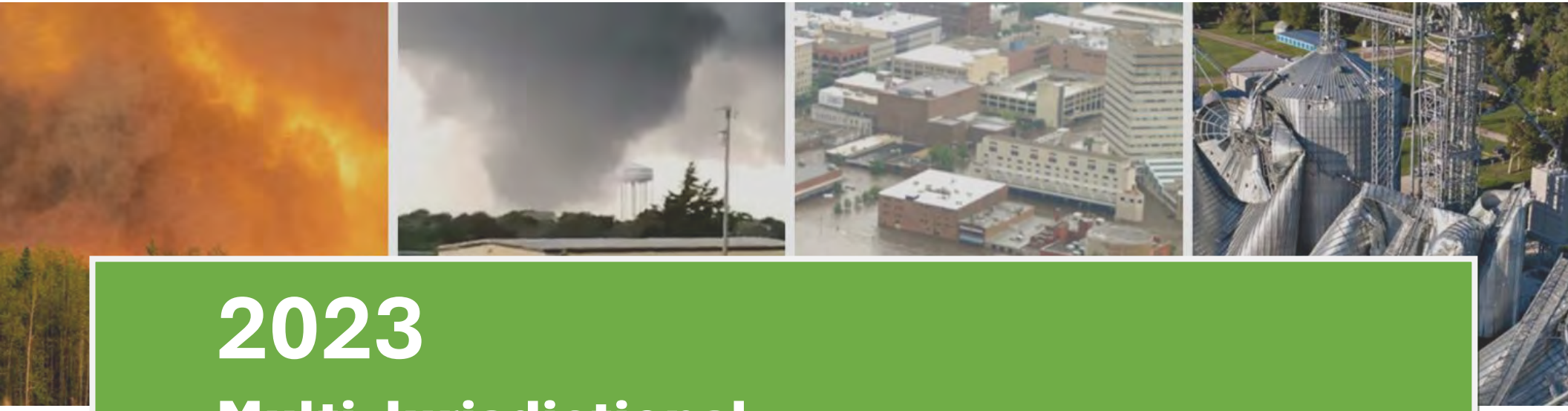

2023
Multi-Jurisdictional
Hazard Mitigation Plan
Grundy County, Iowa

Adopted By: Grundy County, Iowa (01/08/2024)

Including: City of Beaman [01/10/2024], City of Conrad (12/27/2023), City of Dike (01/09/2024), City of Grundy Center (01/08/2024) City of Holland (01/02/2024), City of Morrison (01/08/2024), City of Reinbeck (XX/XX/2024), City of Stout (XX/XX/2023), City of Wellsburg (01/02/2024), Dike – New Harford Community School District (12/20/2023), and Grundy Center Community School District (11/27/2023)

Approved by FEMA: Month, Date, 2024 FEMA Approval Expiration: Month, Date, 2029

Funded by:
Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation Planning Grant,
Iowa Homeland Security and Emergency Management Department (Iowa HSEMD),
& Grundy County of Iowa

Prepared by
INRCOG
Iowa Northland Regional
Council of Governments

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ACKNOWLEDGMENTS

GRUNDY COUNTY HAZARD MITIGATION PLANNING COMMITTEE

Over the course of the planning process, many individuals donated their time and efforts toward providing information, attending meetings, and providing input for the successful completion of the plan. The following is a list of people who participated in the development of this Grundy County Multi-Jurisdictional Hazard Mitigation Plan, in no particular order:

Grundy County	Lucas Halverson, *District 1 Supervisor* Chase Babcock, *Emergency Management Agency Coordinator* Katie Thorton-Long, *Public Health Administrator* Dwight Gliem, *Chief of Grundy Ambulance Service* Gary Mauer, *County Engineer* Rhonda Deters, *County Auditor* Nick Buseman, *Grundy County Conservation*
City of Beaman	Anne Smith, *Mayor* Denise Hoy, *City Clerk*
City of Conrad	Jeff Martin, *Mayor* Lori Stansberry, *City Clerk*
City of Dike	Michael Soppe, *Mayor* Lindsay Nielsen, *City Clerk*
City of Grundy Center	Paul Eberline, *Mayor* Kristy Sawyer, *City Clerk*
City of Holland	Scott Borchardt, *Mayor* Kristy Sawyer, *City Clerk*
City of Morrison	David Hach, *Mayor* Robin Folkerts, *City Clerk*
City of Reinbeck	Ash Larsen, *Mayor* Julie Wilkerson, *City Clerk*
City of Stout	Jim Folkerts, *Mayor* Brooke Spencer, *City Clerk*
City of Wellsburg	Eric Minteer, *Mayor* Heather Beving, *City Clerk*
Grundy Center Community School District	Robert Hughes, *Superintendent* Dan Breyfogle, *K-12 Vice Principal*
Dike – New Hampton School Community District	Justin Stockdale, *Superintendent*

