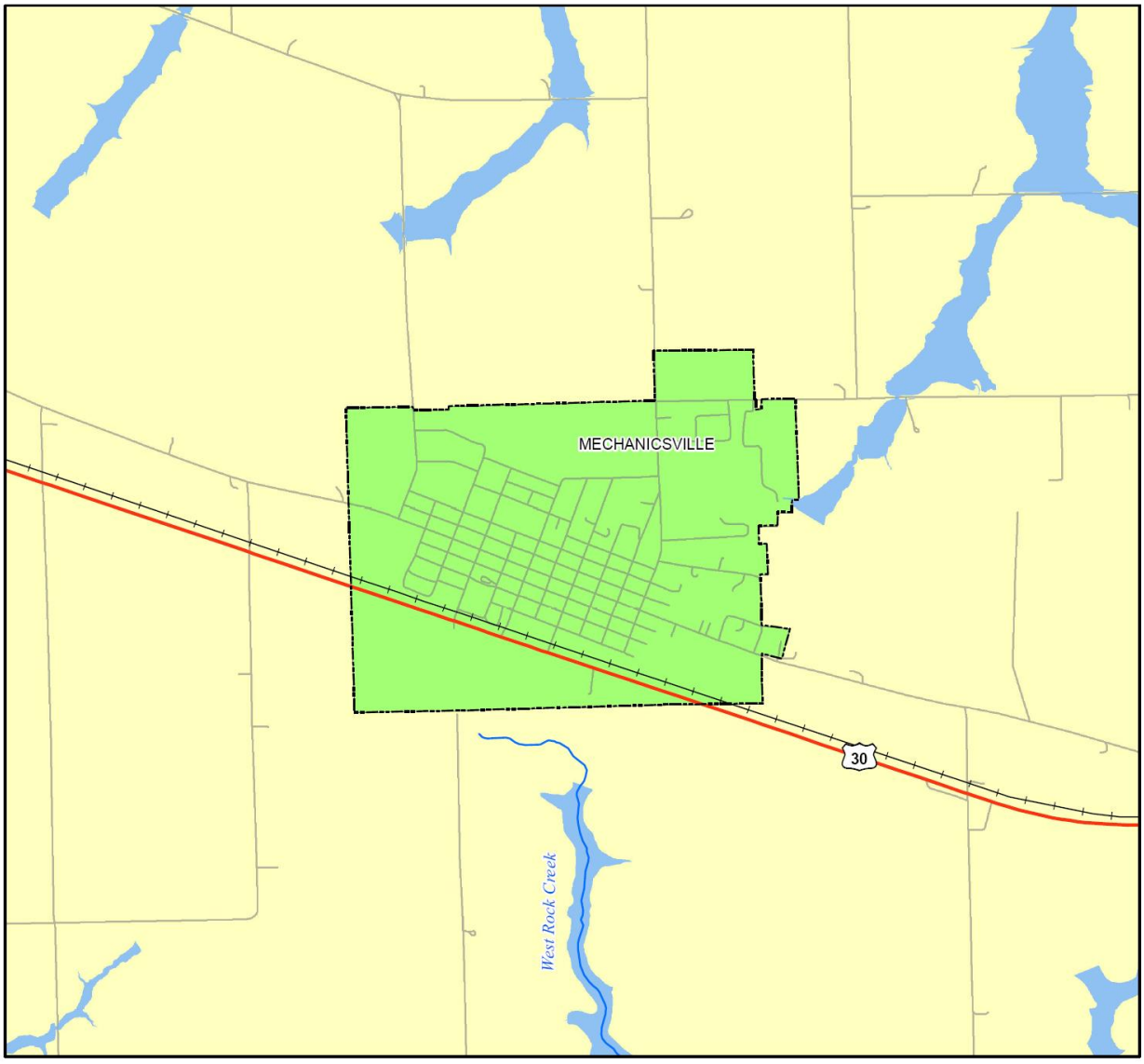


Figure 3.27. City of Mechanicsville DFIRM 1-Percent Annual Chance Floodplain (100-Year Floodplain



0 0.25 0.5 1 Miles

N

Map Compiled: 04/2014
Intended for planning purposes only
Source: Cedar County GIS Department, Iowa DNR, FEMA

Counties
Cities
Airports
100 Year Floodplain
Highways
Railroads
Streams
Local Roads

Figure 3.28. City of Stanwood DFIRM 1-Percent Annual Chance Floodplain (100-Year Floodplain

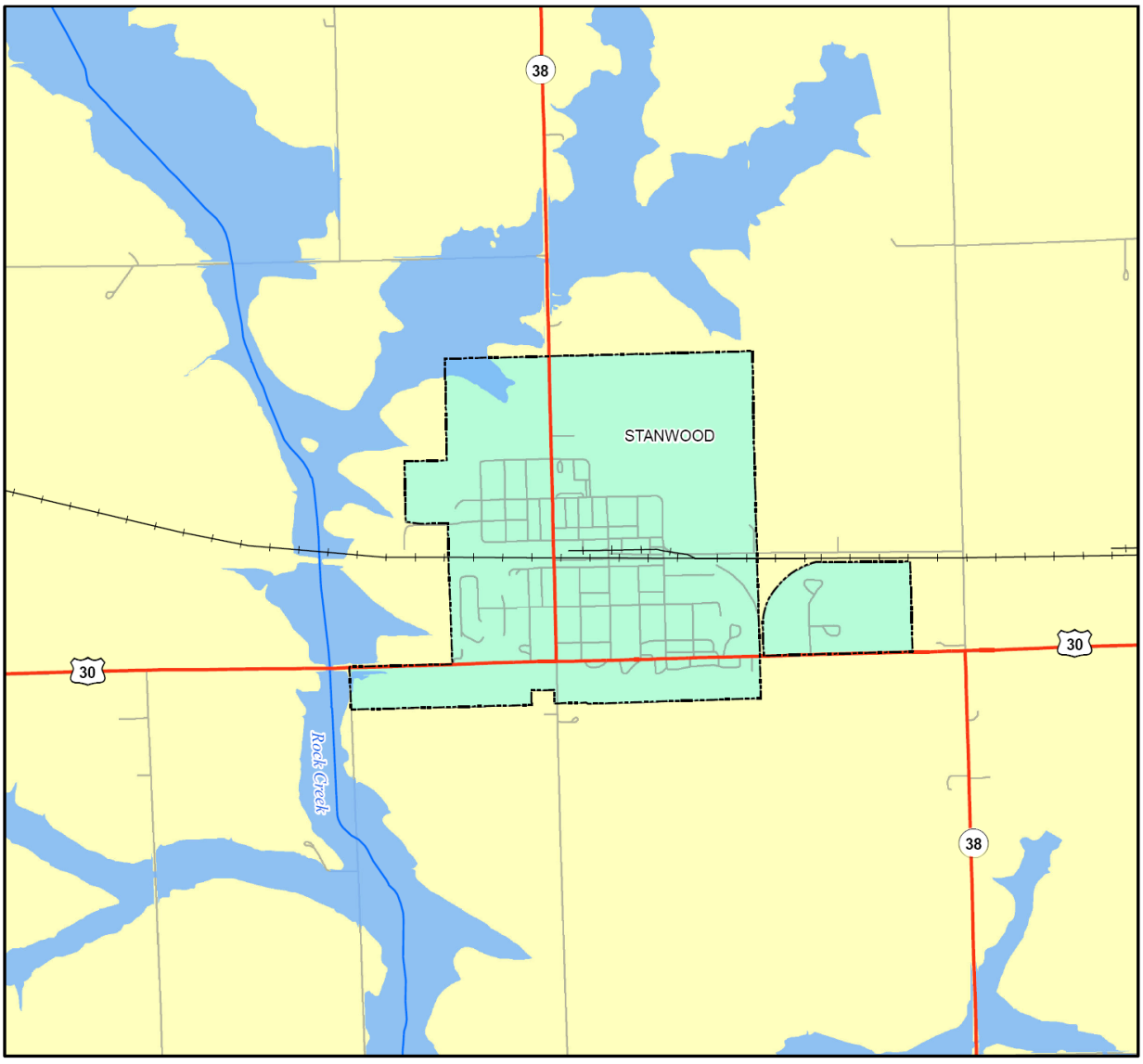


Figure 3.29. City of Tipton DFIRM 1-Percent Annual Chance Floodplain (100-Year Floodplain

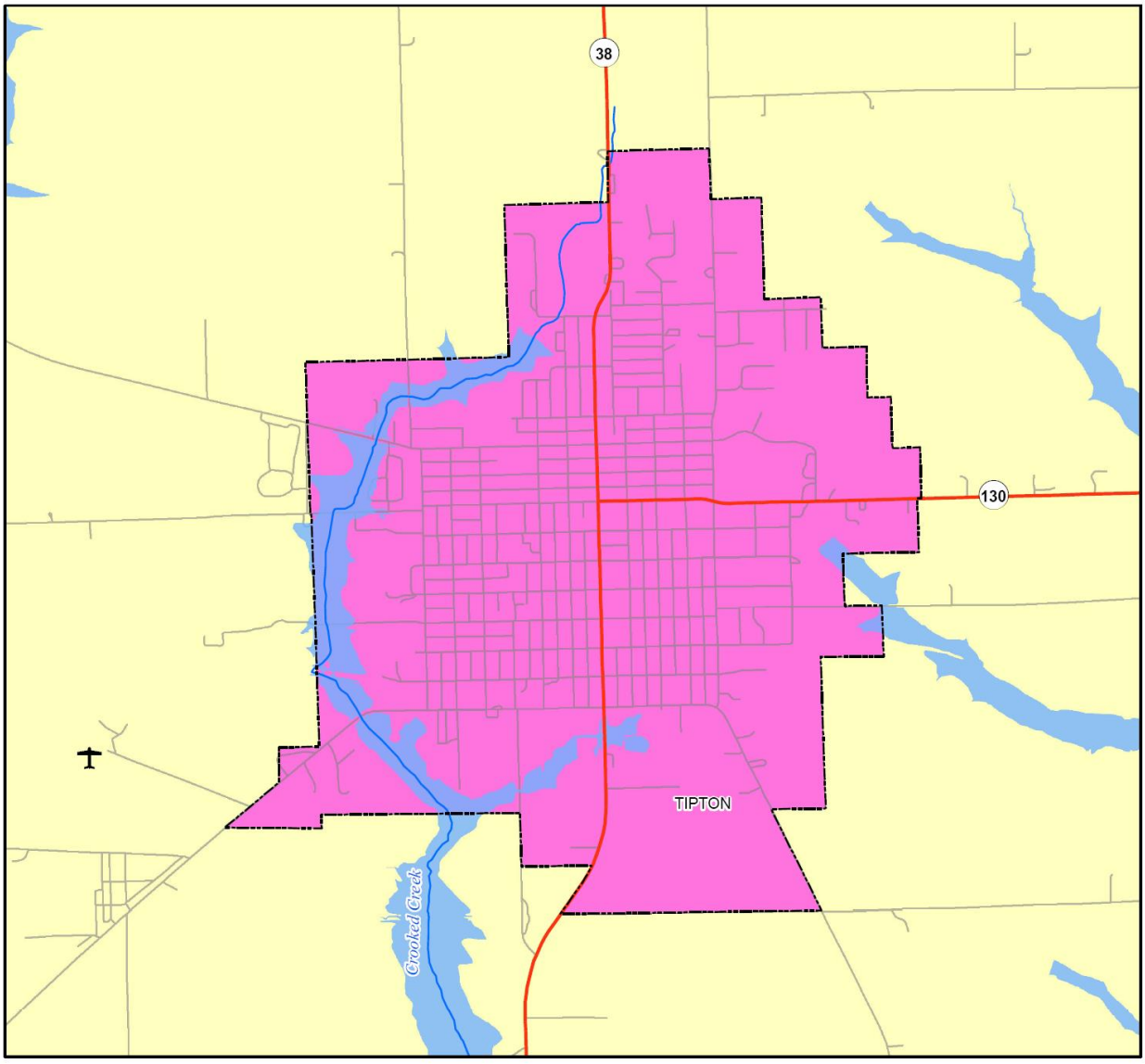
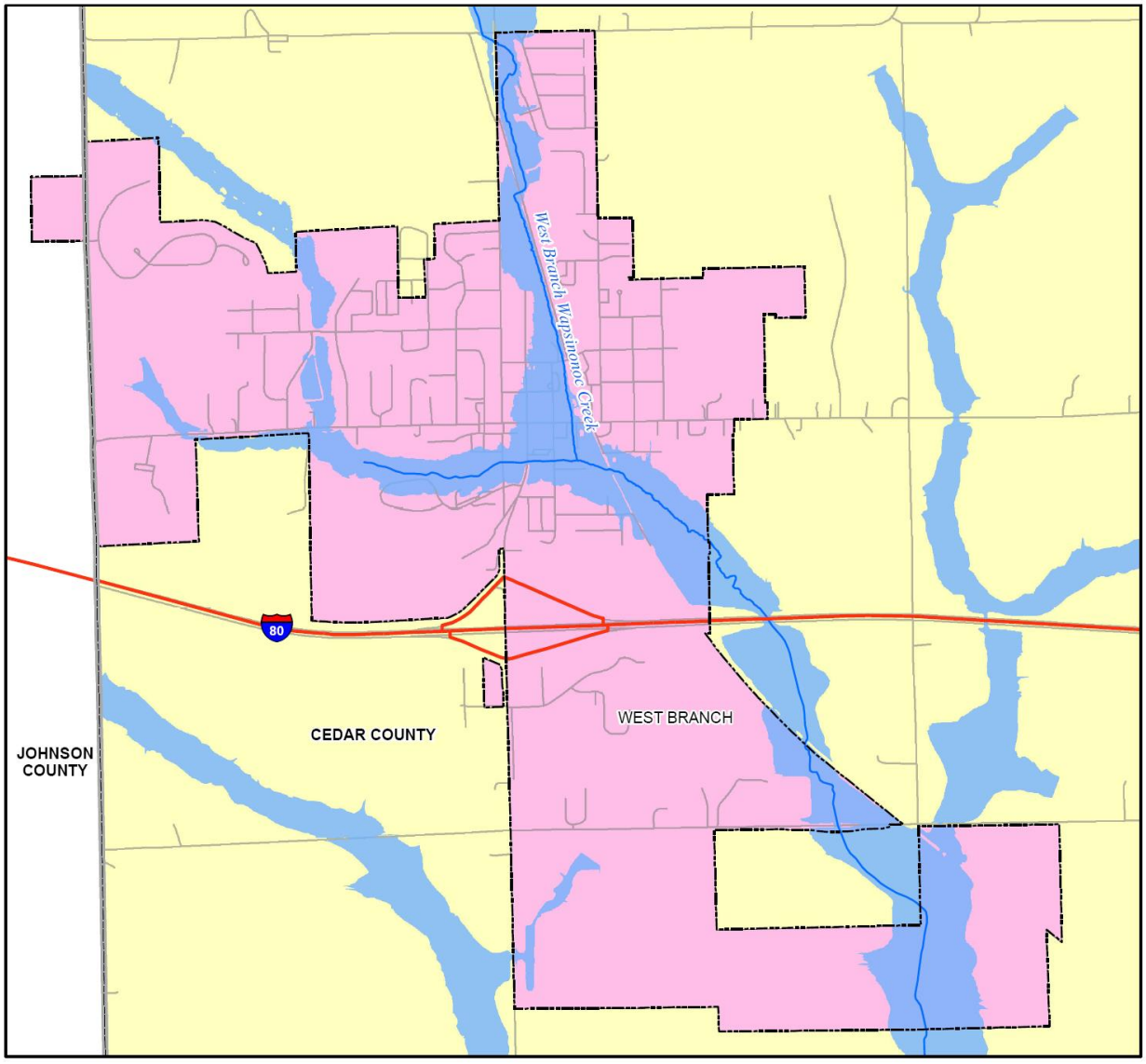


Figure 3.30. City of West Branch DFIRM 1-Percent Annual Chance Floodplain (100-Year Floodplain



Map Compiled: 04/2014
Intended for planning purposes only
Source: Cedar County GIS Department, Iowa DNR, FEMA

Previous Occurrences

This section provides information on previous occurrences of riverine flooding in the planning area.

Presidential Declarations for Flooding in Planning Area

Since 2004 there have been five Presidential Disaster Declarations that included flooding in the planning area. Only two declarations during this time period did not include flooding and those were for Winter/Snow Storm. Additional details of the flood-related disaster declarations are provided in **Table 3.40**

Table 3.40. FEMA Flood Disaster Declarations that included Cedar County, Iowa, 2004-2013

Number	Declared	Incident Period	Description
4187	8/5/2014	6/26 to 7/7/2014	Severe Storms, Tornadoes, Straight-line Winds, and Flooding
4135	07/31/2013	06/21 to 06/28/2013	Severe Storms, Tornadoes, and Flooding
4119	05/31/2013	04/17 to 04/30/2013	Severe Storms, Straight-line Winds, and Flooding
1763	5/27/2008	5/25 to 8/13/2008	Severe Storms, Tornadoes and Flooding
1518	05/25/2004	5/19 to 6/24/2004	Severe Storms, Tornadoes, and Flooding

Source: Federal Emergency Management Agency, www.fema.gov/

The following section provides additional detail regarding principle flooding issues and previous flooding events in the planning area.

Unincorporated Cedar County

The Cedar and Wapsipinicon Rivers are the major river systems in the county. The floodplains of these main-stem rivers and their tributaries criss-cross the county. The main flood season in Cedar County is in spring and early summer. Most of the larger floods have resulted from heavy general rains during this season. Presence of railroad and interstate highway embankments, restrictive bridges, and buildings in the floodplain has added further complications to the flooding. The greatest known flood flow on record occurred in 1967.

City of Bennett

The Bennett Creek floodplain traverses north-south along the eastern side of city limits as well and wraps east-west across the southern boundary.

City of Clarence

There are No Special Flood Hazard Areas within the corporate limits of the City of Clarence. However, the Mill Creek floodplain is in the unincorporated county area just to the northwest of corporate limits.

City of Durant

The Big Elkhorn Creek floodplain extends east-west over the western half of the northern corporate boundary and the floodplain combined with the Mud Creek floodplain covers the western boundary of the city as well.

City of Lowden

The broad floodplain of the Yankee Run River extends over the southwest boundary of city limits.

City of Mechanicsville

The floodplain of a small tributary of Pioneer Creek touches a very small section of the western corporate boundary.

City of Stanwood

Rock Creek flows through the unincorporated county to the west of the City of Stanwood. Small portions of the floodplain extend into corporate limits on the southwest and northwest corners of city limits.

City of Tipton

Crooked Creek and its narrow floodplain flow along the western boundary of the city and a small portion of the floodplain a tributary of Sugar Creek extends into the city at the middle of the eastern city boundary.

City of West Branch

The West Branch Wapsinonoc Creek bisects the city north to south, including some developed areas of the city center. An offshoot tributary of the creek extends into the western city limits as well.

Previous Agricultural Impacts

Flooding and excess moisture take a toll on crop production in the planning area. According to the USDA's Risk Management Agency, payments for insured crop losses in the planning area as a result of excess moisture and flood conditions from 2004-2013 totaled $8,423,922. This translates to an annual average of $842,392. According to USDA Risk Management Agency's 2012 Iowa Crop Insurance Profile, 90.5 percent of insurable crops in Iowa were insured. **Table 3.41** summarizes the claims paid by year.

Table 3.41. Crop Insurance Claims Paid in Cedar County for Crop Loss as a result of Excess Moisture/Precipitation/Rain and Flood (2004-2013)

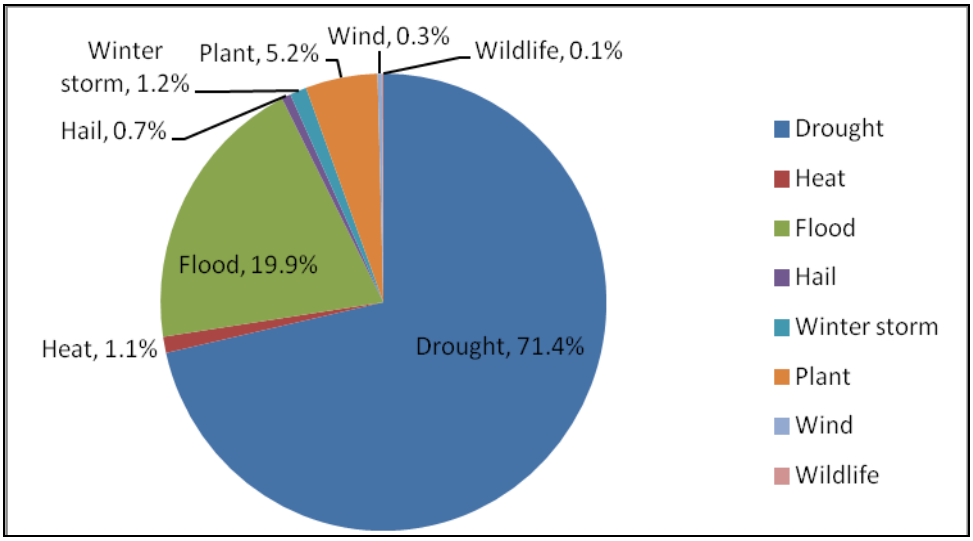
Crop Year	Crop Insurance Paid
2004	$455,633
2005	$40,429
2006	$32,930
2007	$832,588
2008	$4,427,371

Crop Year	Crop Insurance Paid
2009	$309,569
2010	$1,516,084
2011	$17,268
2012	$36,446
2013	$755,604
Total	**$8,423,922**

Source: USDA Risk Management Agency

An analysis of crop insurance paid as a result of all hazards reveals that19.9 percent of the crop insurance payments during this 10-year period from 2004-2013 were attributed to excess moisture/precipitation/rain and flood (see **Figure 3.31**).

Figure 3.31. Percent of Crop Insurance Payments in Cedar County by Hazard (2004-2013)



Source: Statistics from USDA Risk Management Agency, Analysis by AMEC

National Flood Insurance Program (NFIP) Participation

Table 3.42 provides details on NFIP participation for the communities in the planning area as well as the number of policies in force, amount of insurance in force, number of closed losses, and total payments for each jurisdiction, where applicable. The claims information is for the period from January 1, 1978 to December 31, 2013.

Table 3.42. NFIP Participation, Policy, and Claim Statistics (as of 12/31/2013)

Community Name	NFIP Participant (Yes/No)	Participant in CRS (Yes/No)	Community ID #	Current Effective Map Date	Regular-Emergency Program Entry Date	Policies in Force	Insurance in Force	Closed Losses	Total Payments
Cedar County	Yes	No	190050	8/19/2013	8/5/1985	29	$6,459,100	4	$495,604
Bennett	Yes	No	190051	08/19/2013(M)	9/4/1985	0	$0	0	0
Clarence	Yes	No	190045	NSFHA	8/19/2013	0	$0	0	0
Durant	Yes	No	190922	08/19/2013(M)	6/11/1976	2	$455,000	0	0
Lowden	Yes	No	190054	08/19/2013(M)	8/19/1985	3	$346,600	0	0
Mechanicsville	Yes	No	190970	08/19/2013(M)	8/16/2013	0	$0	0	0
Stanwood	Yes	No	190056	08/19/2013(M)	11/1/1979	0	$0	0	0
Tipton	Yes	No	190057	08/19/2013(M)	9/4/1985	3	$700,000	0	0
West Branch	Yes	No	190058	8/19/2013	3/16/1983	33	$4,187,700	6	$21,587

Source: Participation details from NFIP Community Status Book, 12/31/2013; BureauNet, http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book; M= No elevation determined – all Zone A, C, and X: NSFHA = No Special Flood Hazard Area; E=Emergency Program: Policy and Loss Statistics from BureauNet, http://bsa.nfipstat.fema.gov/reports/reports.html; *Closed Losses are those flood insurance claims that resulted in payment. Loss statistics are for the period from January 1, 1978 to December 31, 2013.

According to the policy and loss statistics, policy holders in the unincorporated portion of Cedar County have received the most in insurance payments by far with over $495,604 in payments. The City of West Branch is the only other community with closed losses. West Branch losses total $21,587.

Repetitive Loss/Severe Repetitive Loss Properties

Repetitive Loss: Repetitive Loss Properties are those properties with at least two flood insurance payments of $5,000 or more in a 10-year period. According to the Flood Insurance Administration, there are no repetitive loss properties in the planning area.

Severe Repetitive Loss (SRL): SRL properties are defined it as "a single family property" (consisting of one-to-four residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which four or more separate claims payments have been paid under flood insurance coverage with the amount of each claim payment exceeding $5,000 and with cumulative amounts of such claims payments exceeding $20,000; or for which at least two separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

According to the Flood Insurance Administration, there are not severe repetitive loss properties in the planning area.

Probability of Future Occurrence

With the history of flooding in the planning area, it is likely that flooding of various levels will continue to occur. In 10 years time, Cedar County was declared for events involving flooding four times. This translates to a 40 percent annual probability

Probability Score: 4—Highly Likely

Vulnerability

Overview

The flood vulnerability and loss estimates for the unincorporated county and the incorporated cities were generated using the 8/19/2013 Effective DFIRM layer and the Cedar County parcel and building data layer provided by the Cedar County GIS Department. GIS analysis was conducted to determine the number and values of buildings at risk to the 1-percent annual chance flood. For purposes of this analysis, if any portion of a parcel was within the 1-percent annual chance floodplain, then all buildings and the total value of improvements associated with the parcel were considered at risk to the 1-percent annual chance flood (Note: land values were excluded). Additionally, to determine the population at risk, the number of residential properties at risk was multiplied by the average household size.

Table 3.43 provides the numbers of buildings per jurisdiction by type that are in the 1-percent annual chance floodplain for the unincorporated county and cities according to the analysis methodology described above. **Table 3.44** that follows provides the building exposure values in the floodplain for the unincorporated county and the incorporated cities in the planning area.

According to this analysis, unincorporated Cedar County has the greatest number of buildings in the floodplain with a total of 209. Of those, 76 are residential. The next highest number of buildings in the floodplain is in the City of West Branch, followed by the City of Lowden. The greatest exposure of building value in the 1-percent annual chance floodplain is in the unincorporated portion of Cedar County with a total of $14,565,900 in improvements present in the 1-percent annual chance floodplain.

Table 3.43. Cedar County, Iowa Building Counts In The 1-Percent Annual Chance Floodplain

Jurisdiction	Agricultural	Commercial	Industrial	Residential	Total
Unincorporated Cedar County	122	11	0	76	209
Bennett	0	2	0	3	5
Clarence	0	0	0	0	0
Durant*	0	1	1	6	8
Lowden	2	5	0	15	22
Mechanicsville	0	0	0	0	0
Stanwood	0	0	0	0	0
Tipton	0	3	0	3	6
West Branch*	0	30	2	23	55
Wilton**	0	0	0	0	0
Total	**124**	**52**	**3**	**126**	**305**

Source: 8/19/2013 Effective DFIRM; Cedar County GIS Department.
*Data includes all incorporated area, including portion(s) in adjacent counties.
** Data is for the portion in Cedar County only.

Table 3.44. Cedar County Building Values In The 1-Percent Annual Chance Floodplain

Jurisdiction	Agricultural	Commercial	Industrial	Residential	Total
Unincorporated Cedar County	$8,438,450	$439,380	$0	$5,688,070	$14,565,900
Bennett	$0	$16,080	$0	$288,360	$304,440
Clarence	$0	$0	$0	$0	$0
Durant*	$0	$102,640	$87,870	$619,600	$810,110
Lowden	$21,510	$371,950	$0	$746,630	$1,140,090
Mechanicsville	$0	$0	$0	$0	$0
Stanwood	$0	$0	$0	$0	$0
Tipton	$0	$426,000	$0	$237,460	$663,460
West Branch*	$0	$1,303,070	$105,020	$2,227,820	$3,635,910
Wilton**	$0	$0	$0	$0	$0
Total	**$8,459,960**	**$2,659,120**	**$192,890**	**$9,807,940**	**$21,119,910**

Source: 8/19/2013 Effective DFIRM; Cedar County GIS Department.
*Data includes all incorporated area, including portion(s) in adjacent counties.
** Data is for the portion in Cedar County only.

For the planning area ranking, the HMPC determined the magnitude of river flooding to be critical. Individual jurisdictional ratings are provided at the end of this hazard section.

Magnitude Score: 3—Critical

Potential Losses to Existing Development

The potential losses to existing development will be provided for the following categories of losses:

- Building Losses—this will include counts and values for buildings exposed to potential damage from the 1-percent annual chance flood for each jurisdictions in the planning area;
- Estimated Population Displaced;
- Agricultural Impacts; and
- Critical Facilities and Infrastructure at Risk.

Building Losses and Impacted Population

The result of the exposure analysis summarizes the values at risk in the floodplain. When a flood occurs, seldom does the event cause total destruction of an area. Potential losses from flooding are related to a variety of factors including flood depth, flood velocity, building type and construction. Based on FEMA Flood Insurance Administration (FIA) flood depth-damage curves, the percent of damage is directly related to the flood depth. FEMA's HAZUS flood loss estimation tool and the flood benefit/cost module both use this simplified approach to model flood damage based on building type and flood depth. A damage estimation of 20 percent of the total value was used based on FIA depth-damage curves for a one-story structure with no basement flooded to two feet. While there are several limitations to this model, it does present a methodology to estimate potential damages. This model may include structures within the 1-percent annual chance floodplain that may be elevated above the level of the base flood elevation, according to local floodplain development requirements, and thus mitigate the risk.

Additionally, structures with finished basements and commercial properties would likely sustain a higher percentage of damage.

To determine the population that would be impacted and potentially displaced by a 1-percent annual chance flood event, the average household size, as determined by the 2010 census, was multiplied by the number of residential structures in the 1-percent annual chance floodplain for each jurisdiction. The population impacted is somewhat underestimated since some of the residential structures are multi-family structures. However, data was not available to determine the number of households in each multi-family structure.

Table 3.45 provides the summary of potential flood loss estimates and impacted population for the 1-percent annual chance flood by jurisdiction.

Table 3.45. Flood Loss Estimates For 1-Percent Annual Chance Flood

	Total Building/ Improvement Value	Total Building/ Improvement Value in Floodplain	Estimated Building/ Improvement Losses	Loss Ratio (%)	Total Residential Buildings in Floodplain	Average Household Size	Estimated Impacted Population	2012 Population Estimate Total	Estimated Impacted Population (%)
Unincorporated County	$422,049,350	$14,565,900	$2,913,180.0	0.69%	76	2.42	184	7,107	2.59%
City of Bennett	$10,455,940	$304,440	$60,888.0	0.58%	3	2.53	8	398	1.91%
City of Clarence	$35,047,570	$0	$0.0	0.00%	0	2.22	0	966	0.00%
City of Durant*	$94,971,006	$810,110	$162,022.0	0.17%	6	2.45	15	1,829	0.80%
City of Lowden	$27,227,056	$1,140,090	$228,018.0	0.84%	15	2.28	34	780	4.38%
City of Mechanicsville	$39,365,410	$0	$0.0	0.00%	0	2.34	0	1,129	0.00%
City of Stanwood	$23,475,106	$0	$0.0	0.00%	0	2.49	0	675	0.00%
City of Tipton	$133,371,010	$663,460	$132,692.0	0.10%	3	2.25	7	3,201	0.21%
City of West Branch*	$141,927,556	$3,635,910	$727,182.0	0.51%	23	2.39	55	2,331	2.36%
City of Wilton**	$124,240	$0	$0.0	0.00%	0	2.43	0	N/A	0.00%
Total	**$928,014,244**	**$21,119,910**	**$4,223,982.0**	**0.46%**	**126**	**N/A**	**302**	**18,416**	**1.64%**

Source: 8/19/2013 Effective DFIRM; Cedar County GIS Department; Average Household Size from U.S. Bureau, 2010 Census; U.S. Census Bureau 2012 Populations Estimates.
*Data includes all incorporated area, including portion(s) in adjacent counties.
** Data is for the portion in Cedar County only.

Agricultural Impacts

Additionally, USDA crop insurance claims for excess moisture/precipitation/rain and flood conditions for the ten-year period from 2004-2013 totaled $8,423,922. Considering that 90.5 percent of insurable crops are insured in Iowa (2013 Iowa Crop Insurance Profile, USDA, RMA), the adjusted losses calculate to $9,359,913 for all insurable crops for the period. This results in an average annual loss of $935,991 to insurable crops as a result of excess moisture/precipitation/rain and flood conditions affecting agriculture.

Critical Facilities and Infrastructure at Risk

To analyze critical facilities at risk in the planning area, the planning committee reviewed and updated the inventory of critical and essential facilities and infrastructure in the planning area that was compiled in 2011 as part of the development of the 2011 *Cedar County Multi-jurisdictional Hazard Mitigation Plan*. After the critical facilities were validated and revised as part of this plan update effort, a comparison was made with the Effective DFIRM layer to determine those facilities that would be damaged in a 1-percent annual chance flood event. This analysis revealed 12 critical or essential facilities that are in the 1-percent annual chance floodplain and one critical facility in the 0.2-percent annual chance floodplain.

Appendix E provides the list of critical facilities in the 1-percent annual chance floodplain that could be damaged in the event of a 1-percent annual chance flood. This Appendix is "For Official Use Only". To obtain access for official use, contact the Cedar County Emergency Management Coordinator.

Future Development

Any future development in floodplains would increase risk in those areas. For those communities that participate in the National Flood Insurance Program, enforcement of the floodplain management regulations will ensure mitigation of future construction in those areas. However, even if structures are mitigated, evacuation may still be necessary due to rising waters. In addition, floods that exceed mitigated levels may still cause damages.

The City of West Branch 2013 Comprehensive Plan specifically addresses future development in terms of the flood hazards in the community. **Figure 3.4** provides a comparison of future development with the flood risk based on the 2011 FEMA Flood map.

River Flooding Hazard Summary by Jurisdiction

Since the City of Clarence does not have any 1-percent annual chance floodplain in the Effective DFIRM (No Special Flood Hazard Area), it was determined that the River Flood hazard does not apply. Additionally, the analysis revealed there are no improvements in the floodplain in Mechanicsville or Stanwood. Therefore, it was determined that the River Flood hazard does not apply to these jurisdictions as well.

To demonstrate how river flooding varies additionally by jurisdiction, all jurisdictions that had any improvements in the 1-percent annual chance floodplain (including school districts) received a rating of 4 for probability. To determine the magnitude rating, those jurisdictions with critical facilities in the 1-percent annual chance floodplain and/or a loss ratio higher than .5 percent were assigned a magnitude of 3. Those jurisdictions with no critical facilities in the floodplain

and loss ratio less than .5 percent were assigned a magnitude of 1. The warning time and duration were considered to be 1 and 4 for all jurisdictions that have any properties in the floodplain.

For those jurisdictions that do not have improvement exposures in the floodplain, all elements indicate Not Applicable (N/A). To determine the rankings for the school districts, the critical facility layer of school buildings was compared against the revised preliminary DFIRM. This analysis revealed no school buildings in the 100-year floodplain.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	4	3	1	4	3.25	High
City of Bennett	4	3	1	4	3.25	High
City of Clarence	N/A	N/A	N/A	N/A	N/A	N/A
City of Durant	4	1	1	4	2.65	Moderate
City of Lowden	4	3	1	4	3.25	Moderate
City of Mechanicsville	N/A	N/A	N/A	N/A	N/A	N/A
City of Stanwood	N/A	N/A	N/A	N/A	N/A	N/A
City of Tipton	4	1	1	4	2.65	Moderate
City of West Branch	4	3	1	4	3.25	High
Bennett School District, #603	N/A	N/A	N/A	N/A	N/A	N/A
Durant School District, #1926	N/A	N/A	N/A	N/A	N/A	N/A
North Cedar School District, #3691	N/A	N/A	N/A	N/A	N/A	N/A
Tipton School District #6408	N/A	N/A	N/A	N/A	N/A	N/A
West Branch School District #6930	N/A	N/A	N/A	N/A	N/A	N/A

3.5.11 Severe Winter Storm

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
4	2	3	3	3.15	High

Profile

Hazard Description

Severe winter storms are an annual occurrence in Iowa. A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, cold temperatures and drifting snow creating blizzards. The National Weather Service describes different types of winter storm events as follows:

- **Blizzard**—Winds of 35 mph or more with snow and blowing snow reducing visibility to less than ¼ mile for at least three hours.
- **Blowing Snow**—Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- **Snow Squalls**—Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.
- **Snow Showers**—Snow falling at varying intensities for brief periods of time. Some accumulation is possible.
- **Freezing Rain**—Measurable rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces, such as trees, cars, and roads, forming a coating or glaze of ice. Most freezing-rain events are short lived and occur near sunrise between the months of December and March.
- **Sleet**—Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects.

Heavy accumulations of ice, often the result of freezing rain, can bring down trees, utility poles, and communications towers and disrupt communications and power for days. Even small accumulations of ice can be extremely dangerous to motorists and pedestrians.

Severe winter storms include extreme cold, heavy snowfall, ice, and strong winds which can push the wind chill well below zero degrees in the planning area. Heavy snow can bring a community to a standstill by inhibiting transportation (in whiteout conditions), weighing down utility lines, and by causing structural collapse in buildings not designed to withstand the weight of the snow. Repair and snow removal costs can be significant. Ice buildup can collapse utility lines and communication towers, as well as make transportation difficult and hazardous. Ice can also become a problem on roadways if the air temperature is high enough so that precipitation falls as freezing rain rather than snow.

Extreme cold often accompanies severe winter storms and can lead to hypothermia and frostbite in people who are exposed to the weather without adequate clothing protection. Cold can cause fuel to congeal in storage tanks and supply lines, stopping electric generators. Cold temperatures can also overpower a building's heating system and cause water and sewer pipes

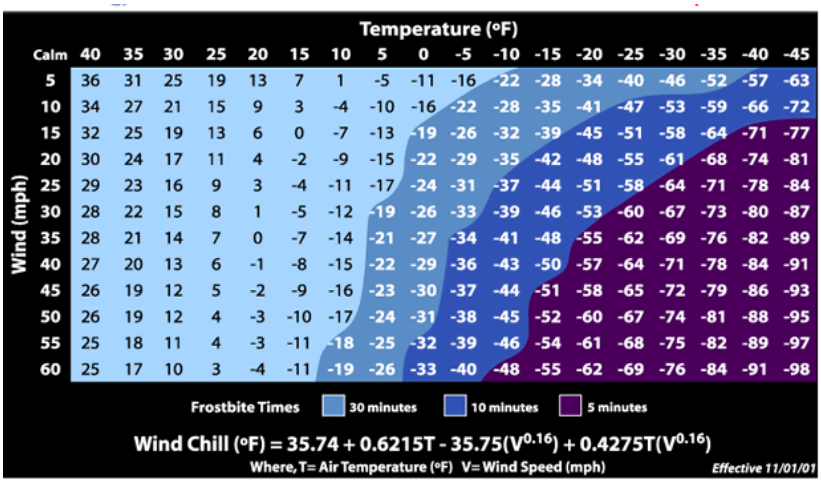
to freeze and rupture. When combined with high winds from winter storms, extreme cold becomes extreme wind chill, which is extremely hazardous to health and safety.

The National Institute on Aging estimates that more than 2.5 million Americans are especially vulnerable to hypothermia, with the isolated elderly being most at risk. About 10 percent of people over the age of 65 have some kind of temperature-regulating defect, and 3-4 percent of all hospital patients over 65 are hypothermic.

Also at risk are those without shelter or who are stranded, or who live in a home that is poorly insulated or without heat. Other impacts of extreme cold include asphyxiation (unconsciousness or death from a lack of oxygen) from toxic fumes from emergency heaters; household fires, which can be caused by fireplaces and emergency heaters; and frozen/burst pipes.

Wind can greatly amplify the impact of cold ambient air temperatures. Provided by the National Weather Service**, Figure 3.32** below shows the relationship of wind speed to apparent temperature and typical time periods for the onset of frostbite.

Figure 3.32. Wind Chill Chart



Source: National Weather Service

Warning Time Score: 3—6-12 hours

Duration Score: 3—less than 1 week

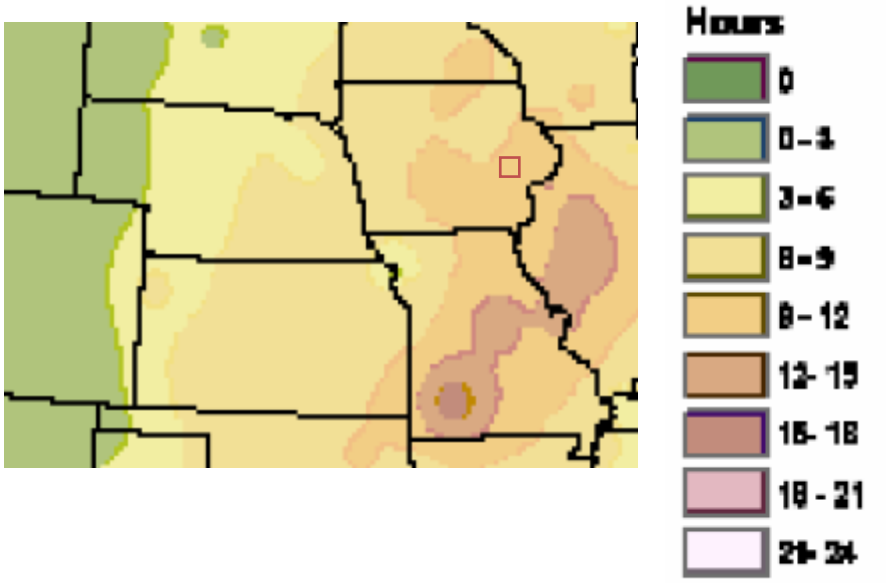
Geographic Location/Extent

According to the High Plains Regional Climate Center, the planning area had a winter high temperature normal of 31.9 degrees (F), the winter low temperature normal of 14.2 degrees (F) and the annual average snowfall of 30.7 inches from 1893 to 2010.

The entire state of Iowa is vulnerable to heavy snow, extreme cold temperatures and freezing rain. Generally, winter storms occur between the months of November and March, but can occur as early as October and as late as April.

Figure 3.33 shows that the entire planning area (approximated within the red square) is in the orange-shaded area that receives 9-12 hours of freezing rain per year.

Figure 3.33. Average Number of Hours per Year with Freezing Rain



Source: American Meteorological Society. "Freezing Rain Events in the United States." http://ams.confex.com/ams/pdfpapers/71872.pdf.; Note: Red square provides approximate location of planning area.

Previous Occurrences

Historically, there have been two Presidential Disaster Declarations for Severe Winter Storm that included Cedar County (**Table 3.46)**.

Table 3.46. Winter Storm Presidential Disaster Declarations (1965-April 2014)

Disaster Number	Description	Declaration Date (Incident Period)
DR-1737	Severe Winter Storms	01/04/2008 (12/10 to 12/11/2007)
DR-1688	Severe Winter Storms	03/14/2007 (2/23 to 3/2/2007)

Source: Federal Emergency Management Agency, www.fema.gov/; Note: Incident dates are in parentheses

From 1996 thru 2013, the National Climatic Data Center reports five blizzard events, 15 heavy snow events, 48 winter storm events, six ice storm events, and seven wind chill events for a total of 81 winter events that impacted the planning area during this 18 year time-period. This translates to an average of five winter storm events each year. The total property damage for these 81 events was a conservative $1,205,000.

NOAA's National Weather Service has issued 296 Advisory, Watch, and/or Warnings concerning winter weather phenomena between 2005 and April 2014 (see **Table 3.47**). The data is kept with Iowa Environmental Mesonet, Iowa State University Department of Agronomy website, (http://mesonet.agron.iastate.edu/vtec/search.php).

Table 3.47. National Weather Service Issuances for Winter Weather in Cedar County, IA

Phenomena	Significance	Number Issued between 2005 and April 2014
Blizzard	Watch	3
Blizzard	Warning	8
Blowing Snow	Advisory	7
Freeze	Watch	3
Freeze	Warning	17
Freezing Rain	Advisory	7
Frost	Advisory	21
Ice Storm	Warning	4
Snow	Advisory	15
Snow and Blowing Snow	Advisory	4
Wind Chill	Advisory	52
Wind Chill	Watch	1
Wind Chill	Warning	8
Winter Storm	Watch	39
Winter Storm	Warning	29
Winter Weather	Advisory	78
Total		**296**

Source: Environmental Mesonet, Iowa State University Department of Agronomy website, http://mesonet.agron.iastate.edu/vtec/search.php

The following section provides additional information for some of the winter storm and ice storm events that have impacted Cedar County:

- **February 21-22, 2013**—This system spread a swath of moderate to briefly heavy snow and strong winds over much of the area. Snowfall amounts of 3 to 6 inches were common, and 4.5 inches of snow was reported at Lowden. Wind gusts in the 30 to 35 mph range created considerable blowing and drifting as temperatures were in the 20s.
- **December 12, 2012**—A powerful storm system moved from the Southern Plains on Wednesday morning into Michigan by early Friday morning. This brought a potent winter storm to eastern Iowa through the period. Precipitation began as rain on Wednesday evening and quickly changed over to snow. A powerful cold front swept through eastern Iowa on Thursday morning changing the precipitation over to all snow from west to east by noon. In addition, winds switched to the northwest and increased rapidly to 25 to 35 mph with gusts as high as 60 mph. This created blizzard conditions across all of eastern Iowa reducing visibility to a half mile or less for several hours. The COOP observer in Lowden measured 8.0 inches of snow.
- **March 2, 2012**—Rain quickly changed over to snow during the afternoon of March 2, as a strong low pressure system pushed across the region. Snow ended by 7pm with snow accumulations ranging from 1 to 3 inches in most locations and 3.5 inches of snow was measured in Lowden.

  February 1-2, 2011—A tremendous blizzard, one of the worst in memory, impacted much of the region, as deep low pressure tracked from Texas to southern Indiana. Snowfall total reported at the Lowden COOP was 17.5 inches and wind gusts were 52 mph. Blizzard conditions were widespread with visibilities near zero in heavy snow and winds gusting to

over 50 to 60 mph. Temperatures were in the teens which added to the misery and the fluffy snow was easily blown around. Most roads, including interstates, were closed with numerous vehicles stuck in drifts or sliding into ditches, but no major accidents were reported. Many people became stranded but were eventually rescued. Many schools and events were cancelled or closed for a couple of days, as it took crews a while to open up rural roads and even side streets. At the height of the blizzard during the late afternoon and evening hours on February 1, snowfall rates were as high as 1 to 3 inches per hour. These rates were enhanced by thunder-snows that developed in the evening across eastern Iowa and northwest Illinois.

- **January 25-26, 2010**—Snowfall was only in the 1 to 3 inch range in eastern Iowa, but northwest winds gusting to 45 to 50 mph caused brief near-blizzard conditions with local whiteouts in rural and open areas. Trained spotters reported visibilities less than 1/4 mile to near zero at times. The worst conditions occurred during the afternoon and evening of January 25, but significant blowing and drifting was still being reported in some areas during the early morning hours of January 26.
- **December 25-27, 2009**—Over this three day period widespread snow accumulations of three to eight inches were noted. At Lowden, 6.2 inches of snow was reported.
- **January 13, 2009**—A COOP observer measured 7.2 inches of snow at Lowden.
- **November 29, 2008**—This was the first snowfall of the winter season and produced widespread accumulations of two to four inches.
- **FEMA-1688-DR-IA, February 2007**—A widespread and crippling ice/snow storm affected eastern Iowa, northwest and western Illinois, and extreme northeast Missouri on February 24, 2007. This massive ice storm was the worst to affect the region since January 22-23, 1965. Ice accumulations of around one inch were common, with some reports to near two inches. To make matters worse, east winds gusting over 50 mph, combined with the heavy ice accumulation, brought down numerous tree branches and power lines, along with several thousand power poles. There were even whole trees crashing down from the weight of the ice. Widespread power outages occurred, affecting over 180,000 people, which lasted more than a week in some of the rural areas. The city of Lowden reported losing electricity for approximately 12 hours. Many shelters were opened to accommodate those without power. The Governor of Iowa declared much of the state a disaster area, and requested President Bush to declare much of eastern Iowa a federal disaster area. Considering the magnitude of the storm, remarkably no direct deaths were reported.

  Mechanicsville reported power outages for three days with water plant, sewer lift station, and city office off line. The storm also caused damage to trees and vegetation.