COMMUNITY ORGANIZATIONS AND INRCOG STAFF

Northeast Iowa Area Agency on Aging	Cara Ferch, *Regional Director*
Operation Threshold	Brenda Thompson, *Community Services Manager*
Iowa Northland Regional Council of Governments (INRCOG)	Brian Schoon, *Executive Director* Isaiah Corbin, *Director of Development* Dan Schlichtmann, *GIS Coordinator* Leon Begay, *Community Planner*

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SECTION 1: INTRODUCTION

About

Natural disasters are an ever-present hazard for many communities throughout the world. The Grundy County Multi-Jurisdictional Hazard Mitigation Plan (MJ-HMP) was developed to assist jurisdictions within Grundy County, Iowa in the collaborative effort of developing a strategic action plan to reduce the risk from losses due to natural, man-made, and technological hazards. Hazard mitigation planning involves strategic development which is used at the local, state, and national level. The development of any mitigation strategy involves identifying natural hazards that may impact the area, establishing actions to reduce losses to those hazards, and developing a coordinated process to implement the plan. The planning process documented in this plan was created to meet the requirements in FEMA's 2023 Local Mitigation Policy Guide, Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), and the regulations in 44 CFR § 201.6 Mitigation Planning.

This process summarizes the necessary parts used to develop this strategy on a community wide scale. Those parts included:

1. Evaluating the existing hazard mitigation strategy from previous Grundy County MJ-HMP.
2. Identifying Hazards to Consider in Plan.
3. Identifying vulnerabilities to hazards. Determine hazard losses from potential disasters.
4. Evaluate local capabilities for local government to reduce hazard risk.
5. Develop goals for mitigation and create specific actions/activities/program to meet goals.
6. Organize an updated strategic implementation plan.

This plan is an update to the 2017 Grundy County Multi-Jurisdictional Hazard Mitigation Plan. The planning committee for this plan update was comprised of representatives from each jurisdiction, participating school districts, and multiple county departments. Approval of this plan shall include adopting resolutions by each governing body involved in this plan, approval by Iowa Department of Homeland Security, and an official approval letter by FEMA indicating this plan meets all requirements to apply and receive assistance.

WHAT IS HAZARD MITIGATION?

According to FEMA, hazard mitigation is defined as: "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." Mitigation is any action done to reduce losses and impacts that occur before, during, and after a disaster strikes.

A mitigation action is a measure, project, plan, or activity intended to reduce current and future risks. To begin, an understanding of risk associated with each hazard must be determined. A hazard risk is the potential loss or harm that may occur to a population, the built environment, a community life, or the local economy when a disaster occurs.

Planning for future disasters is a risk-informed approach to emergency management. This means that mitigation actions are determined by assessing risk and vulnerabilities to hazards.

Figure 1: Emergency Management Cycle

Source: FEMA

Purposes of Hazard Mitigation Planning

The following list identifies reasons to conduct hazard mitigation planning:

- To facilitate the protection of the health, safety, and economic security of residents, workers, visitors, and property owners by mitigating the impacts of natural and man-made hazards.
- Influence decision making in both the public and private sectors.
- Fulfill statutory requirements of Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act that a community must have a FEMA-approved hazard mitigation plan in order to be eligible for FEMA project grant funding under programs such as the Flood Mitigation Assistance Grant program (FMA), Hazard Mitigation Grant Program (HMGP), Hazard Mitigation Grant Program Post-Fire (HMGP Post Fire), and Building Resilient Infrastructure and Communities (BRIC) program.
- Fulfill contractual obligations under the Hazard Mitigation Grant Program (HMGP).
- Receive credit under the Community Rating System (CRS).

For this plan, Grundy County's jurisdictions that participated in the process formed their local hazard mitigation plan with assistance from Grundy County EMA and INRCOG. Each participating jurisdiction representative collaborated and participated in a multi-jurisdictional planning process.

A Multi-Jurisdictional Approach

The county's multi-jurisdictional hazard mitigation plan was developed in accordance with FEMA's Local Mitigation Policy Guide. The plan has been developed to meet mitigation planning requirements and federal officials The guide includes requirements comprehensive document that must include required components set by policy and regulations local plans for each jurisdiction are prepared by a planning committee or a plan leader that is responsible for coordinating meetings with the planning committee, collecting information by each jurisdiction to assist in writing their plan, and submitting all the plans together after each jurisdiction has adopted their local plans. Local jurisdictions have the option to participate in a multi-jurisdictional hazard mitigation plan under the Disaster Mitigation Act of 2000 (DMA 2000).

A local government is defined by Title 44 Part 201 Mitigation Planning in the Code of Federal Regulations (CFR) as *"any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity."*

Benefits of Multi-Jurisdictional Mitigation Planning

- Enables comprehensive approaches to mitigation of hazards that affect multiple jurisdictions.
- Imposes external discipline on the process to learn an understanding of natural, technical, and man-made hazards faced by communities.
- Taking an opportunity to create more sustainable and disaster-resistant communities.
- Benefiting from a collaborative intergovernmental effort that qualifies participants for pre-disaster mitigation grants.
- Using limited resources on hazards that have the biggest impacts on a community.
- Reducing or preventing damage to existing structures, subsequently reducing repair costs.
- Identifying vulnerable populations to establish socially equitable outcomes.
- Setting long-term goals that will be compatible with existing community plans such as a comprehensive land use plan.

This is an update to a previous hazard mitigation plan from 2017 for the County. The Plan has been developed to meet the requirements of Title 44 of the Code of Federal Regulation (CFR) for FEMA approval. An approved and adopted mitigation plan qualifies all participating communities for FEMA pre-disaster grant programs that may fund projects for the entire community. Grundy County's Emergency Management Agency (EMA) was awarded a plan development grant and contracted Iowa Northland Regional Council of Government (INRCOG) to assist in the comprehensive planning of this endeavor.

Grundy County's EMA coordinator assembled a planning committee with representatives from each participating community and school district. Participating communities included all nine incorporated communities in the County, Grundy County's Emergency Management Agency, and two public school districts. Unincorporated county areas were represented by the County. Meetings were held every month in Grundy Center from May 2023 to October 2023 and each jurisdiction formed a hazard mitigation plan to reduce their community's risk to hazards.

THE PLANNING PROCESS

Step 1: Assemble a Planning Committee and Update Previous Hazard Mitigation Implementation Strategy

Grundy County's EMA coordinator assembled a planning committee with representatives from each participating community and school district. Participating communities included all nine incorporated communities in the County, Grundy County's Emergency Management Agency, and two public school districts. Unincorporated county areas were represented by the County.

Meetings were held every month in Grundy Center from May 2023 to October 2023 and each jurisdiction formed a hazard mitigation plan to reduce their community's risk to hazards. Public notices were issued and published in local newspapers: Grundy Register or Sun Courier. All meetings were open to the public and community members were welcome to attend, ask questions, and help inform the planning committee in their approach to the development of this plan. Copies of notices are located in Appendix N.

Committee members that participated in the 2017 Grundy County Multi-Jurisdictional Hazard Mitigation Plan updated their implementation strategies by writing the status of each mitigation activity from their existing local hazard mitigation plans (See Appendix M).

Step 2: Identify, Then Assess Hazard and Vulnerabilities

Identify Hazards and Create Hazard Profiles

Through the planning process, the hazards that pose a risk to the entire planning area, as well as unique hazards for each jurisdiction, were reviewed and updated. The committee elected to use the same set of hazards as identified in the 2017 Grundy County MJ-HMP. The hazard in this plan are also included in the lists of hazards from the State of Iowa's 2023 Hazard Mitigation Plan. Hazard profiles are in Section 3 of this plan.

Hazard Assessment

An updated assessment of the hazards was conducted that considered historic occurrence, the number of people that would be or were impacted, the area of the planning area that was or would be affected, potential costs that the planning area, individuals, and organization

Requirement 44 CFR §201.6(c)(1): The plan must include documentation of 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.

have or may incur, the likelihood of future occurrence, and the amount of warning time before an event occur.

An updated composite score for each hazard was developed based on these factors. This process used information from previous and current hazard mitigation plans within the planning area, as well as the State of Iowa's hazard mitigation plan.

Vulnerability Assessment

An updated vulnerability assessment was conducted to identify vulnerable populations, repetitive loss structures, repetitive loss properties, and population located in the identified hazard areas, inventory of existing and proposed buildings, infrastructure, and critical facilities located within identified hazard area boundaries estimate potential losses, and analyze development trends.

INRCOG sent out surveys to community organizations that work with vulnerable communities and have a presence in Grundy County. Two organizations responded and details were shared with committee members on the challenges that vulnerable communities may face and information that may help create more impactful mitigation activities for all people in the community.

Step 3: Establish Goals

The next step involved each committee representative developing and updating goals to that relate to the reduction of hazard risks and losses. Based on their knowledge and familiarity with the issues facing the community, each representative consulted with their local government and local planning committees to determine the goals for their local hazard mitigation plan. Those goals were formed using a problem statement about an issue in their community related to a set of hazard mitigation types or categories. From these problem statements, plan developers consulted with planning committee representatives in formulating their hazard mitigation goals.

Next, participants conducted a capability assessment on their community's abilities to carry out hazard mitigation activities. An inventory of existing policies, practices, programs, regulations, and activities was created in tables. Through this assessment, areas that can be improved upon were identified and used to develop or inform the action items for their mitigation action strategies. Participants were also made aware of the tools they can each use to implement their mitigation strategies. These were categorized by five different mitigation types shown in Chapter 3: Mitigation Strategy.