  Tipton reported power outages, broken power poles at West 4th, bad road conditions, and downed trees.
- **FEMA-1737-DR-IA, December 2007**—A large area of freezing rain developed by the late evening hours over Iowa. Ice accumulations were in the ¼ to 1 inch range, with snow and sleet mixed with the freezing rain in some areas. The ice knocked down some trees and branches, with scattered power outages reported.

  Mechanicsville reported power outage for about six hours.

Tipton reported down trees and limbs, bad road conditions and fallen power poles.

- **December 1, 2007**—A strong system tracked from western Kansas to northern Wisconsin. Ice accumulations of ¼ to ¾ of an inch occurred with wind gusts up to 40 mph caused tree damage and scattered power outages. A West Branch Community School bus slid on an icy road and ended up in a ditch.
- **January 22, 2005**—A fast moving storm with sustained winds of 30 to 40 mph with gusts over 50 mph were common creating blizzard conditions in the pre dawn hours and during the morning commute across east central Iowa. Several county Sheriff's offices issued emergency alerts to media outlets indicating that travel was not recommend in their county. Numerous accidents occurred and highway crews radioed in reports of zero visibility.

Agricultural Impacts

Winter storms, cold, frost and freeze take a toll on crop production in the planning area. According to the USDA's Risk Management Agency, payments for insured crop losses in the planning area as a result of cold conditions and snow from 2004-2013 totaled $514,460 (see **Table 3.48**).

Table 3.48. Crop Insurance Claims Paid in Cedar County as a Result of Cold Conditions and Snow (2004-2013)

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2005	Corn	Cold Wet Weather	$1,652
2005	Soybeans	Cold Wet Weather	$2,061
2006	Soybeans	Cold Wet Weather	$7,375
2008	Corn	Cold Wet Weather	$273,800
2008	Soybeans	Cold Wet Weather	$24,356
2009	Corn	Cold Wet Weather	$1,695
2009	Soybeans	Cold Wet Weather	$2,463
2011	Soybeans	Cold Wet Weather	$1,416
2012	Corn	Cold Wet Weather	$33,934
2012	Soybeans	Cold Wet Weather	$1,205
2013	Corn	Cold Wet Weather	$10,740
2013	Soybeans	Cold Wet Weather	$40,782
2013	Soybeans	Cold Wet Weather	$1,448
2004	Corn	Frost	$13,663
2004	Soybeans	Frost	$3,107
2005	Corn	Frost	$4,421
2005	Soybeans	Frost	$404
2009	Soybeans	Frost	$504
2004	Corn	Snow	$8,391
2004	Soybeans	Snow	$27,590
2008	Corn	Snow	$274
2009	Soybeans	Snow	$6,766
2010	Corn	Snow	$1,603
2013	Corn	Snow	$44,811
Total			**$514,460**

Source: USDA Risk Management Agency, 2013

Probability of Future Occurrence

According to NCDC, during the 18 year period from 1996 thru 2013, the planning area experienced 81 total blizzards, winter storms, ice storms and extreme cold events. This translates to an annual probability of approximately five blizzard, winter/ice storm, or extreme cold events per year.

Probability Score: 4—Highly Likely

Vulnerability

Vulnerability Overview

The entire planning area is vulnerable to the effects of winter storm. Hazardous driving conditions due to snow and ice on highways and bridges lead to many traffic accidents and can impact the response of emergency vehicles. The leading cause of death during winter storms is transportation accidents. About 70 percent of winter-related deaths occur in automobiles due to traffic accidents and about 25 percent are from people caught outside in a storm. Emergency services such as police, fire, and ambulance are unable to respond due to road conditions. Emergency needs of remote or isolated residents for food or fuel, as well as for feed, water and shelter for livestock are unable to be met. The probability of utility and infrastructure failure increases during winter storms due to freezing rain accumulation on utility poles and power lines. People, pets, and livestock are also susceptible to frostbite and hypothermia during winter storms. Those at risk are primarily either engaged in outdoor activity (shoveling snow, digging out vehicles, or assisting stranded motorists), or are the elderly. Schools often close during extreme cold or heavy snow conditions to protect the safety of children and bus drivers. Citizens' use of kerosene heaters and other alternative forms of heating may create other hazards such as structural fires and carbon monoxide poisoning.

According to the 2013 Iowa Hazard Mitigation Plan, of the 8 hazards for which data was available to estimate annualized losses, severe winter storm ranked 6th with $2.2 million in annualized losses based on data spanning a 13-year period.

Magnitude Score: 2—Limited

Potential Losses to Existing Development

Vulnerable Buildings, Infrastructure, and Critical Facilities

Buildings with overhanging tree limbs are more vulnerable to damage during winter storms. Businesses experience loss of income as a result of closure during power outages. In general heavy winter storms increase wear and tear on roadways though the cost of such damages is difficult to determine. Businesses can experience loss of income as a result of closure during winter storms.

Loss of Use

Overhead power lines and infrastructure are also vulnerable to damages from winter storms, in particular ice accumulation during winter storm events can cause damages to power lines due to the ice weight on the lines and equipment as well as damage caused to lines and equipment from falling trees and tree limbs weighted down by ice. Potential losses would include cost of repair or replacement of damaged facilities, and lost economic opportunities for businesses.

Secondary effects from loss of power could include burst water pipes in homes without electricity during winter storms. Public safety hazards include risk of electrocution from downed power lines. Specific amounts of estimated losses are not available due to the complexity and multiple variables associated with this hazard. According to FEMA standard values for loss of service for utilities reported in the 2009 Benefit Cost Analysis Reference Guide, the economic impact as a result of loss of power is $126 per person per day of lost service. The loss of use estimates in the **Tornado/Windstorm Section 3.5.15** are provided to estimate costs associated with the loss of power in relation to the populations in each jurisdiction.

Property Losses

The total property losses reported by the NCDC for a total of 81 winter events that impacted the planning area during the 18 year time-period from 1996 thru 2013 were $1,205,000. However, damages for winter and ice storms are reported for all weather zones impacted. So, it is not possible to determine the damages from these events to just Cedar County.

USDA crop insurance claims for cold conditions and snow for the ten-year period of 2004-2013 totaled $514,460. The 2013 Iowa Crop Insurance Profile from USDA, RMA shows that 90.5 percent of crops are insured in Iowa and the adjusted losses calculate to $568,464 for the period and $56,846 in estimated annualized losses (see **Table 3.49**).

Considering the value of crops from the 2012 Census of Agriculture as baseline crop exposure, the estimated annual losses from cold conditions and snow was determined minimal compared to the value of the insurable crops.

Table 3.49. Estimated Insurable Annual Crops Lost Resulting From Cold Conditions and Snow

10-Year Winter Weather Insurance Paid	Adjusted 10-Year Winter Weather Losses (considering 90.5% insured)	Estimated Annualized Losses*	2012 Value of Crops
$514,460	$568,464	$56,846	$219,282,000

Source: Crop value is from USDA 2012 Census of Agriculture; Crop Insurance Paid is from the USDA's Risk Management Agency for 2004-2013.

*Note: This includes insurable crops that are not insured.

Increased Risk Populations

Elderly populations are considered to be at increased risk to Winter Storms and associated extreme cold events. **Table 3.28** in the Extreme Heat Profile Section provides the number of population over 65 in each jurisdiction in the planning area.

Future Development

Future development could potentially increase vulnerability to this hazard by increasing demand on the utilities and increasing the exposure of infrastructure networks.

Severe Winter Storm Hazard Summary by Jurisdiction

Although crop loss as a result of winter storm occurs more in the unincorporated portions of the planning area, the crops losses are not high since corn and soybeans are not in the ground during winter months and only get affected from unusual weather events. The density of vulnerable populations is higher in the cities. Transportation incidents related to winter storm could also impact all jurisdictions. With these vulnerabilities that apply to both urban and rural jurisdictions, the magnitude of this hazard is relatively equal. The factors of probability, warning time, and duration are also equal across the planning area. This hazard does not substantially vary by jurisdiction.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	4	2	3	3	3.15	High
City of Bennett	4	2	3	3	3.15	High
City of Clarence	4	2	3	3	3.15	High
City of Durant	4	2	3	3	3.15	High
City of Lowden	4	2	3	3	3.15	High
City of Mechanicsville	4	2	3	3	3.15	High
City of Stanwood	4	2	3	3	3.15	High
City of Tipton	4	2	3	3	3.15	High
City of West Branch	4	2	3	3	3.15	High
Bennett School District, #603	4	2	3	3	3.15	High
Durant School District, #1926	4	2	3	3	3.15	High
North Cedar School District, #3691	4	2	3	3	3.15	High
Tipton School District #6408	4	2	3	3	3.15	High
West Branch School District #6930	4	2	3	3	3.15	High

3.5.12 Sinkholes

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
1	1	4	1	1.45	Low

Profile

Hazard 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, void spaces and caverns develop underground. The sudden collapse of the land surface can be dramatic and range in size from broad, regional lowering of the land surface to localized collapse. Although subsidence can be a naturally occurring hazard, the primary causes of most incidents of subsidence are human activities: underground mining of coal, groundwater or petroleum withdraw, and drainage of organic soils. Land subsidence occurs slowly and continuously over time or on occasion abruptly, as in the sudden formation of sinkholes. Sinkholes can be aggravated by flooding.

Warning Time Score: 4—Minimal or no warning time

Duration Score: 1—Less than 6 hours

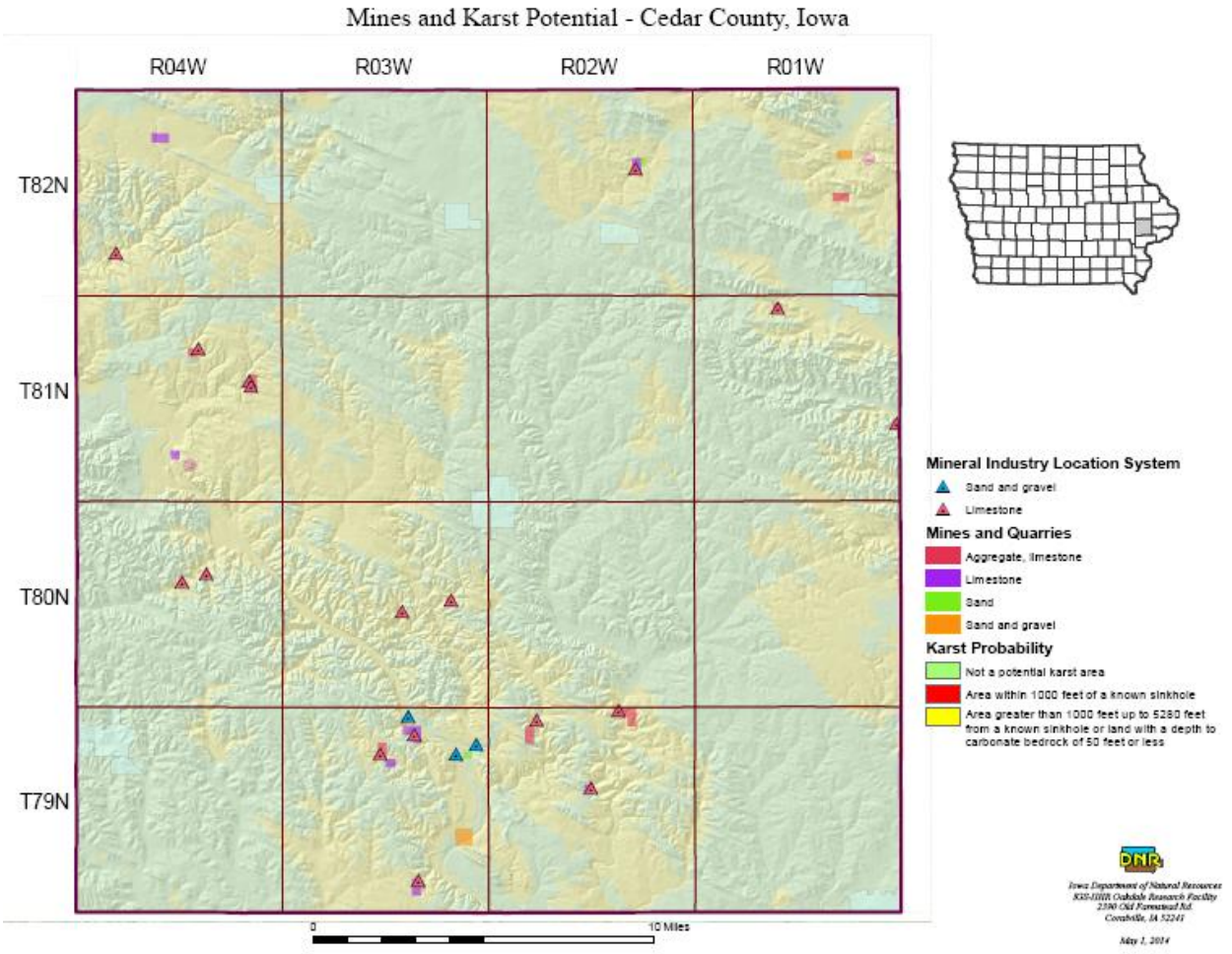
Geographic Location/Extent

According to the Iowa Department of Natural Resources, Cedar County has three levels of karst probability in the County as seen in **Figure 3.34**:

- Low karst area shaded in light green,
- Potential karst areas are shaded in light yellow with greater than 1,000 feet up to 5,280 feet from a known sinkhole or land with a depth to carbonate bedrock of 50 feet or less,
- Potential karst areas within 1,000 feet of a known sinkhole are shaded red.

Figure 3.34 also shows the locations of sand and gravel and limestone industry mines and quarries.

Figure 3.34. Mines and Karst Potential – Cedar County, IA



The Iowa Department of Natural Resources has examined where animal feeding operations are located in Iowa against the locations of known sinkhole areas and there are no known sinkhole areas at animal feeding operations in Cedar County.

Previous Occurrences
Research did not reveal any reported previous occurrences of sinkholes in the planning area.

Probability of Future Occurrence
Based on no reported previous sinkhole events, the probability of future occurrences is "unlikely".

Probability Score: 1—Unlikely

Vulnerability

Vulnerability Overview
Sand and gravel and limestone industry mines and quarries are in the planning area and sinkholes have been found in the planning area.

Magnitude Score: 1—Negligible

Potential Losses to Existing Development

Since Cedar County is considered to have a mixture of karst areas according to Iowa Department of Natural Resources, sinkholes are possible and from abandoned mines and quarries to affect existing development.

Due to the lack of information regarding previous occurrences of this hazard, it is not possible to estimate potential losses.

Future Development

Future development will increase vulnerability to this hazard.

Sinkhole Hazard Summary by Jurisdiction

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	1	1	4	1	1.45	Low
City of Bennett	1	1	4	1	1.45	Low
City of Clarence	1	1	4	1	1.45	Low
City of Durant	1	1	4	1	1.45	Low
City of Lowden	1	1	4	1	1.45	Low
City of Mechanicsville	1	1	4	1	1.45	Low
City of Stanwood	1	1	4	1	1.45	Low
City of Tipton	1	1	4	1	1.45	Low
City of West Branch	1	1	4	1	1.45	Low
Bennett School District, #603	1	1	4	1	1.45	Low
Durant School District, #1926	1	1	4	1	1.45	Low
North Cedar School District, #3691	1	1	4	1	1.45	Low
Tipton School District #6408	1	1	4	1	1.45	Low
West Branch School District #6930	1	1	4	1	1.45	Low

3.5.13 Terrorism

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
1	3	4	1	2.05	Moderate

Profile

Hazard Description

This hazard encompasses the following sub-hazards: enemy attack, biological terrorism, agro-terrorism, chemical terrorism, conventional terrorism, cyber terrorism, radiological terrorism and public disorder. These hazards can occur anywhere and demonstrate unlawful force, violence, and/or threat against persons or property causing intentional harm for purposes of intimidation, coercion or ransom in violation of the criminal laws of the United States. These actions may cause massive destruction and/or extensive casualties. The threat of terrorism, both international and domestic, is ever present, and an attack is likely to occur when least expected.

Enemy attack is an incident that could cause massive destruction and extensive casualties throughout the world. Some areas could experience direct weapons' effects: blast and heat; others could experience indirect weapons' effect. International political and military activities of other nations are closely monitored by our federal government and the State of Iowa would be notified of any escalating military threats.

The use of biological agents against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom can be described as biological terrorism. Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point of line sources such as munitions, covert deposits and moving sprayers. Biological agents vary in the amount of time they pose a threat. They can be a threat for hours to years depending upon the agent and the conditions in which it exists.

Agro-terrorism consists of acts to intentionally contaminate, ruin, or otherwise make agricultural products unfit or dangerous for consumption or further use. Agriculture is an important industry in Iowa and Cedar County. The introduction of a biological agent into the population of 3.9 million cattle and calves or the 13.7 billion acres of corn in Iowa would be financially devastating and would have a major impact on the food supply of the state and the nation. A major attack involving the nation's food supply could be launched in a rural area that has little capacity to respond. Potential terrorists' targets for livestock disease introduction would be concentration points, such as the state's licensed feedlots or livestock markets.

Chemical terrorism involves the use or threat of chemical agents against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom. Effects of chemical contaminants are similar to biological agents.

Use of conventional weapons and explosives against persons or property in violation of the criminal laws of the United States for purposes of intimidations, coercion, or ransom is conventional terrorism. Hazard affects are instantaneous; additional secondary devices may be used, lengthening the time duration of the hazard until the attack site is determined to be clear. The extent of damage is determined by the type and quantity of explosive. Effects are generally

static other than cascading consequences and incremental structural failures. Conventional terrorism can also include tactical assault or sniping from remote locations.

Electronic attack using one computer system against another in order to intimidate people or disrupt other systems is a cyber attack. All governments, businesses and citizens that conduct business utilizing computers face these threats. Cyber-security and critical infrastructure protection are among the most important national security issues facing our country today. As such, the Iowa Division of Criminal Investigation has a Cyber Crime Unit tasked with analysis and retrieval of digital information for investigations.

Radiological terrorism is the use of radiological materials against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion or ransom. Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point of line sources such as munitions, covert deposits and moving sprayers or by the detonation of a nuclear device underground, at the surface, in the air or at high altitude.

Mass demonstrations, or direct conflict by large groups of citizens, as in marches, protest rallies, riots, and non-peaceful strikes are examples of public disorder. These are assembling of people together in a manner to substantially interfere with public peace to constitute a threat, and with use of unlawful force or violence against another person, or causing property damage or attempting to interfere with, disrupting, or destroying the government, political subdivision, or group of people. Labor strikes and work stoppages are not considered in this hazard unless they escalate into a threat to the community. Vandalism is usually initiated by a small number of individuals and limited to a small target or institution. Most events are within the capacity of local law enforcement.

The Southern Poverty Law Center reported in 2014 there were five active hate groups in Iowa: one racist skinhead group (Aryan Strikeforce), three Ku Klux Klan groups (Fraternal White Knights of the KKK, Loyal White Knights of the KKK, and New Empire Knights of the KKK) and one National Socialist Movement group (Neo-Nazi).

Warning Time Score: 4—Minimal or no warning

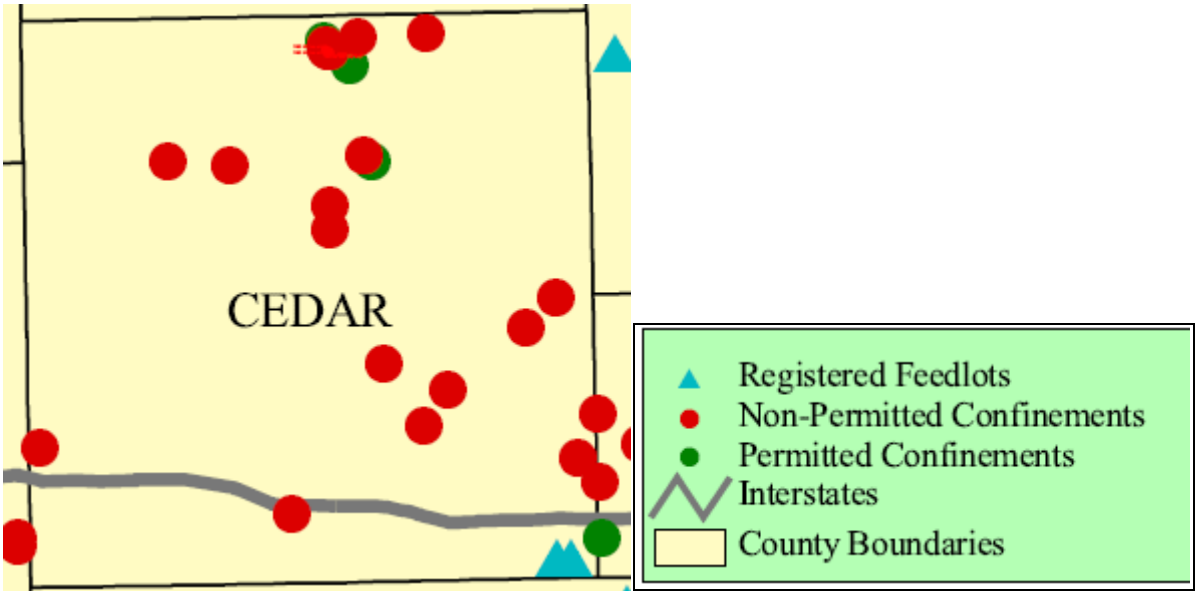
Duration Score: 4—More than 1 week

Geographic Location/Extent

The entire planning area has a low potential for terrorist activity. However, the Herbert Hoover Presidential Library & Museum attracts visitors from all over the world and there are various events throughout the County that include assembly of large crowds of people. Any venue with a large gathering of people could be a potential target for terrorists.

For agro-terrorism planning, **Figure 3.35** shows the locations of animal feeding operations in Cedar County that have greater than 200,000 lbs live weight animals.

Figure 3.35. Locations of Animal Feeding Operations in Cedar County, IA



Source: Iowa Department of Natural Resources,
http://www.iowadnr.gov/Environment/LandStewardship/AnimalFeedingOperations/Mapping.aspx

Previous Occurrences

There have not been any large-scale enemy attacks or acts of radiological terrorism in Iowa. In Iowa there have been biological and chemical agent threats, animal rights activists' vandalism and many bomb threats. In 2002, pipe bombs were found in 18 states including Iowa and six people were injured in the bombings in Iowa and Illinois. In 2005 and 2006, pipe bombs were used in attempted murder cases in two Iowa cities.

The Iowa Department of Public Safety issued an *Iowa Hate Crime by Jurisdiction Report, 1991-2007* and Cedar County had a total of three reported. Two were reported by the Cedar County Sheriff's Office and one was reported by the Tipton Police Department both in 1999.

The Iowa Department of Public Safety issued a *2009 Iowa Uniform Crime Report* showing 18 hate/bias crimes were reported statewide in 2009 and an average of 33 hate/bias crimes statewide from 2000-2009.

According to the Southern Poverty Law Center, there have not been any hate crimes incidents reported in Cedar County.

Probability of Future Occurrence

While difficult to estimate, the probability for a terrorist event is "**Unlikely**" within the next 10 years in Cedar County. The overall crime rate is relatively low in Cedar County. According to the Iowa Division of Criminal Investigation, Cedar County has had an average of 27 criminal investigations and 548 crime lab evidence cases worked during the fiscal years of 2009 through 2013. The Durant, Clarence, Mechanicsville, and Tipton Police Departments and Sheriff's Office provide law enforcement protection.

Probability Score: 1—UnLikely

Vulnerability

Overview
A terrorism event could occur in either limited area of a jurisdiction or over the entire jurisdiction at once. This hazard has the ability to directly cause substantial structural losses and potentially loss of life.

Magnitude Score: 3—Critical

Potential Losses to Existing Development
Potential losses from Terrorism include all infrastructure, critical facilities, crops, humans and animals. The degree of impact would be directly related to the type of incident and the target. Potential losses could include cost of repair or replacement of damaged facilities, lost economic opportunities for businesses, loss of human life, injuries to persons, loss of food supplies, disruption of the food supply chain, and immediate damage to the surrounding environment. Secondary effects of infrastructure failure could include public safety hazards, spread of disease, increased morbidity and mortality among the local and distant populations, public panic and long-lasting damage to the environment. Terrorism events are rare occurrences and specific amounts of estimated losses for previous occurrences are not available due to the complexity and multiple variables associated with these types of hazards. In some instances, information about these events is secure and unavailable to the public in order to maintain national security and prevent future attacks.

As discussed previously, it is difficult to quantify potential losses in terms of the jurisdictions most threatened by CBRNE (chemical, biological, radiological, nuclear, and high yield explosive) attack events due to the many variables and human element. Therefore, for the purposes of this plan, the loss estimates will take into account a hypothetical scenario. The attack scenario is staged at a speedway during a Friday night race event. The hypothetical speedway is situated on the edge of town and has approximately 800 persons in the stands, race pit area, and concession areas on any given Friday night during spring and summer.

Analysis of vulnerable populations is aided by a program developed by Johns Hopkins University in 2006 called Electronic Mass Casualty Assessment and `Planning Scenarios (EMCAPS) http://www.hopkins-cepar.org/EMCAPS/EMCAPS.html which utilizes scenarios developed by the Department of Homeland Security.

****THE FOLLOWING HYPOTHETICAL SCENARIO IS FOR INSTRUCTIONAL AND ILLUSTRATIVE PURPOSES ONLY****

Chemical Attack – Toxic Gas – Chlorine Release

***Scenario Overview*:** A bomb is attached to a tractor trailer tanker carrying compressed chlorine and enters a speedway parking lot. The entire contents of the tank escape to the atmosphere and the plume spreads to the speedway grounds and the immediate surrounding parking lot area. This particular type of attack would cause harm to humans and could render portions of the venue unusable for a short time period in order to allow for a costly clean-up. There might

also be a fear by the public of long-term contamination of the venue and subsequent boycott of events at that location and create a loss of revenue and tourism dollars.

Assumptions: (1) The population density at the event venue is approximately 800 persons around the speedway property. (2) Chlorine is toxic and may damage eyes, skin and respiratory tract. (3) The rate of "worried well" is equal to 9 times the number of infected cases.

Table 3.50. Described Losses from a Chemical Attack – Chlorine Scenario

Eye pain & swelling, headache, restricted airflow – difficulty breathing, possible chemical burns	35 persons
Eye pain & swelling, headache, rapid breathing, skin irritation	67 persons
Eye pain & swelling, headache, rapid breathing, coughing, chest pain, skin irritation	137 persons
Eye irritation, headache, throat irritation, coughing, skin irritation	190 persons
Eye irritation, headache, coughing, skin irritation	131 persons
Total "Worried Well" Cases (9 times the number of affected cases)	1,710 persons
Deaths	0 persons
Cost of Decontamination @ $12/person (assumes all persons with skin injuries will require decontamination and approximately 1/10 of the worried well will demand to be decontaminated) - total persons =731.	$8,772

Notes: Victims will require decontamination and both long and short term treatment. Events may need to be suspended at the speedway until all investigations are conducted.

Improvised Explosive Device Attack – ANFO

Scenario Overview: An Improvised Explosive Device (IED) utilizing an ammonium nitrate/fuel oil (ANFO) mixture is carried in a panel van to a parking area during a time when speedway patrons are leaving their cars and entering the stands. Potential losses with this type of scenario include both human and structural assets.

Assumptions: (1) The population density in the parking lot during the beginning and ending of the race is high, at least 1 person /100 square feet. (2) The quantity of ANFO used is 500 lbs.

Table 3.51. Described Losses from a Improvised Explosive Device Attack - ANFO

Total Dead	87 persons
Total Traumatic Injuries	151 persons
Total Urgent Care Injuries	745 persons
Injuries not Requiring Hospitalization	279 persons
Structures and Other Physical Assets (Damages would certainly occur to vehicles and depending on the proximity of other structures, damages would occur to the speedway complex itself. The exact amount of these damages is difficult to predict because of the large numbers of factors, including the type of structures nearby and the amount of insurance held by vehicle owners.)	Vehicles – Replacement cost for approximately 350 vehicles @ $10,000 per vehicle inside the 200 ft BATF described Lethal Air Blast range = $ 3,500,000 Repair / repainting cost for approximately 70 vehicles @ $ 4,000 per vehicle inside the BATF described Falling Debris Hazard = $280,000

Note: These are the numbers of persons that could be injured from an IED Attack if they are in the area.

Future Development

As public events are held at speedway, county fair ground, schools, and the Herbert Hoover Presidential Library & Museum the potential may exist for these locations to become targets of attack. With human-caused hazards such as this that can have multiple variables involved, increases in development is not always a factor in determining risk, although the physical cost of the event may increase with the increased or newly developed areas.

Terrorism Hazard Summary by Jurisdiction

The overall rating for any type of terrorism in the County is 2.05 “Moderate”. This rating score continues for the cities with over 1,000 in population, the school districts in those cities. The cities with less than 1,000 in population were given a magnitude of 2 and an overall rating score of 1.75.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	1	3	4	1	2.05	Moderate
City of Bennett	1	2	4	1	1.75	Low
City of Clarence	1	2	4	1	1.75	Low
City of Durant	1	3	4	1	2.05	Moderate
City of Lowden	1	2	4	1	1.75	Low
City of Mechanicsville	1	3	4	1	2.05	Moderate
City of Stanwood	1	2	4	1	1.75	Low
City of Tipton	1	3	4	1	2.05	Moderate
City of West Branch	1	3	4	1	2.05	Moderate
Bennett School District, #603	1	2	4	1	1.75	Low
Durant School District, #1926	1	3	4	1	2.05	Moderate
North Cedar School District, #3691	1	2	4	1	1.75	Low
Tipton School District #6408	1	3	4	1	2.05	Moderate
West Branch School District #6930	1	3	4	1	2.05	Moderate

3.5.14 Thunderstorm with Lightning and Hail

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
4	1	3	1	2.65	Moderate

Profile

Hazard Description

A thunderstorm is defined as a storm that contains lightning and thunder which is caused by unstable atmospheric conditions. When the upper air which is cold sinks and the warm moist air rises, storm clouds or 'thunderheads' develop resulting in thunderstorms. This can occur singularly, in clusters or in lines. Severe thunderstorms most often occur in Iowa in the spring and summer, during the afternoon and evenings, but can occur at any time. Other hazards associated with thunderstorms and lightning include: heavy rains causing flash flooding (discussed separately in **Section 3.5.6**) and tornadoes and windstorms (discussed further in **Section 3.5.15**).

Lightning

All thunderstorms produce lightning which often strikes outside of the area where it is raining and is known to fall more than 10 miles away from the rainfall area. Thunder is simply the sound that lightning makes. Lightning is a huge discharge of electricity. When lightning strikes, electricity shoots through the air and causes vibrations creating the sound of thunder. Nationwide, lightning kills 75 to 100 people each year. Lightning strikes can also start building fires, wildland fires, and damage electrical systems and equipment.

Hail

According to the National Oceanic and Atmospheric Administration (NOAA), hail is precipitation that is formed when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere causing them to freeze. The raindrops form into small frozen droplets and then continue to grow as they come into contact with super-cooled water which will freeze on contact with the frozen rain droplet. This frozen rain droplet can continue to grow and form hail. As long as the updraft forces can support or suspend the weight of the hailstone, hail can continue to grow.

At the time when the updraft can no longer support the hailstone, it will fall down to the earth. For example, a ¼" diameter or pea sized hail requires updrafts of 24 mph, while a 2 ¾" diameter or baseball sized hail requires an updraft of 81 mph. The largest hailstone recorded in the United States was found in Vivian, South Dakota on July 23, 2010, measuring eight inches in diameter, almost the size of a soccer ball. Soccer-ball-sized hail is the exception, but even small pea sized hail can do damage.

Hailstorms in Iowa cause damage to property, crops, and the environment and kill and injure livestock. In the United States, hail causes more than $1 billion in damage to property and crops each year. Much of the damage inflicted by hail is to crops. Even relatively small hail can shred plants to ribbons in a matter of minutes. Vehicles, roofs of buildings and homes, and

landscaping are the other things most commonly damaged by hail. Hail has been known to cause injury to humans, occasionally fatal injury.

Based on information provided by the Tornado and Storm Research Organization, **Table 3.52** below describes typical damage impacts of the various sizes of hail.

Table 3.52. Tornado and Storm Research Organization Hailstorm Intensity Scale

Intensity Category	Diameter (mm)	Diameter (inches)	Size Description	Typical Damage Impacts
Hard Hail	5-9	0.2-0.4	Pea	No damage
Potentially Damaging	10-15	0.4-0.6	Mothball	Slight general damage to plants, crops
Significant	16-20	0.6-0.8	Marble, grape	Significant damage to fruit, crops, vegetation
Severe	21-30	0.8-1.2	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
Severe	31-40	1.2-1.6	Pigeon's egg > squash ball	Widespread glass damage, vehicle bodywork damage
Destructive	41-50	1.6-2.0	Golf ball > Pullet's egg	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
Destructive	51-60	2.0-2.4	Hen's egg	Bodywork of grounded aircraft dented, brick walls pitted
Destructive	61-75	2.4-3.0	Tennis ball > cricket ball	Severe roof damage, risk of serious injuries
Destructive	76-90	3.0-3.5	Large orange > Soft ball	Severe damage to aircraft bodywork
Super Hailstorms	91-100	3.6-3.9	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Super Hailstorms	>100	4.0+	Melon	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: Tornado and Storm Research Organization (TORRO), Department of Geography, Oxford Brookes University
Notes: In addition to hail diameter, factors including number and density of hailstones, hail fall speed and surface wind speeds affect severity.

The onset of thunderstorms with lightning and hail is generally rapid. Duration is less than 6 hours and warning time is generally 6 to 12 hours.

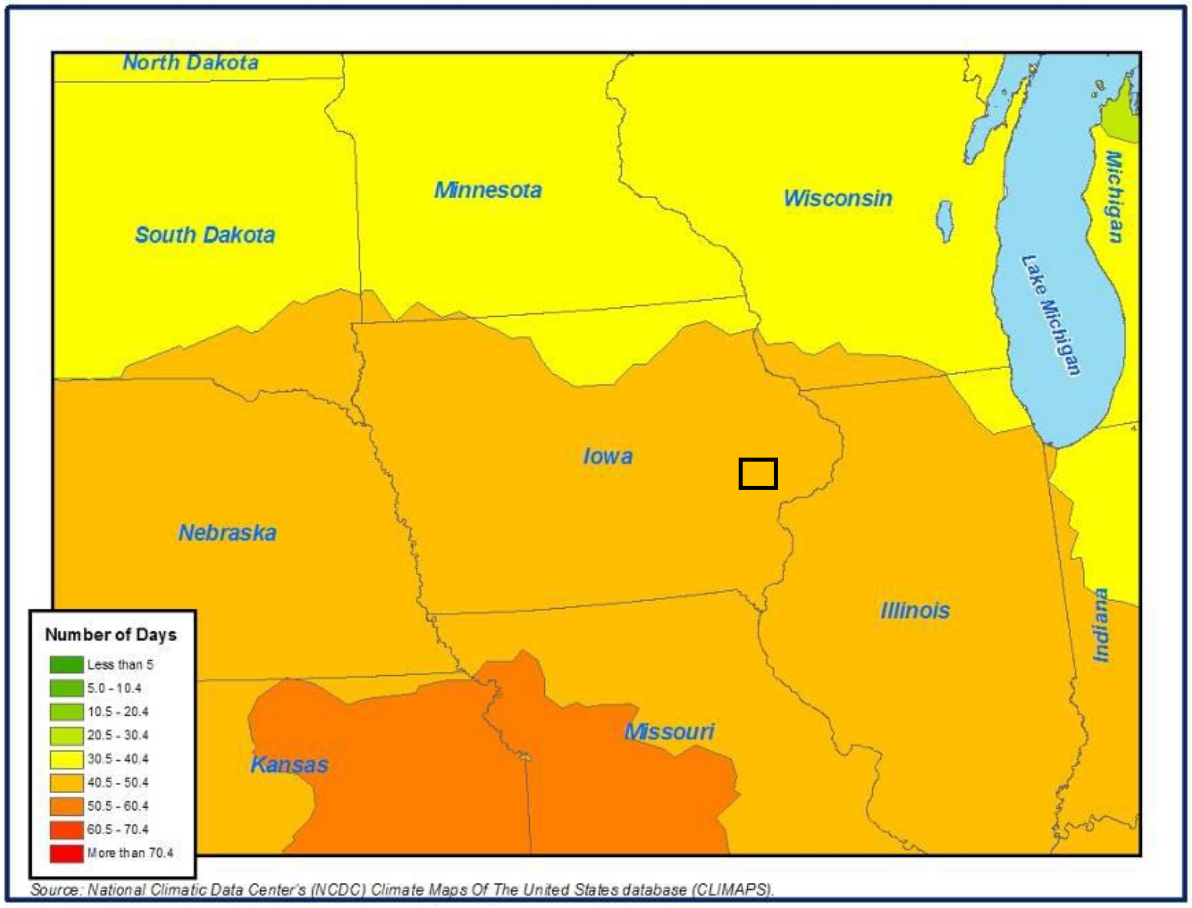
Warning Time Score: 3—6 — 12 hours

Duration Score: 1—less than 6 hours

Geographic Location/Extent

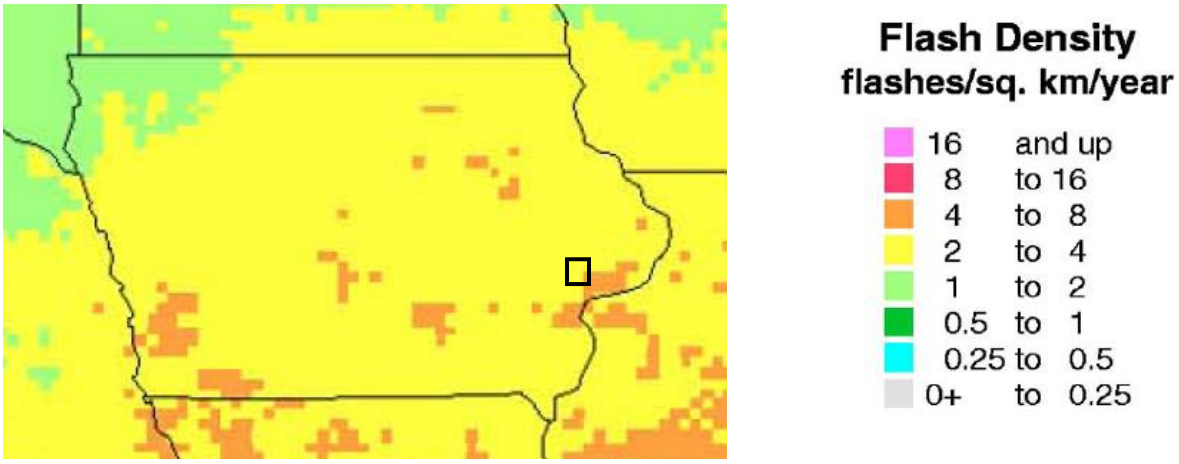
Thunderstorms and the associated hail and lightning impact the entire County with relatively similar frequency. Although, these events occur similarly throughout the planning area, they are more frequently reported in more urbanized areas. In addition, damages are more likely to occur in more densely developed urban areas. **Figure 3.36** displays the average number of days with thunder experienced throughout different areas of the county each year, showing the County experiences between 40.5 to 50.4 days with thunder per year. **Figure 3.37** shows 2 to 8 lightning strikes per square kilometer per year with both yellow and orange shaded areas.

Figure 3.36. Distribution and Frequency of Thunderstorms



Note: Black Square indicates approximate location of Cedar County

Figure 3.37. Location and Frequency of Lightning in Iowa



Source: National Weather Service, www.lightningsafety.noaa.gov/lightning_map.htm
Note: Black Square indicates approximate location of Cedar County

Previous Occurrences

Since 1969, Cedar County has been included in four presidential disaster declarations that included severe storms (see **Table 3.53**). Some of the damages that resulted in the declarations were from tornadoes and flooding that accompanied the severe weather.

Table 3.53. Presidential Disaster Declarations for Severe Storms that included Cedar County (1969-2013)

Number	Declared	Incident Period	Description
4135	07/31/2013	06/21 to 06/28/2013	Severe Storms, Tornadoes, and Flooding
4119	05/31/2013	04/17 to 04/30/2013	Severe Storms, Straight-line Winds, and Flooding
1763	5/27/2008	5/25 to 8/13/2008	Severe Storms, Tornadoes and Flooding
1518	05/25/2004	5/19 to 6/24/2004	Severe Storms, Tornadoes, and Flooding

Source: FEMA

The NCDC reported 106 total thunderstorm events for the Cedar County planning area from January 1996 thru December 2013, excluding multiple events on the same day. The events with damage search was limited to hail size of at least one inch in diameter and wind speed of at least 60 miles per hour. Of the reported events, there was $1,633,025 in total property damage and no injuries or fatalities.

Table 3.54. Thunderstorm Summary for Cedar County

Hazard type	Total Events	Events with Damage	Property Damage	Injuries	Fatalities
Hail	38	18	$313,000	0	0
Lightning	7	7	$163,025	0	0
Windstorms	61	51	$1,157,000	0	0
Totals	**106**	**76**	**$1,633,025**	**0**	**0**

Source: NCDC

Lightning

Some of the more notable damaging lightning events are described in additional detail below. Information on these events is from NCDC:

- **April 14, 2012**—As the thunderstorms moved through Cedar County, lightning struck a house in Stanwood setting it on fire.
- **September 20, 2010**—A thunderstorm moved across Lowden during the early morning hours and several homes in town sustained lightning damage.
- **June 21, 2007**—A house was struck by lightning knocking the chimney off and causing some electrical wiring damage in Clarence.
- **July 9, 2003**—An early morning thunderstorm with considerable lightning killed seven dairy cows and damaged a farm house southwest of Lowden.

Hail

Table 3.55 shows the number of hail events 0.75 inches and larger by the size of the hail.

Table 3.55. Hail Events Summarized by Hail Size

Hail Size (inches)	# of Events 1996-2013
2.75	1
2.50	1
2.00	0
1.75	6
1.50	2
1.25	3
1.00	14
0.88	10
0.75	20
Totals	**57**

Source: NCDC

Some of the more notable damaging hail events are described in additional detail below. Information on these events is from NCDC:

- **March 31, 2012**—Widespread thunderstorms across eastern Iowa. Tennis ball size (2.50 inch) hail fell in Clarence and smaller hail (1.25 inch) was recorded in Lowden. The hail damaged roofs, siding, windows and vehicles.
- **May 22, 2011**—Storms were severe producing large hail (1 inch) in Stanwood, damaging winds, and a few tornadoes.
- **August 9, 2008**—Some of the storms surpassed severe limits; producing hail the size of a penny up to the size of a ping pong ball. Tipton record hail 1 inch in size. In addition to the large hail, torrential rains also accompanied the storms.
- **August 15, 2007**—Hail 1.25 inch size fell just northeast of Tipton.
- **August 11, 2005**—Baseball sized hail damaged the home of the county emergency manager and several other homes on the east side of West Branch.
- **March 24, 2004**—Golfball hail covered the ground to the southeast of Mechanicsville.

Thunderstorm Winds

Information concerning tornadoes and windstorms, separate from thunderstorms, can be found in **Section 3.5.15**.

Some of the more notable damaging thunderstorm wind events are described in additional detail below. Information on these events is from NCDC:

- **September 19, 2013**—Numerous reports of high winds were received with wind speeds of 60 to 80 MPH. Several large trees were down in Tipton and a cattle shed at the fairgrounds was also blown down.
- **July 19, 2013**—Wind gusts estimated to be 70 mph blew down some large tree limbs and ripped off a barn roof about 5 miles south of Bennett.
- **May 22, 2011**—Wind gusts estimated to be 70 mph blew down some trees onto some buildings and vehicles on the east side of Lowden. Power lines were also downed and some streets were blocked.
- **June 18, 2010**—Wind gusts estimated to be 70 mph blew down a number of trees onto cars and power lines in Clarence.

- **June 8, 2008**—Wind gusts estimated to be 65 mph blew down some trees and power poles in Stanwood.
- **October 17, 2007**—The fire station in Lowden measured a peak gust of 62 mph during a thunderstorm, while a coop observer measured a 58 mph wind gust. Several trees were blown down in the Lowden area, and several cornfields were flattened. A machine shed was also damaged south of Lowden.
- **April 15, 2006**—A line of storms produced a severe downburst in Clarence and south of Clarence in the unincorporated area. Winds with this downburst were estimated at 83-87 knots (95-100 mph). In Clarence, Hunwardsen Fabrication lost the roof and one entire wall of their building. Other reports of damage south of town include trees down, grain bin and a gazebo were destroyed, barn roof ripped off, a 70 foot silo destroyed, sheds destroyed, livestock building rook peeled off and down power lines.
- **July 20, 2003**—Corn flattened with trees down and an out building damaged.
- **March 9, 2002**—The Tipton Country Club suffered heavy damage. A large cart shed was destroyed and blown into a parking area south of the clubhouse. Several large trees were blown down. A roof was peeled back on another shed, holes were punched in a third shed, the roof was blown off a small structure next to the pool, and approximately 9 trees were damaged or destroyed. At Country Estates, the skirting was blown off several homes, and a roof was blown off a barn.

The National Weather Service (NWS) will issue a Severe Thunderstorm Warning whenever a thunderstorm is forecasted to produce wind gusts to 58 miles per hour (50 knots) or greater and/or hail size one inch (quarter-size) diameter which can produce significant damage (source: http://www.nws.noaa.gov/oneinchhail/). **Table 3.56** shows the number of Severe Thunderstorm Watches and Warnings issued by NOAA's National Weather Service. The data is kept on Iowa Environmental Mesonet, Iowa State University Department of Agronomy website, (http://mesonet.agron.iastate.edu/vtec/search.php).

Table 3.56. National Weather Service Severe Thunderstorm Watch and Warning Issued in Cedar County, IA, 2005-April 2014

Year	Severe Thunderstorm Watch	Severe Thunderstorm Warning
So far in 2014	2	2
2013	10	17
2012	10	15
2011	8	25
2010	13	11
2009	11	10
2008	15	24
2007	12	9
2006	18	10
2005	0	11
Total	**97**	**132**

Source: Environmental Mesonet, Iowa State University Department of Agronomy website, http://mesonet.agron.iastate.edu/vtec/search.php , accessed April 2014

Although NCDC provides estimates of crop losses, crop insurance payment statistics are considered a more accurate resource for this data. According to the USDA Risk Management

Agency, insured crop losses in Cedar County as a result of hail from 2004 to 2013 totaled $275,527 (see **Table 3.57**) and $128,407 from windstorms (see **Table 3.58**). There was no crop damage reported from lightning.

Table 3.57. Crop Insurance Claims Paid in Cedar County from Hailstorms, 2004-2013.

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2004	Corn	Hail	$4,631
2007	Corn	Hail	$1,527
2008	Corn	Hail	$24,304
2008	Soybeans	Hail	$177,908
2009	Hybrid Corn Seed	Hail	$64,204
2010	Corn	Hail	$904
2011	Corn	Hail	$2,050
Total			**$275,527**

Source: USDA Risk Management Agency Crop Insurance Payment FOIA Request; USDA Risk Management Agency Iowa Crop Insurance Profile, http://www.rma.usda.gov/pubs/2012/stateprofiles/iowa11.pdf

Table 3.58. Crop Insurance Claims Paid in Cedar County from Windstorms, 2004-2013.

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2004	Corn	Wind/Excess Wind	$36,331
2007	Corn	Wind/Excess Wind	$20,673
2007	Hybrid Corn Seed	Wind/Excess Wind	$9,136
2007	Soybeans	Wind/Excess Wind	$207
2010	Corn	Wind/Excess Wind	$4,242
2011	Corn	Wind/Excess Wind	$57,819
Total			**$128,407**

Probability of Future Occurrence

NCDC-reported damaging lightning events occurred 7 times from 1996 thru 2013. Since lightning accompanies thunderstorms, it can be assumed that lightning occurs more often than damages are reported. These rates of occurrence are expected to continue in the future.

Based on NCDC data, there have been 38 separate hail events in an 18 year period, producing an average of two hail events each year in Cedar County. When limiting the probability analysis to hail events producing hail one inches and larger, there have been 18 separate events (separate days) in an 18 year period. Based on this history, there can be a severe hail event every year making the probability for damaging hail "highly likely" in any given year.

Probability Score: 4—Highly Likely

Vulnerability

Overview

In general, assets in the County are vulnerable to thunderstorms winds, lightning and hail including people, crops, vehicles, and built structures. According to the 2013 Iowa Hazard Mitigation Plan, of the 8 hazards for which data was available to estimate annualized losses, thunderstorm with lightning and hail ranked 4th with $30 million in annualized losses based on

data spanning a 17-year period. Although this hazard results in high annual losses, generally private property insurance and crop insurance cover the majority of losses. Considering insurance coverage as a recovery capability and therefore mitigation of devastating impacts to the economy, the overall impact on jurisdictions is reduced; therefore, this hazard's magnitude score to the planning area is "negligible".

Potential Losses to Existing Development

Most lightning damages occur to electronic equipment located inside buildings. But structural damage can also occur when a lightning strike causes a building fire. In addition, lightning strikes can cause damages to crops if fields light on fire. Communications equipment and warning transmitters and receivers can also be knocked out by lightning strikes. There have not been any fatalities in Cedar County from lightning strikes.

Thunderstorm winds and hail can cause damage to property, vehicles, trees, and crops.

Property and Crop Losses

Table 3.59 provides the estimated annualized property damages resulting from Thunderstorms, including lightning, hail and wind. This annualized damage has been compared to the total building exposure for Cedar County and the level of damage is minimal compared to the value of building exposure. Building Exposure values are based on parcel data provided by the Cedar County GIS Department and Muscatine County GIS.

Table 3.59. Estimated Annualized Property Damages Resulting from Severe Thunderstorms (Hail/Lightning/Wind, 1996-2013)

Building Exposure	Hail/Lightning/Thunderstorm Wind Property Damages	Annualized Property Damages
$1,581,681,078	Hail - $313,000 Lightning - $163,025 Wind - $1,157,000 Total $1,633,025	$90,724

Source: Building Exposure, Cedar County GIS Department and Muscatine County GIS 2014; Hail, Lightning, & Thunderstorm Wind Property Damage from NCDC records

Table 3.60 provides the insured crop losses for resulting from hail and wind. The insured loss has been adjusted to estimate losses to all insurable crops by considering that 90.5 percent of insurable crops in the State were insured (2013 Iowa Crop Insurance Profile from USDA's Risk Management Agency).

Table 3.60. Estimated Insurable Annualized Crop Damages Resulting from Severe Thunderstorms (Hail//Wind)

Crop Exposure (2012)	Insurance Paid (2004-2013)	Adjusted Crop Damages	Annualized Adjusted Crop Damages
$219,282,000	Hail -$275,527 Wind -$128,407 Total -$403,934	$446,336	$44,634

Source: Crop Exposure is from Iowa State University, University Extension, 2007; Insurance paid is from USDA's RMA; Statewide Crop insurance Coverage is from USDA's RMA Iowa Crop Insurance Profile.
Note: This includes insurable crops that are not insured.

Future Development

The Cedar County Economic Development Commission encourages new businesses in the County and with new businesses it is likely to increase vulnerability to wind, lightning and hail. Additional development means more households and businesses vulnerable to damages from severe thunderstorms, lightning and hail.

Thunderstorm, Lightning and Hail Hazard Summary by Jurisdiction

The following hazard summary table shows how this hazard varies by jurisdiction. Although thunderstorms winds, lightning and hail occur at similar rates in all parts of the planning area, damages are more likely in the incorporated areas that are more densely developed. Therefore, the magnitude level for these areas was determined to be two.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	4	1	3	1	2.65	Moderate
City of Bennett	4	2	3	1	2.95	Moderate
City of Clarence	4	2	3	1	2.95	Moderate
City of Durant	4	2	3	1	2.95	Moderate
City of Lowden	4	2	3	1	2.95	Moderate
City of Mechanicsville	4	2	3	1	2.95	Moderate
City of Stanwood	4	2	3	1	2.95	Moderate
City of Tipton	4	2	3	1	2.95	Moderate
City of West Branch	4	2	3	1	2.95	Moderate
Bennett School District, #603	4	2	3	1	2.95	Moderate
Durant School District, #1926	4	2	3	1	2.95	Moderate
North Cedar School District, #3691	4	2	3	1	2.95	Moderate
Topton School District #6408	4	2	3	1	2.95	Moderate
West Branch School District #6930	4	2	3	1	2.95	Moderate

3.5.15 Tornado/Windstorm

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
4	3	3	1	3.25	High

Profile

Hazard Description
This hazard section discusses both tornado and windstorm.

Tornado: The NWS defines a tornado as "a violently rotating column of air extending from a thunderstorm to the ground." It is usually spawned by a thunderstorm and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. Often, vortices remain suspended in the atmosphere as funnel clouds. When the lower tip of a vortex touches the ground, it becomes a tornado and a force of destruction.

Tornadoes are the most violent of all atmospheric storms and are capable of tremendous destruction. Wind speeds can exceed 250 miles per hour and damage paths can be more than one mile wide and 50 miles long. Tornadoes have been known to lift and move objects weighing more than 300 tons a distance of 30 feet, toss homes more than 300 feet from their foundations, and siphon millions of tons of water from water bodies. Tornadoes also generate a tremendous amount of flying debris or "missiles," which often become airborne shrapnel that causes additional damage. If wind speeds are high enough, missiles can be thrown at a building with enough force to penetrate windows, roofs, and walls. However, the less spectacular damage is much more common.

Windstorm: Windstorms for purposes of this plan refer to other non-tornadic damaging winds of thunderstorms including downbursts, microbursts, and straight-line winds. Downbursts are localized currents of air blasting down from a thunderstorm, which induce an outward burst of damaging wind on or near the ground. Microbursts are minimized downbursts covering an area of less than 2.5 miles across. They include a strong wind shear (a rapid change in the direction of wind over a short distance) near the surface. Microbursts may or may not include precipitation and can produce winds at speeds of more than 150 miles per hour. Straight-line winds are generally any thunderstorm wind that is not associated with rotation. It is these winds, which can exceed 100 mph, which represent the most common type of severe weather and are responsible for most wind damage related to thunderstorms. Since thunderstorms do not have narrow tracks like tornadoes, the associated wind damage can be extensive and affect entire (and multiple) counties. Objects like trees, barns, outbuildings, high-profile vehicles, and power lines/poles can be toppled or destroyed, and roofs, windows, and homes can be damaged as wind speeds increase.

Strong winds can occur year-round in Iowa. These winds typically develop with strong pressure gradients and gusty frontal passages. The closer and stronger two systems are, (one high pressure, one low pressure) the stronger the pressure gradient, and therefore, the stronger the winds are. Objects such as trees, barns, outbuildings, high-profile vehicles, and power

line/poles can be toppled or destroyed, and roofs, windows, and homes can be damaged as wind speeds increase. Downbursts can be particularly dangerous to aviation.

The NWS can issue High Wind Watch, High Wind Warning, and Wind Advisory to the public. The following are the definitions of these issuances:

- High Wind Watch—This is issued when there is the potential of high wind speeds developing that may pose a hazard or is are life-threatening.
- High Wind Warning—The 1-minute surface winds of 35 knots (40 mph) or greater lasting for one hour or longer, or winds gusting to 50 knots (58 mph) or greater, regardless of duration, that are either expected or observed over land.
- High Wind Advisory—This is issued when high wind speeds may pose a hazard. Sustained winds 25 to 39 mph and/or gusts to 57 mph.

Warning Time Score: 3—6 to 12 hours

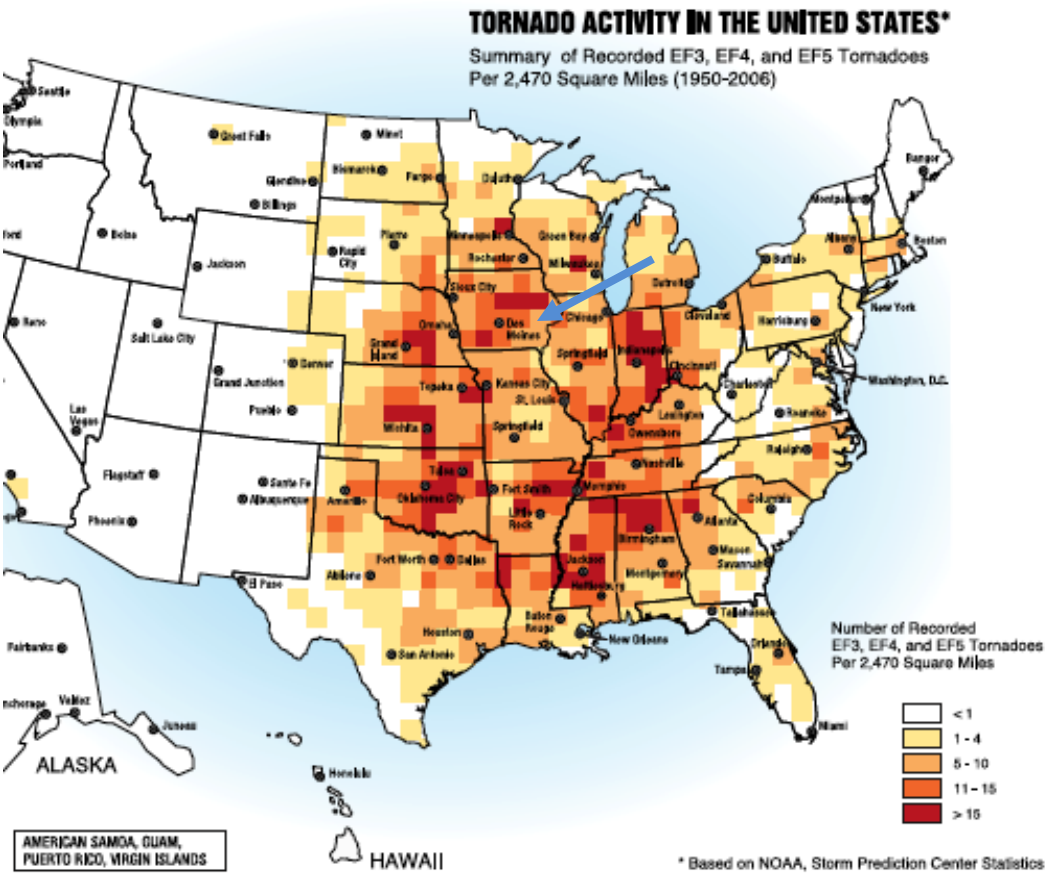
Duration Score: 1—less than 6 hours

Geographic Location/Extent

Iowa is located in a part of the United States where tornadoes are a common occurrence. Iowa has experienced 1,517 tornadoes from 1980 through 2011 (32 year period) with 86 percent of them being rated F0 and F1, 14 percent rated F2 through F5. Only one F5 rated tornadoes have occurred in Iowa during this timeframe (Parkersburg in 2008). Since 1980, there have been on average 47 tornadoes per year in Iowa. Most tornadoes occurred in May and June but can occur during any month. Also mid afternoon until around sunset is the peak time of day for tornado activity. There have been 763 injuries and 26 deaths attributable to tornadoes (source: National Weather Service, Iowa Tornado Climatology Report 1980-2011).

Tornadoes can occur in the entire planning area. **Figure 3.38** illustrates the number of F3, F4, and F5 tornadoes recorded in the United States per 3,700 square miles between 1950 and 2006. Cedar County is in the section with orange shading, indicating 5 to 15 tornadoes of this magnitude during this 57-year period.

Figure 3.38. Tornado Activity in the United States



Source: FEMA 320, Taking Shelter from the Storm, 3rd edition
Note: Blue arrow is approximate location of Cedar County

Tornadoes are classified according to the EF- Scale (the original F – Scale was developed by Dr. Theodore Fujita, a renowned severe storm researcher). The Enhanced F- Scale (see **Table 3.61**) attempts to rank tornadoes according to wind speed based on the damage caused. This update to the original F scale was implemented in the U.S. on February 1, 2007.

Table 3.61. Enhanced F Scale for Tornado Damage

FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

Source: The National Weather Service, www.spc.noaa.gov/faq/tornado/ef-scale.html

The wind speeds for the EF scale and damage descriptions are based on information on the NOAA Storm Prediction Center as listed in **Table 3.62**. The damage descriptions are summaries. For the actual EF scale it is necessary to look up the damage indicator (type of structure damaged) and refer to the degrees of damage associated with that indicator. Information on the Enhanced Fujita Scale's damage indicators and degrees of damage is located online at www.spc.noaa.gov/efscale/ef-scale.html.

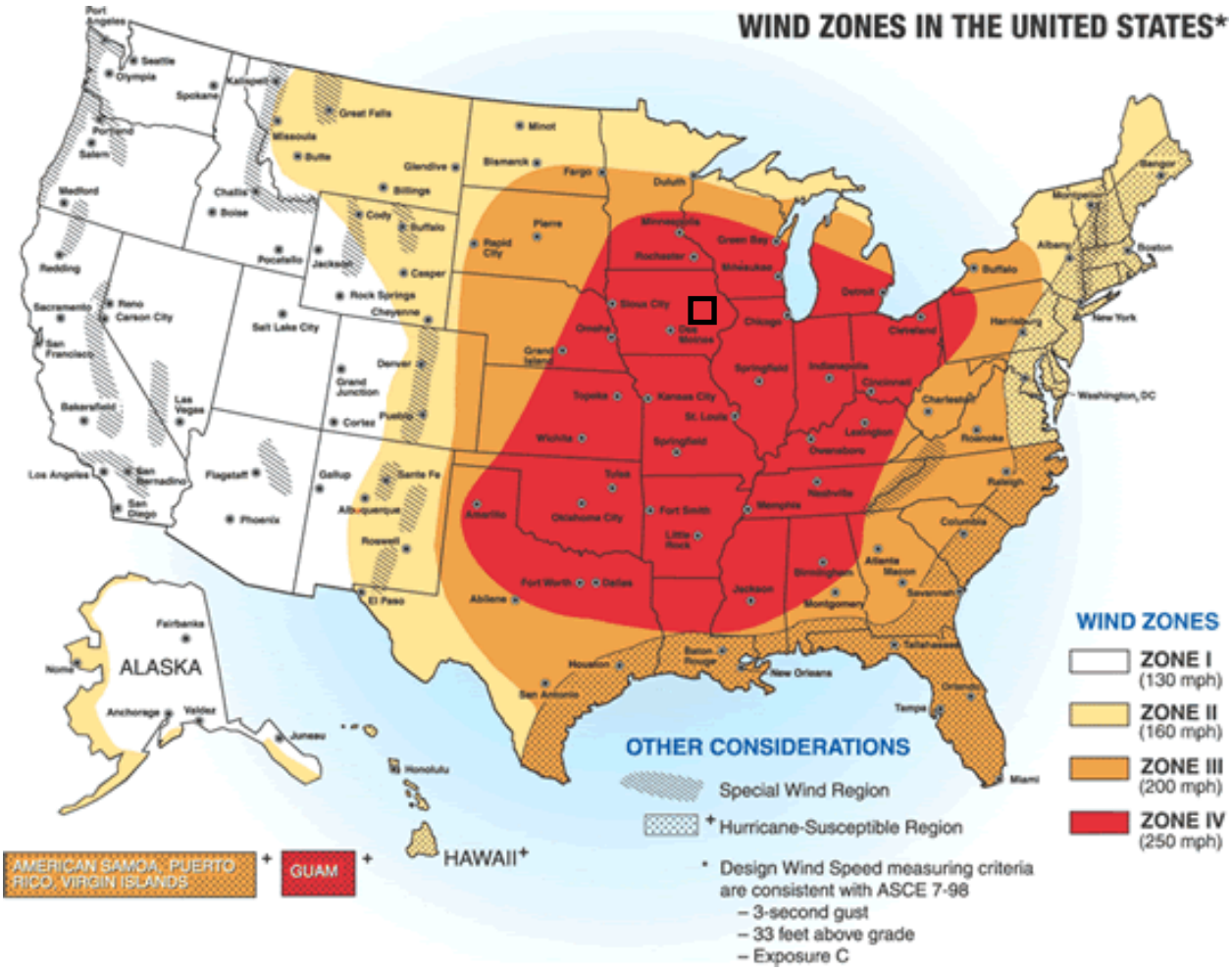
Table 3.62. Enhanced Fujita Scale with Potential Damage

Enhanced Fujita Scale			
Scale	Wind Speed (mph)	Relative Frequency	Potential Damage
EF0	65-85	53.5%	Light. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e. those that remain in open fields) are always rated EF0).
EF1	86-110	31.6%	Moderate. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	10.7%	Considerable. Roofs torn off well constructed houses; foundations of frame homes shifted; mobile homes complete destroyed; large trees snapped or uprooted; light object missiles generated; cars lifted off ground.
EF3	136-165	3.4%	Severe. Entire stores of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	0.7%	Devastating. Well-constructed houses and whole frame houses completely levelled; cars thrown and small missiles generated.
EF5	>200	<0.1%	Explosive. Strong frame houses levelled off foundations and swept away; automobile-sized missiles fly through the air in excess of 300 ft.; steel reinforced concrete structure badly damaged; high rise buildings have significant structural deformation; incredible phenomena will occur.

Source: NOAA Storm Prediction Center

All of Cedar County is susceptible to high wind events. The County is located in Wind Zone IV, which is susceptible to winds up to 250 mph. All of the participating jurisdictions are vulnerable to this hazard. **Figure 3.39** shows the wind zones of the United States based on maximum wind speeds; the entire state of Iowa is located within wind zone IV, the highest inland category.

Figure 3.39. Wind Zones in the United States



Source: FEMA; http://www.fema.gov/plan/prevent/saferoom/tsfs02_wind_zones.shtm
Note: Black square indicates approximate location of Cedar County

The advancement in weather forecasting has provided for the ability to predict severe weather that is likely to produce tornadoes days in advance. Tornado watches can be delivered to those in the path of these storms several hours in advance. Lead time for actual tornado warnings 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 if they occur after sundown or due to blowing dust or driving rain and hail.

Previous Occurrences

Tornadoes

According to statistics reported by the NCDC, Cedar County had 31 recorded tornado events from 1950 to 2013. Of these, 1 was F4, 1 was F3, 7 were F2, 9 were F1 and EF1, and 13 were F0. These tornadoes caused 1 fatality, 20 injuries, over $8.6 Million in property damages, and over $90,000 in crop damages. **Table 3.63** summarizes these events.

Table 3.63. Recorded Tornadoes in Cedar County, 1950 - 2013

Date	Location	Length (miles)	Width (yards)	Magnitude	Fatalities	Injuries	Property Damage	Crop Damage
6/1/2007	Lime City	1.05	75	EF1	0	0	$0	$0
7/20/2003	Clarence	2.4	440	F1	0	0	$1,000,000	$30,000
6/18/1998	Mechanicsville	0.1	0.2	F0	0	0	$0	$0
5/15/1998	Downey	15	400	F3	0	2	$1,750	$0
5/18/1997	Mechanicsville	3	50	F1	0	0	$0	$0
4/30/1997	Durant	3	20	F0	0	0	$10,000	$0
8/22/1996	Lowden	0.3	20	F0	0	0	$0	$0
7/27/1995	Lowden	0.1	20	F0	0	0	$0	$50
7/27/1995	Bennett	0.1	25	F0	0	0	$1,000	$1,000
7/27/1995	Atalissa To	7.5	100	F2	0	0	$500,000	$60,000
5/9/1995	Cedar Bluff	7	100	F2	0	0	$500,000	$0
5/9/1995	Mechanicsville	0.5	50	F0	0	0	$60,000	$0
11/29/1991	Cedar Co.	1	30	F1	0	0	$25,000	$0
7/22/1991	Cedar Co.	0.1	13	F0	0	0	$25,000	$0
3/22/1991	Cedar Co.	10	80	F2	0	0	$250,000	$0
3/22/1991	Cedar Co.	0.1	20	F1	0	0	$2,500	$0
3/8/1990	Cedar Co.	0.1	23	F0	0	0	$2,500	$0
5/8/1988	Cedar Co.	7	90	F2	0	0	$2,500,000	$0
4/2/1988	Cedar Co.	2.5	20	F1	0	0	$250,000	$0
8/21/1987	Cedar Co.	1	20	F1	0	0	$250,000	$0
6/22/1984	Cedar Co.	0	33	F0	0	0	$0	$0
6/17/1984	Cedar Co.	0.5	40	F1	0	0	$25,000	$0
7/1/1983	Cedar Co.	15	50	F1	0	1	$250,000	$0
5/20/1982	Cedar Co.	0	33	F0	0	0	$250	$0
5/20/1982	Cedar Co.	0	33	F0	0	0	$30	$0
5/20/1982	Cedar Co.	0	33	F0	0	0	$250	$0
5/20/1982	Cedar Co.	0	33	F0	0	0	$250	$0
4/28/1974	Cedar Co.	2.3	100	F2	0	16	$250,000	$0
4/11/1965	Cedar Co.	70.2	200	F4	1	0	$2,500,000	$0
6/7/1961	Cedar Co.	5.1	200	F2	0	1	$25,000	$0
5/21/1957	Cedar Co.	8.9	100	F2	0	0	$250,000	$0
Totals					**1**	**20**	**$8,678,530**	**$91,050**

Source: National Climatic Data Center

Table 3.64 shows the number of Tornado Watches and Warnings issued by NOAA's National Weather Service. The data is kept on Iowa Environmental Mesonet, Iowa State University Department of Agronomy website, (http://mesonet.agron.iastate.edu/vtec/search.php).

Table 3.64. National Weather Service Tornado Watches and Warnings, 2005-April 2014

Year	Tornado Watch	Tornado Warning
So far in 2014	0	1
2013	5	2
2012	1	0
2011	3	1
2010	8	0
2009	5	0
2008	14	2
2007	4	3
2006	3	5
2005	1	0
Total	**44**	**14**

Source: Environmental Mesonet, Iowa State University Department of Agronomy website, http://mesonet.agron.iastate.edu/vtec/search.php , accessed April 2014

Cedar County has been included in two presidential disaster declarations that involved tornadoes since 1988. Descriptions of notable previous tornado events are provided below:

FEMA-4135-DR-IA—Severe Storms, Tornadoes, and Flooding, *Declared July 31, 2013; Incident Period June 21 to June 28, 2013.*
FEMA-*1763-DR-IA—Severe Storms, Tornadoes, & Flooding*, *Declared May 27, 2008; Incident Period May 25 to August 13, 2008*. The primary damages in Cedar County associated with this declaration were for severe storms and flooding.
FEMA-1518-DR-IA—Severe Storms, Tornadoes, & Flooding, *Declared May 25, 2004; Incident Period May 19 to June 24, 2004*. The primary damages in Cedar County associated with this declaration were for severe storms and flooding.

Windstorms

Previous Occurrences
According to the NCDC database, there were 103 high wind events in Cedar County from 1996 to 2013. During this time period there were no reported deaths or injuries and an estimated $1.3 Million in property damages. Recorded wind gusts ranged from a high of 83 knots to a low of 39 knots. **Table 3.65** provides a summary of the wind speeds reported for the wind events. Many of the wind events reported to NCDC occurred on the same day. When counting only events that occurred on different days, there were 86 separate events in this 18 year period.

Table 3.65. Reported Wind Speeds, NCDC Events from 1996 to April 2013

Wind Speed	# of Events
83 kts.	1
80 kts.	2
78 kts.	1
75 kts.	1
74 kts.	1
70 kts.	3
65 kts.	5
63 kts.	1
61 kts.	14
61 kts.	12
60 kts.	2
57 kts.	7
56 kts.	7
55 kts.	1
54 kts.	1
53 kts.	1
52 kts.	29
51 kts.	2
50 kts.	6
47 kts.	1
39 kts.	2
Not Reported	3

Source: NCDC

Cedar County has been included in one presidential disaster declaration that involved straight-line winds. Summaries of notable damaging events are provided below:

FEMA-4119-DR-IA—Sever Storms, Straight-line Winds, and Flooding, *Declared May 31, 2013; Incident Period April 17 to 30, 2013.*

Table 3.66 shows the insurable crop insurance claims paid in Cedar County as a result of windstorms.

Table 3.66. Crop Insurance Claims Paid in Cedar County from Windstorms, 2004-2013.

Crop Year	Crop Name	Cause of Loss Description	Insurance Paid
2004	Corn	Wind/Excess Wind	$36,331
2007	Corn	Wind/Excess Wind	$20,673
2007	Hybrid Corn Seed	Wind/Excess Wind	$9,136
2007	Soybeans	Wind/Excess Wind	$207
2010	Corn	Wind/Excess Wind	$4,242
2011	Corn	Wind/Excess Wind	$57,819
Total			**$128,407**

Source: USDA Risk Management Agency Crop Insurance Payment FOIA Request; USDA Risk Management Agency Iowa Crop Insurance Profile, http://www.rma.usda.gov/pubs/2012/stateprofiles/iowa11.pdf

Probability of Future Occurrence

The NCDC reported 31 tornadoes in Cedar County in a 64 year time period, which calculates to 48 percent chance of a tornado in any given year.

With the 14 NWS tornado warnings issued for Cedar County from 2005 thru April 2014 there have been an average of 1.5 tornado warnings per year during these 9.3 years of data.

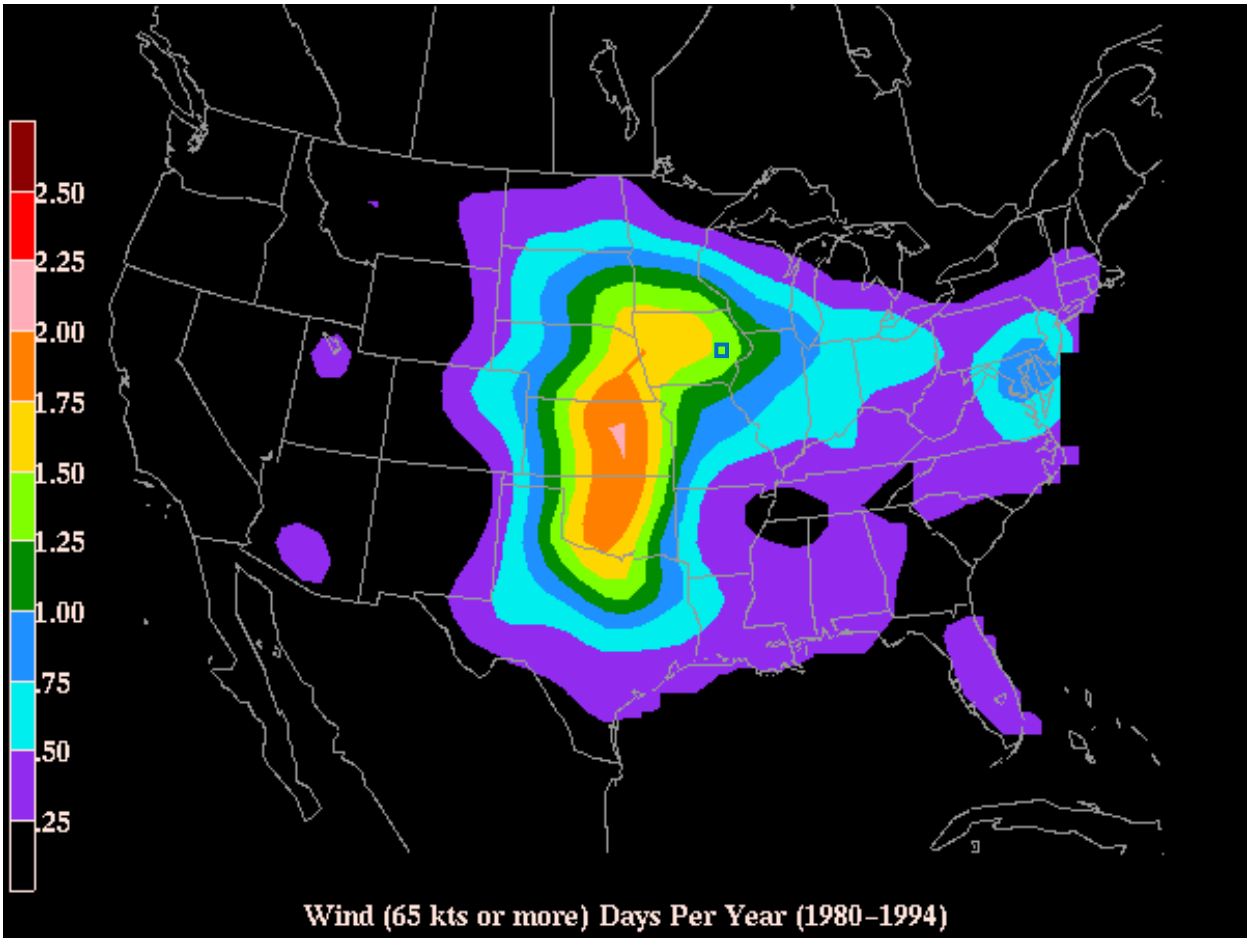
Therefore, it is a high probability that some portion of Cedar County will experience tornado activity in any given year.

According to NCDC, there were 86 separate high wind events from 1996 to 2013 (18 year period) in Cedar County. Based on this data, an average of 4.7 high wind events occur in Cedar County each year.

Probability Score: 4—Highly Likely

Figure 3.40 below shows the probability of a windstorm event (65 knots or greater) in the U.S. The Cedar County planning area is colored lime green showing that 65+ knot winds are probable to occur 1.25 to 1.50 times a year.

Figure 3.40. Annual Windstorm Probability (65+ knots), United States 1980-1994



Source: NSSL, http://www.nssl.noaa.gov/users/brooks/public_html/bigwind.gif;
Note: Blue square indicates approximate location of Cedar County

Vulnerability

Overview

Cedar County is located in a region of the U.S. with high frequency of dangerous and destructive tornadoes and is referred to as "Tornado Alley". **Figure 3.41** is based on areas where dangerous tornadoes are most likely to take place.

Figure 3.41. Tornado Alley in the U.S.

Source: http://www.tornadochaser.net/tornalley.html

Light frame structures, such as mobile homes, outbuildings and sheds are considered especially vulnerable to damage from tornadoes.

According to the 2013 Iowa Hazard Mitigation Plan, of the 8 hazards for which data was available to estimate annualized losses, tornadoes ranked 3rd with $36 million in annualized losses based on data spanning a 63-year period.

Due to the potential for damaging tornadoes in the planning area, the magnitude was determined to be a 3, critical.

Magnitude Score: 3—Critical

Potential Losses to Existing Development

In Cedar County, the NCDC estimate for past property damages resulting from tornadoes from 1950 – 2013 (64 years) was $8,678,530. This translates to an annualized loss of amount of $135,602. For windstorms, NCDC loss estimates were $1,356,600 from 1996 to 2013 (18 years). This translates to an annualized loss of $75,367. Combined tornado and windstorm annualized losses calculate to $210,969.

To estimate vulnerability to tornadoes, a potential tornado scenario was analyzed for each jurisdiction in the planning area. The scenario chosen was an F1/EF1 tornado with wind speed of approximately 100 mph. From the NCDC reports, it was determined that there have been 9 F1 tornadoes in Cedar County since 1950. Of all tornadoes reported by NCDC since 1950, the average length was 3 miles long with an average width of 80 yards.

To provide estimated damage results from an F1/EF1 tornado with these dimensions, a hypothetical tornado track was considered at a 45 degree angle running through the approximate center of each jurisdiction in the planning area. For Unincorporated Cedar County and the incorporated cities, the parcel data provided by Cedar County GIS Department was

utilized as the basis for determining damage estimates. Separate analyses were not conducted for the public school districts. Since the public school districts have a relatively small number of buildings, it was not possible to apply this same type of random tornado path scenario to provide meaningful results.

With the infinite variables associated with tornado occurrences such as wind speed, direction, length, width, time on the ground, etc., it is not possible to accurately estimate future losses. However, this methodology provides loss estimates for a defined scenario. Utilizing GIS data with associated building values considers variations in density of the built environment as well as variations in values. Although it is not possible to accurately predict tornado losses, this analysis demonstrates how the impacts of specific tornado scenario would vary among jurisdictions in Cedar County.

Once the number and values of buildings within the hypothetical tornado track were determined, a 10 percent damage calculation was made. This damage percent is based on information from the NOAA Storm Prediction Center, which estimates that a F1/EF1 tornado of this magnitude would severely strip roofs; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.

Table 3.67 provides the results of the analysis in terms of the number and value of buildings in the scenario tornado path and estimated losses in Cedar County. A planning area total was not calculated as this scenario is not meant to indicate that these damages would occur simultaneously.

Table 3.67. F/EF 1 Tornado Scenario Loss Estimates for Jurisdictions in Cedar County

Jurisdiction	# of Buildings in Path	Building Types	Total Building Values in Path	10% Loss Estimate
Unincorporated County	18	10-A, 3-C, 5-R	$624,610	$62,461
City of Bennett	20	7-C, 13-R	$747,290	$74,729
City of Clarence	25	2-C, 23-R	$1,540,970	$154,097
City of Durant	12	12-R	$1,832,840	$183,284
City of Lowden	23	2-C, 21-R	$1,206,670	$120,667
City of Mechanicsville	21	4-C, 17-R	$1,505,680	$150,568
City of Stanwood	24	8-C, 16-R	$1,550,380	$155,038
City of Tipton	74	15-C, 59-R	$6,727,280	$672,728
City of West Branch	12	2-A, 3-C, 7-R	$610,480	$61,048

Source: AMEC Analysis of parcel data from Cedar County GIS Department; A=Agricultural, C=Commercial, R=Residential

Loss of Use

Overhead power lines and infrastructure are also vulnerable to damages from windstorms. Potential losses would include cost of repair or replacement of damaged facilities, and lost economic opportunities for businesses. Public safety hazards include risk of electrocution from downed power lines. Specific amounts of estimated losses are not available due to the complexity and multiple variables associated with this hazard. The electric power loss of use estimates provided in **Table 3.68** below were calculated using FEMA's Standard Values for Loss of Service for Utilities published in the June 2009 *BCA Reference Guide*. These figures are used to provide estimated costs associated with the loss of power in relation to the populations

in Cedar County's jurisdictions. The loss of use estimates for power failure associated with windstorms is provided as the loss of use cost per person, per day of loss. The estimated loss of use provided for each jurisdiction represents the loss of service of the indicated utility for one day for 10 percent of the population. It is understood that in rural areas, the typical loss of use may be for a larger percentage of the population for a longer time during weather extremes. These figures do not take into account physical damages to utility equipment and infrastructure.

Table 3.68. Loss of Use Estimates for Power Failure

Jurisdiction	2013 Population Estimate	Estimated Affected Population 10%	Electric Loss of Use Estimate ($126 per person per day)
Unincorporated County	7,097	710	$89,422
City of Bennett	396	40	$4,990
City of Clarence	961	96	$12,109
City of Durant*	1,832	183	$23,083
City of Lowden	780	78	$9,828
City of Mechanicsville	1,129	113	$14,225
City of Stanwood	673	67	$8,480
City of Tipton	3,199	320	$40,307
City of West Branch*	2,326	233	$29,308
Total		**1,839**	**$231,752**

Source: Loss of Use Estimates from FEMA BCA Reference Guide, 2009; Population Estimates, Iowa State University of Science and Technology, Iowa Community Indicators Program
*Data is for entire incorporated area, including portion(s) in adjacent counties.
**Data is for Cedar County portion of incorporated area only.

Crop Losses

Crop insurance payments for the period from 2004-2013 were $128,407 for wind damage. Considering that 90.5 percent of insurable crops are insured in Iowa (2013 Iowa Crop Insurance Profile, USDA, RMA), the adjusted losses calculate to $141,886 for all insurable crops for the period. This results in an average annual loss of $14,187 to insurable crops as a result of wind damage

Future Development

Public buildings such as schools, government offices, as well as other buildings with a high occupancy and mobile home parks should consider inclusion of a tornado saferoom to shelter occupants in the event of a tornado.

Windstorm is primarily a public safety and economic concern, and the planning area is located in a region with very high frequency of occurrence. Windstorm can cause damage to structures and power lines which in turn create hazardous conditions for people. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered.

Although windstorms occur frequently in the planning area and damages to property occur, much of the damage is generally covered by private insurance. This results in less impact to individuals and the community since recovery is facilitated by insurance.

Tornado/Windstorm Hazard Summary by Jurisdiction

The magnitude was rated as a level 3 for all the participating jurisdictions as they are all vulnerable to tornado and windstorm damage. The factors of probability, warning time, and duration are also equal across the planning area. This hazard does not substantially vary by jurisdiction.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	4	3	3	1	3.25	High
City of Bennett	4	3	3	1	3.25	High
City of Clarence	4	3	3	1	3.25	High
City of Durant	4	3	3	1	3.25	High
City of Lowden	4	3	3	1	3.25	High
City of Mechanicsville	4	3	3	1	3.25	High
City of Stanwood	4	3	3	1	3.25	High
City of Tipton	4	3	3	1	3.25	High
City of West Branch	4	3	3	1	3.25	High
Bennett School District, #603	4	3	3	1	3.25	High
Durant School District, #1926	4	3	3	1	3.25	High
North Cedar School District, #3691	4	3	3	1	3.25	High
Tipton School District #6408	4	3	3	1	3.25	High
West Branch School District #6930	4	3	3	1	3.25	High

3.5.16 Transportation Incident

Hazard Score Calculation					
Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score	Level
4	2	4	1	3.10	High

Profile

Hazard Description

This hazard encompasses the following: air transportation, highway transportation, and railway transportation. The transportation incidents can involve any mode of transportation that directly threatens life and which results in property damage and/or death(s)/injury(s) and/or adversely impact a community's capabilities to provide emergency services. Incidents involving buses and other high occupancy vehicles could trigger a response that exceeds the normal day-to-day capabilities of response agencies.

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

Highway transportation incidents are very complex. Contributing factors can include a roadway's design and/or pavement conditions (e.g. rain, snow and ice), a vehicle's mechanical condition (e.g. tires, brakes, lights), a driver's behavior (e.g. speeding, inattentiveness and seat belt usage), the driver's condition (e.g. alcohol use, age-related conditions, physical impairment) and driver inattention by using a wireless device. In fact, the driver's behavior and condition factors are the primary cause in an estimated 67 percent of highway crashes and a contributing factor in an estimated 95 percent of all crashes.

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

Warning Time Score: 4—Minimal or no warning

Duration Score: 1—Less than 6 hours

Geographic Location/Extent

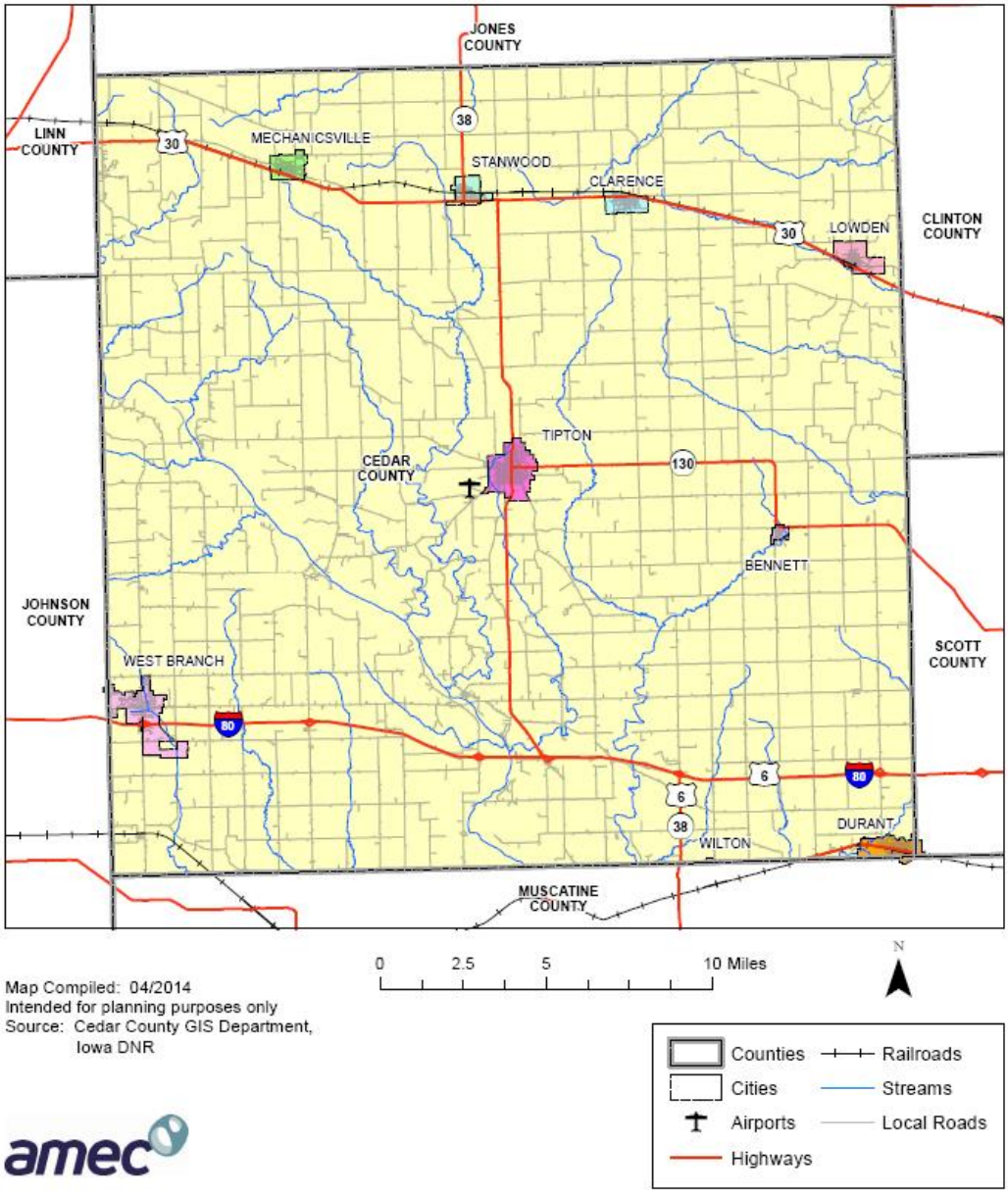
The entire planning area is subject to transportation incidents and all participating jurisdictions are affected. The major transportation routes include Interstate 80, US Highways 6 and 30, Iowa State Highways 38 and 130.

The Mathews Memorial Airport in Tipton is the only airport in the County. There are no heliports in the County.

Cedar County has two railroads one being a Class I, the Union Pacific (UP) Railroad Company, and one Class II railroad, the Iowa Interstate Railroad (IAIS). The UP parallels Highway 30 and connects the jurisdictions of Lowden, Clarence, Stanwood, and Mechanicsville. The IAIS travels through Durant, enters Muscatine County, and reenters Cedar County north of West Liberty on its way to Downey.

Figure 3.42 shows all the transportation routes in Cedar County.

Figure 3.42. Cedar County Transportation Routes & Airports



Previous Occurrences

Air Transportation Incidents:

There have not been any Cedar County aviation incidents reported to the National Transportation Safety Board (NTSB) in the last 50 years. For information and details about other air transportation incidents in Iowa, see http://planecrashmap.com/list/ia/.

Highway Transportation Incidents:

The Iowa Department of Transportation's Office of Traffic and Safety maintains traffic crash statistics and location maps by county and cities in Iowa. **Table 3.69** shows the most recent available number of crashes categorized by the following: fatal, major, minor, possibility unknown, property damage only. The data is reported for Cedar County unincorporated and for the cities of Bennett, Clarence, Durant, Lowden, Mechanicsville, Stanwood, Tipton, and West Branch. Eighty-three percent of all crashes in Cedar County occurred on rural roads during the 2009-2013 timeframe.

Table 3.69. All Crashes in Cedar County, 2009-2013

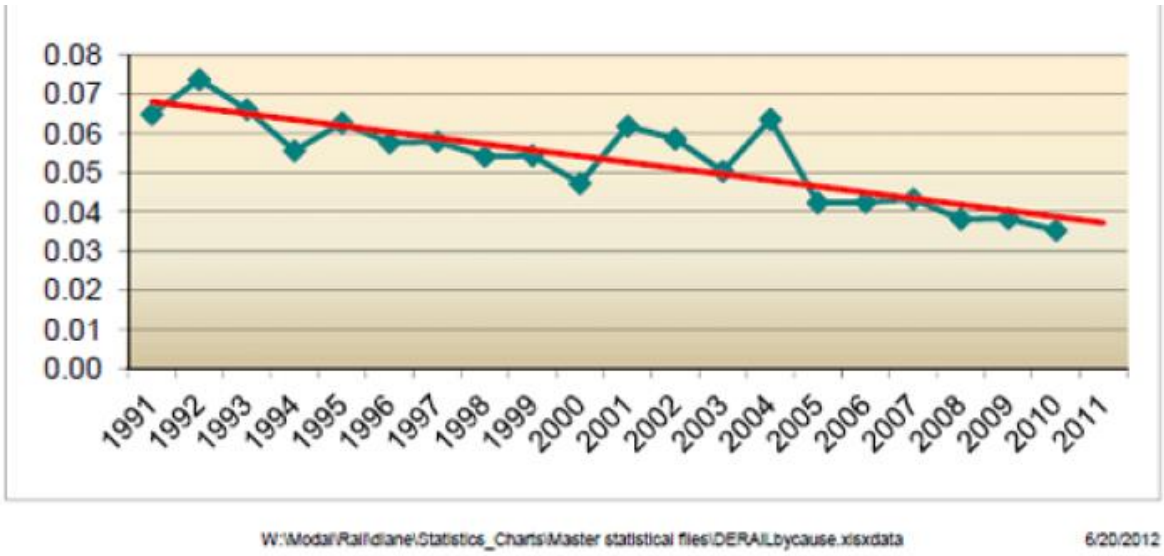
Crashes					
Crashes	**Fatal**	**Major**	**Minor**	**Possibility Unknown**	**Property Damage Only**
Cedar County (unincorporated)					
1,370	14	27	106	126	1,097
City of Bennett					
6	0	0	0	0	6
City of Clarence					
27	0	0	2	2	23
City of Durant					
24	0	1	2	2	19
City of Lowden					
19	1	3	1	1	13
City of Mechanicsville					
29	0	2	0	4	23
City of Stanwood					
25	0	1	1	3	20
City of Tipton					
102	0	0	4	13	85
City of West Branch					
52	0	1	3	4	44
Total Countywide					
1,654	15	35	119	155	1,330

Source: Iowa Department of Transportation's Office of Traffic and Safety

Railway Transportation Incidents

According to the Federal Railroad Administration's Office of Safety Analysis, there have not been any train derailments in Cedar County since 1999. In that year, two train derailments occurred, one was caused by extreme wind velocity and one was caused by a bolt hole crack or break. Throughout Iowa, rail car traffic has increased but the number of derailments in relationship to the traffic is trending downward according to the Iowa Department of Transportation (see **Figure 3.43**).

Figure 3.43. Derailments in Iowa per Million Rail Car Miles, 1991-2011.



Source: Iowa Department of Transportation, http://www.iowadot.gov/about/Derailments.html

As of 2013, Iowa has 5,157 highway-rail crossings in the State. There has not been an incident in Cedar County since 2011. **Table 3.70** shows the highway–railroad grade crossing accidents that occurred at public and private crossings in Cedar County from 2005-2013.