Early in the planning process meeting attendees identified broad goals that briefly stated what the plan should attempt to accomplish. Every action step should, if implemented, work toward one or more of the goals of the plan. An action step may suggest continuing a current mitigation effort or propose a new project altogether.

Many of the identified action steps were projects that the local jurisdictions could independently accomplish. Other identified projects included efforts that either require the cooperation of two or more jurisdictions or would not include the local jurisdiction at all but designated to a county department. The intention is that each action step is developed so that it can have enough specifics that will create accountability and metrics to determine how to implement supposed action items. To increase the likelihood that the entire planning area implements the plan, each action step identifies the parties that would most likely be responsible for completing an annual review of that step.

During this step, the previous hazard mitigation plan for the planning area was assessed for action items to continue or remove. Reasons are located in each jurisdiction's action plan update in Appendix M.

Step 4: Create or Update the Hazard Mitigation Strategy

Finally, a strategy was developed as a tool for the local government and stakeholders in the implementation and tracking of their action items for the next 5 years. Each action or activity item in the strategy focuses on hazard mitigation and consisted of a time frame, designated agent or leader, estimated cost, any hazards that the activity addresses, primary funding source, and a priority level designated by their local planning committees.

Therefore, the final piece of the plan suggests recommendations to implement the plan, how to keep the public involved, and how to update or make changes to the plan.

When implemented appropriately, mitigation projects can save lives, reduce property damage, be cost-effective, and environmentally sound. This, in turn, can reduce the enormous cost of disasters to property owners and all levels of government. In addition to the approach from this plan, hazard mitigation can protect critical community facilities, ensure equitable outcomes, reduce exposure to liability, and minimize community disruption.

Step 5: Adopt Hazard Mitigation Plan

Each jurisdiction received their local hazard mitigation plans then shared the draft with their local officials, emergency responders, board members, etc. for feedback. All feedback was addressed, incorporated, and a final plan was sent out for a public hearing at a city council meeting. A coordinator from the plan development team (INRCOG or Grundy County) was present during each public hearing and presented the planning process, pointed out any changes from existing hazard mitigation plan (if applicable), and the overall benefits of an approved plan for the community (ie. funding, reduction of risks).

All city councils and/or school district boards voted unanimously to adopt their updated hazard mitigation plan. See Appendix L for signed resolutions.

PLANNING COMMITTEE

Those that participated were administrators or elected officials. County staff included those from the county public health department, engineering department, ambulance services, auditor's office, conservation board and board of supervisors. These participants helped form county-wide input for hazard mitigation in unincorporated county planning areas. The committee members are listed in Table 1.

People that were considered and invited to participate in the planning committee included local officials from all nine incorporated communities throughout the county, department heads from various county departments, and superintendents of all school districts. Invitations were sent out to stakeholders such as major employers in the county, insurance business offices, real estate businesses, and county residents involved in community planning. Each person was invited to attend all committee meetings and participate in the process.

Representatives from the nine incorporated cities of Grundy County included: Beaman, Conrad, Dike, Grundy Center, Holland, Morrison, Reinbeck, Stout, and Wellsburg. Each city had a representative to participate in the planning committee meeting and those participants were either mayors or city clerks. All cities that participated in the 2017 Grundy County MJ-HMP participated in this 2023 plan update. Some of the representatives served as previous committee members that participated in the previous update.

All school districts with areas within Grundy County were invited to participate in the plan development process and serve on the committee. Grundy Center Community School District (GCCSC) and Dike-New Hampton Community School District (DNHCSD) each participated in the planning process by attending meetings and completing necessary data. GCCSD was a previous participant in the 2017 Grundy County MJ-HMP.

Multi-Jurisdictional Planning Participation

Each respective jurisdiction attended planning meetings and completed all necessary information for this hazard mitigation plan. Topics from the information gathering phase of the process included local critical facilities/sites, numbers and equipment used by emergency responders, administrative capabilities, vulnerable populations, shelters, and funding capabilities. Each jurisdiction scored factors that would calculate their community's overall risk to each hazard in their local hazard mitigation plans.

Other stakeholders including organizations and/or individuals were invited to attend committee meetings to be informed about the process and provide an opportunity to join the committee such as:

- Grundy Center School District
- Dike – New Hampton School District
- Grundy Center Ambulance Services

Public Participation

The public was invited to all planning committee meetings with public notices for all committee meetings published in either one of the biweekly newspaper publications (paper and online), within the planning area: *The Grundy Center Register* and *Sun Courier*. This outreach invited neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties and residents of the planning process and to invite all interested parties to attend and contribute to the development of the plan.

INRCOG interviewed two community organizations that work with older adults, low-to-medium income (LMI) households, and children in Grundy County to expand an informed understanding of the needs and barriers for all people in Grundy County during the planning for mitigating disasters. The Iowa Northeast Iowa Agency on Aging serves older adults and focuses on services with advocacy at the regional level. Operation Threshold serves the needs of households or individuals with low or moderate incomes (LMI), children, older adults, and people with physical disabilities. Results from a survey sent to these organizations are in the Appendices.

Public notices and public involvement materials can be found in Appendix N. All public notices for each public hearing held for each jurisdiction's local hazard mitigation plan are found in Appendix N.

Table 1: Grundy County MJ-HMP Planning Committee Members		
Name	**Jurisdiction or Dept.**	**Position**
Anne Smith	Beaman	Mayor
Denise Hoy	Beaman	City Clerk
Jeff Martin	Conrad	Mayor
Lori Stansberry	Conrad	City Clerk
Mike Soppe	Dike	Mayor
Lindsey Nielson	Dike	City Clerk
Paul Eberline	Grundy Center	Mayor
Kristy Sawyer	Grundy Center/Holland	City Clerk
Scott Borchardt	Holland	Mayor
David Hach	Morrison	Mayor
Robin Folkerts	Morrison	City Clerk
Tim Johnson	Reinbeck	Mayor
Julie Wilkerson	Reinbeck	City Clerk
Eric Minteer	Wellsburg	Mayor
Heather Beaving	Wellsburg	City Clerk
Jim Folkerts	Stout	Mayor
Brooke Spencer	Stout	City Clerk
Justin Stockdale	Dike – New Hartford Comm. School District	Superintendent
Robert Hughes	Grundy Center Comm. School District	Superintendent
Dan Breyfogle	Grundy Center Comm. School District	School District Safety and Security Lead, K-12 Vice-Principal
Chase Babcock	Grundy County Emergency Management Agency	Coordinator
Dwight Gliem	Grundy County Ambulance Services	Chief
Katie Thorton-Long	Grundy County Public Health Dept.	Administrator
Gary Mauer	Grundy County Engineering Dept.	County Engineer
Rhonda Deters	Grundy County Auditor's Office	County Auditor
Dave Buseman	Grundy County Conservation Board	Executive Director
Lucas Halverson	Grundy County Board of Supervisors	District 1 Supervisor

INRCOG organized the meetings in conjunction with the Grundy County Emergency Management Coordinator. INRCOG was also responsible for compiling information and writing the final document.

Each participant on the planning committee completed worksheets that would provide the content used to write their local hazard mitigation plan in accordance with requirements for approval by Iowa Department of Homeland Security and FEMA. Changes or updates are documented in the responses by participants located in Appendix N.

COMMITTEE MEETINGS

Six public meetings were held at the Grundy County Public Health Annex building and Kling Memorial Library in Grundy Center on the first Thursday of the month. Each meeting was open to all residents and stakeholders in the planning area, as well as neighboring communities. Attendance for each meeting was documented and can be found in Appendix K. Table 2 provides a list of the public meetings. Public notices were published in two local newspapers for 3 of 6 public committee meetings. Meetings #1 and #6 did not meet the deadline to make the biweekly newspapers for publication.

Requirement 44 CFR §201.6(b)(2): 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 must include 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 nonprofit interests to be involved in the planning process.

Table 2: Summary of All Public Meetings for the 2023 Grundy County M-J HMP

Meeting #	Date	Description of Meeting and Outcomes of Meetings
Meeting 1	Thursday, May 25, 2023	Review the scope of the planning process and schedule meetings for the planning committee. Reviewed and updated community profile data. Completed worksheets to update the status of their actions within the 2017 Local Hazard Mitigation Strategy.
Meeting 2	Thursday, June 29, 2023	Reviewed hazard profiles to be assessed in this planning process for Grundy County's communities. Discussed additional hazards to consider. Completed a hazard assessment using a scoring rubric developed in the plan.
Meeting 3	Thursday, July 27, 2023	Discussed hazard mitigation impacts of climate change trends in Grundy County. Reviewed previous meeting information and worked on completing tasks from previous meetings.
Meeting 4	Wednesday, August 30, 2023	Assessed community vulnerabilities to associated hazards in Grundy County and began a capability assessment for each jurisdiction (city, school district, county)
Meeting 5	Thursday, September 28, 2023	Develop problem statements in the formation of local hazard mitigation goals. Develop mitigation actions for new goals. Prioritized a list of new and existing mitigation actions for the 2023 implementation strategy.
Meeting 6	Thursday, October 26, 2023	Complete all assigned tasks to turn into planning lead coordinators and prepare for adoption at city council meetings.

The newspaper publisher had technical difficulties which did not print meeting #4's public notice. INRCOG and Grundy County followed up with participants absent from any of the meetings for in person or video meetings. Meeting packet material was shared so participants understood how to complete any worksheets given out during committee meetings by INRCOG. Meeting packet material and public notices are in Appendix N.