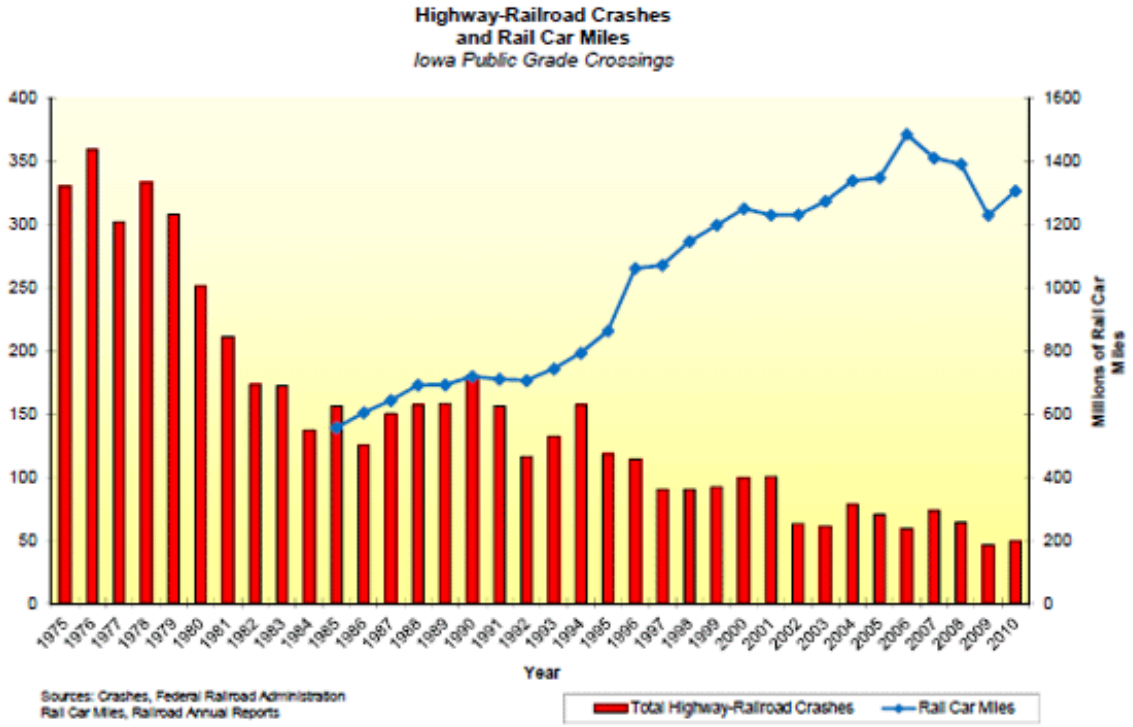
Table 3.70. Highway-Rail Accidents at Public and Private Crossings in Cedar County, 2005-2013

Year	# of Accidents	Injuries
2013	0	0
2012	0	0
2011	2	1
2010	0	0
2009	0	0
2008	0	0
2007	0	0
2006	0	0
2005	1	0

Source: Federal Railroad Administration's Office of Safety Analysis, http://safetydata.fra.dot.gov/officeofsafety/default.aspx

Figure 3.44 shows the significant decline in highway-railroad crashes from 1975 to 2010 compared to the increased miles that rail cars are traveling.

Figure 3.44. Highway-Railroad crashes in Iowa, 1975-2010



Source: Iowa Department of Transportation, http://www.iowadot.gov/about/RailHighwayCrossing.html

Probability of Future Occurrence

A major transportation incident can occur at any time, even though traffic engineering, inspection of traffic facilities, and land use management of areas adjacent to roads and highways has increased, incidents continue to occur. As the volume of traffic on the county roads, highways and interstates increases, the number of traffic accidents will likely also increase. The combination of large numbers of people on the road, farm equipment, wildlife, unpredictable weather conditions, potential mechanical problems and human error always leaves the potential for a transportation accident.

Based on the available information, the probability of air transportation, highway, or railway incident that directly threatens life and which results in property damage and/or death(s)/injury(s) and/or adversely impact a community's capabilities to provide emergency services is **"Highly Likely"** with greater than 33 percent likelihood to occur in any given year.

Probability Score: 4—Highly Likely

Vulnerability

Overview

Transportation incidents can almost always be expected to occur in specific areas, on or near airports, roadways, railroads, or other transportation infrastructure. The exception is air transportation incidents can occur anywhere. However, it is difficult to predict the magnitude of any specific event because these types of events are accidental and the circumstances surrounding these events will impact the extent of damage or injuries that occur. Rural road transportation incidents, which are the most common, generally involve isolated impacts to a few vehicles and persons per incident.

Magnitude Score: 2—Limited

Potential Losses to Existing Development

The U.S. Department of Transportation Federal Highway Administration issued a technical advisory in 1994 providing suggested estimates of the cost of traffic crashes to be used for planning purposes. These figures were converted from 1994 dollars to 2014 dollars using an annual inflation rate of 2.85 percent. The costs are listed below in **Table 3.71.**

Table 3.71. Costs of a Traffic Crash

Severity	Cost per injury (in 2014 dollars $)
Fatal	$4,171,814
Evident Injury	$57,762
Possible Injury	$30,487
Property Damage Only	$3,209

Source: U.S. Department of Transportation Federal Highway Administration Technical Advisory T 7570.2, 1994. Adjusted to 2014 dollars.

Using the traffic crash costs per type of severity from **Table 3.71**, the total costs of traffic crashes is figured in **Table 3.72** for Cedar County and several incorporated cities from 2009-2013. Based on this analysis, the estimated average annual cost of all types of traffic accidents for the planning area was $14,806,927.

Table 3.72. Costs of Traffic Crashes in Cedar County, 2009-2013

	Fatal Crash	Major Crash (Evident Injury)	Minor Crash (Possible Injury)	Crash with Property Damage Only
Cedar County (unincorporated)				
Number of incidents	15	35	119	1,330
Total Cost	$62,577,210	$2,021,670	$3,627,953	$4,267,970
Average Annual Cost	$12,515,442	$404,334	$725,591	$853,594
City of Bennett				
Number of incidents	0	0	0	6
Total Cost	$0	$0	$0	$19,254
Average Annual Cost	$0	$0	$0	$3,851
City of Clarence				
Number of incidents	0	0	2	23
Total Cost	$0	$0	$60,974	$73,807
Average Annual Cost	$0	$0	$12,194	$14,761
City of Durant				
Number of incidents	0	1	2	19

	Fatal Crash	Major Crash (Evident Injury)	Minor Crash (Possible Injury)	Crash with Property Damage Only
Total Cost	$0	$57,762	$60,974	$60,971
Average Annual Cost	$0	$11,552	$12,195	$12,194
City of Lowden				
Number of incidents	1	3	1	13
Total Cost	$4,171,814	$173,286	$30,487	$41,717
Average Annual Cost	$834,363	$34,657	$6,097	$8,343
City of Mechanicsville				
Number of incidents	0	2	0	23
Total Cost	$0	$115,524	$0	$73,807
Average Annual Cost	$0	$23,104	$0	$14,761
City of Stanwood				
Number of incidents	0	1	1	20
Total Cost	$0	$57,762	$30,487	$64,180
Average Annual Cost	$0	$11,552	$6,097	$16,045
City of Tipton				
Number of incidents	0	0	4	85
Total Cost	$0	$0	$121,948	$272,765
Average Annual Cost	$0	$0	$24,390	$54,553
City of West Branch				
Number of incidents	0	1	3	44
Total Cost	$0	$57,762	$91,461	$141,196
Average Annual Cost	$0	$11,552	$1,829	$28,239

Sources: U.S. Department of Transportation Federal Highway Administration Technical Advisory T 7570.2, 1994. Adjusted to 2014 dollars and Iowa Department of Transportation's Office of Traffic and Safety, http://www.iowadot.gov/crashanalysis/index.htm?

Estimated losses as a result of air transportation and railway transportation are not available for this analysis.

Future Development

The closest passenger airport for Cedar County residents is in the neighboring Linn County at the Eastern Iowa Airport. This airport had a total of 1,042,291 annual passengers in 2013 which is an increase of 57,117 from 2012. The Iowa Aviation System Plan, 2010-2030 makes recommendations for future development at the Eastern Iowa Airport (source: http://www.iowadot.gov/aviation/data_driven/publications/System_plan_reports/SPRCID.pdf).

According to the Iowa Department of Transportation, there is resurfacing work being done on U.S. 30 Highway in Cedar and Clinton Counties from April 2014 to October 2014 as well as pavement rehab and bridge deck overlay on I-80 in Cedar County in 2014.

Transportation Hazard Summary by Jurisdiction

All jurisdictions within the planning area are at risk to some kind of transportation incident. Higher vulnerability occurs with the jurisdictions within close proximity of the interstate and highways and railways respectively. The jurisdictions of Bennett, Clarence, Lowden, Mechanicsville, Stanwood, Tipton and West Branch have increased vulnerability to transportation incidents on the interstate and highways and Clarence, Lowden, Durant, Mechanicsville, and Stanwood to railroad incidents. All jurisdictions are susceptible to airplane

crashes. The City of Bennett and the Bennett School District were given a magnitude rating of 1 since they had less than 10 crashes in the 5-year reporting data and they do not have any railroads or federal highways through the jurisdiction.

Jurisdiction	Probability	Magnitude	Warning Time	Duration	Score	Level
Cedar County	4	2	4	1	3.10	High
City of Bennett	4	1	4	1	2.80	Moderate
City of Clarence	4	2	4	1	3.10	High
City of Durant	4	2	4	1	3.10	High
City of Lowden	4	2	4	1	3.10	High
City of Mechanicsville	4	2	4	1	3.10	High
City of Stanwood	4	2	4	1	3.10	High
City of Tipton	4	2	4	1	3.10	High
City of West Branch	4	2	4	1	3.10	High
Bennett School District, #603	4	1	4	1	2.80	Moderate
Durant School District, #1926	4	2	4	1	3.10	High
North Cedar School District, #3691	4	2	4	1	3.10	High
Topton School District #6408	4	2	4	1	3.10	High
West Branch School District #6930	4	2	4	1	3.10	High

3.6 Hazard Analysis Summary

This section provides a tabular summary of the hazard ranking for each jurisdiction in the planning area.

Table 3.73. Hazard Ranking Summary by Jurisdiction

Jurisdiction	Dam Failure	Drought	Earthquakes	Expansive Soils	Extreme Heat	Flash Flood	Grass/Wildland Fire	Hazardous Materials Incident	Radiological Incident	River Flood	Severe Winter Storm	Sinkholes	Terrorism	Thunderstorm/Lightning/Hail	Tornado/Windstorm	Transportation Incident
Cedar County	L	M	L	L	L	M	M	H	M	H	H	L	M	M	H	H
City of Bennett	N/A	M	L	L	L	L	M	M	M	H	H	L	L	M	H	M
City of Clarence	N/A	M	L	L	L	L	M	H	M	N/A	H	L	L	M	H	H
City of Durant	L	M	L	L	L	L	M	H	M	M	H	L	M	M	H	H
City of Lowden	N/A	M	L	L	L	M	M	H	M	M	H	L	L	M	H	H
City of Mechanicsville	N/A	M	L	L	L	M	M	H	M	N/A	H	L	M	M	H	H
City of Stanwood	N/A	M	L	L	L	M	M	H	M	N/A	H	L	L	M	H	H
City of Tipton	N/A	M	L	L	L	M	M	H	M	M	H	L	M	M	H	H
City of West Branch	L	M	L	L	L	L	M	H	M	H	H	L	M	M	H	H
Bennett School District, #603	N/A	M	L	L	L	L	L	L	M	N/A	H	L	L	M	H	M
Durant School District, #1926	N/A	M	L	L	L	L	L	L	M	N/A	H	L	M	M	H	H
North Cedar School District, #3691	N/A	M	L	L	L	M	L	L	M	N/A	H	L	L	M	H	H
Tipton School District #6408	N/A	M	L	L	L	M	L	L	M	N/A	H	L	M	M	H	H
West Branch School District #6930	N/A	M	L	L	L	L	L	L	M	N/A	H	L	M	M	H	H

4 MITIGATION STRATEGY

44 CFR Requirement §201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section presents the mitigation strategy updated by the Hazard Mitigation Planning Committee (HMPC) based on the risk assessment. The mitigation strategy was developed through a collaborative group process and consists of updated general goal statements to guide the jurisdictions in efforts to lessen disaster 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* (April 2003):

- **Goals** are general guidelines that explain what you want to achieve. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. They are usually long-term, broad, policy-type statements.
- **Mitigation Actions** are specific actions that help achieve goals.

4.1 Goals

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.

This planning effort is an update to an existing hazard mitigation plan. Therefore, the goals from the *2011 Cedar County Hazard Mitigation Plan* were reviewed to determine if they are still valid. AMEC facilitated a discussion session with the HMPC during their second meeting to review and update the plan goals. To ensure that the goals are comprehensive and support State goals, the 2013 State Hazard Mitigation Plan goals were reviewed. AMEC also presented common categories of mitigation goals from other plans.

The planning committee made the following changes to the 2011 goals:

- Goal 2—the word “property” was added.
- Goal 4—the words “and continuity of operations” were added.
- Goal 5 was deleted—“Pursue multi-objective opportunities whenever possible”.

The revised goals for this plan update are provided below:

Goal 1: Protect the Health and Safety of Residents

Goal 2: Reduce Future Property Losses from Hazard Events

Goal 3: Increase Public Awareness and Educate on the Vulnerability to Hazards

Goal 4: Improve Emergency Management and Continuity of Operations Capabilities

4.2 Identification and Analysis of Mitigation Actions

44 CFR Requirement §201.6(c)(3)(ii): 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.

During the second meeting of the HMPC, the results of the risk assessment update were provided to the HMPC members for review and the key issues were identified for the high-ranked hazards. Meeting #2 concluded with an introduction to mitigation actions to prompt discussions within and among the jurisdictions about any new mitigation actions as well as on-going actions from the existing plans.

The focus of Meeting #3 was to update the mitigation strategy. For a comprehensive range of mitigation actions to consider, the HMPC reviewed the following information during Meeting #3:

- Existing Actions submitted in the previous mitigation plan,
- Key Issues from Risk Assessment (top 10 hazards),
- State Priorities for Hazard Mitigation Assistance Grants, and
- Public Opinion from Surveys.

In development of each jurisdictions final mitigation strategy for submission to the plan, the jurisdictions were encouraged to review the details of the risk assessment to address vulnerabilities specific to their jurisdiction. Prior to the meeting, they were also provided a link to the publication, *FEMA Mitigation Action Ideas, 2013*. This document was developed by FEMA to provide a resource that communities can use to identify and evaluate a range of potential mitigation actions for reducing risk to natural hazards and disasters.

The mitigation strategy update included a thorough review and status update of the existing actions. **Table 4.1** provides a summary of the number of actions that each jurisdiction identified in the previous plan. Please note that the public school districts were not included as officially participating jurisdictions in the previous plan. As a result, there are no previous actions for them.

Table 4.1. Summary of Number of Actions in Previous Plan

Jurisdiction	# of Actions
Cedar County	23
City of Bennett	19
City of Clarence	16
City of Durant	17
City of Lowden	19
City of Mechanicsville	36
City of Stanwood	21
City of Tipton	18
City of West Branch	18
Total	**187**

Source: 2011 Cedar County Hazard Mitigation Plan

Prior to Meeting #3, the list of actions submitted in the previous plan was emailed to all members of the HMPC. Then at the third meeting, a print-out was provided to members of the HMPC with the actions submitted in the previous Hazard Mitigation Plan. Each jurisdiction was instructed to complete the column titled "2013 Action Status" with one of the following status choices:

- Completed,
- Not Started/Continue in Plan Update,
- In Progress/Continue in Plan Update, or
- Delete.

Of the 187 actions in the previous plan, 14 have been completed, 6 were deleted, and 167 were continued in the plan update (47 not started and 120 in progress). Appendix C contains the actions that were either completed or deleted from the mitigation strategy along with any applicable comments. The continued actions are discussed in additional detail, along with the new actions in **Section 4.3**.

The jurisdictions were encouraged to be comprehensive and include all appropriate actions to work toward becoming more disaster resistant. However, they were encouraged to maintain a realistic approach and were reminded that the hazard mitigation plan is a "living document". As capabilities, vulnerabilities, or the nature of hazards that threaten each jurisdiction change, the mitigation actions can and should be updated to reflect those changes, including addition or deletion of actions, as appropriate.

As part of the meeting discussion, jurisdictions were instructed to consider the potential cost of each project in relation to the anticipated future cost savings. This type of discussion allowed the committee as a whole to understand the broad priorities and discussion of the types of projects most beneficial to all jurisdictions within Cedar County.

4.3 Implementation of Mitigation Actions

44 CFR Requirement §201.6(c)(3)(ii): The mitigation strategy shall include an action strategy describing how the actions identified in paragraph (c)(2)(ii) 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 benefits review of the proposed projects and their associated costs.

Jurisdictions were encouraged to meet with others in their community to finalize the actions to be submitted to the updated mitigation strategy. Throughout the discussion of the types of projects that the committee would include in the mitigation plan, emphasis was placed on the importance of a benefit-cost analysis in determining project priority. The Disaster Mitigation Act regulations state that benefit-cost review is the primary method by which mitigation projects should be prioritized. Recognizing the federal regulatory requirement to prioritize by benefit-cost, and the need for any publicly funded project to be cost-effective, the HMPC decided to pursue implementation according to when and where damage occurs, available funding, political will, jurisdictional priority, and priorities identified in the Iowa State Hazard Mitigation Plan. Due to many variables that must be examined during project development, the benefit/cost review at the planning stage, will primarily consist of a qualitative analysis. For each action, the jurisdictions included a narrative describing the types of benefits that could be realized with implementation of the action. Where possible, the cost was estimated as closely as possible with further refinement to occur as project development occurs. Cost-effectiveness will be considered in additional detail when seeking FEMA Hazard Mitigation Assistance grant funding for eligible projects identified in this plan. At that time, additional information will be researched to provide for a quantitative benefit-cost analysis.

STAPLEE is a tool used to assess the costs and benefits, and overall feasibility of mitigation actions. STAPLEE stands for the following:

- **Social**: Will the action be acceptable to the community? Could it have an unfair effect on a particular segment of the population?
- **Technical**: Is the action technically feasible? Are there secondary impacts? Does it offer a long-term solution?
- **Administrative**: Are there adequate staffing, funding, and maintenance capabilities to implement the project?
- **Political**: Will there be adequate political and public support for the project?
- **Legal**: Does your jurisdiction have the legal authority to implement the action?
- **Economic**: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- **Environmental**: Will there be negative environmental consequences from the action? Does it comply with environmental regulations? Is it consistent with community environmental goals?

To provide a mechanism for jurisdictions to prioritize actions a modified STAPLEE worksheet was completed by the jurisdictions for each new and continued action submitted for the updated mitigation strategy. **Figure 4.1** is a sample of the STAPLEE worksheet. All actions submitted

to the plan are indicated with a high, medium, or low priority level based on the modified STAPLEE score.

Figure 4.1. Modified STAPLEE Worksheet

CEDAR COUNTY
MULTI-JURISDICTIONAL
LOCAL HAZARD MITIGATION PLAN

Action Title:	**Jurisdiction:**
Action ID:	

Note: Make sure the Action ID Matches the Action ID in the spreadsheet. Action ID format for new actions is Jurisdiction-# (Ex. Bennett-1, Bennett-2, etc.)

STAPLEE Criteria	**Evaluation Rating** **Definitely YES = 3** **Maybe YES = 2** **Probably NO = 1** **Definitely NO = 0**	**Score**
S: Is it Socially acceptable?		
T: Is it Technically feasible and potentially successful?		
A: Does the jurisdiction have the administrative capacity to execute this action?		
P: Is it Politically acceptable?		
L: Is there Legal authority to implement?		
E: Is it Economically beneficial?		
E: Will the project have either a neutral or positive impact on the natural environment? (score a 3 if positive impact, 2 if neutral impact)		
Will historic structures be saved or protected?		
Could it be implemented quickly?		
STAPLEE Score		

Mitigation Effectiveness Criteria	**Evaluation Rating**	**Score**
Will the implemented action result in lives saved?	Assign from 5-10 points based on the likelihood that lives would be saved.	
Will the implemented action result in a reduction of disaster damages?	Assign from 5-10 points based on the relative reduction of disaster damages.	
Mitigation Effectiveness Score		

Total Score (STAPLEE Score + Mitigation Effectiveness Score): _____

Local Priority Level: ☐ High (33+ points) ☐ Medium (20-32 points) ☐ Low (less than 20 points)

Completed by (name/title/phone #): _____

The mitigation action summary table presenting the summary of continuing and new mitigation actions for each jurisdiction is provided in **Table 4.2.** In addition to the 167 actions that were continued from the previous plan, 27 new actions were identified, for a combined total of 194 actions in this updated mitigation strategy. The Action ID for each action has been carried over from the 2011 plan for continuing actions. As a result of completed and deleted actions, the Action ID does not follow a sequential order. New actions were assigned the next sequential Action ID. Following the action summary table, additional details are provided for each continuing and new action in **Table 4.3**. The detailed table serves as the action plan describing how each action will be implemented and administered by the local jurisdiction. The section identifying benefits or losses avoided if the action is implemented is primarily a qualitative review at this time. A more detailed and quantitative benefit-cost analysis was discussed and will be performed prior to implementation of actions when additional detailed project cost information has been developed.

Table 4.2. Mitigation Action Summary—Continuing and New Actions

Action ID	Action Title	2014 Action Status	Primary Hazard Addressed *(Select one from list)*	Goal #	STAPLEE Score	Priority
County-01	Obtain Missing Data	In Progress/Continue in Plan Update	All	1	45	High
County-02	Backup Generators	In Progress/Continue in Plan Update	Tornado / Windstorm	2	44	High
County-03	Expand Water Storage Capacity / Emergency Water Supplies / Dry Hydrants	Not Started/Continue in Plan Update	Severe Winter Storm	2	42	High
County-04	Hazardous Tree Removal Program	In Progress/Continue in Plan Update	Thunderstorm/Lightning/Hail	2	43	High
County-05	Power, Service, Electrical, and Water Distribution Lines	In Progress/Continue in Plan Update	Tornado / Windstorm	2	43	High
County-06	Roadway Elevations	Not Started/Continue in Plan Update	Flash Flood	2	42	High
County-07	Storm Shelters / Safe Rooms	In Progress/Continue in Plan Update	Tornado / Windstorm	2	43	High
County-08	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Not Started/Continue in Plan Update	Tornado / Windstorm	2	44	High
County-09	Static Detectors	Not Started/Continue in Plan Update	Thunderstorm/Lightning/Hail	2	41	High
County-10	Stormwater System and Drainage Improvements	Not Started/Continue in Plan Update	Flash Flood	2	42	High
County-11	Streambank Stabilization / Grade Control Structures / Channel Improvements	Not Started/Continue in Plan Update	River Flood	2	42	High
County-12	Drainage Study / Stormwater Master Plan	Not Started/Continue in Plan Update	Flash Flood	2	44	High
County-13	Flood-Prone Property Acquisition	Not Started/Continue in Plan Update	River Flood	2	43	High
County-14	Groundwater / Irrigation / Water Conservation Management Plan and Practices	Not Started/Continue in Plan Update	Drought	2	44	High
County-15	Drainage Districts	Not Started/Continue in Plan Update	River Flood	2	42	High
County-16*	Regulation Enforcements and Updates	In Progress/Continue in Plan Update	River Flood	2	45	High
County-17*	Maintain good standing in National Flood Insurance Program (NFIP)	In Progress/Continue in Plan Update	River Flood	2	45	High
County-18	Warning Systems	In Progress/Continue in Plan Update	Tornado / Windstorm	4	45	High
County-19*	Floodplain Management	In Progress/Continue in Plan Update	River Flood	2	45	High
County-20	Public Awareness / Education	In Progress/Continue in Plan Update	All	3	45	High
County-21	Comprehensive Disaster / Emergency Response / Rescue Plan	In Progress/Continue in Plan Update	Tornado / Windstorm	4	45	High

Action ID	Action Title	2014 Action Status	Primary Hazard Addressed *(Select one from list)*	Goal #	STAPLEE Score	Priority
County-22	Alert / Warning Sirens	In Progress/Continue in Plan Update	All	4	45	High
County-23	Weather Radios	In Progress/Continue in Plan Update	All	4	45	High
County-24	Cyber security	NEW	Man Made	4	43	High
Bennett-01	Obtain Missing Data	In Progress/Continue in Plan Update	All	1	46	High
Bennett-02	Backup Generators	Not Started/Continue in Plan Update	Tornado / Windstorm	2	44	High
Bennett-03	Storm Shelters / Safe Rooms	Not Started/Continue in Plan Update	Tornado / Windstorm	2	42	High
Bennett-04	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	In Progress/Continue in Plan Update	Tornado / Windstorm	2	36	High
Bennett-05	Stormwater System and Drainage Improvements	Not Started/Continue in Plan Update	Flash Flood	2	35	High
Bennett-06	Streambank Stabilization / Grade Control Structures / Channel Improvements	Not Started/Continue in Plan Update	River Flood	2	31	Medium
Bennett-07	Drainage Study / Stormwater Master Plan	Not Started/Continue in Plan Update	Flash Flood	2	30	Medium
Bennett-08	Flood-Prone Property Acquisition	Not Started/Continue in Plan Update	River Flood	2	32	Medium
Bennett-09*	Regulation Enforcements and Updates	In Progress/Continue in Plan Update	River Flood	2	41	High
Bennett-10*	Maintain good standing in National Flood Insurance Program (NFIP)	In Progress/Continue in Plan Update	River Flood	2	47	High
Bennett-11*	Floodplain Management	In Progress/Continue in Plan Update	River Flood	2	46	High
Bennett-12	Tree City USA	Not Started/Continue in Plan Update	Thunderstorm/Lightning/Hail	2	23	Medium
Bennett-13	Public Awareness / Education	In Progress/Continue in Plan Update	All	3	41	High
Bennett-14	Civil Service Improvements	In Progress/Continue in Plan Update	All	4	38	High
Bennett-15	Comprehensive Disaster / Emergency Response / Rescue Plan	In Progress/Continue in Plan Update	Tornado / Windstorm	4	43	High
Bennett-16	Improve Snow / Ice Removal Program / Snow Fence	In Progress/Continue in Plan Update	Severe Winter Storm	4	47	High
Bennett-17	Alert / Warning Sirens	In Progress/Continue in Plan Update	All	4	47	High
Bennett-18	Warning Systems	In Progress/Continue in Plan Update	Tornado / Windstorm	4	47	High
Bennett-19	Weather Radios	In Progress/Continue in Plan Update	All	4	47	High
Bennett-20	Power backup for critical facilities	NEW	All	2	42	High
Bennett-21	Early warning system for critical facilities	NEW	All	2	31	Medium

Action ID	Action Title	2014 Action Status	Primary Hazard Addressed *(Select one from list)*	Goal #	STAPLEE Score	Priority
Clarence-01	Obtain Missing Data	In Progress/Continue in Plan Update	All	1	20	Medium
Clarence-02	Backup Generators	In Progress/Continue in Plan Update	Tornado / Windstorm	2	30	Medium
Clarence-03	Storm Shelters / Safe Rooms	Not Started/Continue in Plan Update	Tornado / Windstorm	2	27	Medium
Clarence-04	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Not Started/Continue in Plan Update	Tornado / Windstorm	2	32	Medium
Clarence-05	Stormwater System and Drainage Improvements	In Progress/Continue in Plan Update	Flash Flood	2	25	Medium
Clarence-06	Streambank Stabilization / Grade Control Structures / Channel Improvements	Not Started/Continue in Plan Update	River Flood	2	20	Medium
Clarence-07	Drainage Study / Stormwater Master Plan	Not Started/Continue in Plan Update	Flash Flood	2	20	Medium
Clarence-08	Flood-Prone Property Acquisition	Not Started/Continue in Plan Update	River Flood	2	22	Medium
Clarence-09*	Regulation Enforcements and Updates	Not Started/Continue in Plan Update	River Flood	2	34	High
Clarence-12	Public Awareness / Education	Not Started/Continue in Plan Update	All	3	28	Medium
Clarence-13	Improve Snow / Ice Removal Program / Snow Fence	In Progress/Continue in Plan Update	Severe Winter Storm	4	28	Medium
Clarence-14	Alert / Warning Sirens	In Progress/Continue in Plan Update	All	4	32	Medium
Clarence-15	Warning Systems	In Progress/Continue in Plan Update	Tornado / Windstorm	4	38	High
Clarence-16	Weather Radios	In Progress/Continue in Plan Update	All	4	38	High
Clarence-17	Sanitary Sewer Upgrade	NEW	Flash Flood	2	28	Medium
Durant-01	Obtain Missing Data	In Progress/Continue in Plan Update	All	1	32	Medium
Durant-02	Backup Generators	In Progress/Continue in Plan Update	Tornado / Windstorm	2	47	High
Durant-03	Storm Shelters / Safe Rooms	Not Started/Continue in Plan Update	Tornado / Windstorm	2	32	Medium
Durant-04	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	In Progress/Continue in Plan Update	Tornado / Windstorm	2	30	Medium
Durant-05	Stormwater System and Drainage Improvements	In Progress/Continue in Plan Update	Flash Flood	2	27	Medium
Durant-06	Streambank Stabilization / Grade Control Structures / Channel Improvements	Not Started/Continue in Plan Update	Flash Flood	2	26	Medium
Durant-07	Drainage Study / Stormwater Master Plan	Not Started/Continue in Plan Update	Flash Flood	2	37	High
Durant-08	Flood-Prone Property Acquisition	Not Started/Continue in Plan Update	Flash Flood	2	29	Medium

Action ID	Action Title	2014 Action Status	Primary Hazard Addressed *(Select one from list)*	Goal #	STAPLEE Score	Priority
Durant-09*	Regulation Enforcements and Updates	In Progress/Continue in Plan Update	Flash Flood	2	37	High
Durant-10*	Maintain good standing in National Flood Insurance Program (NFIP)	In Progress/Continue in Plan Update	Flash Flood	2	34	High
Durant-11*	Floodplain Management	In Progress/Continue in Plan Update	Flash Flood	2	41	High
Durant-12	Tree City USA	Not Started/Continue in Plan Update	Thunderstorm/Lightning/Hail	2	27	Medium
Durant-14	Civil Service Improvements	Not Started/Continue in Plan Update	All	4	40	High
Durant-15	Improve Snow / Ice Removal Program / Snow Fence	In Progress/Continue in Plan Update	Severe Winter Storm	4	32	Medium
Durant-16	Alert / Warning Sirens	In Progress/Continue in Plan Update	All	4	40	High
Durant-18	Prepare for Radiological event	NEW	All	1	39	High
Durant-19	Prepare for Earthquake event	NEW	All	1	40	High
Durant-20	Severe Wind Occurrence	NEW	Tornado / Windstorm	2	43	High
Lowden-01	Obtain Missing Data	In Progress/Continue in Plan Update	All	1	34	High
Lowden-02	Backup Generators	In Progress/Continue in Plan Update	Tornado / Windstorm	2	44	High
Lowden-03	Expand Water Storage Capacity / Emergency Water Supplies / Dry Hydrants	In Progress/Continue in Plan Update	Severe Winter Storm	2	40	High
Lowden-04	Storm Shelters / Safe Rooms	In Progress/Continue in Plan Update	Tornado / Windstorm	2	31	Medium
Lowden-05	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	In Progress/Continue in Plan Update	Tornado / Windstorm	2	32	Medium
Lowden-06	Stormwater System and Drainage Improvements	In Progress/Continue in Plan Update	Flash Flood	2	39	High
Lowden-07	Streambank Stabilization / Grade Control Structures / Channel Improvements	In Progress/Continue in Plan Update	Flash Flood	2	39	High
Lowden-08	Drainage Study / Stormwater Master Plan	In Progress/Continue in Plan Update	Flash Flood	2	39	High
Lowden-09	Flood-Prone Property Acquisition	In Progress/Continue in Plan Update	Flash Flood	2	27	Medium
Lowden-10*	Regulation Enforcements and Updates	In Progress/Continue in Plan Update	Flash Flood	2	37	High
Lowden-11*	Maintain good standing in National Flood Insurance Program (NFIP)	In Progress/Continue in Plan Update	Flash Flood	2	38	High
Lowden-12*	Floodplain Management	In Progress/Continue in Plan Update	Flash Flood	2	38	High
Lowden-13	Tree City USA	In Progress/Continue in Plan Update	Thunderstorm/Lightning/Hail	2	32	Medium
Lowden-14	Public Awareness / Education	In Progress/Continue in Plan Update	All	3	31	Medium

Action ID	Action Title	2014 Action Status	Primary Hazard Addressed *(Select one from list)*	Goal #	STAPLEE Score	Priority
Lowden-15	Civil Service Improvements	In Progress/Continue in Plan Update	All	4	43	High
Lowden-16	Alert / Warning Sirens	In Progress/Continue in Plan Update	All	4	42	High
Lowden-17	Emergency Communications	In Progress/Continue in Plan Update	Tornado / Windstorm	4	34	High
Lowden-18	Warning Systems	In Progress/Continue in Plan Update	Tornado / Windstorm	4	33	High
Lowden-19	Weather Radios	In Progress/Continue in Plan Update	All	4	35	High
Lowden-20	6" Mobile Trash Pump	NEW	Flash Flood	2	41	High
Mechanicsville-01	Obtain Missing Data	In Progress/Continue in Plan Update	All	1	45	High
Mechanicsville-02	Backup Generators	In Progress/Continue in Plan Update	Tornado / Windstorm	2	29	Medium
Mechanicsville-03	Electrical System Looped Distribution / Redundancies	Not Started/Continue in Plan Update	Tornado / Windstorm	2	22	Medium
Mechanicsville-04	Elevate Pad Mounted Transformers and Switch Gear	Not Started/Continue in Plan Update	River Flood	2	23	Medium
Mechanicsville-05	Expand Water Storage Capacity / Emergency Water Supplies / Dry Hydrants	Not Started/Continue in Plan Update	Severe Winter Storm	2	23	Medium
Mechanicsville-07	Hazardous Tree Removal Program	In Progress/Continue in Plan Update	Thunderstorm/Lightning/Hail	2	30	Medium
Mechanicsville-08	New Municipal Well	Not Started/Continue in Plan Update	Drought	2	31	Medium
Mechanicsville-09	Power, Service, Electrical, and Water Distribution Lines	In Progress/Continue in Plan Update	Tornado / Windstorm	2	19	Low
Mechanicsville-10	Roadway Elevations	Not Started/Continue in Plan Update	Flash Flood	2	27	Medium
Mechanicsville-11	Storm Shelters / Safe Rooms	Not Started/Continue in Plan Update	Tornado / Windstorm	2	24	Medium
Mechanicsville-12	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	In Progress/Continue in Plan Update	Tornado / Windstorm	2	42	High
Mechanicsville-13	Static Detectors	Not Started/Continue in Plan Update	Thunderstorm/Lightning/Hail	2	22	Medium
Mechanicsville-15	Streambank Stabilization / Grade Control Structures / Channel Improvements	Not Started/Continue in Plan Update	River Flood	2	32	Medium
Mechanicsville-17	Complete / Update wildfire Protection Plan	Not Started/Continue in Plan Update	Grass/Wildland Fire	2	28	Medium
Mechanicsville-18	Drainage Study / Stormwater Master Plan	In Progress/Continue in Plan Update	Flash Flood	2	32	Medium
Mechanicsville-19	Drought Monitoring Plan and Procedures	Not Started/Continue in Plan Update	Drought	2	22	Medium
Mechanicsville-24	Fire Wise Community	Not Started/Continue in Plan Update	Grass/Wildland Fire	2	28	Medium

Action ID	Action Title	2014 Action Status	Primary Hazard Addressed *(Select one from list)*	Goal #	STAPLEE Score	Priority
Mechanicsville-25*	Regulation Enforcements and Updates	In Progress/Continue in Plan Update	River Flood	2	36	High
Mechanicsville-27	Tree City USA	In Progress/Continue in Plan Update	Thunderstorm/Lightning/Hail	2	25	Medium
Mechanicsville-28	Public Awareness / Education	In Progress/Continue in Plan Update	All	3	28	Medium
Mechanicsville-29	Civil Service Improvements	In Progress/Continue in Plan Update	All	4	31	Medium
Mechanicsville-30	Fire Prevention Program	In Progress/Continue in Plan Update	Grass/Wildland Fire	4	30	Medium
Mechanicsville-31	Improve Snow / Ice Removal Program / Snow Fence	In Progress/Continue in Plan Update	Severe Winter Storm	4	32	Medium
Mechanicsville-32	Evacuation Plan	In Progress/Continue in Plan Update	Thunderstorm/Lightning/Hail	4	32	Medium
Mechanicsville-33	Alert / Warning Sirens	In Progress/Continue in Plan Update	All	4	28	High
Mechanicsville-34	Emergency Communications	In Progress/Continue in Plan Update	Tornado / Windstorm	4	34	High
Mechanicsville-35	Warning Systems	Not Started/Continue in Plan Update	Tornado / Windstorm	4	30	Medium
Stanwood-01	Obtain Missing Data	In Progress/Continue in Plan Update	All	1	47	High
Stanwood-03	Hazardous Tree Removal Program	In Progress/Continue in Plan Update	Thunderstorm/Lightning/Hail	2	44	High
Stanwood-04	Power, Service, Electrical, and Water Distribution Lines	In Progress/Continue in Plan Update	Tornado / Windstorm	2	43	High
Stanwood-05	Storm Shelters / Safe Rooms	In Progress/Continue in Plan Update	Tornado / Windstorm	2	42	High
Stanwood-06	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	In Progress/Continue in Plan Update	Tornado / Windstorm	2	44	High
Stanwood-07	Stormwater System and Drainage Improvements	In Progress/Continue in Plan Update	Flash Flood	2	39	High
Stanwood-08	Streambank Stabilization / Grade Control Structures / Channel Improvements	Not Started/Continue in Plan Update	River Flood	2	39	High
Stanwood-09	Groundwater / Irrigation / Water Conservation Management Plan and Practices	In Progress/Continue in Plan Update	Drought	2	41	High
Stanwood-10	Source Water Contingency Plan	In Progress/Continue in Plan Update	Drought	2	40	High
Stanwood-11*	Maintain good standing in National Flood Insurance Program (NFIP)	Not Started/Continue in Plan Update	River Flood	2	46	High
Stanwood-12*	Floodplain Management	Not Started/Continue in Plan Update	River Flood	2	47	High
Stanwood-13	Tree City USA	In Progress/Continue in Plan Update	Thunderstorm/Lightning/Hail	2	44	High
Stanwood-15	Civil Service Improvements	In Progress/Continue in Plan	All	4	44	High

Action ID	Action Title	2014 Action Status	Primary Hazard Addressed *(Select one from list)*	Goal #	STAPLEE Score	Priority
		Update				
Stanwood-16	Comprehensive Disaster / Emergency Response / Rescue Plan	In Progress/Continue in Plan Update	Tornado / Windstorm	4	46	High
Stanwood-17	Evacuation Plan	In Progress/Continue in Plan Update	Thunderstorm/Lightning/Hail	4	40	High
Stanwood-19	Emergency Communications	In Progress/Continue in Plan Update	Tornado / Windstorm	4	44	High
Stanwood-20	Warning Systems	In Progress/Continue in Plan Update	Tornado / Windstorm	4	46	High
Stanwood-21	Weather Radios	In Progress/Continue in Plan Update	All	4	46	High
Tipton-01	Obtain Missing Data	In Progress/Continue in Plan Update	All	1	28	Medium
Tipton-02	Backup Generators	In Progress/Continue in Plan Update	Tornado / Windstorm	2	38	High
Tipton-03	Power, Service, Electrical, and Water Distribution Lines	In Progress/Continue in Plan Update	Tornado / Windstorm	2	28	Medium
Tipton-04	Storm Shelters / Safe Rooms	In Progress/Continue in Plan Update	Tornado / Windstorm	2	26	Medium
Tipton-05	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Not Started/Continue in Plan Update	Tornado / Windstorm	2	27	Medium
Tipton-06	Stormwater System and Drainage Improvements	In Progress/Continue in Plan Update	Flash Flood	2	33	High
Tipton-07	Streambank Stabilization / Grade Control Structures / Channel Improvements	In Progress/Continue in Plan Update	River Flood	2	25	Medium
Tipton-08	Drainage Study / Stormwater Master Plan	In Progress/Continue in Plan Update	Flash Flood	2	34	High
Tipton-09	Flood-Prone Property Acquisition	Not Started/Continue in Plan Update	River Flood	2	27	Medium
Tipton-10*	Regulation Enforcements and Updates	In Progress/Continue in Plan Update	River Flood	2	34	High
Tipton-11*	Maintain good standing in National Flood Insurance Program (NFIP)	In Progress/Continue in Plan Update	River Flood	2	33	High
Tipton-12*	Floodplain Management	In Progress/Continue in Plan Update	River Flood	2	35	High
Tipton-13	Tree City USA	In Progress/Continue in Plan Update	Thunderstorm/Lightning/Hail	2	33	High
Tipton-14	Public Awareness / Education	In Progress/Continue in Plan Update	All	3	28	Medium
Tipton-15	Alert / Warning Sirens	In Progress/Continue in Plan Update	All	4	33	High
Tipton-16	Emergency Communications	In Progress/Continue in Plan Update	Tornado / Windstorm	4	32	Medium
Tipton-17	Warning Systems	In Progress/Continue in Plan Update	Tornado / Windstorm	4	34	High

Action ID	Action Title	2014 Action Status	Primary Hazard Addressed *(Select one from list)*	Goal #	STAPLEE Score	Priority
Tipton-18	Weather Radios	In Progress/Continue in Plan Update	All	4	28	Medium
West Branch-01	Obtain Missing Data	In Progress/Continue in Plan Update	All	1	44	High
West Branch-02	Backup Generators	In Progress/Continue in Plan Update	Tornado / Windstorm	2	42	High
West Branch-03	Power, Service, Electrical, and Water Distribution Lines	In Progress/Continue in Plan Update	Tornado / Windstorm	2	39	High
West Branch-04	Storm Shelters / Safe Rooms	In Progress/Continue in Plan Update	Tornado / Windstorm	2	32	Medium
West Branch-06	Stormwater System and Drainage Improvements	In Progress/Continue in Plan Update	Flash Flood	2	39	High
West Branch-07	Streambank Stabilization / Grade Control Structures / Channel Improvements	In Progress/Continue in Plan Update	River Flood	2	39	High
West Branch-08	Drainage Study / Stormwater Master Plan	In Progress/Continue in Plan Update	Flash Flood	2	34	High
West Branch-09	Flood-Prone Property Acquisition	In Progress/Continue in Plan Update	River Flood	2	34	High
West Branch-10*	Regulation Enforcements and Updates	In Progress/Continue in Plan Update	River Flood	2	38	High
West Branch-11*	Maintain good standing in National Flood Insurance Program (NFIP)	In Progress/Continue in Plan Update	River Flood	2	40	High
West Branch-12*	Floodplain Management	In Progress/Continue in Plan Update	River Flood	2	38	High
West Branch-14	Public Awareness / Education	In Progress/Continue in Plan Update	All	3	42	High
West Branch-15	Civil Service Improvements	In Progress/Continue in Plan Update	All	4	39	High
West Branch-16	Alert / Warning Sirens	In Progress/Continue in Plan Update	All	4	42	High
West Branch-19*	Relocate Police/Fire Station out of the floodway	New	River Flood	4	31	Medium
Bennett Schools - 01	Obtain Missing Data	NEW	All	1	46	High
Bennett Schools - 02	Backup Generators	NEW	Tornado / Windstorm	2	44	High
Bennett Schools - 03	Storm Shelters / Safe Rooms	NEW	Tornado / Windstorm	2	41	High
Bennett Schools - 04	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	NEW	Tornado / Windstorm	2	39	High
Bennett Schools - 05	Public Awareness / Education	NEW	All	3	42	High
Durant Schools-01	Backup Generators	NEW	Severe Winter Storm	1	37	High
Durant Schools-02	Construct Safe Rooms	NEW	Tornado / Windstorm	1	43	High
North Cedar Schools-01	Sloping creek banks in Lowden to prevent washouts	NEW	All	1	41	High

Action ID	Action Title	2014 Action Status	Primary Hazard Addressed *(Select one from list)*	Goal #	STAPLEE Score	Priority
North Cedar Schools-02	Public Awareness / Education	NEW	All	3	45	High
North Cedar Schools-03	Backup Generators	NEW	Tornado / Windstorm	2	43	High
North Cedar Schools-04	Storm Shelter/Safe Room	NEW	Tornado / Windstorm	2	42	High
North Cedar Schools-05	Obtain Missing Data	NEW	All	1	45	High
Tipton Schools-01	Backup Generators	NEW	Tornado / Windstorm	1	36	High
Tipton Schools-02	Safe Room	NEW	Tornado / Windstorm	2	30	Medium
Tipton Schools-03	Obtain Missing Data	NEW	All	1	45	High
West Branch Schools-01	Back up Generators	NEW	Tornado / Windstorm	4	42	High
West Branch Schools-02	Storms Shelters/ Safe Rooms	NEW	Tornado / Windstorm	1	41	High
West Branch Schools-03	Pipeline Break Disaster: Schools have plan for this in crisis management documents. (Students, staff walk in direction of wind to avoid fallout (or) if possible bused	NEW	Earthquakes	4	39	High