CURRENT & PREVIOUS PLANNING DOCUMENTS USED

In addition to information obtained through the series of Committee Meetings, INRCOG reviewed existing reports, plans, studies, reports, and historical data. Relevant information and resources were shared with each jurisdiction. These documents and data include:

- Grundy County Emergency Response Plan.
- Grundy County Comprehensive Countywide Emergency Operations Plan.
- 2017 Grundy County Multi-Jurisdictional Hazard Mitigation Plan.
- 2017 Local Hazard Mitigation Plans (incl. in 2017 GC MJ-HMP) for Beaman, Conrad, Dike, Grundy Center, Holland, Morrison, Reinbeck, Stout, and Grundy Center Comm. School District.
- 2023 Iowa Hazard Mitigation Plan.
- Plans, studies, reports, maps, and technical information, including updated Flood Insurance Rate Maps (FIRM) and data.
- Documentation of communities' status in the National Flood Insurance Program (NFIP).
- Repetitive Loss Properties and /or Severe Repetitive Loss Properties information from FEMA.
- 2020 Middle Cedar Watershed Management Plan.
- Grundy County 2019 Housing Needs Assessment.
- 2040 RTA Long Range Transportation Plan.
- 2016-2021 Grundy County Health Department Community Health Needs Assessment and Plan.
- 2018 Iowa Emergency Preparedness and Response Planning Guide for Child Care.
- ISU's Center for Food Security and Public Health 2016 All Hazard Preparedness for Rural Communities Guide.
- FEMA and AARP Guide to Expanding Mitigation for Older Adults.
- 2013 Urban Forestry Management Plan for Grundy Center.
- 2015 Iowa Emergency Management Association Outdoor Warning Siren Best Practices Recommendation.
- Iowa DNR Report on Emerging Threats: Emerald Ash Boror.
- 2017 SAMHSA Disaster Technical Assistance Center Supplemental Research Bulletin Greater Impact: How Disasters Affect People of Low Socioeconomic Status.
- 2005 Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning.
- 2010 Climate Change Impacts on Iowa Report to the Governor and General Assembly.
- 2015 CDC Planning for An Emergency: Strategies for Identifying and Engaging At-Risk Groups.
- 2018 National Climate Assessment

Requirement 44 CFR §201.6(b)(3): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process must include review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