*Denotes Actions related to continued compliance with the NFIP

Table 4.3. Mitigation Action Implementation Strategy—Continuing and New Actions

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
County-01	Obtain Missing Data	Obtain necessary data to improve vulnerability assessments when updating this plan	None Identified	Emergency Management	Local Jurisdictions, DNR, IA HSEMD	HMGP	N/A	Improve the overall quality and information found in this plan.	Five Years
County-02	Backup Generators	Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters	None Identified	Emergency Management	HSEMD, FEMA	HMGP	$15,000 - $30,000 per generator	Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.	Ongoing
County-03	Expand Water Storage Capacity / Emergency Water Supplies / Dry Hydrants	Evaluate the need to expand water storage capacity through a new water tower, stand pipe, etc. to provide a safe water supply for the community and additional water for fire protection. Establish emergency water supplies such as dry hydrants and individual or community cisterns for defending structures from wildland fires.	None Identified	Engineer's Office	DNR	CDBG	$30,000+	Establish back-up supplies of municipal water to fight wildfires and supply the needs of citizens. Identify adequate water sources to mitigate potential damages or expenses due to drought. Provide a dependable and ready supply of water so fire districts don't have to rely on equipment and personnel to move water from local water sources to the fire.	Five Years
County-04	Hazardous Tree Removal Program	Identify and remove hazardous limbs and/or trees.	None Identified	Conservation Board	Utility Companies	HMGP, US Forest Service	$20,000	Decrease the risk of damage to electrical lines and personal property.	Ongoing
County-05	Power, Service, Electrical, and Water Distribution Lines	Communities can work with their local Power CO OP District or Electricity Department to identify vulnerable transmission and distribution lines and plan to bury lines underground, upgrade, or retrofit existing structures to be less vulnerable to storm events. Electrical utilities shall be required to use underground construction methods where possible for future installation of power lines. Rural Water Districts can work with their County to identify vulnerable distribution lines near river crossings or creek beds and plan to place lines underground to reduce vulnerability from storm events and erosion.	None Identified	Engineer's Office	Utility Companies	HMGP, PDM, Power Districts, Rural Water Districts	$50,000 to $70,000 (per mile for electrical)	To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
County-06	Roadway Elevations	Improve elevations of roadways in low-lying areas prone to flooding. Elevate roads above the adjacent land to minimize risk from flooding to the transport system. Under flood conditions those works can serve as embankments, i.e. an obstruction to the water	None Identified	Engineer's Office	Iowa DOT	HMGP, PDM	$100,000+	Increase public health and safety. Ensure accessibility to all areas and persons	Five Years
County-07	Storm Shelters / Safe Rooms	Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofits.	None Identified	Emergency Management	HSEMD, FEMA	HMGP, PDM	$200-$300/ sf stand alone; $150-$200/sf addition/retrofit	Reduce the risk of death or injury in areas vulnerable to tornadoes, severe thunderstorms, and other hazards	Ongoing
County-08	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Anchor fuel tanks to prevent movement. If left unanchored, tanks could present a major threat to property and safety in a tornado or high wind event. "Tie downs" can be used to anchor manufactured homes to their pads or concrete foundations.	None Identified	Environmental Health	CO-OP, Citizens	HMGP, PDM	$1,000+	Limits the chance of fuel/chemical spills. Reduce chance that propane tanks and other items become missiles during tornado events.	Ongoing
County-09	Static Detectors	Static Detectors are designed to detect lightning strikes and can predict the distance to the lightning strike and whether a storm is approaching or moving away from the detector. Deploying a static detector at outdoor events can warn of approaching, fast moving , storms and associated lightning, thus helping officials to respond appropriately. Areas prone to lightning strikes may increase grounding capabilities.	None Identified	Emergency Management	None Identified	N/A	$1,000	Increase public health and safety at outdoor events.	Five Years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
County-10	Stormwater System and Drainage Improvements	Larger communities generally utilize underground stormwater systems comprised of pipes and inlets to convey runoff. Undersized systems can contribute to localized flooding. Stormwater system improvements may include pipe upsizing and additional inlets. Smaller communities may utilize stormwater systems comprised of ditches culverts, or drainage ponds to convey runoff. Drainage improvements may include ditch upsizing, ditch cleanout and culvert improvements. Retention and detention facilities may also be implemented to decrease runoff rates while also decreasing the need for other stormwater system improvements. Bridges typically serve as flow restrictions along streams and rivers. Cleanout and reshaping of channel segments at bridge crossings can increase conveyance, reducing the potential for flooding. Replacement or modification of bridges and other flow restrictions may be necessary to provide greater capacity, maintain or improve a structural integrity during flood events, and eliminate flooding threats and damages. Flood protection such as armoring structures downstream.	None Identified	Engineer's Office	HSEMD, FEMA, HUD	HMGP, CDBG, County & Local Governing Agency	$10,000 to $100,000	These improvements can serve to more effectively convey runoff within cities and towns, preventing interior localized flooding. May also reduce the risk of illness / disease by eliminating standing water.	Five Years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
County-11	Streambank Stabilization / Grade Control Structures / Channel Improvements	Stream bank / bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures include sheet-pile weirs, rock-weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection fro critical and/or highly vulnerable facilities, areas, populations, and infrastructure are key.	None Identified	Engineer's Office	USACE, HSEMD, FEMA	USACE, PDM, HMGP, County & Local Governing Agency	$50,000 to $100,000+	Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.	Three to five years
County-12	Drainage Study / Stormwater Master Plan	Preliminary drainage studies and assessments can be conducted to identify and prioritize design improvements to address site specific localized flooding drainage issues to reduce and/or alleviate flooding. Stormwater master plans can be conducted to perform community-wide stormwater evaluation. Identifying multiple problem areas and potential drainage improvements.	None Identified	Engineer's Office	HUD	CDBG, County & Local Governing Agency	$10,000 to $100,000+	Proactive steps to identify all potential problems/issues can lead to effectively addressing the improvements and prioritizing the projects to improve conditions. These improvements can serve to more effectively convey runoff within jurisdictions, preventing interior localized flooding resulting in damages. this ensures that the most beneficial projects are done first and could possibly eliminate the need for others.	One to three years
County-13	Flood-Prone Property Acquisition	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the NFIP. Repetitive loss structures are typically highest priority.	None Identified	Emergency Management	DHSEM, FEMA	HMGP, PDM, CDBG, USACE, FMA	Varies	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally this can provide flood insurance benefits to those communities within the NFIP. Communities must be in good standing with the NFIP in order to be eligible for HMGP.	One to two years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
County-14	Groundwater / Irrigation / Water Conservation Management Plan and Practices	Develop and implement a plan/best management practices to conserve water use and reduce total use (high water use to low water use) and consumption of groundwater resources by citizens and irrigators of agricultural land during prolonged periods of drought. Identify water saving irrigation projects or improvements such as sprinklers or soil moisture monitoring. Potential restrictions on water could include limitations on lawn watering, car washing, farm irrigation restrictions, or water sold to outside sources. Implement BMPs through water conservation practices such as changes in irrigation management, education on no-till agriculture and modified crop selection, use of xeroscapting in communities and buffer strips.	None Identified	Conservation Board	DNR	HMGP, PDM, DEQ, county & Local Governin g Agency	$10,000+	Conserving water during periods in which the demand increases along with best management practices will reduce the total consumption of groundwater resources and ensure an adequate water supply during drought periods and reduce the risk of depleting the water supply. This protects the residents and the local agricultural economy.	Ongoing
County-15	Drainage Districts	Evaluate the need to establish or improve drainage districts as necessary. Drainage districts are local bodies formed for the purpose of draining, ditching, and improving land for agricultural and sanitary purposes. They are authorized to build and maintain drains and levees, to use all necessary private land within their corporate bodies for that purpose, and to tax land within their boundaries as necessary.	None Identified	Conservation Board	DNR	N/A	N/A	Improve land for agricultural and sanitary purposes on a regular basis.	Five Years
County-16	Regulation Enforcements and Updates	Continue to enforce local floodplain management regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of building permits by any community or County. Continue education of Building Inspectors or Certified Floodplain Managers. Encourage building regulations for storm-resistant structures.	None Identified	Zoning Office	DNR, FEMA	HMGP, CDBG	$4,000+	Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
County-17	Maintain good standing in National Flood Insurance Program (NFIP)	Maintain good standing with the National Flood Insurance Program (NFIP) including floodplain management practices/requirements and regulation enforcements and updates	None Identified	Zoning Office	DNR, FEMA	N/A	N/A	Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for PDM and HMGP cost-share	Ongoing
County-18	Warning Systems	Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.	None Identified	Emergency Management	DHSEM, FEMA	HMGP, PDM, County & Local Governing Agency	$5,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Two to four years
County-19	Floodplain Management	Continue to improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in SFHA, floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the NFIP, Community Rating System (CRS), and participation in FEMA's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process.	None Identified	Zoning Office	DNR, FEMA	N/A	N/A	Continue compliance with the NFIP. Good standing enables participants to apply for PDM and HMGP cost share.	Ongoing
County-20	Public Awareness / Education	Through activities such as outreach projects, distribution of maps and environmental education, increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.	None Identified	Emergency Management	DHSEM	HMGP, PDM	$500+	Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.	Ongoing
County-21	Comprehensive Disaster / Emergency Response / Rescue Plan	Establish or update Comprehensive City/Village Disaster and Emergency Response / Rescue Plan. Disaster Plans should include land-use planning and mitigation when applicable.	None Identified	Emergency Management	DHSEM, FEMA	Emergency Management Performance Grant, Homeland Security Funding	$6,000+	Comprehensive plans such as these identify effective procedures and vulnerable areas when disaster strikes. This ensures preparedness and promotes emergency operations to run smoothly, reducing damages, deaths, and injuries.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
County-22	Alert / Warning Sirens	Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking remote activation.	None Identified	Emergency Management	DHSEM, FEMA	HMGP, PDM, County & Local Governing Agency	$15,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Three to five years
County-23	Weather Radios	Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.	None Identified	Emergency Management	DHSEM, FEMA	HMGP, PDM, County & Local Governing Agency	$50 per radio	Reduces the risk of death/injury associated with severe weather conditions by communication.	Ongoing
County-24	Cyber security	Install EVMS scanning system, or system of same capability.	None Identified	Emergency Management	Homeland Security Region, DHSEM	HMGP, PDM, County & Local Governing Agency	$10,000.+	Protect documents and continuity of operations capabilities, breach of personnel information, and internal cyber attacks.	Three to five years
Bennett-01	Obtain Missing Data	Obtain necessary data to improve vulnerability assessments when updating this plan	None Identified	City Clerk		HMGP	N/A	Improve the overall quality and information found in this plan.	Five Years
Bennett-02	Backup Generators	Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters	None Identified	Public Works		HMGP	$15,000 - $30,000 per generator	Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.	Ongoing
Bennett-03	Storm Shelters / Safe Rooms	Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofits.	None Identified	Mayor/City Council		HMGP, PDM	$200-$300/ sf stand alone; $150-$200/sf addition/retrofit	Reduce the risk of death or injury in areas vulnerable to tornadoes, severe thunderstorms, and other hazards	Ongoing
Bennett-04	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Anchor fuel tanks to prevent movement. If left unanchored, tanks could present a major threat to property and safety in a tornado or high wind event. "Tie downs" can be used to anchor manufactured homes to their pads or concrete foundations.	None Identified	Public Works		HMGP, PDM	$1,000+	Limits the chance of fuel/chemical spills. Reduce chance that propane tanks and other items become missiles during tornado events.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Bennett-05	Stormwater System and Drainage Improvements	Larger communities generally utilize underground stormwater systems comprised of pipes and inlets to convey runoff. Undersized systems can contribute to localized flooding. Stormwater system improvements may include pipe upsizing and additional inlets. Smaller communities may utilize stormwater systems comprised of ditches culverts, or drainage ponds to convey runoff. Drainage improvements may include ditch upsizing, ditch cleanout and culvert improvements. Retention and detention facilities may also be implemented to decrease runoff rates while also decreasing the need for other stormwater system improvements. Bridges typically serve as flow restrictions along streams and rivers. Cleanout and reshaping of channel segments at bridge crossings can increase conveyance, reducing the potential for flooding. Replacement or modification of bridges and other flow restrictions may be necessary to provide greater capacity, maintain or improve a structural integrity during flood events, and eliminate flooding threats and damages. Flood protection such as armoring structures downstream.	None Identified	Public Works		HMGP, DCBG, County & Local Governing Agency	$10,000 to $100,000	These improvements can serve to more effectively convey runoff within cities and towns, preventing interior localized flooding. May also reduce the risk of illness / disease by eliminating standing water.	Five Years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Bennett-06	Streambank Stabilization / Grade Control Structures / Channel Improvements	Stream bank / bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures include sheet-pile weirs, rock-weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection fro critical and/or highly vulnerable facilities, areas, populations, and infrastructure are key.	None Identified	Public Works/City Council		USACE, PDM, HMGP, County & Local Governing Agency	$50,000 to $100,000+	Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.	Three to five years
Bennett-07	Drainage Study / Stormwater Master Plan	Preliminary drainage studies and assessments can be conducted to identify and prioritize design improvements to address site specific localized flooding drainage issues to reduce and/or alleviate flooding. Stormwater master plans can be conducted to perform community-wide stormwater evaluation. Identifying multiple problem areas and potential drainage improvements.	None Identified	Public Works/City Council		CDBG, County & Local Governing Agency	$10,000 to $100,000+	Proactive steps to identify all potential problems/issues can lead to effectively addressing the improvements and prioritizing the projects to improve conditions. These improvements can serve to more effectively convey runoff within jurisdictions, preventing interior localized flooding resulting in damages. this ensures that the most beneficial projects are done first and could possibly eliminate the need for others.	One to three years
Bennett-08	Flood-Prone Property Acquisition	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the NFIP. Repetitive loss structures are typically highest priority.	None Identified	City Council		HMGP, PDM, CDBG, USACE, FMA	Varies	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally this can provide flood insurance benefits to those communities within the NFIP. Communities must be in good standing with the NFIP in order to be eligible for HMGP.	One to two years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Bennett-09	Regulation Enforcements and Updates	Continue to enforce local floodplain management regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of building permits by any community or County. Continue education of Building Inspectors or Certified Floodplain Managers. Encourage building regulations for storm-resistant structures.	None Identified	City Council		HMGP, CDBG	$4,000+	Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.	Ongoing
Bennett-10	Maintain good standing in National Flood Insurance Program (NFIP)	Maintain good standing with the National Flood Insurance Program (NFIP) including floodplain management practices/requirements and regulation enforcements and updates	None Identified	City Council		N/A	N/A	Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for PDM and HMGP cost-share	Ongoing
Bennett-11	Floodplain Management	Continue to improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in SFHA, floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the NFIP, Community Rating System (CRS), and participation in FEMA's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process.	None Identified	City Council		N/A	N/A	Continue compliance with the NFIP. Good standing enables participants to apply for PDM and HMGP cost share.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Bennett-12	Tree City USA	Work to become a Tree City USA through the National Arbor Day Foundation in order to receive direction, technical assistance, and public education on how to establish a hazardous tree identification and removal program in order to limit potential tree damage and damages caused by trees in a community when a storm event occurs. The four main requirements include: 1) Establish a tree board; 2) Enact a tree care ordinance; 3) Establish a forestry care program; 4) Enact an Arbor Day observance and proclamation.	None Identified	Public Works		Arbor Day Foundation, US Forest Service	$1,000+	Better maintained trees and hazard tree removal will eliminate damages to power lines and personal property during hazard events. Participation in Tree City USA will support community actions to mitigate damages from trees.	Ongoing
Bennett-13	Public Awareness / Education	Through activities such as outreach projects, distribution of maps and environmental education, increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.	None Identified	City Council		HMGP, PDM	$500+	Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.	Ongoing
Bennett-14	Civil Service Improvements	Improve emergency rescue and response equipment and fatalities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/trucks, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles identifying and training additional personnel for emergency response or continuing educational opportunities for current personnel.	None Identified	City Council		PDM, IA HSEMD, Governing County and Local Governing Agency	$5,000 to $400,000 per vehicle, varies depending on what equipment is needed.	Having appropriate and up to date equipment along with adequately trained personnel increases the safety and reduces the risk of damage.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Bennett-15	Comprehensive Disaster / Emergency Response / Rescue Plan	Establish or update Comprehensive City/Village Disaster and Emergency Response / Rescue Plan. Disaster Plans should include land-use planning and mitigation when applicable.	None Identified	City Council		Emergency Management Performance Grant, Homeland Security Funding	$6,000+	Comprehensive plans such as these identify effective procedures and vulnerable areas when disaster strikes. This ensures preparedness and promotes emergency operations to run smoothly, reducing damages, deaths, and injuries.	Ongoing
Bennett-16	Improve Snow / Ice Removal Program / Snow Fence	Revise and improve the snow and ice removal program for streets. Revisions should address situations such as plowing snow, ice removal, parking during snow and ice removal, and removal of associated storm debris. This would include updating the emergency routes, acquiring equipment that is needed, paving routes, and ordinances as necessary. consider purchase of snow fence at critical areas and installation of living snow fence.	None Identified	Public Works		PDM	$20,000+	Having an effective snow/ice removal program will improve capabilities to rescue stranded residents and increase the capacity in which snow can be removed after a severe winter storm.	Ongoing
Bennett-17	Alert / Warning Sirens	Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking remote activation.	None Identified	Fire Department		HMGP, PDM, County & Local Governing Agency	$15,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Three to five years
Bennett-18	Warning Systems	Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.	None Identified	City Clerk		HMGP, PDM, County & Local Governing Agency	$5,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Two to four years
Bennett-19	Weather Radios	Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.	None Identified	County EMA/City Council		HMGP, PDM, County & Local Governing Agency	$50 per radio	Reduces the risk of death/injury associated with severe weather conditions by communication.	Ongoing
Bennett-20	Power backup for critical facilities	Purchase and Install backup generators	None Identified	Public Works		HMGP, PDM, County & Local Governing Agency	$35,000	Provides continuity of operations for critical functions	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Bennett-21	Early warning system for critical facilities	Purchase and Install early warning system	None Identified	County EMA/City Council		HMGP, PDM, County & Local Governing Agency	$50 per radio	Provides warning of severe weather conditions to allow citizens to take cover, reducing the risk of death/injury	Ongoing
Clarence-01	Obtain Missing Data	Obtain necessary data to improve vulnerability assessments when updating this plan	funding	city office	city council, fire department	HMGP	N/A	Improve the overall quality and information found in this plan.	Five Years
Clarence-02	Backup Generators	Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters	funding	city council	public works	HMGP	$15,000 - $30,000 per generator	Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.	Ongoing
Clarence-03	Storm Shelters / Safe Rooms	Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofits.	funding	city council	public works	HMGP, PDM	$200-$300/ sf stand alone; $150-$200/sf addition/retrofit	Reduce the risk of death or injury in areas vulnerable to tornadoes, severe thunderstorms, and other hazards	Ongoing
Clarence-04	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Anchor fuel tanks to prevent movement. If left unanchored, tanks could present a major threat to property and safety in a tornado or high wind event. "Tie downs" can be used to anchor manufactured homes to their pads or concrete foundations.	funding	public works	fire department	HMGP, PDM	$1,000+	Limits the chance of fuel/chemical spills. Reduce chance that propane tanks and other items become missiles during tornado events.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Clarence-05	Stormwater System and Drainage Improvements	Larger communities generally utilize underground stormwater systems comprised of pipes and inlets to convey runoff. Undersized systems can contribute to localized flooding. Stormwater system improvements may include pipe upsizing and additional inlets. Smaller communities may utilize stormwater systems comprised of ditches culverts, or drainage ponds to convey runoff. Drainage improvements may include ditch upsizing, ditch cleanout and culvert improvements. Retention and detention facilities may also be implemented to decrease runoff rates while also decreasing the need for other stormwater system improvements. Bridges typically serve as flow restrictions along streams and rivers. Cleanout and reshaping of channel segments at bridge crossings can increase conveyance, reducing the potential for flooding. Replacement or modification of bridges and other flow restrictions may be necessary to provide greater capacity, maintain or improve a structural integrity during flood events, and eliminate flooding threats and damages. Flood protection such as armoring structures downstream.	funding	public works	fire department	HMGP, DCBG, County & Local Governing Agency	$10,000 to $100,000	These improvements can serve to more effectively convey runoff within cities and towns, preventing interior localized flooding. May also reduce the risk of illness / disease by eliminating standing water.	Five Years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Clarence-06	Streambank Stabilization / Grade Control Structures / Channel Improvements	Stream bank / bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures include sheet-pile weirs, rock-weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection fro critical and/or highly vulnerable facilities, areas, populations, and infrastructure are key.	funding	public works	city council	USACE, PDM, HMGP, County & Local Governing Agency	$50,000 to $100,000+	Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.	Three to five years
Clarence-07	Drainage Study / Stormwater Master Plan	Preliminary drainage studies and assessments can be conducted to identify and prioritize design improvements to address site specific localized flooding drainage issues to reduce and/or alleviate flooding. Stormwater master plans can be conducted to perform community-wide stormwater evaluation. Identifying multiple problem areas and potential drainage improvements.	funding	city engineer	public works	CDBG, County & Local Governing Agency	$10,000 to $100,000+	Proactive steps to identify all potential problems/issues can lead to effectively addressing the improvements and prioritizing the projects to improve conditions. These improvements can serve to more effectively convey runoff within jurisdictions, preventing interior localized flooding resulting in damages. this ensures that the most beneficial projects are done first and could possibly eliminate the need for others.	One to three years
Clarence-08	Flood-Prone Property Acquisition	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the NFIP. Repetitive loss structures are typically highest priority.	funding	city council	public works	HMGP, PDM, CDBG, USACE, FMA	Varies	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally this can provide flood insurance benefits to those communities within the NFIP. Communities must be in good standing with the NFIP in order to be eligible for HMGP.	One to two years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Clarence-09	Regulation Enforcements and Updates	Continue to enforce local floodplain management regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of building permits by any community or County. Continue education of Building Inspectors or Certified Floodplain Managers. Encourage building regulations for storm-resistant structures.	funding	planning zoning committee	public works	HMGP, CDBG	$4,000+	Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.	Ongoing
Clarence-12	Public Awareness / Education	Through activities such as outreach projects, distribution of maps and environmental education, increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.	funding	city council	city clerk	HMGP, PDM	$500+	Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.	Ongoing
Clarence-13	Improve Snow / Ice Removal Program / Snow Fence	Revise and improve the snow and ice removal program for streets. Revisions should address situations such as plowing snow, ice removal, parking during snow and ice removal, and removal of associated storm debris. This would include updating the emergency routes, acquiring equipment that is needed, paving routes, and ordinances as necessary. consider purchase of snow fence at critical areas and installation of living snow fence.	funding	city council	city clerk, public works	PDM	$20,000+	Having an effective snow/ice removal program will improve capabilities to rescue stranded residents and increase the capacity in which snow can be removed after a severe winter storm.	Ongoing
Clarence-14	Alert / Warning Sirens	Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking remote activation.	funding	fire department	police department	HMGP, PDM, County & Local Governing Agency	$15,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Three to five years
Clarence-15	Warning Systems	Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.	funding	city council	city clerk	HMGP, PDM, County & Local Governing Agency	$5,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Two to four years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Clarence-16	Weather Radios	Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.	funding, manpower	fire department	public works	HMGP, PDM, County & Local Governing Agency	$50 per radio	Reduces the risk of death/injury associated with severe weather conditions by communication.	Ongoing
Clarence-17	Sanitary Sewer Upgrade	The DNR has given us a consent order to try to cut down on Inflow and Infiltration into the lagoons which includes steps the city must take and a timeline	funding	city council	public works	CDBG, Local Governing Agency	TO BE DETERMINED	Reduce inflow and infiltration to lagoons.	3-5 years
Durant-01	Obtain Missing Data	Obtain necessary data to improve vulnerability assessments when updating this plan	None Identified	City Clerk	EMA director	HMGP	N/A	Improve the overall quality and information found in this plan.	Five Years
Durant-02	Backup Generators	Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters	None Identified	Public Works	City Engineer and Electric Utility	HMGP	$15,000 - $30,000 per generator	Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.	Ongoing
Durant-03	Storm Shelters / Safe Rooms	Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofits.	None Identified	City Council and Engineer	Engineer and EMA Director	HMGP, PDM	$200-$300/ sf stand alone; $150-$200/sf addition/retrofit	Reduce the risk of death or injury in areas vulnerable to tornadoes, severe thunderstorms, and other hazards	Ongoing
Durant-04	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Anchor fuel tanks to prevent movement. If left unanchored, tanks could present a major threat to property and safety in a tornado or high wind event. "Tie downs" can be used to anchor manufactured homes to their pads or concrete foundations.	None Identified	Public Works	EMA director	HMGP, PDM	$1,000+	Limits the chance of fuel/chemical spills. Reduce chance that propane tanks and other items become missiles during tornado events.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Durant-05	Stormwater System and Drainage Improvements	Larger communities generally utilize underground stormwater systems comprised of pipes and inlets to convey runoff. Undersized systems can contribute to localized flooding. Stormwater system improvements may include pipe upsizing and additional inlets. Smaller communities may utilize stormwater systems comprised of ditches culverts, or drainage ponds to convey runoff. Drainage improvements may include ditch upsizing, ditch cleanout and culvert improvements. Retention and detention facilities may also be implemented to decrease runoff rates while also decreasing the need for other stormwater system improvements. Bridges typically serve as flow restrictions along streams and rivers. Cleanout and reshaping of channel segments at bridge crossings can increase conveyance, reducing the potential for flooding. Replacement or modification of bridges and other flow restrictions may be necessary to provide greater capacity, maintain or improve a structural integrity during flood events, and eliminate flooding threats and damages. Flood protection such as armoring structures downstream.	None Identified	Water & Sewer dept along with city council	City Engineer and IDNR	HMGP, DCBG, County & Local Governing Agency	$10,000 to $100,000	These improvements can serve to more effectively convey runoff within cities and towns, preventing interior localized flooding. May also reduce the risk of illness / disease by eliminating standing water.	Five Years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Durant-06	Streambank Stabilization / Grade Control Structures / Channel Improvements	Stream bank / bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures include sheet-pile weirs, rock-weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection fro critical and/or highly vulnerable facilities, areas, populations, and infrastructure are key.	None Identified	Council	IDNR	USACE, PDM, HMGP, County & Local Governing Agency	$50,000 to $100,000+	Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.	Three to five years
Durant-07	Drainage Study / Stormwater Master Plan	Preliminary drainage studies and assessments can be conducted to identify and prioritize design improvements to address site specific localized flooding drainage issues to reduce and/or alleviate flooding. Stormwater master plans can be conducted to perform community-wide stormwater evaluation. Identifying multiple problem areas and potential drainage improvements.	None Identified	Engineer/Council	IDNR, City Engineer, conservation groups for watershed	CDBG, County & Local Governing Agency	$10,000 to $100,000+	Proactive steps to identify all potential problems/issues can lead to effectively addressing the improvements and prioritizing the projects to improve conditions. These improvements can serve to more effectively convey runoff within jurisdictions, preventing interior localized flooding resulting in damages. this ensures that the most beneficial projects are done first and could possibly eliminate the need for others.	One to three years
Durant-08	Flood-Prone Property Acquisition	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the NFIP. Repetitive loss structures are typically highest priority.	None Identified	Council	IDNR	HMGP, PDM, CDBG, USACE, FMA	Varies	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally this can provide flood insurance benefits to those communities within the NFIP. Communities must be in good standing with the NFIP in order to be eligible for HMGP.	One to two years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Durant-09	Regulation Enforcements and Updates	Continue to enforce local floodplain management regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of building permits by any community or County. Continue education of Building Inspectors or Certified Floodplain Managers. Encourage building regulations for storm-resistant structures.	None Identified	Council	Police Dept., County Gov't and EMA director; State EMA	HMGP, CDBG	$4,000+	Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.	Ongoing
Durant-10	Maintain good standing in National Flood Insurance Program (NFIP)	Maintain good standing with the National Flood Insurance Program (NFIP) including floodplain management practices/requirements and regulation enforcements and updates	None Identified	Council	Insurance Agent, IDNR, and County gov't	N/A	N/A	Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for PDM and HMGP cost-share	Ongoing
Durant-11	Floodplain Management	Continue to improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in SFHA, floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the NFIP, Community Rating System (CRS), and participation in FEMA's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process.	None Identified	Mayor, Clerk & council	Engineer, IDNR, Army Corp of engineers	N/A	N/A	Continue compliance with the NFIP. Good standing enables participants to apply for PDM and HMGP cost share.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Durant-12	Tree City USA	Work to become a Tree City USA through the National Arbor Day Foundation in order to receive direction, technical assistance, and public education on how to establish a hazardous tree identification and removal program in order to limit potential tree damage and damages caused by trees in a community when a storm event occurs. The four main requirements include: 1) Establish a tree board; 2) Enact a tree care ordinance; 3) Establish a forestry care program; 4) Enact an Arbor Day observance and proclamation.	None Identified	Sewer & water dept. with engineer and council	Tree Committee, IDNR, local community groups	Arbor Day Foundation, US Forest Service	$1,000+	Better maintained trees and hazard tree removal will eliminate damages to power lines and personal property during hazard events. Participation in Tree City USA will support community actions to mitigate damages from trees.	Ongoing
Durant-14	Civil Service Improvements	Improve emergency rescue and response equipment and fatalities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/trucks, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles identifying and training additional personnel for emergency response or continuing educational opportunities for current personnel.	None Identified	Council	IDNR	PDM, IA HSEMD, Governing County and Local Governing Agency	$5,000 to $400,000 per vehicle, varies depending on what equipment is needed.	Having appropriate and up to date equipment along with adequately trained personnel increases the safety and reduces the risk of damage.	Ongoing
Durant-15	Improve Snow / Ice Removal Program / Snow Fence	Revise and improve the snow and ice removal program for streets. Revisions should address situations such as plowing snow, ice removal, parking during snow and ice removal, and removal of associated storm debris. This would include updating the emergency routes, acquiring equipment that is needed, paving routes, and ordinances as necessary. consider purchase of snow fence at critical areas and installation of living snow fence.	None Identified	Council	County gov't	PDM	$20,000+	Having an effective snow/ice removal program will improve capabilities to rescue stranded residents and increase the capacity in which snow can be removed after a severe winter storm.	Ongoing
Durant-16	Alert / Warning Sirens	Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking remote activation.	None Identified	Council	EMA director	HMGP, PDM, County & Local Governing Agency	$15,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Three to five years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Durant-18	Prepare for Radiological event	Obtain necessary data to improve vulnerability assessments when updating this plan	None Identified	City Clerk, County	EMA director	HMGP, Fire Dept	$25,000	Reduce the risk of death/injury associated with radiation, and ensure we have a good evacuation plan and shelter for residents.	Five Years
Durant-19	Prepare for Earthquake event	Obtain necessary data to improve vulnerability assessments when updating this plan	None Identified	City Clerk, County, Fire Dept	EMA director	HMGP, Fire Dept	$25,000	Reduce the risk of death/injury associated with earthquake destruction	Five Years
Durant-20	Severe Wind Occurrence	Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofits.	None Identified	City Council, Building Inspector & Engineer & DME	Engineer and EMA Director	HMGP, PDM	$15,000 +	Reduce the risk of death or injury in areas vulnerable to tornadoes, severe thunderstorms, and other hazards	Ongoing
Lowden-01	Obtain Missing Data	Obtain necessary data to improve vulnerability assessments when updating this plan	None Identified	Public Works	Clerk	HMGP	N/A	Improve the overall quality and information found in this plan.	Ongoing
Lowden-02	Backup Generators	Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters	Funding	Public Works	City Council/Clerk	HMGP	$15,000 - $30,000 per generator	Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.	Five Years
Lowden-03	Expand Water Storage Capacity / Emergency Water Supplies / Dry Hydrants	Evaluate the need to expand water storage capacity through a new water tower, stand pipe, etc. to provide a safe water supply for the community and additional water for fire protection. Establish emergency water supplies such as dry hydrants and individual or community cisterns for defending structures from wildland fires.	Funding	Public Works	City Council/Clerk	CDBG	$30,000+	Establish back-up supplies of municipal water to fight wildfires and supply the needs of citizens. Identify adequate water sources to mitigate potential damages or expenses due to drought. Provide a dependable and ready supply of water so fire districts don't have to rely on equipment and personnel to move water from local water sources to the fire.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Lowden-04	Storm Shelters / Safe Rooms	Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofits.	Funding/Location	City Council	County Emergency Director/Fire Department/Engineer	HMGP, PDM	$200-$300/ sf stand alone; $150-$200/sf addition/retrofit	Reduce the risk of death or injury in areas vulnerable to tornadoes, severe thunderstorms, and other hazards	Ongoing
Lowden-05	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Anchor fuel tanks to prevent movement. If left unanchored, tanks could present a major threat to property and safety in a tornado or high wind event. "Tie downs" can be used to anchor manufactured homes to their pads or concrete foundations.	Funding/Identification	Public Works	City Council/Clerk/ Fire Department/Businesses	HMGP, PDM	$1,000+	Limits the chance of fuel/chemical spills. Reduce chance that propane tanks and other items become missiles during tornado events.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Lowden-06	Stormwater System and Drainage Improvements	Larger communities generally utilize underground stormwater systems comprised of pipes and inlets to convey runoff. Undersized systems can contribute to localized flooding. Stormwater system improvements may include pipe upsizing and additional inlets. Smaller communities may utilize stormwater systems comprised of ditches culverts, or drainage ponds to convey runoff. Drainage improvements may include ditch upsizing, ditch cleanout and culvert improvements. Retention and detention facilities may also be implemented to decrease runoff rates while also decreasing the need for other stormwater system improvements. Bridges typically serve as flow restrictions along streams and rivers. Cleanout and reshaping of channel segments at bridge crossings can increase conveyance, reducing the potential for flooding. Replacement or modification of bridges and other flow restrictions may be necessary to provide greater capacity, maintain or improve a structural integrity during flood events, and eliminate flooding threats and damages. Flood protection such as armoring structures downstream.	Funding	Public Works	City Council/ Civil Engineer	HMGP, DCBG, County & Local Governing Agency	$10,000 to $100,000	These improvements can serve to more effectively convey runoff within cities and towns, preventing interior localized flooding. May also reduce the risk of illness / disease by eliminating standing water.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Lowden-07	Streambank Stabilization / Grade Control Structures / Channel Improvements	Stream bank / bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures include sheet-pile weirs, rock-weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection fro critical and/or highly vulnerable facilities, areas, populations, and infrastructure are key.	Funding	Public Works	City Council/ Civil Engineer	USACE, PDM, HMGP, County & Local Governing Agency	$50,000 to $100,000+	Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.	Ongoing
Lowden-08	Drainage Study / Stormwater Master Plan	Preliminary drainage studies and assessments can be conducted to identify and prioritize design improvements to address site specific localized flooding drainage issues to reduce and/or alleviate flooding. Stormwater master plans can be conducted to perform community-wide stormwater evaluation. Identifying multiple problem areas and potential drainage improvements.	Funding	Public Works	City Council/Civil Engineer	CDBG, County & Local Governing Agency	$10,000 to $100,000+	Proactive steps to identify all potential problems/issues can lead to effectively addressing the improvements and prioritizing the projects to improve conditions. These improvements can serve to more effectively convey runoff within jurisdictions, preventing interior localized flooding resulting in damages. this ensures that the most beneficial projects are done first and could possibly eliminate the need for others.	One to three years
Lowden-09	Flood-Prone Property Acquisition	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the NFIP. Repetitive loss structures are typically highest priority.	Funding	Public Works	City Council/County Emergency Director/County Planning and Zoning	HMGP, PDM, CDBG, USACE, FMA	Varies	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally this can provide flood insurance benefits to those communities within the NFIP. Communities must be in good standing with the NFIP in order to be eligible for HMGP.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Lowden-10	Regulation Enforcements and Updates	Continue to enforce local floodplain management regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of building permits by any community or County. Continue education of Building Inspectors or Certified Floodplain Managers. Encourage building regulations for storm-resistant structures.	Maintaining Current Regulations	Public Works	City Council/County Emergency Director/County Planning and Zoning	HMGP, CDBG	$4,000+	Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.	Ongoing
Lowden-11	Maintain good standing in National Flood Insurance Program (NFIP)	Maintain good standing with the National Flood Insurance Program (NFIP) including floodplain management practices/requirements and regulation enforcements and updates	Maintaining Current Regulations	Public Works	City Council/County Emergency Director/County Planning and Zoning	N/A	N/A	Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for PDM and HMGP cost-share	Ongoing
Lowden-12	Floodplain Management	Continue to improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in SFHA, floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the NFIP, Community Rating System (CRS), and participation in FEMA's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process.	Maintaining Current Regulations	Public Works	City Council/County Emergency Director/County Planning and Zoning	N/A	N/A	Continue compliance with the NFIP. Good standing enables participants to apply for PDM and HMGP cost share.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Lowden-13	Tree City USA	Work to become a Tree City USA through the National Arbor Day Foundation in order to receive direction, technical assistance, and public education on how to establish a hazardous tree identification and removal program in order to limit potential tree damage and damages caused by trees in a community when a storm event occurs. The four main requirements include: 1) Establish a tree board; 2) Enact a tree care ordinance; 3) Establish a forestry care program; 4) Enact an Arbor Day observance and proclamation.	Initiate Requirements	City Council	Tree Broad	Arbor Day Foundation, US Forest Service	$1,000+	Better maintained trees and hazard tree removal will eliminate damages to power lines and personal property during hazard events. Participation in Tree City USA will support community actions to mitigate damages from trees.	Ongoing
Lowden-14	Public Awareness / Education	Through activities such as outreach projects, distribution of maps and environmental education, increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.	Establish Education Program	City Council	Public Works/Fire Department/County Emergency Director/School Administration	HMGP, PDM	$500+	Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.	Ongoing
Lowden-15	Civil Service Improvements	Improve emergency rescue and response equipment and fatalities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/trucks, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles identifying and training additional personnel for emergency response or continuing educational opportunities for current personnel.	Funding	City Council	Fire Department/Rescue	PDM, IA HSEMD, Governing County and Local Governing Agency	$5,000 to $400,000 per vehicle, varies depending on what equipment is needed.	Having appropriate and up to date equipment along with adequately trained personnel increases the safety and reduces the risk of damage.	Ongoing
Lowden-16	Alert / Warning Sirens	Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking remote activation.	Funding	City Council	Public Works/County Emergency Director/Fire Department	HMGP, PDM, County & Local Governing Agency	$15,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Lowden-17	Emergency Communications	Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish interoperable communications.	Funding	City Council	Public Works/Fire Department/County Emergency Director	Homeland Security, County & Local Governing Agency	$10,000	Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.	Ongoing
Lowden-18	Warning Systems	Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.	Funding	City Council	Public Works/Fire Department/County Emergency Director	HMGP, PDM, County & Local Governing Agency	$5,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Ongoing
Lowden-19	Weather Radios	Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.	Funding	City Council	Public Works/Fire Department/County Emergency Director/ School Administration	HMGP, PDM, County & Local Governing Agency	$50 per radio	Reduces the risk of death/injury associated with severe weather conditions by communication.	Ongoing
Lowden-20	6" Mobile Trash Pump	Provide a portable source for pumping storm water in an effort to reduce strain on sanitary sewer system and waste water treatment plant	Funding	City Council	Public Works/Fire Department	HMGP	$25,000-$35,000	Reduces strain on waste water treatment plant and collection system.	1-3 years
Mechanicsville-01	Obtain Missing Data	Obtain necessary data to improve vulnerability assessments when updating this plan	Availability of time	City Council		HMGP	N/A	Improve the overall quality and information found in this plan.	Five Years
Mechanicsville-02	Backup Generators	Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters	None Identified	City Council	None Identified	HMGP	$15,000 - $30,000 per generator	Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.	Ongoing
Mechanicsville-03	Electrical System Looped Distribution / Redundancies	Provide looped distribution service and other redundancies in the electrical system as a backup-power supply in the event the primary system is destroyed or fails	Funding	City Council	Alliant Energy	HMGP, PDM, Public Power Districts	$40,000 per mile	More reliable and resistant power distribution system	Three to five years
Mechanicsville-04	Elevate Pad Mounted Transformers and Switch Gear	Communities can elevate pad mounted transformers and switch gear above base flood elevation to eliminate damages from flooding	Funding	City Council	Alliant Energy	HMGP, PDM, Public Power Districts	$3,000 per location	Reduce flood damages	One year

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Mechanicsville-05	Expand Water Storage Capacity / Emergency Water Supplies / Dry Hydrants	Evaluate the need to expand water storage capacity through a new water tower, stand pipe, etc. to provide a safe water supply for the community and additional water for fire protection. Establish emergency water supplies such as dry hydrants and individual or community cisterns for defending structures from wildland fires.	Funding	Public Works/Administration & Fire	City Engineer	CDBG	$30,000+	Establish back-up supplies of municipal water to fight wildfires and supply the needs of citizens. Identify adequate water sources to mitigate potential damages or expenses due to drought. Provide a dependable and ready supply of water so fire districts don't have to rely on equipment and personnel to move water from local water sources to the fire.	Five Years
Mechanicsville-07	Hazardous Tree Removal Program	Identify and remove hazardous limbs and/or trees.	Funding and staff time	City Council	Contractors	HMGP, US Forest Service	$20,000	Decrease the risk of damage to electrical lines and personal property.	Ongoing
Mechanicsville-08	New Municipal Well	Communities can evaluate the need to install a new well to provide a safe backup water supply for the community, replace existing wells affected by drought, and additional water for fire protection	Funding	Public Works	None Identified	CDBG, State Revolving Fund (SRF)	$350,000 to $450,000	Provide adequate water sources to mitigate potential damages or expenses due to drought.	Five years
Mechanicsville-09	Power, Service, Electrical, and Water Distribution Lines	Communities can work with their local Power CO OP District or Electricity Department to identify vulnerable transmission and distribution lines and plan to bury lines underground, upgrade, or retrofit existing structures to be less vulnerable to storm events. Electrical utilities shall be required to use underground construction methods where possible for future installation of power lines. Rural Water Districts can work with their County to identify vulnerable distribution lines near river crossings or creek beds and plan to place lines underground to reduce vulnerability from storm events and erosion.	Funding and staff time	City Council	Alliant Energy	HMGP, PDM, Power Districts, Rural Water Districts	$50,000 to $70,000 (per mile for electrical)	To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Mechanicsville-10	Roadway Elevations	Improve elevations of roadways in low-lying areas prone to flooding. Elevate roads above the adjacent land to minimize risk from flooding to the transport system. Under flood conditions those works can serve as embankments, i.e. an obstruction to the water	Funding	Public Works	None Identified	HMGP, PDM	$100,000+	Increase public health and safety. Ensure accessibility to all areas and persons	Five Years
Mechanicsville-11	Storm Shelters / Safe Rooms	Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofits.	Funding	City Administrator	None Identified	HMGP, PDM	$200-$300/ sf stand alone; $150-$200/sf addition/retrofit	Reduce the risk of death or injury in areas vulnerable to tornadoes, severe thunderstorms, and other hazards	Ongoing
Mechanicsville-12	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Anchor fuel tanks to prevent movement. If left unanchored, tanks could present a major threat to property and safety in a tornado or high wind event. "Tie downs" can be used to anchor manufactured homes to their pads or concrete foundations.	None Identified	City Council	None Identified	HMGP, PDM	$1,000+	Limits the chance of fuel/chemical spills. Reduce chance that propane tanks and other items become missiles during tornado events.	Ongoing
Mechanicsville-13	Static Detectors	Static Detectors are designed to detect lightning strikes and can predict the distance to the lightning strike and whether a storm is approaching or moving away from the detector. Deploying a static detector at outdoor events can warn of approaching, fast moving , storms and associated lightning, thus helping officials to respond appropriately. Areas prone to lightning strikes may increase grounding capabilities.	Funding	Fire/Administration	None Identified	N/A	$1,000	Increase public health and safety at outdoor events.	Five Years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Mechanicsville-15	Streambank Stabilization / Grade Control Structures / Channel Improvements	Stream bank / bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures include sheet-pile weirs, rock-weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection fro critical and/or highly vulnerable facilities, areas, populations, and infrastructure are key.	Funding	Public Works/Administration	None Identified	USACE, PDM, HMGP, County & Local Governing Agency	$50,000 to $100,000+	Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.	Three to five years
Mechanicsville-17	Complete / Update wildfire Protection Plan	Complete and/or update a Community Wildfire Protection Plan (CWPP). The CWPP enables a community to plan how it will reduce the risk of wildfire.	Availability of time, funding	Fire/Administration	None Identified	National Fire Plan, United States Forest Service, Bureau of Land Management	$20,000	The plan identifies strategic sites and methods for fuel reduction projects across the landscape and jurisdictional boundaries.	Five Years
Mechanicsville-18	Drainage Study / Stormwater Master Plan	Preliminary drainage studies and assessments can be conducted to identify and prioritize design improvements to address site specific localized flooding drainage issues to reduce and/or alleviate flooding. Stormwater master plans can be conducted to perform community-wide stormwater evaluation. Identifying multiple problem areas and potential drainage improvements.	Funding and staff time	City Council	City Engineer	CDBG, County & Local Governing Agency	$10,000 to $100,000+	Proactive steps to identify all potential problems/issues can lead to effectively addressing the improvements and prioritizing the projects to improve conditions. These improvements can serve to more effectively convey runoff within jurisdictions, preventing interior localized flooding resulting in damages. this ensures that the most beneficial projects are done first and could possibly eliminate the need for others.	One to three years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Mechanicsville-19	Drought Monitoring Plan and Procedures	Develop and implement a plan/program to monitor the effects of drought.	Availability of time, funding	City Administrator	None Identified	HMGP, PDM	N/A	Communities can be proactive and well prepared to act as the effects of drought become an issue. Thorough monitoring systems, communities can mitigate potential damage or costs from the result of a drought event.	Five Years
Mechanicsville-24	Fire Wise Community	Work to become a Firewise Community USA participant through the US Forest Service in order to educate homeowners, community leaders, planners, developers, and others in the effort to protect people, property, and natural resources from the risk of wildland fire. The Firewise Communities approach emphasizes community responsibility for planning in the design of a safe community as well as effective emergency response, and individual responsibility for safer home construction and design, landscaping, and maintenance.	Availability of time; funding	Fire/Administration	None Identified	US Forest Service	$20,000	The national Firewise Communities program is intended to serve as a resource for agencies, tribes, organizations, fire departments, and communities across the U.S. to reduce loss of lives and property, and resources to wildland fire by building and maintaining communities in a way that is compatible with our natural surroundings.	Ongoing
Mechanicsville-25	Regulation Enforcements and Updates	Continue to enforce local floodplain management regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of building permits by any community or County. Continue education of Building Inspectors or Certified Floodplain Managers. Encourage building regulations for storm-resistant structures.	None Identified	City Council/City Clerk	None Identified	HMGP, CDBG	$4,000+	Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Mechanicsville-27	Tree City USA	Work to become a Tree City USA through the National Arbor Day Foundation in order to receive direction, technical assistance, and public education on how to establish a hazardous tree identification and removal program in order to limit potential tree damage and damages caused by trees in a community when a storm event occurs. The four main requirements include: 1) Establish a tree board; 2) Enact a tree care ordinance; 3) Establish a forestry care program; 4) Enact an Arbor Day observance and proclamation.	Availability of time; funding	Administration and Public Works	None Identified	Arbor Day Foundation, US Forest Service	$1,000+	Better maintained trees and hazard tree removal will eliminate damages to power lines and personal property during hazard events. Participation in Tree City USA will support community actions to mitigate damages from trees.	Ongoing
Mechanicsville-28	Public Awareness / Education	Through activities such as outreach projects, distribution of maps and environmental education, increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.	Funding and staff time	Water department/Administration	IRWA, IAMU	HMGP, PDM	$500+	Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.	Ongoing
Mechanicsville-29	Civil Service Improvements	Improve emergency rescue and response equipment and fatalities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/trucks, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles identifying and training additional personnel for emergency response or continuing educational opportunities for current personnel.	Funding and volunteer and staff time	Fire/Administration	Community volunteers	PDM, IA HSEMD, Governing County and Local Governing Agency	$5,000 to $400,000 per vehicle, varies depending on what equipment is needed.	Having appropriate and up to date equipment along with adequately trained personnel increases the safety and reduces the risk of damage.	Ongoing
Mechanicsville-30	Fire Prevention Program	The Forest Service Wildland Fire Protection Program provides services in wildfire suppression training, equipment, pre-suppression planning, wildfire prevention, and aerial fire suppression.	Funding and volunteer time.	Fire/Administration	None Identified	NFS	Varies	This program is aimed at helping maximize the impact of the existing (predominantly volunteer) force of local firefighters across the state.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Mechanicsville-31	Improve Snow / Ice Removal Program / Snow Fence	Revise and improve the snow and ice removal program for streets. Revisions should address situations such as plowing snow, ice removal, parking during snow and ice removal, and removal of associated storm debris. This would include updating the emergency routes, acquiring equipment that is needed, paving routes, and ordinances as necessary. consider purchase of snow fence at critical areas and installation of living snow fence.	Funding and availability of staff time.	Public Works/Administration	None Identified	PDM	$20,000+	Having an effective snow/ice removal program will improve capabilities to rescue stranded residents and increase the capacity in which snow can be removed after a severe winter storm.	Ongoing
Mechanicsville-32	Evacuation Plan	Establish a plan to effectively evacuate residents during storm events and major flooding.	None Identified	Fire/Administration	None Identified	Homeland Security	$2,000	Plans such as these identify effective procedures and ensure preparedness and promote emergency operations to run smoothly, reducing deaths and injuries.	Ongoing
Mechanicsville-33	Alert / Warning Sirens	Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking remote activation.	Funding	City Administrator	None Identified	HMGP, PDM, County & Local Governing Agency	$15,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Three to five years
Mechanicsville-34	Emergency Communications	Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish interoperable communications.	Funding; political boundaries, Interoperable communication was in place and then EMA determined wasn't necessary for fire and law to communicate until events happened to prove otherwise.	Fire/EMS/Police/Administration	None Identified	Homeland Security, County & Local Governing Agency	$10,000	Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.	One Year

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Mechanicsville-35	Warning Systems	Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.	Availability of time; funding	City Administrator	None Identified	HMGP, PDM, County & Local Governing Agency	$5,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Two to four years
Stanwood-01	Obtain Missing Data	Obtain necessary data to improve vulnerability assessments when updating this plan	None Identified	City Council	None Identified	HMGP	N/A	Improve the overall quality and information found in this plan.	Five Years
Stanwood-03	Hazardous Tree Removal Program	Identify and remove hazardous limbs and/or trees.	None Identified	Public Works	None Identified	HMGP, US Forest Service	$20,000	Decrease the risk of damage to electrical lines and personal property.	Ongoing
Stanwood-04	Power, Service, Electrical, and Water Distribution Lines	Communities can work with their local Power CO OP District or Electricity Department to identify vulnerable transmission and distribution lines and plan to bury lines underground, upgrade, or retrofit existing structures to be less vulnerable to storm events. Electrical utilities shall be required to use underground construction methods where possible for future installation of power lines. Rural Water Districts can work with their County to identify vulnerable distribution lines near river crossings or creek beds and plan to place lines underground to reduce vulnerability from storm events and erosion.	None Identified	Public Works	None Identified	HMGP, PDM, Power Districts, Rural Water Districts	$50,000 to $70,000 (per mile for electrical)	To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.	Ongoing
Stanwood-05	Storm Shelters / Safe Rooms	Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofits.	None Identified	Public Works/City Clerk	None Identified	HMGP, PDM	$200-$300/ sf stand alone; $150-$200/sf addition/retrofit	Reduce the risk of death or injury in areas vulnerable to tornadoes, severe thunderstorms, and other hazards	Ongoing
Stanwood-06	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Anchor fuel tanks to prevent movement. If left unanchored, tanks could present a major threat to property and safety in a tornado or high wind event. "Tie downs" can be used to anchor manufactured homes to their pads or concrete foundations.	None Identified	Public Works	None Identified	HMGP, PDM	$1,000+	Limits the chance of fuel/chemical spills. Reduce chance that propane tanks and other items become missiles during tornado events.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Stanwood-07	Stormwater System and Drainage Improvements	Larger communities generally utilize underground stormwater systems comprised of pipes and inlets to convey runoff. Undersized systems can contribute to localized flooding. Stormwater system improvements may include pipe upsizing and additional inlets. Smaller communities may utilize stormwater systems comprised of ditches culverts, or drainage ponds to convey runoff. Drainage improvements may include ditch upsizing, ditch cleanout and culvert improvements. Retention and detention facilities may also be implemented to decrease runoff rates while also decreasing the need for other stormwater system improvements. Bridges typically serve as flow restrictions along streams and rivers. Cleanout and reshaping of channel segments at bridge crossings can increase conveyance, reducing the potential for flooding. Replacement or modification of bridges and other flow restrictions may be necessary to provide greater capacity, maintain or improve a structural integrity during flood events, and eliminate flooding threats and damages. Flood protection such as armoring structures downstream.	None Identified	Public Works	None Identified	HMGP, DCBG, County & Local Governing Agency	$10,000 to $100,000	These improvements can serve to more effectively convey runoff within cities and towns, preventing interior localized flooding. May also reduce the risk of illness / disease by eliminating standing water.	Five Years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Stanwood-08	Streambank Stabilization / Grade Control Structures / Channel Improvements	Stream bank / bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures include sheet-pile weirs, rock-weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection fro critical and/or highly vulnerable facilities, areas, populations, and infrastructure are key.	None Identified	Public Works	None Identified	USACE, PDM, HMGP, County & Local Governing Agency	$50,000 to $100,000+	Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.	Three to five years
Stanwood-09	Groundwater / Irrigation / Water Conservation Management Plan and Practices	Develop and implement a plan/best management practices to conserve water use and reduce total use (high water use to low water use) and consumption of groundwater resources by citizens and irrigators of agricultural land during prolonged periods of drought. Identify water saving irrigation projects or improvements such as sprinklers or soil moisture monitoring. Potential restrictions on water could include limitations on lawn watering, car washing, farm irrigation restrictions, or water sold to outside sources. Implement BMPs through water conservation practices such as changes in irrigation management, education on no-till agriculture and modified crop selection, use of xeroscapting in communities and buffer strips.	None Identified	Public Works	None Identified	HMGP, PDM, DEQ, county & Local Governing Agency	$10,000+	Conserving water during periods in which the demand increases along with best management practices will reduce the total consumption of groundwater resources and ensure an adequate water supply during drought periods and reduce the risk of depleting the water supply. This protects the residents and the local agricultural economy.	Ongoing
Stanwood-10	Source Water Contingency Plan	Villages and cities can evaluate and locate new sources of groundwater to ensure adequate supplies to support the existing community and any additional growth which may occur. Also, identify and develop water sources for fire protection.	None Identified	Public Works	None Identified	CDBG, SRF, DEQ	$5,000+	Provide adequate water sources to mitigate potential damages or expenses due to drought or wildfire.	Five Years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Stanwood-11	Maintain good standing in National Flood Insurance Program (NFIP)	Maintain good standing with the National Flood Insurance Program (NFIP) including floodplain management practices/requirements and regulation enforcements and updates	None Identified	City Council	None Identified	N/A	N/A	Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for PDM and HMGP cost-share	Ongoing
Stanwood-12	Floodplain Management	Continue to improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in SFHA, floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the NFIP, Community Rating System (CRS), and participation in FEMA's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process.	None Identified	City Council	None Identified	N/A	N/A	Continue compliance with the NFIP. Good standing enables participants to apply for PDM and HMGP cost share.	Ongoing
Stanwood-13	Tree City USA	Work to become a Tree City USA through the National Arbor Day Foundation in order to receive direction, technical assistance, and public education on how to establish a hazardous tree identification and removal program in order to limit potential tree damage and damages caused by trees in a community when a storm event occurs. The four main requirements include: 1) Establish a tree board; 2) Enact a tree care ordinance; 3) Establish a forestry care program; 4) Enact an Arbor Day observance and proclamation.	None Identified	Public Works/City Clerk	None Identified	Arbor Day Foundation, US Forest Service	$1,000+	Better maintained trees and hazard tree removal will eliminate damages to power lines and personal property during hazard events. Participation in Tree City USA will support community actions to mitigate damages from trees.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Stanwood-15	Civil Service Improvements	Improve emergency rescue and response equipment and fatalities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/trucks, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles identifying and training additional personnel for emergency response or continuing educational opportunities for current personnel.	None Identified	Public Works/City Clerk	None Identified	PDM, IA HSEMD, Governing County and Local Governing Agency	$5,000 to $400,000 per vehicle, varies depending on what equipment is needed.	Having appropriate and up to date equipment along with adequately trained personnel increases the safety and reduces the risk of damage.	Ongoing
Stanwood-16	Comprehensive Disaster / Emergency Response / Rescue Plan	Establish or update Comprehensive City/Village Disaster and Emergency Response / Rescue Plan. Disaster Plans should include land-use planning and mitigation when applicable.	None Identified	Public Works/City Clerk	None Identified	Emergency Management Performance Grant, Homeland Security Funding	$6,000+	Comprehensive plans such as these identify effective procedures and vulnerable areas when disaster strikes. This ensures preparedness and promotes emergency operations to run smoothly, reducing damages, deaths, and injuries.	Ongoing
Stanwood-17	Evacuation Plan	Establish a plan to effectively evacuate residents during storm events and major flooding.	None Identified	Public Works/City Clerk	None Identified	Homeland Security	$2,000	Plans such as these identify effective procedures and ensure preparedness and promote emergency operations to run smoothly, reducing deaths and injuries.	Two Years
Stanwood-19	Emergency Communications	Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish interoperable communications.	None Identified	City Clerk	None Identified	Homeland Security, County & Local Governing Agency	$10,000	Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.	Three Years
Stanwood-20	Warning Systems	Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.	None Identified	Public Works/City Clerk/Fire Department	None Identified	HMGP, PDM, County & Local Governing Agency	$5,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Two to four years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Stanwood-21	Weather Radios	Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.	None Identified	City Clerk	None Identified	HMGP, PDM, County & Local Governing Agency	$50 per radio	Reduces the risk of death/injury associated with severe weather conditions by communication.	Ongoing
Tipton-01	Obtain Missing Data	Obtain necessary data to improve vulnerability assessments when updating this plan	Time and sources of information	City Administrator	State, County, Federal agencies, along with private groups.	HMGP	N/A	Improve the overall quality and information found in this plan.	Five Years
Tipton-02	Backup Generators	Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters	Cost	Electric, Gas, Public Works	State, Federal Hazard Mitigation agencies	HMGP	$15,000 - $30,000 per generator	Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.	Ongoing
Tipton-03	Power, Service, Electrical, and Water Distribution Lines	Communities can work with their local Power CO OP District or Electricity Department to identify vulnerable transmission and distribution lines and plan to bury lines underground, upgrade, or retrofit existing structures to be less vulnerable to storm events. Electrical utilities shall be required to use underground construction methods where possible for future installation of power lines. Rural Water Districts can work with their County to identify vulnerable distribution lines near river crossings or creek beds and plan to place lines underground to reduce vulnerability from storm events and erosion.	Cost and feasibility. Placing lines underground requires cooperation and investment from property owners	Electric, Gas, Public Works	ITC, Northern, Clayton Energy, Alliance Water Resources	HMGP, PDM, Power Districts, Rural Water Districts	$50,000 to $70,000 (per mile for electrical)	To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.	Ongoing
Tipton-04	Storm Shelters / Safe Rooms	Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofits.	Cost and available property in needed areas	Administration, Public Safety	State, FEMA	HMGP, PDM	$200-$300/ sf stand alone; $150-$200/sf addition/retrofit	Reduce the risk of death or injury in areas vulnerable to tornadoes, severe thunderstorms, and other hazards	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Tipton-05	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Anchor fuel tanks to prevent movement. If left unanchored, tanks could present a major threat to property and safety in a tornado or high wind event. "Tie downs" can be used to anchor manufactured homes to their pads or concrete foundations.	Private sector cooperation	Administration, Public Safety	State, Federal Regulators	HMGP, PDM	$1,000+	Limits the chance of fuel/chemical spills. Reduce chance that propane tanks and other items become missiles during tornado events.	Ongoing
Tipton-06	Stormwater System and Drainage Improvements	Larger communities generally utilize underground stormwater systems comprised of pipes and inlets to convey runoff. Undersized systems can contribute to localized flooding. Stormwater system improvements may include pipe upsizing and additional inlets. Smaller communities may utilize stormwater systems comprised of ditches culverts, or drainage ponds to convey runoff. Drainage improvements may include ditch upsizing, ditch cleanout and culvert improvements. Retention and detention facilities may also be implemented to decrease runoff rates while also decreasing the need for other stormwater system improvements. Bridges typically serve as flow restrictions along streams and rivers. Cleanout and reshaping of channel segments at bridge crossings can increase conveyance, reducing the potential for flooding. Replacement or modification of bridges and other flow restrictions may be necessary to provide greater capacity, maintain or improve a structural integrity during flood events, and eliminate flooding threats and damages. Flood protection such as armoring structures downstream.	Cost and magnitude of project	Public Works	State, Federal Hazard Mitigation agencies	HMGP, DCBG, County & Local Governing Agency	$10,000 to $100,000	These improvements can serve to more effectively convey runoff within cities and towns, preventing interior localized flooding. May also reduce the risk of illness / disease by eliminating standing water.	10 years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Tipton-07	Streambank Stabilization / Grade Control Structures / Channel Improvements	Stream bank / bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures include sheet-pile weirs, rock-weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection fro critical and/or highly vulnerable facilities, areas, populations, and infrastructure are key.	Cost and availability of replacement wetland acres. The west drainage project was able to utilize existing City property by the sewer lagoons, however no additional space is available in that same area.	Public Works	State, Army Corp of Engineers, Federal Hazard Mitigation agencies	USACE, PDM, HMGP, County & Local Governing Agency	$50,000 to $100,000+ per project	Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.	Five to ten years
Tipton-08	Drainage Study / Stormwater Master Plan	Preliminary drainage studies and assessments can be conducted to identify and prioritize design improvements to address site specific localized flooding drainage issues to reduce and/or alleviate flooding. Stormwater master plans can be conducted to perform community-wide stormwater evaluation. Identifying multiple problem areas and potential drainage improvements.	Funding to date. If the Council approves the stormwater utility fee on December 1, 2014, staff will have a direct financing tool.	Public Works, Administration	State, Engineering firm	CDBG, County & Local Governing Agency	$50,000 to $100,000+	Proactive steps to identify all potential problems/issues can lead to effectively addressing the improvements and prioritizing the projects to improve conditions. These improvements can serve to more effectively convey runoff within jurisdictions, preventing interior localized flooding resulting in damages. this ensures that the most beneficial projects are done first and could possibly eliminate the need for others.	One year
Tipton-09	Flood-Prone Property Acquisition	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the NFIP. Repetitive loss structures are typically highest priority.	Recent changes to the adopted flood maps, funding	Administration, Building Department	FEMA, State	HMGP, PDM, CDBG, USACE, FMA	Varies	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally this can provide flood insurance benefits to those communities within the NFIP. Communities must be in good standing with the NFIP in order to be eligible for HMGP.	Five years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Tipton-10	Regulation Enforcements and Updates	Continue to enforce local floodplain management regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of building permits by any community or County. Continue education of Building Inspectors or Certified Floodplain Managers. Encourage building regulations for storm-resistant structures.	Part time staffing levels	Building and Zoning	None Identified	HMGP, CDBG	$4,000+	Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.	Ongoing
Tipton-11	Maintain good standing in National Flood Insurance Program (NFIP)	Maintain good standing with the National Flood Insurance Program (NFIP) including floodplain management practices/requirements and regulation enforcements and updates	Part time staffing levels	Building and Zoning	None Identified	N/A	N/A	Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for PDM and HMGP cost-share	Ongoing
Tipton-12	Floodplain Management	Continue to improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in SFHA, floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the NFIP, Community Rating System (CRS), and participation in FEMA's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process.	Part time staffing levels	Building and Zoning	None Identified	N/A	N/A	Continue compliance with the NFIP. Good standing enables participants to apply for PDM and HMGP cost share.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Tipton-13	Tree City USA	Work to become a Tree City USA through the National Arbor Day Foundation in order to receive direction, technical assistance, and public education on how to establish a hazardous tree identification and removal program in order to limit potential tree damage and damages caused by trees in a community when a storm event occurs. The four main requirements include: 1) Establish a tree board; 2) Enact a tree care ordinance; 3) Establish a forestry care program; 4) Enact an Arbor Day observance and proclamation.	Time needed to complete the tree work	Public Works	Tree City USA	Arbor Day Foundation, US Forest Service	$5,000+	Better maintained trees and hazard tree removal will eliminate damages to power lines and personal property during hazard events. Participation in Tree City USA will support community actions to mitigate damages from trees.	Ongoing
Tipton-14	Public Awareness / Education	Through activities such as outreach projects, distribution of maps and environmental education, increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.	Lack of citizen involvement or concern until a threat or hazard is eminent	Administration, Public Safety	County, State, Federal Agencies	HMGP, PDM	$500+	Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.	Ongoing
Tipton-15	Alert / Warning Sirens	Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking remote activation.	Staff time dedicated to training	Public Safety (Police, Fire)	County, State	HMGP, PDM, County & Local Governing Agency	$15,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Three to five years
Tipton-16	Emergency Communications	Establish an action plan to improve communication between agencies to better assist residents and businesses during and following emergencies. Establish interoperable communications.	Obstacles were out of date facilities, however the City has spent $48,000 in Police renovations and completed a new fire station communications office	Administration and Public Works	City, County, State	Homeland Security, County & Local Governing Agency	$10,000	Coordination and clear and efficient communications between agencies increases the capabilities to protect and rescue, increases safety, and reduces the risk of mistakes due to miscommunications.	Three Years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Tipton-17	Warning Systems	Improve city cable TV interrupt warning system and implement telephone interrupt system such as Reverse 911.	Employee training. Switching of responsible program administrators.	City Administrator	County, State	HMGP, PDM, County & Local Governing Agency	None	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Ongoing
Tipton-18	Weather Radios	Conduct an inventory of weather radios at schools and other critical facilities and provide new radios as needed.	None Identified	Police/Fire Department	None Identified	HMGP, PDM, County & Local Governing Agency	$50 per radio	Reduces the risk of death/injury associated with severe weather conditions by communication.	Ongoing
West Branch-01	Obtain Missing Data	Obtain necessary data to improve vulnerability assessments when updating this plan	Limited Staffing	Police Department	Administration	HMGP	N/A	Improve the overall quality and information found in this plan.	Five Years
West Branch-02	Backup Generators	Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters	Funding	Police Department/Fire Department/Utility	Administration	HMGP, CIP	$15,000 - $30,000 per generator	Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.	Ongoing
West Branch-03	Power, Service, Electrical, and Water Distribution Lines	Communities can work with their local Power CO OP District or Electricity Department to identify vulnerable transmission and distribution lines and plan to bury lines underground, upgrade, or retrofit existing structures to be less vulnerable to storm events. Electrical utilities shall be required to use underground construction methods where possible for future installation of power lines. Rural Water Districts can work with their County to identify vulnerable distribution lines near river crossings or creek beds and plan to place lines underground to reduce vulnerability from storm events and erosion.	Funding, Property Access, Financial status and goals of Alliant Energy	City of West Branch Utilities	Alliant Energy	HMGP, PDM, Power Districts, Rural Water Districts	$50,000 to $70,000 (per mile for electrical)	To protect the power and water infrastructure and prevent lines from coming down or being washed out during storm events.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
West Branch-04	Storm Shelters / Safe Rooms	Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofits.	Funding, Property Access, Financial status and goals of Alliant Energy	City Administrator/City Council	West Branch Community Schools, Fire Department, Police Department, Hames Homes	HMGP, PDM	$200-$300/ sf stand alone; $150-$200/sf addition/retrofit	Reduce the risk of death or injury in areas vulnerable to tornadoes, severe thunderstorms, and other hazards	Ongoing
West Branch-06	Stormwater System and Drainage Improvements	Larger communities generally utilize underground stormwater systems comprised of pipes and inlets to convey runoff. Undersized systems can contribute to localized flooding. Stormwater system improvements may include pipe upsizing and additional inlets. Smaller communities may utilize stormwater systems comprised of ditches culverts, or drainage ponds to convey runoff. Drainage improvements may include ditch upsizing, ditch cleanout and culvert improvements. Retention and detention facilities may also be implemented to decrease runoff rates while also decreasing the need for other stormwater system improvements. Bridges typically serve as flow restrictions along streams and rivers. Cleanout and reshaping of channel segments at bridge crossings can increase conveyance, reducing the potential for flooding. Replacement or modification of bridges and other flow restrictions may be necessary to provide greater capacity, maintain or improve a structural integrity during flood events, and eliminate flooding threats and damages. Flood protection such as armoring structures downstream.	Funding, Property Access	City Administrator/City Council	City of West Branch Utilities	HMGP, DCBG, County & Local Governing Agency	$10,000 to $100,000	These improvements can serve to more effectively convey runoff within cities and towns, preventing interior localized flooding. May also reduce the risk of illness / disease by eliminating standing water.	Five Years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
West Branch-07	Streambank Stabilization / Grade Control Structures / Channel Improvements	Stream bank / bed degradation can occur along many rivers and creeks. Stabilization improvements including rock rip rap, vegetative cover, j-hooks, boulder vanes, etc. can be implemented to reestablish the channel banks. Grade control structures include sheet-pile weirs, rock-weirs, ponds, road dams, etc. can be implemented and improved to maintain the channel bed. Channel stabilization can protect structures, increase conveyance and provide flooding benefits. Flood protection fro critical and/or highly vulnerable facilities, areas, populations, and infrastructure are key.	Funding, Property Access	City Administrator/City Council	City of West Branch Utilities	USACE, PDM, HMGP, County & Local Governing Agency	$50,000 to $100,000+	Stream bed/grade stabilization improvements can serve to more effectively protect structures, increase conveyance, prevent down cutting, and provide flooding benefits.	Three to five years
West Branch-08	Drainage Study / Stormwater Master Plan	Preliminary drainage studies and assessments can be conducted to identify and prioritize design improvements to address site specific localized flooding drainage issues to reduce and/or alleviate flooding. Stormwater master plans can be conducted to perform community-wide stormwater evaluation. Identifying multiple problem areas and potential drainage improvements.	Funding, Property Access	City Administrator/City Council	City of West Branch Utilities	CDBG, County & Local Governing Agency	$10,000 to $100,000+	Proactive steps to identify all potential problems/issues can lead to effectively addressing the improvements and prioritizing the projects to improve conditions. These improvements can serve to more effectively convey runoff within jurisdictions, preventing interior localized flooding resulting in damages. this ensures that the most beneficial projects are done first and could possibly eliminate the need for others.	One to three years
West Branch-09	Flood-Prone Property Acquisition	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally, this can provide flood insurance benefits to those communities within the NFIP. Repetitive loss structures are typically highest priority.	Funding, Willingness of Property Sales	City Administrator/City Council	City of West Branch Utilities	HMGP, PDM, CDBG, USACE, FMA	Varies	Voluntary acquisition and demolition of properties prone to flooding will reduce the general threat of flooding for communities. Additionally this can provide flood insurance benefits to those communities within the NFIP. Communities must be in good standing with the NFIP in order to be eligible for HMGP.	One to two years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
West Branch-10	Regulation Enforcements and Updates	Continue to enforce local floodplain management regulations for structures located in the 100-year floodplain. Strict enforcement of the type of development and elevations of structures should be considered through issuance of building permits by any community or County. Continue education of Building Inspectors or Certified Floodplain Managers. Encourage building regulations for storm-resistant structures.	Funding, Willingness of Property Owners	City Administrator/City Council	City of West Branch Utilities	HMGP, CDBG	$4,000+	Ensures that no new structures built will be vulnerable to flooding. Reducing damages and health risks associated with flooding.	Ongoing
West Branch-11	Maintain good standing in National Flood Insurance Program (NFIP)	Maintain good standing with the National Flood Insurance Program (NFIP) including floodplain management practices/requirements and regulation enforcements and updates	Communication	City Administrator/City Council	City of West Branch Utilities	N/A	N/A	Enable property owners to purchase insurance protection against flood losses. Good standing enables participants to apply for PDM and HMGP cost-share	Ongoing
West Branch-12	Floodplain Management	Continue to improve floodplain management practices such as adoption and enforcement of floodplain management requirements (regulation of construction in SFHA, floodplain identification and mapping (local requests for map updates), description of community assistance and monitoring activities, explanation for failure to participate in the NFIP, Community Rating System (CRS), and participation in FEMA's Cooperating Technical Partners Program (CTP) to increase local involvement in the flood mapping process.	Communication	City Administrator/City Council	City of West Branch Utilities	N/A	N/A	Continue compliance with the NFIP. Good standing enables participants to apply for PDM and HMGP cost share.	Ongoing
West Branch-14	Public Awareness / Education	Through activities such as outreach projects, distribution of maps and environmental education, increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.	Funding for all partners	City Administrator/City Council	Community Schools, National Park Service, Nursing Home.	HMGP, PDM	$500+	Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
West Branch-15	Civil Service Improvements	Improve emergency rescue and response equipment and fatalities by providing additional, or updating existing emergency response equipment. This could include fire equipment, ATVs, water tanks/trucks, snow removal equipment, pumps, etc. This would also include developing backup systems for emergency vehicles identifying and training additional personnel for emergency response or continuing educational opportunities for current personnel.	Funding	Fire Department & Police Department	Administration, Township Trustees, 911 Board	PDM, IA HSEMD, Governing County and Local Governing Agency	$5,000 to $400,000 per vehicle, varies depending on what equipment is needed.	Having appropriate and up to date equipment along with adequately trained personnel increases the safety and reduces the risk of damage.	Ongoing
West Branch-16	Alert / Warning Sirens	Perform an evaluation of existing alert sirens in order to determine sirens which should be replaced or upgraded. Install new sirens where lacking remote activation. Explore options to activate sirens by Cedar County Dispatch with the ability for the Fire Department to override, if necessary.	Funding	Fire Department	Administration	HMGP, PDM, County & Local Governing Agency	$15,000+	Reduces the risk of death/injury associated with severe weather; promoting awareness and ensures people take shelter when needed.	Three to five years
West Branch-19	Relocate Police/Fire Station out of the floodway	Seek funds that can move the building out of a flood	Funding	Police Department	Administration	HMGP, PDM, County & Local Governing Agency	$500,00	The West Branch Fire Department and the West Branch Police Department building and facilities are in a flood way. Seek funds that can move the building out of a flood way.	Ongoing
Bennett Schools -01	Obtain Missing Data	Obtain necessary data to improve vulnerability assessments when updating this plan	None Identified	Superintendent	None Identified	HMGP	N/A	Improve the overall quality and information found in this plan.	Five Years
Bennett Schools -02	Backup Generators	Provide a portable or stationary source of backup power to redundant power supplies, municipal wells, lift stations, and other critical facilities and shelters	None Identified	Superintendent	None Identified	HMGP	$15,000 - $30,000 per generator	Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.	Ongoing
Bennett Schools -03	Storm Shelters / Safe Rooms	Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofits.	None Identified	Superintendent	None Identified	HMGP, PDM	$200-$300/ sf stand alone; $150-$200/sf addition/retrofit	Reduce the risk of death or injury in areas vulnerable to tornadoes, severe thunderstorms, and other hazards	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
Bennett Schools -04	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Anchor fuel tanks to prevent movement. If left unanchored, tanks could present a major threat to property and safety in a tornado or high wind event. "Tie downs" can be used to anchor manufactured homes to their pads or concrete foundations.	None Identified	Superintendent	None Identified	HMGP, PDM	$1,000+	Limits the chance of fuel/chemical spills. Reduce chance that propane tanks and other items become missiles during tornado events.	Ongoing
Bennett Schools -05	Public Awareness / Education	Through activities such as outreach projects, distribution of maps and environmental education, increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.	None Identified	Superintendent	None Identified	HMGP, PDM	$500+	Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.	Ongoing
Durant Schools-01	Backup Generators	Purchase and install generators in school buildings as backup power source during extreme weather events or other outage	Funding	School Board	Iowa Homeland Security & Emergency Management, FEMA	HMGP, PDM, County & Local Governing Agency	$15,000 per generator	Avoid disruption, including loss of heat, as a result of power outage	2 years
Durant Schools-02	Construct Safe Rooms	Design and construct safe rooms for faculty and staff in school buildings	Funding	School Board	Iowa Homeland Security & Emergency Management, FEMA	HMGP, PDM, County & Local Governing Agency	$1,000,000 per safe room	Provide life safety to students and staff during tornado events	4 years
North Cedar Schools-01	Sloping creek banks in Lowden to prevent washouts	Obtain necessary data to improve vulnerability assessments when updating this plan	None Identified	School Board	None Identified	HMGP	N/A	Improve the overall quality and information found in this plan.	Five Years
North Cedar Schools-02	Public Awareness / Education	Through activities such as outreach projects, distribution of maps and environmental education, increase public awareness of natural hazards to both public and private property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. In addition, educate citizens on erosion control and water conservation methods.	None Identified	School Board	None Identified	HMGP, PDM	$500+	Public awareness reduces the risk of property loss and damage, injury and death. It increases knowledge on emergency procedures, facilities, conservation, and is key to preparedness.	Ongoing
North Cedar Schools-03	Backup Generators	Provide a portable or stationary source of backup power to redundant power supplies, critical facilities and shelters	None Identified	School Board	None Identified	HMGP	$15,000 - $30,000 per generator	Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.	Ongoing

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
North Cedar Schools-04	Storm Shelter/Safe Room	Assess, design and construct fully supplied safe rooms in highly vulnerable urban and rural areas such as mobile home parks, campgrounds, schools, and other such areas throughout the planning area. Assess the adequacy of current public buildings to be used as safe rooms. Construct safe rooms in areas of greatest need, either as new construction or retrofits.	None Identified	School Board	None Identified	HMGP, PDM	$200-$300/ sf stand alone; $150-$200/sf addition/retrofit	Reduce the risk of death or injury in areas vulnerable to tornadoes, severe thunderstorms, and other hazards	Ongoing
North Cedar Schools-05	Obtain Missing Data	Obtain necessary data to improve vulnerability assessments when updating this plan	None Identified	School Board	None Identified	HMGP	N/A	Improve the overall quality and information found in this plan.	Five Years
Tipton Schools-01	Backup Generators	Install backup generators	None Identified	School Principal's Office; Superintendent's Office	Local Jurisdictions, County Emergency Management	HMGP	$15,000 - $30,000 per generator	Improve the overall quality and information found in this plan.	3-5 years
Tipton Schools-02	Safe Room	Construct safe rooms in accordance with FEMA 361 Design and Construction Guidance for Community Shelters	None Identified	School Principal's Office; Superintendent's Office	Local Jurisdictions, County Emergency Management	HMGP	$275.00 per sq foot. Based on population of building at time of application. 300K to 500K	Reduce the danger to human life/health by keeping utilities operating. Reduce the economic downtime associated with utility loss.	5 plus years
Tipton Schools-03	Obtain Missing Data	Obtain necessary data to improve vulnerability assessments when updating this plan	None Identified	School Principal's Office; Superintendent's Office	Local Jurisdictions, County Emergency Management	HMGP	N/A	Improve the overall quality and information found in this plan.	Ongoing
West Branch Schools-01	Back up Generators	Purchase and Retrofitting of existing facilities to allow for generators to work (Kick on)	30,000	School	School, Aliant Energy	Unknown	30K	Improve school facility safety and allow schools to function as centers for community (warming centers) if power out	3-5 years
West Branch Schools-02	Storms Shelters/ Safe Rooms	Would be part of long-term Master School Facilities Improvement Plans already developed	500,000	School, Fed Gov, County, City	School Boards, City Councils	FEMA	500K	Improve school facility safety and community use	5-10 years

Action ID	Action Title	Ideas for Implementation: How can the problem be solved?	Obstacles	Responsible Office	Partners	Potential Funding Source	Cost Estimate	Benefits: (Describe Losses Avoided)	Timeline
West Branch Schools-03	Pipeline Break Disaster: Schools have plan for this in crisis management documents. (Students, staff walk in direction of wind to avoid fallout (or) if possible bused	Ongoing coordination with Pipeline Companies and Emergency Management - mock pipeline break disaster drill	10,000 estimate for several years of disaster training and mock disaster runs	Schools, City, County, State	Emergency Response Team and Responders	Unknown	10K	Practice in case of possible disaster	1-3 years

Acronyms: CIP = Capital Improvement Plan; HMGP = Hazard Mitigation Grant Program; PDM = Pre-disaster Mitigation grant; FMA = Flood Mitigation Assistance; CDBG = Community Development Block Grant; TBD = To Be Determined

5 PLAN MAINTENANCE PROCESS

This chapter provides an overview of the overall strategy for plan maintenance and outlines the method and schedule for monitoring, updating and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

5.1 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.

5.1.1 Hazard Mitigation Planning Committee (HMPC)

With adoption of this plan, the HMPC will be tasked with plan monitoring, evaluation and maintenance. The participating jurisdictions and agencies, led by the Cedar County Emergency Management Coordinator, agree to:

- Meet annually, and after a disaster event, to monitor and evaluate the implementation of the plan;
- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high priority, low- or no-cost recommended actions;
- Maintain vigilant monitoring of multi-objective, cost-share, and other funding opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update 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 recommended changes to the Cedar County Board of Supervisors and governing bodies of participating jurisdictions; and
- Inform and solicit input from the public.

The HMPC is an advisory body and can only make recommendations to county, city, town, or district elected officials. Its primary duty is to see the plan successfully carried out and to report to the community 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 about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information in areas accessible to the public.

5.1.2 Plan Maintenance Schedule

The HMPC agrees to meet annually and after a state or federally declared hazard event as appropriate to monitor progress and update the mitigation strategy. The Cedar County Emergency Management Coordinator will be responsible for initiating the plan reviews and will invite members of the HMPC to the meeting.

In coordination with the other participating jurisdictions, a five-year written update of the plan will be submitted to the Iowa Homeland Security and Emergency Management Division and FEMA Region VII per Requirement §201.6(c)(4)(i) of the Disaster Mitigation Act of 2000, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

5.1.3 Plan Maintenance Process

Evaluation of progress can be achieved by monitoring changes in 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, and/or
- Increased vulnerability as a result of new development (and/or annexation).

Updates to this 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,
- Incorporate new capabilities or changes in capabilities,
- Incorporate growth and development-related changes to inventories, and
- 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 follow the following process:

- A representative from the responsible office identified in each mitigation action will be responsible for tracking and reporting on an annual basis to the jurisdictional HMPC member on action status and providing 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 HMPC member 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 for actions that have failed or are not considered feasible after a review of their consistency with 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 as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as the Cedar County HMPC deems appropriate and necessary, and as approved by the Cedar County Board of Supervisors and the governing boards of the other participating jurisdictions.

5.2 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. Based on the capability assessments of the participating jurisdictions, communities in Cedar County will continue to plan and implement programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through the following plans:

- General or master plans of participating jurisdictions;
- Ordinances of participating jurisdictions;
- Cedar County Emergency Operations Plan;
- Capital improvement plans and budgets;
- Other community plans within the County, such as water conservation plans, stormwater management plans, and parks and recreation plans;
- School Plans; and
- Other plans and policies outlined in the capability assessment sections for each jurisdiction in Chapter 2 of this plan.

HMPC members involved in updating these existing planning mechanisms will be responsible for integrating the findings and actions of the mitigation plan, as appropriate. The HMPC is also

responsible for monitoring this integration and incorporating the appropriate information into the five-year update of the multi-jurisdictional hazard mitigation plan.

Additionally, after the annual review of the Hazard Mitigation Plan, the Cedar County Emergency Management Coordinator will provide the updated Mitigation Strategy with current status of each mitigation action to the County Commission as well as all Mayors, City Clerks, and School District Superintendents requesting that the mitigation strategy be incorporated, where appropriate in other planning mechanisms.

The City of West Branch Comprehensive Plan is a good example of integration of various planning mechanisims for a coordinated future development approach. Chapter o10 of this plan is dedicated to discussion of Hazard Mitigation including incorporation of selected specific actions from the Hazard Mitigaton Plan.

5.3 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 about the annual reviews will be posted in the *West Branch times and Tipton Conservative*, and on the County website following each annual review of the mitigation plan. When the HMPC reconvenes for the update, it will coordinate with all stakeholders participating in the planning process, including those who joined the HMPC after the initial effort, to update and revise the plan. Public notice will be posted and public participation will be invited, at a minimum, through available website postings and press releases to local media outlets, primarily newspapers.

- American Meteorological Society
- Cedar County Conservation Board
- Cedar County Digital Flood Insurance Rate Maps
- Cedar County Economic Development Council
- Cedar County Emergency Management
- Cedar County GIS Department
- Cedar County Multi-jurisdictional Hazard Mitigation Plan (January 2011);
- Cedar County, Iowa Land Use Plan, 2006
- Census of Agriculture, 2012
- Clarence, Iowa Comprehensive Land Use Plan, 2000
- Data Collection Guides completed by each jurisdiction
- Environmental Protection Agency, Surf Your Watershed
- Federal Emergency Management Agency (FEMA);
- FEMA 320, Taking Shelter from the Storm, 3rd edition
- FEMA BCA Reference Guide, June 2009
- Flood Insurance Administration
- Hazards and Vulnerability Research Institute
- Hazards US (HAZUS) MH 2.1
- Homeland Security Infrastructure Program Freedom, 2011, bridge inventory
- Iowa Department of Agriculture and Land Stewardship, Division of Soil Conservation
- Iowa Department of Education, Bureau of Information and Analysis Services
- Iowa Department of Natural Resources; Dam Safety Program
- Iowa Department of Natural Resources; Emergency Response and Homeland Security Unit, Tier II Chemical Facilities
- Iowa Department of Public Health, Bureau of Health Statistics
- Iowa Department of Public Health, Center for Acute Disease Epidemiology
- Iowa Department of Public Safety, State Fire Marshal Division
- Iowa Department of Transportation, Office of Traffic and Safety
- Iowa Homeland Security and Emergency Management
- Iowa State Fire Marshal Division
- Iowa State University Department of Agronomy, Environmental Mesonet
- Iowa State University Extension, 2009 Agriculture Profile for Cedar County
- Iowa State University of Science and Technology, Population Statistics
- Iowa Utilities Board
- Iowa Workforce Development, Iowa's Workforce and the Economy, 2014
- Iowa Hazard Mitigation Plan (November 2013);
- Johns Hopkins University 2006 Electronic Mass Casualty Assessment and Planning Scenarios (EMCAPS)
- National Climatic Data Center
- National Drought Mitigation Center Drought Reporter;
- National Fire Incident Reporting System (NFIRS)
- National Hydrography Dataset
- National Oceanic and Atmospheric Administration’s (NOAA) National Climatic Data Center;
- National Oceanic and Atmospheric Administration’s (NOAA) National Weather Service, Des Moines Weather Forecast Office
- National Severe Storms Laboratory
- National Weather Service
- NFIP Community Status Book
- Pipeline and Hazardous Materials Safety Administration
- SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin
- State Historical Society of Iowa
- Tornado and Storm Research Organization (TORRO)
- U.S. Census Bureau

- U.S. Department of Agriculture, Census of Agriculture, 2012
- U.S. Department of Agriculture, Cooperative Emerald Ash Borer Project
- U.S. Department of Agriculture, CropScape
- U.S. Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics;
- U.S. Department of Health and Human Services, Centers for Disease Control and Prevention
- U.S. Department of Transportation
- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- Wate.com, Lowden flooding photos
- West Branch, Iowa Comprehensive Plan, April 1, 2013
- Wetlands, Wildlife Habitat, and Flood Hazards in the Cedar River Basin, Iowa, February 2013

APPENDIX B: PLANNING PROCESS

The following materials are provided to document the planning process:

B.1 Cedar County Hazard Mitigation Planning Committee (HMPC) Members

Jurisdictional Representatives

First	Last	Title	Department	Jurisdiction	Type	Initial Mtg.	K-O Mtg.	Mtg. #2	Mtg. #3
Mike	Anderson	Fire Chief	Fire Department	Bennett	City	x	x		
Orville	Randolph	Mayor/EMS Director	City Administration/EMS	Bennett	City	x	x	x	x
Sidney	Randolph	Assistant to Mayor	City Administration	Bennett	City				x
Mike	Shotwell	Director	Public Works	Bennett	City		x	x	x
Jeric	Armstrong	Mayor	City Administration	Clarence	City	x	x	x	x
Randy	Burken	Fire Chief	Fire Department	Clarence	City	x	x	x	x
Brian	Meyer	Police Chief	Police Department	Clarence	City		x		
Kevin	Wenndt	Assistant Chief	Fire Department	Clarence	City		x		
Deana	Cavin	City Clerk	City Administration	Durant	City				x
Allen	Olderos	Public Works Director/Supv.	Public Works	Durant	City			x	
Kyle	Olderos	Assistant Chief	Fire Department	Durant	city		x	x	x
Dawn	Smith	Mayor	City Administration	Durant	City	x	x		x
Barry	Hoffmeier	Mayor	City Administration	Lowden	City		x	x	x
Joel	Brown	Trustee	City Administration	Mechanicasville	City		x		
Larry	Butler	Mayor	City Administration	Mechanicasville	City	x	x	x	
Tim	Horihan	Chief	Police Department	Mechanicasville	City		x	x	x
Linda	Coppess	City Clerk/Township Clerk	City Administration	Mechanicasville/ Fremont Township	City		x	x	x
Greg	Wagner	Mayor	City Administration	Stanwood	City	x	x	x	x
Brian	Brennen	Director	Public Works	Tipton	City		x		
Roger	Dewolf	Public Works Official	Public Works	Tipton	City		x		
Eldon Ray	Downs	Public Works Official	Public Works	Tipton	City		x	x	
Lorna	Fletcher	City Clerk	City Administration	Tipton	City		x		
Brian	Hudson		Electric	Tipton	City		x		
Tawnya	Johnson		Electric	Tipton	City		x		
Steve	Nash	Public Works Director/Supv.	Public Works	Tipton	City		x	x	
Chris	Nosbisch	City Manager	City Administration	Tipton	City	x	x	x	
Ken	Paul	Firefighter	Fire Department	Tipton	City		x		
Sean	Paustian	1st Assistant	Fire Department	Tipton	City		x		
Bradly	Peck	Officer	Police Department	Tipton	city		x		
V.	Penrod		Gas Department	Tipton	City		x		
Pamella	Spear	Council Member	City Council	Tipton	City	x	x	x	
Melissa	Steffen	EMT	Ambulance	Tipton	City			x	

First	Last	Title	Department	Jurisdiction	Type	Initial Mtg.	K-O Mtg.	Mtg. #2	Mtg. #3
Floyd	Taber	Electric Manager	Electric	Tipton	City		x		
John	Walsh		Electric	Tipton	City		x		
Mark	Wild	Water Operator	Water Department	Tipton	City			x	
Leanne	Zearley	Council member	City Administration	Tipton	City	x		x	x
Mike	Horihan	Police Chief		West Branch	City		x		
David	Hosier	Assistant Chief	Fire Department	West Branch	City	x	x		
Alex	Koch	Officer	Police Department	West Branch	City			x	
Kevin	Stoolman	Fire Chief	Fire Department	West Branch	City				x
Mark	Worrell	Mayor	City Administration	West Branch	City	x	x		x
Josh	Worrell	Assistant Chief	Fire Department	West Branch	City				x
Jon	Bell	Board Of Supv. Pro Tem	Board of Supervisors	Cedar County	County		x	x	x
Kirby	Blake	Staff	EOC	Cedar County	County		x	x	
Bonnie	Butler	Preparedness Div. Mgr.	Health Department	Cedar County	County				x
Jane	Caes	Dir. Public Health	Public Health Department	Cedar County	County		x	x	
Wayne	Deerberg	Board Of Supv. Chair	Board of Supervisors	Cedar County	County	x	x		x
Betty	Ellerhoff	Board Of Supv.	Board of Supervisors	Cedar County	County	x	x		
Brad	Gaul	Board Of Supv.	Board of Supervisors	Cedar County	County	x	x	x	x
Jeff	Kaufmann	Board Of Supv.	Board of Supervisors	Cedar County	County		x		x
Marcus	Larson	GIS Tech.	GIS Department	Cedar County	County	x	x	x	x
Tim	Malott	Coordinator	Emergency Management	Cedar County	County	x	x	x	x
Bev	Penningroth	Clerk	Auditor's Office	Cedar County	County	x	x		
Brad	Ratliff	Assistant Director	Emergency Management	Cedar County	County				x
Jeffrey	Renander	Attorney Cedar County	Attorney's Office	Cedar County	County			x	x
Barbara	Smith	Clerk	Assessor's Office	Cedar County	County		x		
Warren	Wethington	Sheriff	Sheriff's Department	Cedar County	County	x	x	x	
David	Larson	Superintendent	School Administration	Bennett Community Schools	Public School		x		x
Ron	Fick	Maintenance Manager	Maintenance	Durant Community Schools	Public School				x
Mike	Cooper	Superintendent	School Administration	North Cedar Community Schools	Public School			x	x
Bob	Dohmen	Maintenance Director	Buildng	North Cedar Community Schools	Public School		x		
Dick	Grimoskas	Superintendent	School Administration	Tipton Community Schools	Public School		x	x	x
Andy	Owen	Staff		Tipton Community Schools	Public School			x	
Joey M.	Lande	Director of Operations	Operations	West Branch Community Schools	Public School		x	x	x

Stakeholder Representatives-Attendees

First	Last	Title	Jurisdiction	Type	Initial Mtg.	K-O Mtg.	Mt. #2	Mtg. #3
Betty	Lett	Citizen	Citizen	Citizen		x		
Nichole	Malott	Citizen	Citizen	Citizen		x		
Laura	Twing	Citizen	Citizen	Citizen		x		
Tom	Schwartz	Director	Herbert Hoover Presidential Library & Museum	National Library				x
Sue	Hall	Reporter	N/A	Press	x	x		x
Mark	Wild	Local Manager	Alliance Water	Private		x		
Bobby	Kaufmann	State Representative	State of Iowa	State		x		
Steve	Agri	Trustee	Cass Township	Township		x		
Molly	Williams	Clerk	Cass Township	Township		x		
Dwain	Ford	Clerk	Center Township	Township		x		
David	Niermeyer	Clerk	Springfield Township	Township			x	

Stakeholder Representatives--Invited

First	Last	Title	Jurisdiction	Type
Sara	Steussy	Research Support Coordinator, Iowa Flood Center	University of Iowa	Academic
Nathan	Young	Associate Director, Iowa Flood Center	University of Iowa	Academic
Chance	Kness	Coordinator	Clinton County	Adjacent County
Ken	Brown	Johnson County Haz-Mat	Johnson County	Adjacent County
Dave	Wilson	Coordinator	Johnson County	Adjacent County
Brenda	Leonard	Coordinator	Jones County	Adjacent County
Mike	Goldberg	Coordinator	Linn County	Adjacent County
Brad	Ransford	Linn County Haz-Mat	Linn County	Adjacent County
Tom	Ulrich	Linn County Haz-Mat	Linn County	Adjacent County
Gary	Lee	Muscatine Fire Department	Muscatine County	Adjacent County
Matt	Shook	Coordinator	Muscatine County	Adjacent County
Ross	Bergen	Coordinator	Scott County	Adjacent County
Pam	Paulsen	Scott County SECC (911)	Scott County	Adjacent County
Joe	Chandler	Senior Mitigation Planner	FEMA Region VII	Federal Agency
Christine	Ashley	Head of School	Scattergood Friend School	Private School
Gean	Hammon	Atalissa Fire	Atalissa	Stakeholder
Chad	Petersen	New Liberty Fire Chief	New Liberty	Stakeholder
Greg	Gerdes	Olin EMS/Fire	Olin	Stakeholder

First	Last	Title	Jurisdiction	Type
Dennis	Coon	Oxford Jct Fire/EMS Chief	Oxford Jct	Stakeholder
Dan	Wall	Iowa State Patrol	State of Iowa	Stakeholder
Bill		Tipton DOT Shop	State of Iowa	Stakeholder
Curt	Sunderman	Corps of Engineers (Cedar)	U.S. Army Corps of Engineers	Stakeholder
Matt	Zager	Corps of Engineers (Wapsi)	U.S. Army Corps of Engineers	Stakeholder
Niel	Korsmo	National Park Service	U.S. National Parks Service	Stakeholder
Mike	Boyle	USDA Rural Dev.	USDA	Stakeholder
Gary	Devore	Wilton Fire	Wilton	Stakeholder
Bill	Cappuccio	State NFIP Coordinator	Iowa Department of Natural Resources	State Agency
Ryan	Clark	Geologist	Iowa Department of Natural Resources	State Agency
Jonathan	Garton	Environmental Engineer Senior	Iowa Department of Natural Resources	State Agency
Gail	Kantak	Wildland Fire Supervisot	Iowa Department of Natural Resources	State Agency
Robert	Libra	State Geologist	Iowa Department of Natural Resources	State Agency
Ryan	Schlater	Fire Specialist	Iowa Department of Natural Resources	State Agency
Linda	Roose	Mitigation Project Officer, Saferoom Team Lead	Iowa Homeland Security and Emergency Mangement Division	State Agency
Jessica	Turba	Hazard Mitigtion Project Officer	Iowa Homeland Security and Emergency Mangement Division	State Agency
Robert	King Kelly	Clerk	Dayton Township	Township
Duane	Stonerook	Clerk	Fairfield Township	Township
David	Schuett	Clerk	Farmington Township	Township
Wayne	Lainf	Clerk	Gower Township	Township
Tom	Burmeister	Clerk	Inland Township	Township
Betsy	Nebergall	Clerk	Iowa Township	Township
Marcia	Driscoll	Clerk	Linn Township	Township
Bruce	Jensen	Clerk	Massillon Township	Township
Sheryl	Koch	Clerk	Pioneer Township	Township
Barbara	Haynes	Clerk	Red Oak Township	Township
Lynne	Treimer	Clerk	Rochester Township	Township
Jim	Farmer	Clerk	Springdale Township	Township
David	Niermeyer	Trustee	Springfield Township	Township
Allen	Kroeger	Clark	Sugar Creek Township	Township

B.2 Hazard Mitigation Plan Initial Meeting Minutes (4/10/2014)

To	**Tim Malott, Emergency Management Coordinator**
From	**Laurie Bestgen, AMEC Mitigation Planner**
Tel / E-mail	**816-637-6378 /laurie.bestgen@amec.com**
Date	**4/15/2014**
Subject	**Minutes from Cedar County Mitigation Planning Informational Meeting held on 4/10/2014**

This document is a record of attendance and a summary of the topics discussed at the above meeting including the following:

- Planning Process
- GIS Resources
- Risk Assessment/Format
- Flood Risk Assessment Methodology
- Public Notification Process
- Politically Sensitive Issues
- Contract
- Final Plan Document

The meeting began at 6:30 pm and concluded at 7:30 pm.

Attendees

Name		Title	Department	Jurisdiction
Mike	Anderson	Chief	Fire Department	City of West Branch
Jeric	Armstrong	Mayor	City Administration	City of Clarence
Randy	Burken	Chief	Fire Department	City of Clarence
Larry	Butler	Mayor	City Administration	City of Mechanicsville
Wayne	Deerbury	Supervisor	Board of Supervisors	Cedar County
Betty	Ellerhoff	Supervisor	Board of Supervisors	Cedar County
Brad	Gaul	Supervisor	Board of Supervisors	Cedar County
Sue	Hall	Reporter	Newspaper	N/A
David	Hosier	Assistant Chief	Fire Department	City of West Branch
Marcus	Larson	GIS Clerk	GIS	Cedar County
Tim	Malott	Coordinator	Emergency Management	Cedar County
Chris	Nosbisch	City Manager	City Administration	City of Tipton
Bev	Penningroth	Clerk	Auditor's Office	Cedar County
Orville	Randolph	Assistant Chief	Fire Department	City of Bennett
Dawn	Smith	Mayor	City Administration	City of Durant
Pam	Spear	City Council	City Administration	City of Tipton
Greg	Wagner	Mayor	City Administration	City of Stanwood
William	Wethington	Sheriff	Sheriff's Office	Cedar County
Mark	Worrell	Mayor	City Administration	City of West Branch
Leanne K.	Zearly	City Council	City Administration	City of Tipton
AMEC				
Laurie	Bestgen			

Planning Process

Jurisdictions/Contacts to Invite and Invitations

The jurisdictions that will be invited to participate as formal participants in the Cedar County Multi-jurisdictional Hazard Mitigation Plan Update will include the following:

- Cedar County
- City of Bennett
- City of Clarence
- City of Durant
- City of Lowden
- City of Mechanicsville
- City of Stanwood
- City of Tipton
- City of West Branch
- Bennett School District
- Durant School District
- North Cedar School District
- Tipton School District
- West Branch School District
- Hoover Presidential Library

In addition to the above, the private non-profit schools in the planning area will be invited to contribute to the mitigation strategy.