SECTION 2: COUNTY PROFILE

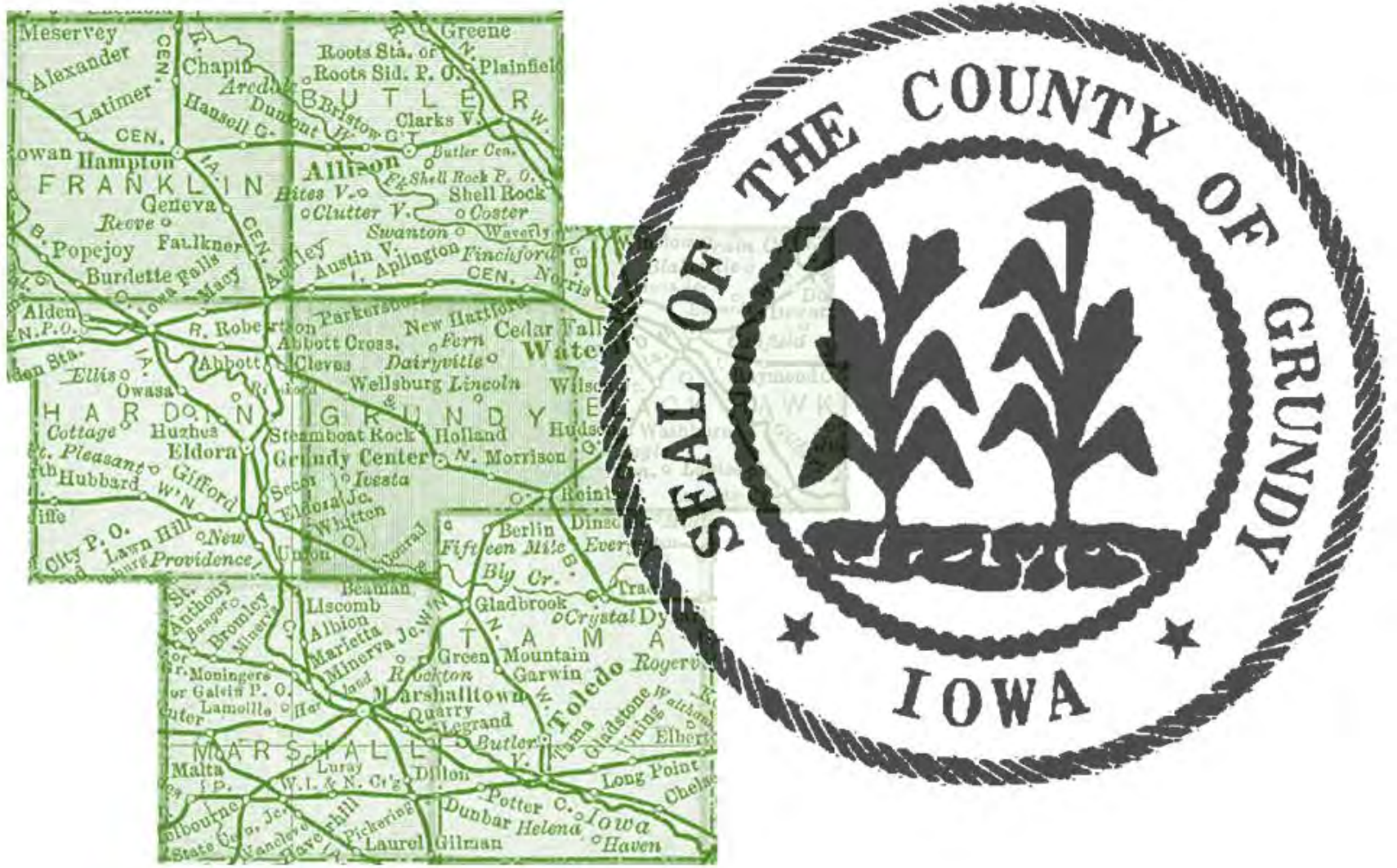
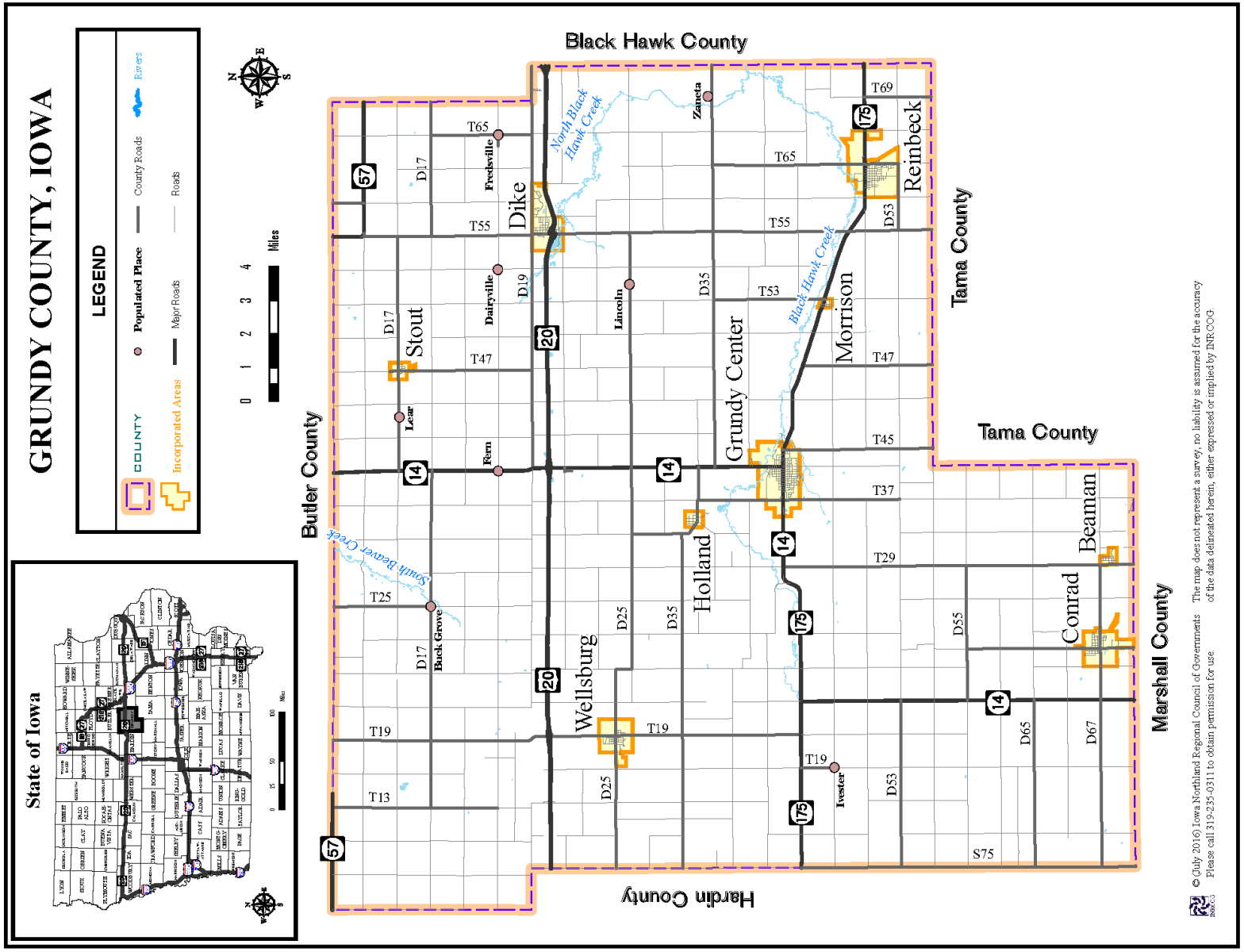