The Cedar County Emergency Management Coordinator, Tim Malott will provide AMEC with contact information for the above jurisdictions as well as key stakeholders such as businesses, academia, local planning organizations, local interest groups, and others that will be invited to contribute to development of the plan update. AMEC will incorporate state and federal stakeholders and will send out meeting invites via Microsoft Outlook. AMEC will request meeting RSVPs and will follow up via phone calls to ensure all jurisdictions have received notifications regarding meeting dates and times. The invite text will include suggested participants from each participating jurisdiction such as floodplain managers, city clerks, planners, etc. for cities and superintendents, facility directors, principals for schools.

Project Schedule and Meeting Dates/Locations

Tentative meeting dates, times, and locations were established as follows:

Kickoff Meeting – Thursday, May 22, 2014, 6:30-8:30 pm at new fire house.
Meeting #2-Thursday, August 7, 6:30-8:30 pm at new school
Meeting #3-Thursday, November 13, 6:30-8:30 pm at Presidential library

GIS Resources

Marcus Larson, the Cedar County GIS Clerk, provided GIS layers to AMEC including parcel data, critical facility data, and other available hazard layers. The meeting attendees were provided with a list of GIS layers that will be useful in updating the risk assessment. Jurisdictional

representatives were asked to forward any local GIS layers that are available, as well as updates to the critical facility layer to Mr. Larson.

Risk Assessment

List of Hazards to Include/Naming of Hazards
AMEC provided a spreadsheet comparing the hazards and hazard naming for the 2013 State Plan update and the 2011 Cedar County Plan. It was agreed that for purposes of the plan update, the hazards/hazard naming will be consistent with the 2013 State Plan for the hazards that will be included.

The list of hazards to be presented to the planning committee for consideration will include the following:

- River Flooding
- Flash Flood
- Tornado/Windstorm
- Thunderstorm/Lightning/Hail
- Severe Winter Storm
- Dam Failure
- Terrorism
- Hazardous Materials Incident
- Radiological Incident
- Drought
- Transportation Incident
- Extreme Heat
- Grass/Wildland Fire
- Sinkholes
- Earthquake
- Expansive Soils

The hazard ranking methodology utilized in the State Hazard Mitigation Plan will be utilized in the Cedar County Plan. The Risk Assessment will include individual jurisdiction-level hazard ranking for the above hazards for review by each jurisdiction.

The overall plan format will be as follows:

Section I—Introduction
Section 2—Planning Process
Section 3—Community Profiles & Capabilities
Section 4—Risk Assessment
Section 5—Mitigation Strategy
Section 6—Plan Implementation & Maintenance

Appendices

This format follows the general format of the 2011 Cedar County Multi-jurisdictional Hazard Mitigation Plan except that Section 3 has been added. This section will contain the profile information for each jurisdiction that was previously included as the Participant Sections in the

2011 plan. Additionally, the jurisdictional hazard ranking summaries included in the Participant Sections and varied flood risk descriptions will be incorporated in the Risk Assessment Section.

Cedar County is not seeking EMAP accreditation at this time. Therefore, a consequence analysis will not be necessary.

Mr. Malott will contact the consultant that prepared the 2011 plan to request a Microsoft Word version of the plan document.

Flood Risk Assessment Methodology

HAZUS Level I vs. DFIRM/Parcel Data Analysis
With the availability of DFIRM/Parcel Data, this is the preferred approach for the Flood Risk Assessment. Therefore, this is the method AMEC will use for the plan update. This will provide data for analysis of actual structures and values by type that fall within the boundaries of the regulatory floodplain. A Level I HAZUS analysis, which can provide loss estimates according to the depth-damage function is considered to be less accurate since Census block data is used and aggregated and the HAZUS approximated floodplain considers only those streams that drain 10 square miles or more.

Public Notification Process

AMEC will facilitate development of a public survey. This survey will be distributed through a variety of mechanisms to capture initial public comment during the drafting stage. Mr. Malott will also utilize the survey during public meetings held prior to City Council meetings in the eight cities that are participating in the multi-jurisdictional plan update. During the Kickoff meeting, AMEC will ask the participating jurisdictions to identify other outreach tools that can be used to disseminate the public survey.

The County website will be utilized to provide a link to the surveys as well as house the draft plan during final public comment. The City websites can include a link to the County website so that residents can complete the survey and view the plan draft.

Politically Sensitive Issues

The group discussed whether or not there were politically sensitive issues in Cedar County currently. No significant issues were identified.

Contract

Billing Process
AMEC will provide invoices to Cedar County Emergency Management on a monthly basis based on percent of the project completed.

Match Documentation
AMEC described the soft-match documentation form that has been successfully utilized for other Iowa planning projects. Cedar County will utilize this form and AMEC will assist with collecting the

soft match documentation and will forward the information in the correct format to Cedar County for submission to the State. AMEC will provide plan participants with information regarding the need for and process for documenting soft match at the Kickoff Meeting. Additional information will be provided regarding the process needed in order to capture soft match credit for additional meetings at the city or school district level.

Final Plan Document

AMEC will provide a minimum of 2 hard copies of the plan, and at least one electronic copy of the plan in PDF format for each participating jurisdiction. Cedar County Emergency Management will also be provided with a copy of the plan in MS-Word at the conclusion of the project. If possible, within the project budget, AMEC will provide hard copies of the updated plan for each participating jurisdiction.

B.3 Kick-off Meeting Invite

Bestgen, Laurie

Subject:	Kick-off Meeting for Cedar County Multi-jurisdictional Hazard Mitigation Plan Update
Location:	Tipton Fire House, 301 Lynn St., Tipton, IA 52772
Start:	Thu 5/22/2014 6:30 PM
End:	Thu 5/22/2014 8:30 PM
Recurrence:	(none)
Meeting Status:	Meeting organizer
Organizer:	Bestgen, Laurie
Required Attendees:	'ojrand@fbcom.net'; 'nikki1@fbcom.net'; 'bennettamb@fbcom.net'; 'jericArmstrong70 @hotmail.com'; 'clarencepolice@gmail.com'; 'cfd133@netins.net'; 'clarambul@netins.net'; 'dawnsmith66@gmail.com'; 'dcavin@cityofdurantiowa.com'; 'shawndfc@gmail.com'; 'durantamb@gmail.com'; 'mayor@cityoflowden.org'; 'clerk@cityoflowden.org'; 'rescue.tech@yahoo.com'; 'chopsie@netins.net'; 'mechanicsville@netins.net'; 'lonni.koch@gmail.com'; 'mfdamb@netins.net'; 'stanwoodmayor@gmail.com'; 'stanwood@netins.net'; 'skepford@tiptoniowa.org'; 'lzearley@cedarcounty.org'; 'cnosbisch@tiptoniowa.org'; 'hholub@tiptoniowa.org'; 'tiptonfire@iowatelecom.net'; 'caapmac789@gmail.com'; 'mark@westbranchiowa.org'; 'matt@westbranchiowa.org'; 'klstoolman@live.com'; 'waynedee@iowatelecom.net'; 'jbell@leeinsure.com'; 'bjellerhoff@windstream.net'; 'jefkauf@netwtc.net'; 'bjgjal33@aol.com'; 'cgritton@cedarcounty.org'; 'dlett@cedarcounty.org'; 'attorney@cedarcounty.org'; 'mdauber@cedarcounty.org'; 'jtischuk@cedarcounty.org'; 'bconrad@cedarcounty.org'; 'touch@netins.net'; 'rfangmann@cedarcounty.org'; 'aanderson@cedarcounty.org'; 'plarue@cedarcounty.org'; 'ema@cedarcounty.org'; 'phamann@cedarcounty.org'; 'gis@cedarcounty.org'; 'jcase@cedarcounty.org'; 'bbutler@cedarcounty.org'; 'awulf@cedarcounty.org'; 'dwehde@cedarcounty.org'; 'mhelmold@cedarcounty.org'; 'wwethington@cedarcounty.org'; 'kknoche@cedarcounty.org'; 'dwilkinson@cedarcounty.org'; 'gjedicka@cedarcounty.org'; 'jbohlen@cedarcounty.org'; 'shenderson@cedarcounty.org'; 'sdeloney@cedarcounty.org'; 'ken-brown@iowa-city.org'; 'tom.ulrich@linncounty-ema.org'; 'Brad.ransford@hotmail.com'; 'glee@ci.muscatine.ia.us'; 'dcoon@scottcountyiowa.com'; 'atalissafire@gmail.com'; 'david.larson@bennett.k12.ia.us'; 'duane.bennett@durant.k12.ia.us'; 'mcooper@north-cedarstu.org'; 'dick.grimoskas@tipton.k12.ia.us'; 'khatfiled@west-branch.k12.i1.us'; 'head@scattergood.org'; 'suehall-writer@gmail.com'; 'bpenningroth@cedarcounty.org'; Belt, Susan A; 'hoover.library@nara.gov'
Optional Attendees:	susanhall-writer@gmail.com; Mike@westbranchiowa.org; susanhall.writer@gmail.com; khatfield@west-branch.k12.i1.us; kckelly@netins.net; drishm@netins.net; khatfiled@west-branch.k12.ia.us; jcaes@cedarcounty.org; awright@cedarcounty.org

Subject: Cedar County Multi-jurisdictional Hazard Mitigation Plan Update

You are invited to the first of three planning meetings to update the Cedar County Multi-jurisdictional Hazard Mitigation Plan. The existing plan was developed in accordance with the Disaster Mitigation Act of 2000 which requires all local governments and special districts to develop a plan to assess their risks to hazards and identify actions that can be taken in advance to reduce future losses to maintain eligibility for certain FEMA Hazard Mitigation Assistance grants. The law requires Hazard Mitigation Plans to be updated every five years. The Cedar County Hazard Mitigation Plan must be updated by January 2016.

Cedar County Multi-jurisdictional Hazard Mitigation Plan Update
Kickoff Meeting
Date: Thursday, May 22, 2014
Time: 6:30 pm—8:30 pm
Place: Tipton Fire House
Address: 301 Lynn St., Tipton, IA 52772

The hazard mitigation planning process is heavily dependent on the participation of representatives from local government agencies and departments, the public, and other stakeholder groups. A Hazard Mitigation Planning Committee will be formed to support this project and will include representatives from the County, cities, school districts, private-non-profit entities, business partners, academic institutions, and other local, state, and federal agencies in or that serve Cedar County.

At the kickoff meeting, we will discuss the benefits of updating the hazard mitigation plan, the project schedule, and all of the hazards that affect Cedar County, such as tornadoes, wildfire, floods, winter storms, hazardous materials, and more. **Cedar County requests your assistance in forwarding this invitation to others in your jurisdiction. Appropriate persons to be a part of the planning committee include, but are not limited to: emergency responders, county clerks, city clerks, elected officials, public works directors, floodplain managers, county and city planners, economic development directors, GIS staff, business partners, private-non-profit representatives, school principals, school facilities directors, and school superintendents.**

Cedar County Emergency Management has taken the lead in developing this plan. The County has hired a consultant, AMEC Environment & Infrastructure, Inc., to manage the planning project. AMEC will facilitate the planning process, collect the necessary data, and perform other technical services, including updating the risk assessment and plan document. However, to successfully complete this project and ensure your organization is eligible for FEMA hazard mitigation assistance funding, we need your participation and input.

Please confirm your attendance or provide contact information for your designated alternate. If you received this message via a Microsoft Outlook meeting invitation, please simply accept the meeting into your calendar. If you received this message in another format, please respond to Laurie Bestgen, AMEC Mitigation Planner, at laurie.bestgen@amec.com or 816.637.6378.

B.4 Kick-Off Meeting Agenda

Cedar County
Multi-Jurisdictional Hazard Mitigation Plan Update
Kick-off Planning Meeting

May 22, 2014
6:30 to 8:30 pm

Agenda

Welcome/Introductions	Tim Malott, Coordinator Cedar County Emergency Management

Soft Match Time Forms

Hazard Mitigation Planning Purpose

Multi-jurisdictional Approach

Grant Programs Linked to Approved Plan

Public Involvement

Data Collection Guides

Discussion/Prioritization of Hazards

Next Steps in the Planning Process

AMEC Team:

Susan Belt
Project Manager/soft-match documentation
- Work phone (785) 272-6830
- Cell phone (785) 217-7957
- Email: susan.belt@amec.com

Laurie Bestgen
- Phone (816) 637-6378
- Email: laurie.bestgen@amec.com

Kari Valentine
- Phone (816) 436-6351
- Email: kari.valentine@amec.com

SAVE THE DATES:
Meeting #2—Thursday, August 7, 2014, 6:30 to 8:30 pm
Meeting #3—Thursday, November 13, 2014, 6:30 to 8:30 pm

B.5 Kick-Off Meeting Minutes (5/22/2014)

To	**Cedar County Hazard Mitigation Planning Committee**
Through	**Tim Malott, Coordinator** **Cedar County Emergency Management**
From	**Susan Belt, AMEC Project Manager** **Laurie Bestgen, AMEC Mitigation Planner**
Tel / E-mail	**785-272-6830 / susan.belt@amec.com, laurie.bestgen@amec.com**
Date	**5/28/2014**
Subject	**Minutes from Cedar County Hazard Mitigation Planning Kickoff Meeting held on 5/23/2014**

This document is a record of attendance and a summary of the issues discussed during the above meeting. Topics covered during the meeting included; the soft match time documentation, an introduction to the purpose of hazard mitigation planning, the benefits of a multi-jurisdictional approach, and grant programs linked to an approved plan. The hazard mitigation planning process was reviewed to include requirements for public involvement and the use of data collection guides. The planning committee participated in a discussion of the hazards that have the potential to impact Cedar County, including preliminary research conducted by AMEC on each hazard. The probability, magnitude, warning time, and duration of hazards affecting Cedar County was also discussed to provide a planning significance ranking. The meeting concluded with a discussion of the next steps in the planning process.

The meeting was held at the Tipton Fire House at 301 Lynn Street, Tipton, Iowa from 6:30 pm to 8:30 pm.

Attendees

Name		Jurisdiction
Steve	Agri	Cass Township
Mike	Anderson	Bennett
Jeric	Armstrong	Clarence
Jon	Bell	Cedar County
Kirby	Blake	Cedar County
Brian	Brennen	Tipton
Joel	Brown	Mechanicsville
Randy	Burken	Clarence
Larry	Butler	Mechanicsville
Jane	Caes	Cedar County
Linda	Coppess	Mechanicsville/Fremont Township
Wayne	Deerberg	Cedar County
Roger	Dewolf	Tipton
Bob	Dohmen	North Cedar Community Schools
Eldon Ray	Downs	Tipton
Betty	Ellerhoff	Cedar County
Lorna	Fletcher	Tipton
Dwain	Ford	Center Township

Name		Jurisdiction
Brad	Gaul	Cedar County
Dick	Grimoskas	Tipton Community Schools
Sue	Hall	N/A
Barry	Hoffmeier	Lowden
Mike	Horihan	West Branch
Tim	Horihan	Mechanicsville
David	Hosier	West Branch
Brian	Hudson	Tipton
Tawnya	Johnson	Tipton
Jeff	Kaufmann	Cedar County
Bobby	Kaufmann	State of Iowa
Joey M.	Lande	West Branch Community Schools
Marcus	Larson	Cedar County
David	Larson	Bennett Community Schools
Betty	Lett	Citizen
Tim	Malott	Cedar County
Nichole	Malott	Citizen
Brian	Meyer	Clarence
Steve	Nash	Tipton
Chris	Nobisch	Tipton
Kyle	Olderos	Durant Community Schools
Ken	Paul	Tipton
Sean	Paustian	Tipton
Bradly	Peck	Tipton
Bev	Penningroth	Cedar County
V.	Penrod	Tipton
Orville	Randolph	Bennett
David	Schuett	Farmington Township
Mike	Shockwell	Bennett
Dawn	Smith	Durant
Barbara	Smith	Cedar County
Pamella	Spear	Tipton
Floyd	Taber	Tipton
Laura	Twing	Citizen
Greg	Wagner	Stanwood
John	Walsh	Tipton
Kevin	Wenndt	Clarence
Warren	Wethington	Cedar County
Mark	Wild	Alliance Water
Molly	Williams	Cass Township

Name		Jurisdiction
Mark	Worrell	West Branch
AMEC		
Susan	Belt	AMEC
Laurie	Bestgen	AMEC

Introductions

Mr. Malott, with Cedar County Emergency Management, began the meeting by welcoming and thanking the attendees. He provided a brief history of Hazard Mitigation Planning in Cedar County and stressed the importance of participation for the jurisdictions represented. He then introduced Susan Belt with the consulting firm AMEC Environment & Infrastructure, Inc., the firm contracted to assist in the development of the Cedar County Multi-jurisdictional Hazard Mitigation Plan Update.

Soft Match Time Forms

Ms. Belt informed participants that this plan is being funded by a Hazard Mitigation Grant Program (HMGP) grant from FEMA that is administered by the Iowa Homeland Security and Emergency Management Division. The grant program requires that 25 percent of the funding must be non-federal match. The State of Iowa is contributing 10 percent of the match. The remaining 15 percent of the funding must come from local funds. These local match funds can consist of time that is donated by planning committee members and others in the planning area that contribute to the planning effort. This donated time is referred to as "Soft Match".

The attendees, also referred to as the Hazard Mitigation Planning Committee (HMPC) , were asked to document their time in planning meetings, gathering data, reviewing the draft plan , notifying the public, etc on the Soft Match Time Form. Additionally, time spent by others within the jurisdiction should be recorded as well, such as time spent by a city clerk researching existing plans, studies, reports, and other capabilities or information reviewed or collected by other members of the jurisdiction. **Separate forms must be completed for each individual contributing time to this effort.**

Ms. Belt discussed specific requirements for documentation of hazard mitigation planning activities that occur in conjunction other jurisdictional meetings such as time during a council meeting, a jurisdictional-information session, Lions Club meeting, etc. For hazard mitigation planning activities held in conjunction with larger meetings, facilitators must first close the other meeting, and open a new meeting just for hazard mitigation planning and ensure meeting times documented for soft match are only for the time spent discussing the hazard mitigation plan. For each locally-facilitated mitigation planning meeting, provide the following to AMEC:

1) Agenda,
2) Meeting minutes (including meeting time and duration), and
3) Sign-in sheet of the attendees.

Soft Match Time Forms do not need to be completed for attending any of the three planning meetings facilitated by AMEC. Specific questions on soft match should be directed to Ms. Belt.

A copy of the Soft Match Time Form was handed out at the meeting, and has been provided electronically to all meeting participants with these minutes. Please submit completed soft-match forms to Susan Belt monthly via; mail, fax, or scan and attach to an email. Ms. Belt's contact information is on the form.

Hazard Mitigation Planning Purpose

Ms. Belt presented information on the purpose of Hazard Mitigation Planning and the Disaster Mitigation Act of 2000. The attendees were reminded this is an update of the Cedar County Hazard Mitigation Plan, previously approved in January 2011. The current plan expires in January 2016. A summary of the 6 Presidential Disaster Declarations including Cedar County since 2004 was presented and an overview of the 9 Planning Tasks that will be followed during the planning process was discussed.

Multi-Jurisdictional Approach

Ms. Belt addressed the benefits for jurisdictions participating in this mitigation plan update including improved coordination and communication among local jurisdictions. Impacts of hazards do not stop at jurisdictional boundaries. This multi-jurisdictional approach allows for a more comprehensive risk assessment and resulting mitigation strategy for the entire planning area. The following 14 jurisdictions have been invited to participate as "official participants" in the Cedar County Multi-jurisdictional Hazard Mitigation Plan Update:

Cedar County (unincorporated areas)

Cities
City of Bennett
City of Clarence
City of Durant
City of Lowden
City of Mechanicsville
City of Stanwood
City of Tipton
City of West Branch

School Districts
Bennett School District
Durant School District
North Cedar School District
Tipton School District
West Branch School District

Ms. Laurie Bestgen, AMEC Mitigation Planner, facilitated the remainder of the presentation beginning with describing the federal hazard mitigation assistance funding programs that require an approved hazard mitigation plan. Historically, Cedar County has received nearly $2 million in FEMA Hazard Mitigation Assistance grants from 1994 to 2014.

Ms. Bestgen also described the role of the HMPC. Each jurisdiction participating in development of the plan must meet the following minimum requirements:

1. Designate a representative to serve on the Cedar County HMPC, which will meet **three** times during the planning process,
2. Provide data for and assist in the development of the updated risk assessment that describes how various hazards impact your jurisdiction,
3. Provide data to describe current capabilities,
4. Develop/update mitigation actions (at least one) specific to your jurisdiction,
5. Provide comments on plan drafts as requested,

6. Inform the public, local officials, and other interested parties about the planning process and provide opportunities for them to comment on the plan, and
7. Formally adopt the mitigation plan.

Jurisdictions that choose not to participate in development of a FEMA-approved mitigation plan will not be eligible applicants for FEMA Hazard Mitigation Assistance Grants.

Planning for Public Involvement

The local hazard mitigation plan requirements state that the public needs to have the opportunity to comment on the plan. The public will be given two opportunities to comment on the plan, once during the drafting stage and another when the plan is complete in the final draft stage.

The meeting attendees discussed methods for notifying the public in the plan. The group discussed methods that are used to effectively engage the public in Cedar County. A survey will be created to both provide information about the plan update under development as well as gain input from the public on the hazards they are most concerned about and mitigation strategies that they think will be most effective.

The survey will be placed in hard copy at:

- Public libraries and
- City hall's of participating jurisdictions

Planning committee representatives will ensure blank copies of the survey are made available at these locations (an electronic copy is provided with these minutes). The survey will also be available on SurveyMonkey.com. The survey link will be provided to all planning committee members for distribution. The survey will be available until October 31, 2014. The planning committee was asked for methods that they could use to disseminate the survey link. The following methods of dissemination were mentioned:

- City, county and school websites,
- Email distribution lists,
- City cable channels,
- Community newsletters

Data Collection Process

AMEC provided hard copies of Data Collection Guides and electronic versions with these meeting minutes. The guides are specific for local units of government and schools.

The Data Collection Guide is designed to collect information on existing capabilities within each jurisdiction to implement mitigation initiatives as well as collect information on previous hazard events. For the hazards that were included in the existing 2011 plan, information is especially needed for the events that have occurred from 2011 to the present.

Deadline for submittal of the Data Collection Guides to AMEC is June 27, 2014.

Introduction to Hazard Identification

Ms. Bestgen presented information about the hazard profiles in the plan and introduced the HMPC to the elements of probability, magnitude, warning time, and duration to rank the hazards. The table below provides additional information on the elements and rating levels.

Element/Level	Characteristics
Probability	
4 - Highly Likely	Event is probable within the calendar year. Event has up to 1 in 1 year chance of occurring (1/1=100%) History of events is greater than 33% likely per year. Event is "Highly Likely" to occur
3 – Likely	Event is probable within the next three years. Event has up to 1 in 3 years chance of occurring (1/3=33%) History of events is greater than 20% but less than or equal to 33% likely per year Event is "Likely" to occur
2 – Occasional	Event is probable within the next five years. Event has up to 1 in 5 years chance of occurring (1/5=20%) History of events is greater than 10% but less than or equal to 20% likely per year Event could "Possibly" occur
1 – Unlikely	Event is possible within the next 10 years Event has up to 1 in 10 years chance of occurring (1/10=10%) History of events is less than or equal to 10% likely per year Event is "Unlikely" but is possible of occurring
Magnitude / Severity**	
4 - Catastrophic	Multiple deaths Complete shutdown of facilities for 30 or more days More than 50 percent of property is severely damaged
3 – Critical	Injuries and/or illnesses result in permanent disability Complete shutdown of critical facilities for at least two weeks 25–50 percent of property is severely damaged
2 – Limited	Injuries and/or illnesses do not result in permanent disability Complete shutdown of critical facilities for more than one week 10–25 percent of property is severely damaged
1 – Negligible	Injuries and/or illnesses are treatable with first aid Minor quality of life lost Shutdown of critical facilities and services for 24 hours or less Less than 10 percent of property is severely damaged
Warning Time	
4	Less Than 6 Hours
3	6-12 Hours
2	12-24 Hours
1	24+ Hours
Duration	
4	More Than 1 Week
3	Less Than 1 Week
2	Less Than 1 Day
1	Less Than 6 Hours

These elements are used in the 2013 Iowa State Hazard Mitigation Plan to determine a Final Hazard Assessment Score for each hazard. The score provides a hazard ranking mechanism as well as a planning significance rating, to focus planning efforts on those hazards with the highest scores. Using the ranking described in the table above, the formula used to determine each hazard's score, which includes weighting factors defined by the State of Iowa's Hazard Mitigation Plan is:

(Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10) = Weighted Score

Based on their score, the hazards were separated into three categories of planning significance; High (3.0-4.0), Moderate (2.0-2.9), and Low (1.1-1.9)

Prior to the kick-off meeting Cedar County Emergency Management and AMEC reviewed the hazards in the 2011 Cedar County plan as well as the 2013 Iowa State Hazard Mitigation Plan to determined the list of 16 hazards that have the potential to impact Cedar County that should be included in the Hazard Mitigation Plan. During the kickoff meeting, the ranking elements and rating descriptions were provided as a handout along with the preliminary hazard ranking for the overall planning area of the 16 hazards that will be analyzed in the Cedar County Multi-jurisdictional Hazard Mitigation Plan Update. The preliminary ranking results of the 16 hazards are provided below:

Hazard	Probability	Magnitude	Warning Time	Duration	Weighted Score	Level
River Flood	4	3	1	4	3.25	High
Tornado/Windstorm	4	3	3	1	3.25	High
Severe Winter Storm	4	2	3	3	3.15	High
Hazardous Materials Incident*	4	2	4	1	3.10	High
Transportation Incident	4	2	4	1	3.10	High
Flash Flood	4	2	2	1	2.80	Moderate
Thunderstorm/Lightning/Hail	4	1	3	1	2.65	Moderate
Drought	3	2	1	4	2.50	Moderate
Grass/Wildland Fire	4	1	1	1	2.35	Moderate
Radiological Incident*	1	3	4	4	2.35	Moderate
Terrorism*	1	3	4	1	2.05	Moderate
Extreme Heat	2	2	1	3	1.95	Low
Dam Failure*	1	1	4	1	1.45	Low
Earthquakes	1	1	4	1	1.45	Low
Sinkholes	1	1	4	1	1.45	Low
Expansive Soils	1	1	1	1	1.00	Low
*** = Hazard not included in 2011 plan**						

Ms. Bestgen, presented preliminary research on each hazard of the above hazards. A copy of the presentation was provided to meeting attendees along with these minutes. Several comments were made by planning committee members for various hazards as follows:

- A Commodity Flow Study for 8 counties, including Cedar County, is currently under development. If draft data is available from this study, it will provide useful information for the Hazardous Materials Incident discussion in the Hazard Mitigation Plan
- New reporting requirements will cause the number of Tier II facilities to increase as the quantity of materials in cell towers now meet the requirement for reporting.
- The City of Durant mentioned their issues with stormwater flooding in town during flash flood events. The existing infrastructure is sometimes inadequate to drain the water

away from town, causing the City to become an island. Two intersections repeatedly are inundated. Additional details will be provided in the Data Collection Guide.

- New wildland areas adjacent to the Presidential Library should be discussed in the wildfire hazard section.
- For the Radiological Hazard, the question was raised as to whether or not Cedar County has a radiation reception center plan. AMEC will follow up with the Cedar County Public Health Department to determine the plans in place for a radiological event.
- For the terrorism hazard, the planning committee agreed that cyberterrorism should be discussed as a potential threat in the planning area.
- There are two new dams in Johnson County, Iowa that are upstream of Cedar County. They are federal dams owned by the Natural Resources Conservation Service. These need to be added to the dam failure hazard section.

Next Steps

Attendees were asked to complete their jurisdiction's Data Collection Guide and to talk with other staff that may be knowledgeable about requested data. Attendees were also reminded to keep track of their time spent conducting research and completing their Data Collection Guides on the Soft Match Documentation Sheet handed out at the meeting and provide back on a monthly basis. The Data Collection Guides are due back to AMEC by June 27, 2014.

The next meeting of the Hazard Mitigation Planning Committee will be Thursday, August 7, 2014 from 6:30 to 8:30 P.M. Location details will be provided in advance of the meeting. A draft of the risk assessment will be provided prior to this meeting. The meeting will involve a review of the risk assessment results and update of the plan's goals.

B.6 Kick-Off Meeting Sign-In Sheets

CEDAR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
KICKOFF MEETING—SIGN-IN SHEET

Project:	Cedar County, Iowa Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	May 22, 2014 6:30-8:30 pm
Facilitators:	Susan Belt & Laurie Bestgen, AMEC	**Place/Room:**	Tipton Fire House 301 Lynn St., Tipton, IA 52772

Name	Title	Department/Agency	Email	Phone #	Signature
David Hosier	Assistant Fire Chief	WBFD	dhosier77@gmail.com	319631-0216	[signature]
Kevin Wenndt	Asst Fire Chief	CFD		563-396-9411	[signature]
Mike Anderson	Fire Chief	Bennett Fire Dept		563-890-2382	[signature]
Jeric Armstrong	Mayor of Clarence		jericarmstrong76@hotmail.com	563-357-6207	[signature]
Tim Horihan	Police Chief mechanicsville	mechanicsville pd		3193054334	[signature]
Tim MALOTT	DIRECTOR	Cedar County EMA	ema@cedarcounty.org	563-886-3355	[signature]

CEDAR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
KICKOFF MEETING—SIGN-IN SHEET

Project:	Cedar County, Iowa Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	May 22, 2014 6:30-8:30 pm
Facilitators:	Susan Belt & Laurie Bestgen, AMEC	**Place/Room:**	Tipton Fire House 301 Lynn St., Tipton, IA 52772

Name	Title	Department/Agency	Email	Phone #	Signature
Dwain Ford	Clerk	Cedar Cnty Justice		563-886-2078	[signature]
Floyd Taber	Electric manager	City of Tipton Ele	fTaber@tipton Iowa.org	563886-6188	[signature]
Brian Hudson	Electric	City of Tipton	BHudson@TiptonIowa.org	563886-4905	[signature]
Jon Walsh	Electric	City of Tipton		563-886-4677	[signature]
Steve Nesi	Director Public Wks	City of Tipton	snesi@tiptoniowa.org	563-886-4675	[signature]
Chris Nosbisch	City Manager	City of Tipton	cnosbisch@tiptoniowa.org	563-886-6564	[signature]
Orville Randolph	Mayor	City of Bennett	bennettamb@fbcom.net	563-886-4131	[signature]
Brian Meyer	Police Chief	City of Clarence	clarencepolice@gmail.com	563-452-3494	[signature]
Ken Paul	Fire Dept.	Tipton	none	563-886-6301	[signature]
Dave Larson	Bennett Comm Schs	Bennett	Prin/Supt	563-890-2226	[signature]

CEDAR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
KICKOFF MEETING—SIGN-IN SHEET

Project:	Cedar County, Iowa Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	May 22, 2014 6:30-8:30 pm
Facilitators:	Susan Belt & Laurie Bestgen, AMEC	**Place/Room:**	Tipton Fire House 301 Lynn St., Tipton, IA 52772

Name	Title	Department/Agency	Email	Phone #	Signature
Larry Butler	Mayor	City Mechanicsville		563-432-7754	Larry Butler
Barry Hoffman	Mayor	Lowden		[illegible] 7616	[signature]
Joel Brown	Tipton Trustee	Mechanicsville		563 452 6694	Joel Brown
Dayna Deerberg	BCS	CCDPRC		563-357-2614	[signature]
Brian Brennan	Public Works	City of Tipton		886-4777	Brian Bren
Lynda Coppess	Township Clerk City Clerk	Fremont Township Mechanicsville		432-6693 432-7756	Lynda Coppess
Eldon Ray Downs	Public Works	City of Tipton		319-631-5664	[signature]
Betty Ellerhoff	BOS	Cedar		563 886 3246	Betty Ellerhoff
Greg Wagner	Mayor	Stanwood		319-590-1522	[signature]
Nichole Malott				563-886-2840	Nichole Malott
Laura Twing		public		563 886-3460	[signature]
Kyle Olderog	3-J Assistance	Durant Community	kolderog@gmail.com	563-449-279-	[signature]
Molly Williams	Clerk	Cass Township	mwilliams49@iowatelecom.net	563-886-2483	[signature]
Bob Dohmen	Maint Director	North Cedar School	bdohmen@north-cedar.schools	563886 4135	[signature]
Tawnya Johnson	Electrical Dept City of Tipton	City of Tipton	tjohnson@tiptoniowa.org	563886 4210	[signature]
Jane Caes	Director	Cedar Co Public Health	jcaes@cedarcounty.org	563 886 2226	Jane K Caes
Dawn Smith	Mayor of Durant	City of Durant	dawnrsmith66@gmail.com	563 357-7668	Dawn Smith
Sue Hall	Press		susanhall.writer@gmail.com	563-886-6825	Sue Hall
Tom Spear	Tipton Council		tsp6112@mutelecom.net	563 886 6112	Tom Spear
Steve Agan	Trustee	Cass	steveagan@yahoo	563-886-3525	[signature]
Dick Grimoskas	Supt.	Tipton Schools	dickgrimoskas@tipton.k12.ia.us		Dick Grimoskas
Mike Shotwell	Pub Wks	City of Durant	[illegible] FB.com	563-590-6264	[signature]

CEDAR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
KICKOFF MEETING—SIGN-IN SHEET

Project: Cedar County, Iowa Multi-jurisdictional Hazard Mitigation Plan Update
Meeting Date/Time: May 22, 2014 6:30-8:30 pm
Facilitators: Susan Belt & Laurie Bestgen, AMEC
Place/Room: Tipton Fire House 301 Lynn St., Tipton, IA 52772

Name	Title	Department/Agency	Email	Phone #	Signature
BRADLY PECK	OFFICER	TIPTON POLICE DEPT	bpeck@tiptonpd.org	319-541-2019	[signature]
Brad Gaul	Supervisor	Cedar Co.	bjjgaul33@aol.com	563 357 4770	[signature]
Barb Smith	Assessor's Office	Cedar Co.	barb@cedarcounty.org	563-886-6413	Barb Smith
KIRBY BLAKE	EOC STAFF	CEDAR CO	IACRUISERANNER@Iowatelecom.net	5633491165	[signature]
Betty Lett	Public	Cedar Co.	bettyLett@	563-357-1361	Betty Lett
Sean Paustian	TFD 1st asst.	TFD	paustian51@ [illegible]	515-779-2770	[signature]
Virgil Penrod	City of Tipton	Gas	vpenrod@tiptoniowa.org	5638864272	[signature]
Marcus Larson	GIS	Assessor's	mlarson@cedarcounty.org		[signature]
Jon Bell	Supervisor	Supervisor	jbell@ [illegible]	563-260-2060	[signature]
Bobby Kaufmann	State Rep			260-3355	[signature]
[illegible]	Sheriff	SO	[illegible]	886-2121	[signature]
Roger DeWulf		P. W. Tipton		886-6355	Roger DeWolf
Jerry M. Lande	WBCSD Director of Operations		JLande@westbranch.k12.ia.us	319-330-7084	[signature]
Bev Penningroth		Cedar County	bevpenningroth@cedarcounty.org	886-3168	[signature]
Jeff Kaufmann	Supervisor	Cedar County	Jeffkauf@netwtc.net	732-2902	[signature]
Mark Wild	Local Manager	Alliance Water City of Tipton	mwild@alliancewater.com	886 4878	[signature]
Mark Worrell	Mayor	City of West Branch	mark@westbranchiowa.org	643-2047	[signature]
Randy Burken	Fire Chief	Clarence	cfd133@netins.net	563-357-5719	Randy Burken
Lorna Fletcher	City Clerk	Tipton	lfletcher@tiptoniowa.org	563.886.6187	Lorna Fletcher
David [illegible]	Farmington Twp Clerk	[illegible]		563-210-[illegible]	[signature]
Mike [illegible]		WEST BRANCH	[illegible]	[illegible]	[signature]

B.7 Meeting #2 Agenda

Cedar County
Multi-Jurisdictional Hazard Mitigation Plan Update
Planning Meeting #2

Tuesday, August 5, 2014
6:30 - 8:30 pm

Agenda

Introductions Tim Malott, Coordinator
Cedar County Emergency Management

Brief Review

Public Survey

Participation Requirements/Status

Plan Update Format

Sample Results of Countywide Risk Assessment

Review/Validate Critical Facilities

Update Mitigation Goals

Discuss Mitigation Actions

Next Steps

AMEC Team:
Susan Belt
Project Manager/soft-match documentation
- Work phone (785) 272-6830
- Cell phone (785) 217-7957
- Fax (785) 272-6878
- Email: susan.belt@amec.com

Laurie Bestgen
- Phone (816) 637-6378
- Fax (785) 272-6878
- Email: laurie.bestgen@amec.com

Kari Valentine
- Phone (816) 436-6351
- Email: kari.valentine@amec.com

B.8 Meeting #2 Minutes (8/5/2014)

To	**Cedar County Hazard Mitigation Planning Committee**
Through	**Tim Malott, Coordinator** **Cedar County Emergency Management**
From	**Laurie Bestgen, Mitigation Planner**
Tel / E-mail	**816-637-6378** **laurie.bestgen@amec.com**
Date	**8/19/2014**
Subject	**Minutes from Cedar County Hazard Mitigation Planning Meeting #2 held on 8/5/2014**

This document is a record of attendance and a summary of the issues discussed during the above meeting, including: a brief review of the purpose of a Hazard Mitigation Plan, the public survey for this effort, participation requirements and the status of each jurisdiction, review/validation of critical facilities to include in the risk assessment, plan update format, sample results of the risk assessment-top 5 hazards, update of mitigation goals, introduction to mitigation actions, and the next steps in this process.

Attendees

First	Last	Jurisdiction
Jeric	Armstrong	Clarence
Jon	Bell	Cedar County
Kirby	Blake	Cedar County
Randy	Burken	Clarence
Larry	Butler	Mechanicsville
Jane	Caes	Cedar County
Mike	Cooper	North Cedar Community Schools
Linda	Coppess	Mechanicsville/Fremont Township
Eldon Ray	Downs	Tipton
Brad	Gaul	Cedar County
Dick	Grimoskas	Tipton Community Schools
Barry	Hoffmeier	Lowden
Tim	Horihan	Mechanicsville
Alex	Koch	City of West Branch
Joey M.	Lande	West Branch Community Schools
Marcus	Larson	Cedar County
Tim	Malott	Cedar County
Steve	Nash	Tipton
David	Niermeyer	Springfield Township
Chris	Nobisch	Tipton
Allen	Olderos	Durant
Kyle	Olderos	Durant Community Schools
Andy	Owen	Tipton Community Schools
Orville	Randolph	Bennett
Jeffrey	Renander	Cedar County
Mike	Shotwell	Bennett
Pamella	Spear	Tipton
Melissa	Steffen	Tipton
Greg	Wagner	Stanwood
Warren	Wethington	Cedar County
Mark	Wild	Tipton
Leanne	Zearley	Tipton
AMEC		
Laurie	Bestgen	

Introductions

Mr. Tim Malott, with Cedar County Emergency Management began the meeting by welcoming and thanking the attendees. Mr. Malott also announced that Cedar County had been added just that afternoon to the list of counties eligible for assistance under the FEMA Presidential Declaration for flooding that occurred in June. Laurie Bestgen, with AMEC Environment & Infrastructure, Inc., the firm contracted to assist in the development of the Cedar County multi-jurisdictional hazard mitigation plan update, facilitated the remainder of the presentation.

The PowerPoint presentation utilized during the meeting is available, along with other planning materials at the following location:

https://amec.box.com/s/7qvrihjkhge3vmrqbulw

Purpose/Public Survey/Participation Status

Ms. Bestgen provided a brief summary of the purpose of the Hazard Mitigation Plan and the Disaster Mitigation Act of 2000 that codified the requirement of local governments to adopt a hazard mitigation plan to maintain eligibility for FEMA Hazard Mitigation Assistance Grants. The nine-task planning process was summarized and participants were informed that at the conclusion of the meeting, the planning committee will have completed at least portions of Tasks1-6. Ms. Bestgen also provided a status update and summary of responses to date for the Public Survey that has been disseminated via survey monkey at: https://www.surveymonkey.com/s/cedar-ia. Planning Committee representatives were encouraged to continue to publicize the availability of the surveys and to notify AMEC project staff of these efforts so that they can be described in the planning process section of the plan.

A review of the requirements for jurisdictions to officially participate in the Multi-jurisdictional Hazard Mitigation Plan was provided as well as a table summarizing each jurisdiction's participation to date. Participants were reminded that a planning grant from FEMA through the Iowa Homeland Security and Emergency Management is funding the plan update. The planning grant is 75% federal, 10% state and 15% local funds. The local funds can be provided as soft-match. As a result, it is very important for planning committee members to record all time they spend on the plan update effort. Soft Match documentation forms were provided and participants were reminded to return them to Susan Belt, AMEC Project Manager on a monthly basis.

Validation of Critical Facilities

Hard copy inventories were distributed of critical and essential facilities for incorporated cities and the unincorporated county for validation and/or correction by each jurisdiction. The inventories were assembled from the inventory developed for the 2011 Hazard Mitigation Plan. Planning committee members were instructed to carefully review the lists and make any corrections, deletions, or additions, as necessary and return to Marcus Larson by September 26, 2014.

Plan Format/Sample Results of Countywide Risk Assessment

Ms. Bestgen provided the overall format of the plan update document as follows:

- Executive Summary
- Chapter 1—Planning Process
- Chapter 2—Jurisdiction Profiles
- **Chapter 3—Risk Assessment**
- Chapter 4—Mitigation Strategy
- Chapter 5—Plan Maintenance
- Appendices

A PDF file of the Chapter 3 draft risk assessment has been uploaded to a Box.com account at https://amec.box.com/s/7qvrihjkhge3vmrqbulw. Ms. Bestgen asked that the planning committee, along with other representatives from their jurisdiction, review the risk assessment and provide comments and additional data by September 26, 2014. Jurisdictions were specifically requested to review the hazard ranking tables at the end of each hazard section to review/validate the ranking of each hazard for their jurisdiction. There are several areas in the draft risk assessment that are highlighted in blue, indicating information is needed from jurisdictions. Yellow highlighting in the risk assessment indicates further analysis or research to be completed by AMEC.

Ms. Bestgen provided an overview of the top 5 hazards according to the overall planning area hazard ranking that was discussed at meeting #1. The overview presentation provided just some of the details that are included in the full Draft Risk Assessment. All 16 hazards are included in the Draft Risk Assessment. Specific questions/comments discussed during the presentation of the risk assessment are provided below:

- Tornado—safe room construction was discussed as an effective mitigation action for life-safety.
- Windstorm and Winter Storm—It was discussed that the municipal electric providers might want to consider mitigation actions to harden or bury power lines.
- River Flooding—Effectiveness of previous floodplain acquisitions programs in the county was discussed.
- Hazardous Materials—The committee was reminded that a Commodity Flow Study is under development for the region including Cedar County. The results of this study will provide additional information on the types of hazardous materials that are transported through the county.

Mitigation Goals

Following the discussion of the risk assessment, Ms. Bestgen facilitated a discussion of the mitigation goals. Common categories of mitigation goals were presented as well as the 2013 State Hazard Mitigation Plan goals.

This planning effort is an update to an existing hazard mitigation plan. As a result, the goals from the *2011 Cedar County Multi-jurisdictional Hazard Mitigation Plan* were reviewed. The planning committee made the following changes to the 2011 goals:

Goal 2—the word “property” was added.
Goal 4—the words “and continuity of operations” were added.
Goal 5 was deleted—“Pursue multi-objective opportunities whenever possible”.

The revised goals for this plan update are provided below:

- Goal 1: Protect the Health and Safety of Residents
- Goal 2: Reduce Future Property Losses from Hazard Events
- Goal 3: Increase Public Awareness and Educate on the Vulnerability to Hazards
- Goal 4: Improve Emergency Management and Continuity of Operations Capabilities

Mitigation Actions

The planning committee was provided an introduction regarding the mitigation actions that might be considered for inclusion in the plan and was asked make a note of all mitigation actions that will help reduce/eliminate vulnerability/damages as they review the risk assessment. The final planning meeting, scheduled for November 13, will continue this discussion and focus on update and development of mitigation actions for the plan.

Next Steps

The meeting concluded with a discussion of the remaining steps to complete the planning process as follows:

- Critical Facilities spreadsheet will be emailed if requested
- **9/26**—Critical Facility Validation/Risk Assessment Comments Due
- **11/13**—Final Meeting, Updating/Developing Mitigation Actions
- **12/31**—Mitigation Actions Due
- **January 2015**—Final Draft of Plan Update Document Available to HMPC
- **February 2015**—Final Public Comment Period
- **March 2015**—Submit Plan to IA HS&EM
- **May 2015**—Submit Plan to FEMA
- **July 2015**—Anticipate FEMA’s Approval Pending Adoption
- **July-Dec 2015**—Jurisdictions Adopt Plan

The meeting concluded with a reminder to the planning committee to turn in soft match forms to AMEC at least once a month. With the critical facility lists to review and validate and the risk assessment to review, all participating jurisdictions should be spending time on this effort and need to complete a soft match form to document that time.

B.9 Meeting #2 Sign-In Sheets

CEDAR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
MEETING #2—SIGN-IN SHEET

Project:	Cedar County, Iowa Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	August 5, 2014 6:30-8:30 pm
Facilitator:	Laurie Bestgen, AMEC	**Place/Room:**	Tipton High School 400 E. 6th Street, Tipton, IA

Name	Title	Department/Agency	Email	Phone #	Signature
Jeric Armstrong	Mayor	City of Clarence	jericarmstrong7N@hotmail.com	563-357-6027	
Randy Burkeen	Fire Chief	City of Clarence	cfd133@netins.net	563-357-3557	Randy Burkeen
Marcus Larson	G.I.S	Cedar County	gis@Cedarcounty.org		
JEFF RENANDER	CEDAR COUNTY ATTORNEY	CEDAR COUNTY	attorney@cedarcounty.org	563 886-6646	
Jane Claes	Director	Cedar County Public Health	jclaes@cedar-county.org	563 886 2226	
JON BELL	SUPERVISOR	CEDAR COUNTY	jbell@leeagency.com	563-260-2662	
Melissa Steffen	EMT	Tipton	msteffen@tiptoniowa.org	886-6187	
Mike Cooper	Superintendent	North Cedar CSD	mcooper@north-cedarstu.org	563-5434289	
Chris Nosbisch	City Manager	Tipton	cnosbisch@tiptoniowa.org	563-886-6564	
Mark Wild	Water Operator	Tipton	mwild@alliancewater.com	563 886 4898	
DICK GRIMESTAS	SUPERINTENDENT	Tipton	dickgrimestas@tipton.k12.ia.us	563 886-6121	

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CEDAR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
MEETING #2—SIGN-IN SHEET

Project:	Cedar County, Iowa Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	August 5, 2014 6:30-8:30 pm
Facilitator:	Laurie Bestgen, AMEC	**Place/Room:**	Tipton High School 400 E. 6th Street, Tipton, IA

Name	Title	Department/Agency	Email	Phone #	Signature
Steve NASH	Public Works Director	City of Tipton	snash@tiptoniowa.org	563-886-4775	
Elden Roy Downs	City & Public Works	City of Tipton	cdowns@iowatelecom.net	563 886-6091	
Joey M. Lunde	Director of operation	West Branch Comm. School District	jlunde@westbranch.k12.ia.us	319-330-7084	
Andy Owen	School Employee	Tipton	aowen78@tipton.k12.ia.us	563-886-2034	
Orville Randolph	Mayor	Bennett	bennettcouncil@iowatelecom.net	563 886-4131	
Mike Shotwell	PWD	Bennett	bennettmgmt@iowatelecom.net	563-870-6266	
Kyle Olderog	3rd Assistant [redacted]	Durant Fire	olderogk@gmail.com	563-449-2790	
Allen Olderog	Public Works Supervisor	City Durant	Dpws@mchsi.com	785-6371	
KIRBY BLAKE	EOC STAFF	Emergency Mgmt Cedar Co.	DPSTUFF@aol.com	5633866026	

CEDAR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
MEETING #2—SIGN-IN SHEET

Project:	Cedar County, Iowa Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	August 5, 2014 6:30-8:30 pm
Facilitator:	Laurie Bestgen, AMEC	**Place/Room:**	Tipton High School 400 E. 6th Street, Tipton, IA

Name	Title	Department/Agency	Email	Phone #	Signature
Brad Gaul	Supervisor	Cedar Co.	bjgjal33@aol.com	563 886 6912	[signature]
Greg Wagner	Mayor Stanwood	Cedar Co.	stanwood mayor @gmail.com	319-540-1922	[signature]
Leanne K Searley	Tipton City Council	City of Tipton	lsearley@tiptoniowa.org	563-886-6398	[signature]
Tom Spear	City Council	City of Tipton	twp611@sourcetelecom.net	563-886-6112	[signature]
Linda Coppess	City Clerk	Mechanicsville	mechanicsville@netins.net	563-432-7756	[signature]
Larry Butler	Mayor	Mechanicsville	"	563-432-7756	[signature]
Tim Horihan	Mechanicsville Police Chief	Mechanicsville	mcville police @netins.net	319 981 9604	[signature]
BARRY HOFFMEIER	LOWDEN MAYOR		MAYOR@CITYOFLOWDEN.ORG	563-941-7705	[signature]
David Niermeyer	Clerk Springfield Twp		dhniermeyer@gmail.com	563-941-5849	[signature]
Alex Koch	Police West Branch	West Branch Police Dept.	alex@westbranchiowa.org	319-631-0770	[signature]
Warren Wethington	Sheriff	Cedar County	WmWethington@gmail.com	886-2121	[signature]

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B.10 Meeting #3 Agenda

Cedar County
Multi-Jurisdictional Hazard Mitigation Plan Update
Planning Meeting #3

Thursday, November 13, 2014
6:30 - 8:30 pm

Agenda

- Introductions Tim Malott, Coordinator
  Cedar County Emergency Management
- Review Purpose/Requirements
- Public Survey Results
- Updating the Mitigation Strategy
  - Review Updated Plan Goals
  - Status of Previous Actions
  - Development of New Actions
  - Prioritization of Mitigation Actions
- Hazard Mitigation Assistance Grants
- Plan Maintenance
- Next Steps

Please access meeting materials and draft documents here:

https://amec.box.com/s/7qvrihjkhge3vmrqbulw

B.11 Meeting #3 Minutes (11/13/2014)

To	**Cedar County Hazard Mitigation Planning Committee**
Through	**Tim Malott, Coordinator** **Cedar County Emergency Management**
From	**Laurie Bestgen, Mitigation Planner**
Tel / E-mail	**816-637-6378** laurie.Bestgen@amec.com
Date	**11/19/2014**
Subject	**Minutes from Cedar County Hazard Mitigation Planning Meeting #3 held on 11/13/2014**

This document is a record of attendance and a summary of the issues discussed during the above meeting, including: a brief review of the purpose of a Hazard Mitigation Plan, the public survey results, updating the mitigation strategy, Hazard Mitigation Assistance grants, plan maintenance and the next steps in this process.

Attendees

First	Last	Title	Department	Jurisdiction
Jeric	Armstrong	Mayor	City Administration	Clarence
Jon	Bell	Board Of Supv. Pro Tem	Board of Supervisors	Cedar County
Randy	Burken	Fire Chief	Fire Department	Clarence
Bonnie	Butler	Preparedness Div. Mgr.	Health Department	Cedar County
Deana	Cavin	City Clerk	City Administration	Durant
Mike	Cooper	Superintendent	School Administration	North Cedar Community Schools
Linda	Coppess	City Clerk/Township Clerk	City Administration	Mechanicsville/Fremont Township
Wayne	Deerberg	Board Of Supv. Chair	Board of Supervisors	Cedar County
Ron	Fick	Maintenance Manager	Maintenance	Durant Community Schools
Brad	Gaul	Board Of Supv.	Board of Supervisors	Cedar County
Dick	Grimoskas	Superintendent	School Administration	Tipton Community Schools
Sue	Hall	Reporter	Newspaper	Press
Barry	Hoffmeier	Mayor	City Administration	Lowden
Tim	Horihan	Chief	Police Department	Mechanicsville
Jeff	Kaufmann	Board Of Supv.	Board of Supervisors	Cedar County
Joey M.	Lande	Director of Operations	Operations	West Branch Community Schools
David	Larson	Superintendent	School Administration	Bennett Community Schools
Marcus	Larson	GIS Tech.	GIS Department	Cedar County
Tim	Malott	Coordinator	Emergency Management	Cedar County
Kyle	Olderos	Assistant Chief	Fire Department	Durant
Orville	Randolph	Mayor/EMS Director	City Administration/EMS	Bennett
Sidney	Randolph	Assistant to Mayor	City Administration	Bennett
Brad	Ratliff	Assistant Director	Emergency Management	Cedar County

First	Last	Title	Department	Jurisdiction
Jeffrey	Renander	Attorney Cedar County	Attorney's Office	Cedar County
Tom	Schwartz	Director	N/A	Herbert Hoover Presidential Library
Mike	Shotwell	Director	Public Works	Bennett
Dawn	Smith	Mayor	City Administration	Durant
Kevin	Stoolman	Fire Chief	Fire Department	West Branch
Greg	Wagner	Mayor	City Administration	Stanwood
Mark	Worrell	Mayor	City Administration	West Branch
Josh	Worrell	Assistant Chief	Fire Department	West Branch
Leanne	Zearley	Council member	City Administration	Tipton
AMEC				
Laurie	Bestgen	Mitigation Planner	Homeland Security & Emergency Management	Consultant

Introductions

Tim Malott, Cedar County Emergency Management Coordinator, began the meeting by welcoming and thanking the attendees. Laurie Bestgen, with Amec Foster Wheeler, the firm contracted to assist in the development of the Cedar County multi-jurisdictional hazard mitigation plan update, facilitated the remainder of the presentation.

The PowerPoint presentation utilized during the meeting is available, along with other planning materials at the following location:

https://amec.box.com/s/7qvrihjkhge3vmrqbulw

Review Purpose/Participation Status

Ms. Bestgen provided a brief summary of the purpose of the Hazard Mitigation Plan and the Disaster Mitigation Act of 2000 that codified the requirement of local governments to adopt a hazard mitigation plan to maintain eligibility for FEMA Hazard Mitigation Assistance Grants. The nine-task planning process was summarized and participants were informed that at the conclusion of the meeting, the planning committee will have completed at least portions of Tasks1-6.

A review of the requirements for jurisdictions to officially participate in the Multi-jurisdictional Hazard Mitigation Plan was provided. To date, all jurisdictions have met the meeting participation requirement and have returned completed Data Collection Guides.

Public Survey Results

Ms. Bestgen presented a summary of the public survey results. To date, 98 surveys have been completed. The Hazard Mitigation Planning Committee (HMPC) was informed that the survey monkey at: https://www.surveymonkey.com/s/cedar-ia will be extended and available until December 5, 2014. Ms. Bestgen encouraged the HMPC to share the link with co-workers, family, friends, etc in Cedar County to complete the quick 5 question survey on hazards.

According to the survey responses, of the 16 hazards evaluated, the top three in terms of probability of occurrence were Thunderstorm/Lightning/Hail, Severe Winter Storm, and Tornado/ Windstorm. The top three hazards in terms of potential magnitude were: Tornado/Windstorm, Severe Winter Storm, and Thunderstorm/Lightning/Hail.

The hazard ranking methodology utilized by the Iowa State Hazard Mitigation Plan was applied to the public opinions of probability and magnitude to provide a comparison of the public's opinion to that of the Hazard Mitigation Planning committee. The public was not surveyed about the elements of warning time and duration. Therefore, the HMPC scores for those elements were applied to the public ranking to allow for comparison. The table below provides the comparison.

Public Survey Results			**Planning Committee Results**	
Hazard	**Weighted Score**		**Hazard**	**Weighted Score**
Severe Winter Storm	3.26		Tornado/Windstorm	3.25
Tornado/Windstorm	3.07		River Flood	3.25
Thunderstorm/Lightning/Hail	3.00		Severe Winter Storm	3.15
Transportation Incident	2.70		Hazardous Materials Incident	3.10
Drought	2.65		Transportation Incident	3.10
Hazardous Materials Incident	2.62		Flash Flood	2.80
Extreme Heat	2.56		Thunderstorm/Lightning/Hail	2.65
Flash Flood	2.42		Drought	2.50
Radiological Incident	2.33		Grass/Wildland Fire	2.35
Grass/Wildland Fire	2.13		Radiological Incident	2.35
River Flood	2.10		Terrorism	2.05
Terrorism	2.03		Extreme Heat	1.95
Sinkholes	1.81		Dam Failure	1.45
Earthquakes	1.67		Earthquakes	1.45
Dam Failure	1.65		Sinkholes	1.45
Expansive Soils	1.49		Expansive Soils	1.00

Mitigation Strategy

Ms. Bestgen reviewed the following information related to update of the mitigation strategy:

- Plan Goals
- Previous Actions from 2011 Plan
- Key Issues from Risk Assessment
- State Priorities for Hazard Mitigation Assistance Grants
- Public Opinion from Surveys

Details of this discussion are included in the meeting Presentation.

Previous Actions

Ms. Bestgen provided handouts to each jurisdiction listing all actions submitted in the 2011 Hazard Mitigation Plan. The community school districts were not provided a list because they did not participate in the 2011 plan. As part of the plan update, the status of each of the 187 previous actions must be provided. The following status options should be used in reporting the status of previous actions:

- Completed
- Not Started/Continue in Plan Update
- In Progress/Continue in Plan Update
- Delete

Ms. Bestgen discussed an excel spreadsheet of each jurisdiction's previous actions that was sent out electronically to the HMPC members prior to the meeting. Instructions were also provided via email and in the meeting packet on completing the spreadsheet to capture required information for each action that jurisdictions wish to submit to the plan update. Ms. Bestgen encouraged each jurisdiction to call if they need assistance going over the spreadsheet and instructions.

New Actions

To facilitate discussion and ideas on new actions that jurisdictions may want to submit to the plan update, Ms. Bestgen presented the following: Key issues the top 10 hazards identified in the risk assessment, the list of Iowa priorities for use of Hazard Mitigation Assistance Grants, and the results of the public survey related to mitigation actions. In addition, a link to FEMA's Mitigation Ideas Booklet at http://www.fema.gov/hazard-mitigation-planning-resources was provided to the HMPC. Prior to the meeting, the link had been emailed to the planning committee as well.

Meeting participants were reminded that each jurisdiction must submit at least one action for participation in the plan. Communities participating in the National Flood Insurance Program must also have an action addressing continued compliance.

Ms. Bestgen asked participants to consider, 1) the Draft Risk Assessment provided at meeting two, 2) State priorities, and 3) ideas generated from reviewing examples of mitigation actions that their jurisdiction might consider submitting to the plan.

STAPLEE Worksheet

For each on-going and new action to be included in the plan, the responsible jurisdiction must complete the STAPLEE Worksheet and record the results in column P in the spreadsheet. The STAPLEE worksheet provides a framework to determine the general effectiveness in accomplishing the goals of life safety and/or reduction or prevention of damage from a hazard event. This method analyzes the Social, Technical, Administrative, Political, Legal, Economic and Environmental aspects of a project and is commonly used by public administration officials and planners for making planning decisions.

The due date for completion and return of the spreadsheet with updated status and details for all actions is December 31, 2014.

Hazard Mitigation Assistance Grants

The Hazard Mitigation Plan is a requirement for jurisdictions to be eligible to apply for FEMA's Hazard Mitigation Assistance Grants. Jurisdictions were informed that Iowa's Homeland Security and Emergency Management Division is the State agency responsible for administration of these grants. If they are considering applying for hazard mitigation assistance funding, they were instructed to contact the Deputy State Hazard Mitigation Officer, Dan Schmitz, at 515-725-9369 to obtain additional details regarding the various grant programs, the application process, and current available funds.

THE HMPC was also given a comprehensive list of state and federal grants for mitigation projects. Ms. Bestgen stressed the importance of local hazard problems and the corresponding appropriate mitigation actions to be identified in this plan. In addition, other funding sources use this plan to see identified problems for their grants too.

Plan Maintenance

Ms. Bestgen discussed the requirements for the plan to provide a formal plan maintenance process to ensure that the mitigation plan remains an active and relevant document. After discussion, the following plan maintenance process was agreed to by group consensus:

- The HMPC will meet annually to review the Hazard Mitigation Plan. At the Emergency Management Coordinator's discretion, the HMPC may also meet to review the plan after significant hazard events;
- The Cedar County Emergency Management Coordinator will organize the meetings;
- The Cedar County Emergency Management Coordinator will coordinate the updated/re-submitted to FEMA every 5 years;
- Individual Representatives on the HMPC will ensure their jurisdictions review the Mitigation Plan during the process to update other jurisdictional plans such as Comprehensive Plans, Capital Improvement Plans, and School Emergency Plans;
- After the annual review, the Emergency Management Coordinator will forward the Mitigation Strategy with status updates to mayors, city clerks, and school superintendents for consideration in other planning mechanisms; and
- The public will be involved in the plan maintenance process by publication of a Press Release indicating the team has met with a website where the mitigation actions and status updates can be viewed.

Next Steps

The meeting concluded with a discussion of the remaining steps to complete the planning process as follows:

- December 31, 2014--Action Spreadsheets Due
- January 2015—Final Draft of Plan Update Document Available to HMPC
- February 2015—Final Public Comment Period
- March 2015—Submit Plan to IA HS&EM
- May 2015—Submit Plan to FEMA
- July 2015—Anticipate FEMA's Approval Pending Adoption (preliminary approval)
- August-December 2015—Jurisdictions Adopt Plan

Participants were also reminded that a planning grant from FEMA through the Iowa Homeland Security and Emergency Management is funding the plan update. The planning grant is 75% federal, 10% State, and 15% local funds. The local funds can be provided as soft-match. As a result, it is very important for planning committee members to record all time they spend on the plan update effort. Soft Match documentation forms were provided in the meeting materials handouts and participants were reminded to return them to Susan Belt, AMEC Project Manager on a monthly basis.

B.12 Meeting #3 Sign-In Sheets

CEDAR COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
MEETING #3—SIGN-IN SHEET

Project:	Cedar County, Iowa Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	November 13, 2014 6:30-8:30 pm
Facilitator:	Laurie Bestgen, AMEC	**Place/Room:**	Herbert Hoover Presidential Library and Museum 210 Parkside Drive, West Branch, IA

Name	Title	Department/Agency	Email	Phone #	Signature
Tom Schwartz	Director	Hoover Library - NARA	Thomas.Schwartz@nara.gov	319-643-6029	Thomas J. Schwartz
Sidney Randolph	Assistant to mayor	City of Bennett		563-890-2910	Sidney Randolph
Orville Randolph	Mayor	City of Bennett	bennettemb@fmtcnet.net	563-886-4131	Orville Randolph
Brad Ratliff	Assistant Director	EMA	bratliff@cedarcounty.org	563-886-3355	
Jeff Kaufman	Supervisor	Cedar County	jeffkauf@netwtc.net	563-260-1580	JK
Greg Wagner	Stanwood	Stanwood	StanwoodMayor@gmail	319 540-1922	
BARRY HOFFMEIER	Mayor Lowden MAYOR	CITY OF LOWDEN	MAYOR@CITY OF LOWDEN.ORG	563-941-7705	Barry Hoffmeier
Marcus Larson	G.I.S	Cedar County	gis@cedarcounty.org	563-886-6413	
Dawn Smith	Current Mayor Supervisor elect		dawnrsmith66@gmail	563-357-7068	Dawn Smith
Mark Worrell	Mayor	City West Branch	markw@westbranch.org	3196313243	mlaswee
Dick Gremotas	Supt.	Tipton Schools	dick.gremotas@tipton.k12.ia.us	563-886-6121	Dick Gremotas
Randy Burken	Fire Chief	Clarence Fire	cfd133@netins.net	563-357-5719	Randy Burken
Jeric Armstrong	Mayor	City of Clarence	jericarmstrong70@hotmail.com	563-357-6227	
Bud Coul	Supervisor	Cedar County	bjgjal33@aol.com	5633574770	
WAYNE DEERBERG	BOS	CEDAR COUNTY			
Kevin Stoolman	Fire Chief	West Branch	KLStoolman@live.com	631-3147	
Joey M. Lande	WBCSD Director of Operations	West Branch community school	JLande@westbranch.k12.ia.us	319-330-7084	
Mike Horihan	West Branch Police	Police Dept	mikeh@westbranchiowa.org	3196432222	
Dave Larson	Principal/Superintendent	Bennett CSD	david.larson@bennett.k12.ia.us	563-890-2226	David R. Larson
Mike Cooper	Superintendent	North Cedar CSD	mcooper@north-cedar.org	563-543-4239	Michael Cooper

amec

Cedar County Multi-Jurisdictional Hazard Mitigation Plan Update
Meeting #3—Sign-in Sheet

Project:	Cedar County, Iowa Multi-jurisdictional Hazard Mitigation Plan Update	**Meeting Date/Time:**	November 13, 2014 6:30-8:30 pm
Facilitator:	Laurie Bestgen, AMEC	**Place/Room:**	Herbert Hoover Presidential Library and Museum 210 Parkside Drive, West Branch, IA

Name	Title	Department/Agency	Email	Phone #	Signature
Bonnie Butler	PHEP Division Manager	Cedar County Public Health	bbutler@cedarcounty...	563-886-2226	[signature]
Josh Worrell	Asst Chief	West Branch Fire Dept	jworrell@ci.westbranch.ia.us	319-325-9402	[signature]
Ron Fick Durant School	Maintenance Manager	Durant School		563-785-4432 563-340-6153	Ron Fick
JEFF RENANDER	county attorney	CEDAR COUNTY ATTORNEY'S OFFICE	attorney@cedarcounty.org	563-886-6646	[signature]
Linda Coppess	City Clerk	Mechanicsville	mechanicsville@netins.net	563 432 7756	[signature]
Jeanne K Zearley	Councilperson	City of Tipton	Jzearley@cedarcounty.org Jzearley@tiptoniowa.org	563 886 6378	Jeanne K Zearley
Kyle Olderog	Asst Chief	City of Durant	olderogk@gmail.com	563-449-2790	[signature]
Deana Cavin	City Clerk	City of Durant	dcavin@cityofdurantiowa.com	563-785-4451	Deana Cavin
Mike Shotwell	PWD	City of Bennett	bennettmaint6@FBCom.net	563-890-626	[signature]
SUE Hall	Press				Sue Hall

Jon Bell	Supervisor	County	jbell@leeagencyinc.com	563-886-3217	[signature]

amec

B.13 Public Notice During Drafting Stage—*West Branch Times* Article

WEST BRANCH times
Birthplace of President Herbert Hoover • The Great Humanitarian
Thursday, June 5, 2014
Vol. 138
No. 22
$1.00

Third-grader Ava Finley leads the sack race followed closely by Marisa Herring.
More on Page 10

David Johnson

Johnson wins 'nail-biter' race

By Gregory R. Norfleet
gregory@westbranchtimes.com

West Branch's David Johnson won the Democratic nomination for Iowa House District 73 in Tuesday's primary election.

Johnson won with 51.4 percent of the vote, or 547 votes, over Dennis Boedeker's 48.6 percent, or 517 votes, according to unofficial results released by Cedar, Johnson and Muscatine counties Tuesday night.

"It was a nail-biter," Johnson said. "But it worked out well."

He said he and wife Jennie Embree saw the Johnson County vote totals come in first, where he led 51 percent (290 votes) to 49 percent (279 votes). Muscatine County followed, where Boedeker won by a single vote — 17 (51.5 percent) to 16 votes (48.5 percent).

Then Cedar County came in with Johnson winning with 49.4 percent, or 241 votes, over Boedeker's 45.3 percent, or 221 votes.

Johnson will face incumbent Republican Robert "Bobby" Kaufmann of Wilton in the November general

STATE HOUSE | Page 12

Briefs

Summer meals at Hoover Elementary

West Branch Community Schools will host Summer Food Rocks! at Hoover Elementary School starting June 9 and running through Aug. 8.

The program serves free breakfast from 8 to 8:30 a.m. and free lunch from 11 a.m. to noon on Mondays through Fridays, except for July 4.

The meals are free for all children up to 18 years old, and $3 for adults. Adult supervision is required.

Participants are asked to enter and exit through the all-purpose room.

For more information, contact Food Service Director Chris Wilson at 627-2071.

Survey looks for vulnerabilities

West Branch and other cities are working on an updated joint mitigation plan with Cedar County regarding local hazards, like droughts, extreme heat, flash flooding, grass fires, severe winter storms, sinkholes, tornadoes, terrorism and more.

Residents can find the survey online at www.surveymonkey.com/s/cedar-ia or pick up a paper copy at city halls or public libraries anywhere in the county.

The Cedar County Hazard Mitigation Planning Committee survey became available June 2 and will remain open through Oct. 31.

"The purpose of this outreach effort is to provide information to the public on the plan that is being updated as well as gain public input," Cedar County Emergency Management Coordinator Tim Malott said.

Sparkling on stage
Showing off their choreographed dance moves May 29 are, from left, third-grader Abby Oakes, fourth-grader Maddey Hartz and third-grader Marisa Herring. The trio was among dozens of acts at the annual end-of-year talent show. Gregory R. Norfleet/West Branch Times

Council hears resistance, tables changes to home-biz ordinance

By Rick DeClue
rdeclue75@gmail.com

A proposed change to city code covering the approval of home-based businesses ran into opposition at the West Branch City Council Meeting Monday.

The purpose of the amendment is to allow the Zoning Board of Adjustments to approve special uses in residential neighborhoods under certain conditions. As drafted, the exceptions are supposed to be consistent with the city's Comprehensive Plan, must not be specifically prohibited, and are limited to three years or less.

City resident and attorney Sally Peck opposed the amendment, citing the importance of the existing code in protecting character, use and compatibility in residential neighborhoods. The amendment could represent "a first step on the slippery slope," she said.

The Board could attach any restrictions it felt appropriate. The amendment, which would repeal all parts of the existing code in conflict with the amendment, was recommended by the city's Planning and Zoning Commission as well as the Zoning Board of Adjustments.

Peck said the language in the amendment has a lack of standards for the Board, which could lead to "spot zoning," and possibly expose the city to litigation. She added the proposed change also competes with Main Street West Branch's goal to fill downtown commercial space.

The proposed amendment resulted from a recent inquiry by another city resident, Kate Cox, about purchasing a residential property to be used for business purposes, but not be owner-occupied.

Cox works for an Atlanta law firm in a support position that does not involve any local clients in West Branch. Two other family members also work for the firm.

She currently rents a small space in town. She said the simple reason she was looking at a house was that she was told by her firm that they would not object to having some equity in an Iowa property. One of the employees could reside at the home.

In approaching the city about a house on the market, Cox said there would be no signage, no customers and no excess parking. She felt the structure would remain compatible with the neighborhood.

Cox said she sometimes brings a cat to her current space, and was looking for a kitchen and convenience for her school-age children. Cox said she supports the amendment, but is not really in a hurry.

Board Chairman Craig Walker said the amendment would allow the Board to hear and decide all special exceptions on a case-by-case basis. Allowed business uses defined under the city's zoning, such as day care centers, currently must still be approved as special exceptions.

Walker described allowed uses cited in the code as the "black and white" cases. This amendment would cover "grey areas," such as Cox's.

Council member Tim Shield said the council needs to have a level of trust in the Board members appointed by the council.

City attorney Kevin Olson said the issue reflects the changing nature of work, mostly spurred by technology. He said the Cox request may not be incompatible with the character of a residential neighborhood.

Council member Mary Beth Stevenson was concerned with what she considered the broad language of the amendment. "We may be opening a can of worms," she said.

Stevenson suggested that language is needed specifying guidelines for such things as signage, parking,

BUSINESS | Page 12

Students pitch fine arts to BOE

Ask school board to continue strong support

By Gregory R. Norfleet
gregory@westbranchtimes.com

Several high school students in May called on the West Branch Board of Education to continue its support of fine arts programs.

Armed with a PowerPoint presentation and prepared remarks about their own experiences, the students highlighted how things like band, show choir and theater help promote inclusion, increase learning, reduce bullying and strengthen peer support.

The students approached the podium at the May 12 meeting during open forum, saying first that they wanted to know what it took to get on the agenda. Senior Justin Roth said they had been on the April 14 agenda, but got "bumped," then got on the May agenda and were "removed" again.

Superintendent Kevin Hatfield said that all he knew was that "some students" wanted to make a presentation, but he did not know what topic they wished to discuss.

Roth said the group needed about 15 minutes to present and did not think five minutes during open forum would be enough.

As an apparent sign of support, Board President Kathy Knoop offered that the students "take as long as you need." The students then launched into a presentation that included interacting with the school board and ran about 45 minutes.

Senior Tyler Haub said the wide offerings in fine arts have drawn more students to get involved, especially those who do not get involved in other electives or extra-curricular activities.

"We appreciate your support for the arts," Haub said. "We want you to see how much we've grown. We fear we will not get the needed support and we want to create a stable future for West Branch arts."

Haub said that in addition to reaching more students, there are fewer fights and greater peer support.

"My freshman year I was so scared of seniors … but Mo Vaughan accepted me," he said of the former upperclassman.

Junior Sam McCrory said band draws students to become friends.

"All six of us can attest to the fact that this is a big family," he said.

He listed off other benefits of involvement in high school fine arts, like increased self-confidence, imagination, empathy, concentration, memory, relaxation, self-discipline, trust and physical fitness.

Roth said music teaches a "universal language."

"Any language you speak, you can feel

FINE ARTS | Page 12

B.14 Public Notice During Drafting Stage—*Tipton Conservative* Articles

Hazard Plan, Notifications, Radios Part Of County Emergency Discussions

4/16/14

by Sue Hall

Hazard plans, emergency notification and sheriff's adios were all topics of discussion April 10 as county mergency personnel met in Tipton.

Community fire department representatives, the heriff, city mayors, and county supervisors attended oint meetings of the county Emergency Manage- nent Commission and the county E-911 Service oard. Director Tim Malott and members shared in- ormation and concerns.

Multi-Jurisdictional Hazard Mitigation Plan Update

A county-wide participation in revision of the exist- ng multi-jurisdictional hazard mitigation Plan begins ext month with the first of 3 initial planning sessions cheduled for 6:30 p.m., Thursday, May 22 in the Tip- on fire department facility. Through a bid-letting rocess, AMEC, an out-of-state company, was hired hrough a $54,000 state grant to guide communi- ies through the revision update. The first Plan was pproved in January 2011. The next is due in 2016 nd begins now through June 2015 to allow approval ime so the Plan doesn't lapse after January 2016.

The county must contribute $9,000 in the required 25% "soft match" funding, which amounts to the time ttendees donate working on update information at $27 per hour. Required attendance from participating urisdictions include county government, the cities of Bennett, Clarence, Durant, Lowden, Mechanicsville, Stanwood, Tipton, West Branch, the school districts of Bennett, Durant, North Cedar, Tipton, West Branch, he Hoover Presidential library, and the private Scat- tergood school. Further, the general public must be notified through a combination of public meeting and survey during the drafting and final conclusion of the Plan to elicit their ideas for prevention of di- sasters.

AMEC's representative, Laurie Bestgen, said the mitigation Plan is designed to prevent disaster before one occurs and enables FEMA grant capability for res- toration after a disaster.

Topics addressed will follow the state's "hazard" list of considerations that apply to Cedar county. These include flooding, tornado/windstorm/lightning/ hail, severe winter storms, dam failures outside the county that affect communities in the county, terror- ism, drought, a HAZMAT incident involving toxic spills on site or during transportation, emission of nuclear material, aircraft and crop dusting issues, extreme heat, grass/wild fire, sinkholes, earthquake, and fugi- tive soil. Loss estimates must be calculated for each of these hazards. Identification and inventory of haz- ards/locations must be part of GIS inclusion.

After the kick-off meeting in May, AMEC will meet with participating representatives at a 2nd gen- eral meeting to update risk assessment at 6:30 p.m., Thursday, Aug. 7 possibly in the Tipton high school auditorium. A 3rd general session to review projects that would reduce risk is planned for 6:30 p.m., Thurs- day, Nov. 13 at the West Branch Presidential library auditorium.

Multi-Jurisdictional Hazard Mitigation Plan holds planning meeting May 22

5/14

by Sue Hall

Governmental entities and school districts in Cedar county were represented at the Tipton fire station safe room to begin the 5 year revision of the county multi-jurisdictional hazard mitigation plan process on May 22. There are also stakeholders that are not entities in the plan revision. These include the county business community, state agencies, the Hoover Presidential library, private/nonprofit organizations, and adjacent counties and communities. Their needs will be acknowledged in the plan.

Leading the county through this revision work is AMEC, a consulting firm from Topeka, Kan., paid with a $64,000 grant that Cedar county received from 75% federal money, 10% state money and 15% local soft match funding. The county's share is $9,000, which will come from participation in the work of information gathering. Time spent on the project is calculated at $27.60 per hour per person. Enough people attended the kick-off meeting to reach a third of the soft match at $3,000.

The effort, said AMEC project managers, produces a plan, which is the ticket to FEMA grants for mitigation (sustained action to reduce/eliminate) of potential natural disaster hazard risks. Such risks are evaluated from negligible to catastrophic in their likely or unlikely occurrence and probable severity.

Highest risk for Cedar county are river floods, tornado/windstorms, severe winter storms, a hazardous material spill, and a transportation incident. As climate changes, other risks reaching a higher level might be flash floods, and effects of lightning/hail and drought.

These hazards are costly with losses calculated through insurance payments. Property damage from flash flood has been $23,611 per year between 1996 and 2013, particularly in unincorporated areas. The best mitigation for flood is an ordinance that does not permit new construction in a floodplain. Flood insurance is scheduled to raise sharply in 4 years.

Thunderstorm/lightening/hail insurance payments amount to $1.6 million in damage coverage. Drought costs in insurance payments were $30 million. This data is suspected to be under reported. Hazards and declaration of disasters have increased because there is more population and, thus, more buildings and infrastructure.

The Plan will identify hazards that are a threat, assess their potential impact, and develop action goals and objectives to prioritize mitigation of these hazards. The process is charted on a Calculated Priority Risk Index (CPRI) and is based on probability, magnitude/severity, warning time, and duration.

There are $112 million in hazard mitigation assistance grant programs this fiscal year through the Flood Mitigation Assistance and Pre-Disaster mitigation grant programs. Flood Mitigation Assistance grants are available to eliminate flood damage risk to buildings insured under the National Flood Insurance Program. The intent is to focus on reducing or eliminating claims under NFIP by mitigating repetitive loss properties in buy-outs. Cedar county received nearly $2 million to purchase flood damaged properties and have them removed from the 2008 Cedar river flood.

The Pre-Disaster Mitigation grant program addresses projects prior to a disaster to avoid after-disaster declarations. This is a nationally competitive grant that gives one percent of available funding to each state in a 75%/25% match. The Tipton fire station safe room came out of this grant money.

Communities and schools must provide data collection guide updates to AMEC by June 24. The next large group planning session is scheduled for Aug. 7 with AMEC.

Update Continues on County-Wide Hazard Mitigation Five Year Plan

by Sue Hall

With expiration of the county's first 5 year multi-jurisdictional hazard mitigation plan in January 2016, cities, school districts, and the unincorporated rural areas of the county are involved in a year-long process of updating the new plan that will be in effect until 2020.

The committee leaders are evaluating the status of actions identified in the first Plan and considering what new actions might be implemented to mitigate the effects of future natural disasters. That includes things like dredging natural drainage ditches and creeks to enable flash floods to pass without harm and anchoring chemical tanks to prevent windstorm or tornado effects.

Committee leaders have been told that if a possible natural hazard is not identified and mitigation action steps are not in this FEMA-required Plan, no federal dollars will be available to make improvements. Tim Malott, the county's emergency management association director, said any governmental entity can apply for the $6.5 million in the hazard mitigation assistance grant program from the Iowa Homeland Security Emergency Management Division and Cedar county entities might as well seek this money.

There are 3 kinds of mitigation assistance grants, the public and individual hazard mitigation grant, the pre-disaster mitigation grant, which is nationally competitive, and the flood mitigation assistance grant for those with flood insurance.

Proposed mitigation actions must be focused on protecting health and safety of citizens, protecting assets, providing public educational awareness, and creating continuation of vital governmental services.

During this update process, all previously listed Plan actions require a status update. Either a community, unincorporated area, or school district has completed an action, has not yet started but is retaining the action in the new Plan, or is progressing with an action but continuing it in the new Plan. There is one final status. If a previously listed action is being deleted in the new Plan, a reason why it is no longer applicable needs to be explained. Deleted actions might be, for example, incorporated into a broader new mitigation action strategy.

Besides updates on mitigation actions, the new Plan is an opportunity to add proposed new actions. Town councils, school administration, and county government have until the end of December to complete their action updates and their proposed actions.

The calendar of responsibilities before January 2016 begins with the actions spreadsheet that each entity must score based on a priority scale. That is scheduled for completion by the end of December. In January 2015 the leadership committee will review their full Plan draft. Then they will make it available for public comment in February where it will be located in public libraries and on the county website or through city and school office sites. In March the Plan will be submitted to Iowa Homeland department for review. If all goes well, the Plan will go to FEMA in May with final approval expected in July. Between August and December each of the local entities will adopt the new updated Multi-Jurisdictional Hazard Mitigation Plan before the first one expires in January 2016.

The scoring sheet for each proposed new mitigation action requires response to such factors as whether it's technically feasible and potentially successful, whether it's socially acceptable, if there is legal authority to implement it, if it's economically beneficial, if it impacts the natural environment positively, whether implementing it will save historic structures, whether lives would be saved, and whether its implementation would reduce disaster damages.

The 10 most likely kinds of natural disasters originally identified in the previous Plan will be expanded this time to include non-natural disasters, too, such as train derailments. Even though FEMA mitigation grants don't apply to events that are not the result of natural circumstances such as flood, tornado or wildfire, in this Plan update, the committee is being urged to include them anyway.

The reason for including them in the FEMA Plan is because there are other funding entities that will give favorable consideration to grant requests that have already been vetted and worked through the FEMA mitigation Plan process. These other kinds of funding entities include the US Corps of Engineers, DNR forestry and flood plain management, department of commerce, Iowa dept. of elder affairs, and the Iowa dept. of transportation safety improvement program or rail/highway safety crossing.

When the general public was asked to also identify the 10 most likely disasters, their list was largely similar to the leadership committee's choices. Both included tornado/windstorm, winter storm, and hazardous materials incident as most likely. The public ranked as their highest priority for mitigation the construction of safe rooms.

However, the leadership planning committee ranked river and flash flooding higher than did the public and the prevention of flood plain construction as the top mitigation action. The reason is a matter of perspective. It is a costly process for governmental entities to go through buy-out of flood prone land. For the general public, if their own property is not in flood plain sites, they discount it as a major mitigation concern.

Committee leadership have been informed that their mitigation project grants could receive more favorable response if they match with state mitigation priorities. The state emphasizes flood prone structure acquisition or elevation, flood-proofing historical structures and non-residential structures, creating tornado safe rooms, electrical infrastructure retrofits, soil erosion mitigation, and wildfire mitigation.

The 10 primary disasters and mitigation actions identified in Cedar county include tornado/windstorms mitigated by back-up generators, emergency communication and warning systems, power line retrofits, and safe rooms.

River floods are to be mitigated by ordinances against construction in flood plains, elevating transformers, property acquisitions, stream bank stabilization, and drainage district improvements.

Severe winter storm mitigation actions include shelter for vulnerable people during power outage, continuity of public services during power outages, road closures, snow fence installation and ice removal plans, and survival kit education.

Hazardous materials incidents require a commodity flow study of what is traveling through the county and where. Protection of critical facilities must be planned for those a half mile from a chemical facility such as anhydrous tanks, etc.

Flash flood issues occur from aging storm sewer systems, and flooded roadways and intersections. Would gauges in streams serve an automatic pre-warning system?

Thunderstorm mitigation actions might entail a tree removal program or regular trimming of sound trees to prevent property damage and personal injury.

Drought losses have been identified as $3.3 million. Mitigation actions include new municipal wells, windbreaks and snow fences for crop moisture retention, and ponds and collection tanks for use during critical dry periods as well as the planting of special green cover crop seeds that are "stomped" into soil by grazing animal hooves in order to exchange existing ground cover with plants that preserve soil and require less moisture than traditional grassland.

Wildland fire risks need increase of water storage capacity and management of brush for fuel reduction.

Radiological incidents are a threat because the county is within a 50 mile radius of 2 power plants. I-80 is a route for nuclear waste material. Development of a containment/response action plan for a spill/leak is a primary mitigation action.

The committee leadership was asked to think beyond the Plan's implementation in 2016. For example, representatives of towns, schools, and unincorporated areas will meet annually to review the effectiveness of the in-place new Plan and to provide updates on the status of completing their identified mitigation actions. They will also meet as a group after a hazard event to evaluate response results.

And, finally, the new strategic action Plan will be made available to incorporate into the planning mechanisms entities engage in, such as their comprehensive plan or capital improvement plan or their school emergency/construction plan.

B.15 Plan Summary/Questionnaire for Public Comment during Drafting Stage

Online Survey was available at SurveyMonkey.com and hard copies were also distributed.

Public Survey: Cedar County Multi-jurisdictional Hazard Mitigation Plan

The federal government requires all states and local governments to have hazard mitigation plans approved by FEMA that are consistent with the Disaster Mitigation Act of 2000. This is required to maintain eligibility for certain types of federal Hazard Mitigation Assistance Grants.

A planning committee comprised of representatives from Cedar County, the incorporated cities, and the public school districts is currently developing an update to the comprehensive Cedar County Multi-jurisdictional Hazard Mitigation Plan with a strategy to reduce the vulnerability of people and property in the planning area to the impacts of hazards and to remain eligible for mitigation funding programs from FEMA.

One of the key components of a hazard mitigation plan is public input during the planning process. The planning committee will be evaluating information on the hazards that impact each jurisdiction within Cedar County. The committee is seeking your input on the hazards that will be evaluated as well as your opinions on the types of activities that should be considered to reduce future impacts. Your comments will be considered by your community's representatives on the planning committee as the plan is developed. Please take a few moments to answer the following questions. Thank you for your participation.

1. Please select your jurisdiction from the list. You may only select one jurisdiction for each survey completed. If you belong to more than one jurisdiction in this list, please complete multiple surveys.

- ❑ Unincorporated Cedar County
- ❑ City of Bennett
- ❑ City of Clarence
- ❑ City of Durant
- ❑ City of Lowden
- ❑ City of Mechanicsville
- ❑ City of Stanwood
- ❑ City of Tipton
- ❑ City of West Branch
- ❑ Bennett School District #603
- ❑ Durant School District #1926
- ❑ North Cedar School District #3691
- ❑ Tipton School District #6408
- ❑ West Branch School District #6930

2. The hazards addressed in the Multi-jurisdictional Hazard Mitigation Plan Update are listed below. Please indicate your opinion on the likelihood for each hazard to impact YOUR JURISDICTION (identified above). **Please rate <u>EACH</u> hazard 1 through 4 as follows: 1=Unlikely, 2=Occasional, 3=Likely, 4=Highly Likely**

- ❑ Dam Failure
- ❑ Drought
- ❑ Earthquakes
- ❑ Expansive Soils
- ❑ Extreme Heat
- ❑ Flash Flood
- ❑ Grass/Wildland Fire
- ❑ Hazardous Materials Incident
- ❑ Radiological Incident
- ❑ River Flood
- ❑ Severe Winter Storm
- ❑ Sinkholes
- ❑ Terrorism
- ❑ Thunderstorm/Lightning/Hail
- ❑ Tornado/Windstorm
- ❑ Transportation Incident

Public Survey: Cedar County
Multi-jurisdictional Hazard Mitigation Plan

3. Please indicate your opinion on the potential magnitude of each hazard's impact on YOUR JURISDICTION (identified above). **Please rate EACH hazard 1 through 4 as follows:**
1=Negligible, 2=Limited, 3=Critical, 4=Catastrophic

- ❑ Dam Failure
- ❑ Drought
- ❑ Earthquakes
- ❑ Expansive Soils
- ❑ Extreme Heat
- ❑ Flash Flood
- ❑ Grass/Wildland Fire
- ❑ Hazardous Materials Incident
- ❑ Radiological Incident
- ❑ River Flood
- ❑ Severe Winter Storm
- ❑ Sinkholes
- ❑ Terrorism
- ❑ Thunderstorm/Lightning/Hail
- ❑ Tornado/Windstorm
- ❑ Transportation Incident

4. FEMA Hazard Mitigation Assistance Grants are administered by the Iowa Homeland Security & Emergency Management Division. Listed below are some types of projects considered.
Please check all those that could benefit your jurisdiction, in your opinion:

- ❑ Flood-prone Property Acquisition & Structure Demolition /Relocation
- ❑ Flood-Prone Structure Elevation
- ❑ Dry Floodproofing of Historical Residential Structures and/or Non-residential Structures
- ❑ Minor Localized Flood Reduction Projects (storm water management or localized flood control projects)
- ❑ Structural Retrofitting of Existing Buildings to Add a Tornado Safe Room
- ❑ Non-structural Retrofitting of Existing Buildin and Facilities from wind damage.
- ❑ New Tornado Safe Room Construction
- ❑ Electrical Utilities Infrastructure Retrofit
- ❑ Soil Erosion Stabilization
- ❑ Wildfire Mitigation
- ❑ Other (please specify)

_____

5. Please comment on any other issues that the Cedar County Hazard Mitigation Planning Committee should consider in developing a strategy to reduce future losses caused by hazard events.

Return / Contact Information: Tim Malott, Cedar County Emergency Management Coordinator, (563) 886-3355, fax: (563) 886-3079, 711 E. South St., Tipton, IA 52772.

B.16 Announcement for Final Public Comment Period

Cedar County, Iowa
Multi-jurisdictional Hazard Mitigation Plan

Contact: Tim Malott
563-886-3355

Cedar County Planning Committee Seeks Public Input

Cedar County, IA — The public is encouraged to review and comment on the Cedar County Multi-jurisdictional Hazard Mitigation Plan Update before it is finalized. The plan includes an updated strategy to reduce damage and losses caused by hazard events. The final draft of the plan will be available online and in hard-copy at select public locations in Cedar County from March 2-16, 2015. The purpose is to provide information to the public on the Multi-jurisdictional Hazard Mitigation Plan Update as well as gain public input.

Taxpayers pay billions of dollars each year for disaster recovery. Some events are predictable, and often, damages can be reduced or eliminated. The Federal Disaster Mitigation Act of 2000 requires communities to develop an approved local hazard mitigation plan to remain eligible for certain federal funding.

The Cedar County Emergency Management Coordinator, Tim Malott, invited representatives from County departments, the incorporated cities, and public school districts to work together to develop this plan update. The planning committee addressed 16 hazards—ranging from flooding and tornadoes to hazardous materials and severe winter storms—and considered the impacts of these events on local communities. Based on the results of an updated risk assessment of the hazards, committee members updated the strategies for their jurisdictions to reduce damages caused by the various hazards. The committee consulted with AMEC Foster Wheeler to assist with the plan update and ensure that the final plan meets federal regulations.

The planning committee would like input from the public on the updated strategy to lessen impacts of future disasters on people and property in Cedar County. The Plan will be sent to the Iowa Homeland Security and Emergency Management Division (IA HSEMD) and FEMA after this public comment period. Public comments will be considered by the Hazard Mitigation Planning Committee and incorporated into the plan, as appropriate.

From, March 2-16, 2015, the final draft plan will be available for your review at the following locations:

Online at: https://amec.box.com/s/7qvrihjkhge3vmrqbulw

In hard-copy during normal operating hours at: Public Libraries

The final plan must be approved by the governing body of each participating jurisdiction, IA HSEMD, and FEMA before becoming official.

For more information on this planning effort, or to provide your comments, please contact Cedar County Emergency Management at 563-886-3355 or ema@cedarcounty.org.

APPENDIX C: COMPLETED/DELETED MTIGATION ACTIONS

Table C.1 provides the disposition of actions from the previous Cedar County Hazard Mitigation Plans that the jurisdictions did not to continue forward in the mitigation strategy of this plan update. This includes actions with the following statuses:

- Completed
- Delete

Table C.1. Completed and Deleted Actions from Previous Hazard Mitigation Plans

Action ID	Action Title	2014 Action Status	2014 Action Status Comment	Primary Hazard Addressed	Completion Date	Completed Action Funding Sources	Completed Action Funding Amount
Clarence-10	Participate in the National Flood Insurance Program (NFIP)	Completed	Joined NFIP	River Flood	Not Reported	Not Reported	Not Reported
Clarence-11	Tree City USA	Completed	N/A	Thunderstorm/ Lightning/ Hail	Not Reported	Not Reported	Not Reported
Durant-13	Public Awareness / Education	Completed	We alert the public by joining WENS (Wireless emergency notification system) and posting information at our website, weekly newspaper, and monthly newsletter. We also provide free pamphlets and information on preparedness at city hall-free to anyone.	All	9/16/14	No costs to the city for now	Not Reported
Durant-17	Weather Radios	Completed	We advertised in the monthly newsletter about free weather radios provided by the county if the residents show our EMA director their plans.	All	10/1/2014	No cost	

Action ID	Action Title	2014 Action Status	2014 Action Status Comment	Primary Hazard Addressed	Completion Date	Completed Action Funding Sources	Completed Action Funding Amount
Mechanicsville-06	Hazardous Fuels Reduction	Delete	Not applicable	Grass/ Wildland Fire	Not Reported	Not Reported	
Mechanicsville-14	Stormwater System and Drainage Improvements	Completed	Installed almost 1 mile of new storm sewer pipe.	Flash Flood	2012-2014	Borrowed funds	$ 525,000.00
Mechanicsville-16	Windbreaks / Living Snow Fence	Delete	Not applicable	Drought	Not Reported	Not Reported	Not Reported
Mechanicsville-20	Flood-Prone Property Acquisition	Delete	Not applicable	River Flood	Not Reported	Not Reported	Not Reported

Action ID	Action Title	2014 Action Status	2014 Action Status Comment	Primary Hazard Addressed	Completion Date	Completed Action Funding Sources	Completed Action Funding Amount
Mechanicsville-21	Groundwater / Irrigation / Water Conservation Management Plan and Practices	Completed	Have ordinance that addresses water conservation.	Drought	prior to 2006	Not Reported	Not Reported
Mechanicsville-22	Source Water Contingency Plan	Completed	IRWA completed a source water protection plan	Drought	2013	No direct charge, provided by IRWA from membership dues	Free
Mechanicsville-23	Drainage Districts	Delete	Does not appear to be applicable to city at this time.	River Flood	Not Reported	Not Reported	Not Reported
Mechanicsville-26	Participate in the National Flood Insurance Program (NFIP)	Completed	The city adopted flood plan mgmt ordinance. No buildings in flood plain.	River Flood	2012/2013	No direct charge to city.	Not Reported
Mechanicsville-36	Weather Radios	Completed	N/A	All	2011?	Radios provided by County Emergency Mgmt.	Not Reported
Stanwood-02	Backup Generators	Completed	Have 1 generator	Tornado / Windstorm	Not Reported	Not Reported	Not Reported

Action ID	Action Title	2014 Action Status	2014 Action Status Comment	Primary Hazard Addressed	Completion Date	Completed Action Funding Sources	Completed Action Funding Amount
Stanwood-14	Public Awareness / Education	Completed	Use CodeRed	All	Not Reported	Not Reported	Not Reported
Stanwood-18	Alert / Warning Sirens	Completed	N/A	All	Not Reported	Not Reported	Not Reported
West Branch-05	Stabilize / Anchor Fertilizer, Fuel and Propane Tanks and Secure At-Risk Development	Delete	N/A	Tornado / Windstorm	Not Reported	Not Reported	Not Reported
West Branch-13	Tree City USA	Delete	N/A	Thunderstorm/ Lightning/ Hail	Not Reported	Not Reported	Not Reported
West Branch-17	Warning Systems	Completed	Cable alert in place. WENS added in 2014.	Tornado / Windstorm	3/15/2014	Cable Access Alerts and WENS systems in place.	$1000 annually
West Branch-18	Weather Radios	Completed	Weather radios sold to those in community without one. Radios given to local community partners.	All	8/1/2011	Weather Radios distributed to community partners	$1,000

Source: Mitigation Action Spreadsheets Completed by Each Jurisdiction; N/A= Not Available or Not Applicable

APPENDIX D: ADOPTION RESOLUTIONS

<placeholder for resolutions after FEMA provides approval pending adoption letter>