Figure 2: Grundy County Map



LOCATION:

Located in northeast section of Iowa, Grundy County is part of the Corn Belt of the United States and covered with some of the most productive soils in the world for agriculture. Grundy County's sweeping and outstretched landscapes span large swathes of the county. The county includes several incorporated cities: Beaman, Conrad, Dike, Grundy Center, Holland, Morrison, Reinbeck, Stout, and Wellsburg. Grundy County is divided into fourteen townships including: Beaver, Black Hawk, Clay, Colfax, Fairfield, Felix, German, Grant, Lincoln, Melrose, Palermo, Pleasant Valley, Shiloh, and Washington.

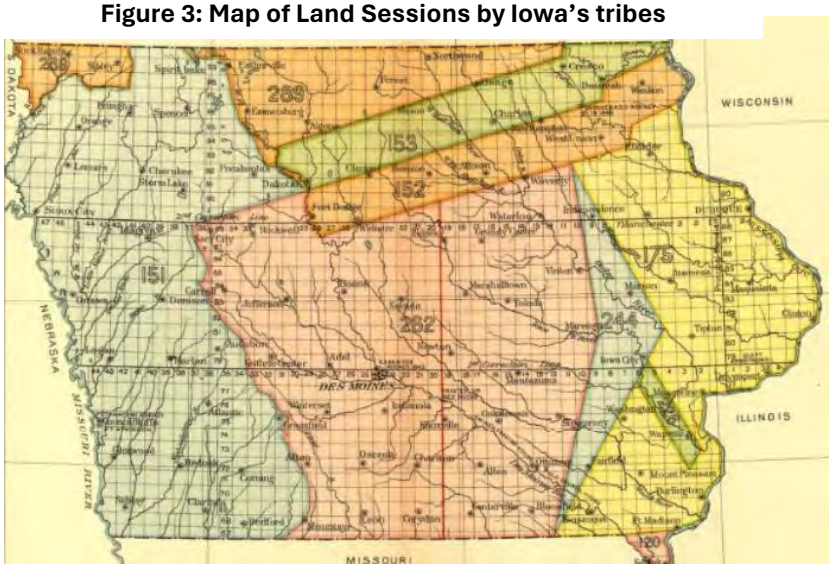
The County encompasses a total area of approximately 503 square miles. The population is the 60th largest in the state with 12,329 residents (2020 Census). The city of Grundy Center is the county seat which is located at the junction of State Highways 14 and 175. Black Hawk County, Butler County, and Hardin County border the east, north, and west boundary, respectively. Both Tama and Benton Counties border the south boundary.

Figure 2 illustrates the location of the city in relation to the county, region, and state.

HISTORY OF GRUNDY COUNTY

Before the arrival of European settlers, Grundy County was a marshy prairie cultivated by the Ioway tribe until a period of emigration of several tribal groups resettled in the area due land acquisitions through land purchases or forced removal due to conflict with white settlers. . This fate of resettlement occurred over the first half of the 19th century from 1832 to 1857 when several tribal groups resettled in and around Grundy County but were all eventually removed to Kansas and Oklahoma. Forcible removal of tribes in the region occurred over the first half of the 19th century by either land acquisitions through sale or

Figure 3: Map of Land Sessions by Iowa's tribes



Source: Library of Congress

treaty negotiations. In 1842, the Sauk and Meskwaki tribes ceded the rest of the lands in Central Iowa (shown in red in Figure 1) with Cession 262 and relocated west. The following year, the state of Iowa was created in Des Moines.

Former Congressman, Statesman, and U.S. Attorney General Felix Grundy of Tennessee (1777-1840)

Grundy County was formed on January 15, 1851 and became self-governing in 1856. The county was named after Felix Grundy of Tennessee, who served as a statesman, U.S. Senator, member of the House of Representatives, and Attorney General under the Polk administration. Grundy Center is the county seat of Grundy County. The city of

Grundy Center was incorporated on April 17, 1877.

The cornerstone for the county courthouse was laid on November 11, 1891. This landmark was listed on the National Register of Historic Places in 1981 as part of the County Courthouses in Iowa Thematic Resource

GOVERNMENT STRUCTURE

Grundy County is governed by a five-member elected body. Each member represents one of the five supervisor districts within Grundy County. See Figure 4 for the updated supervisor district map for Grundy County (2022).

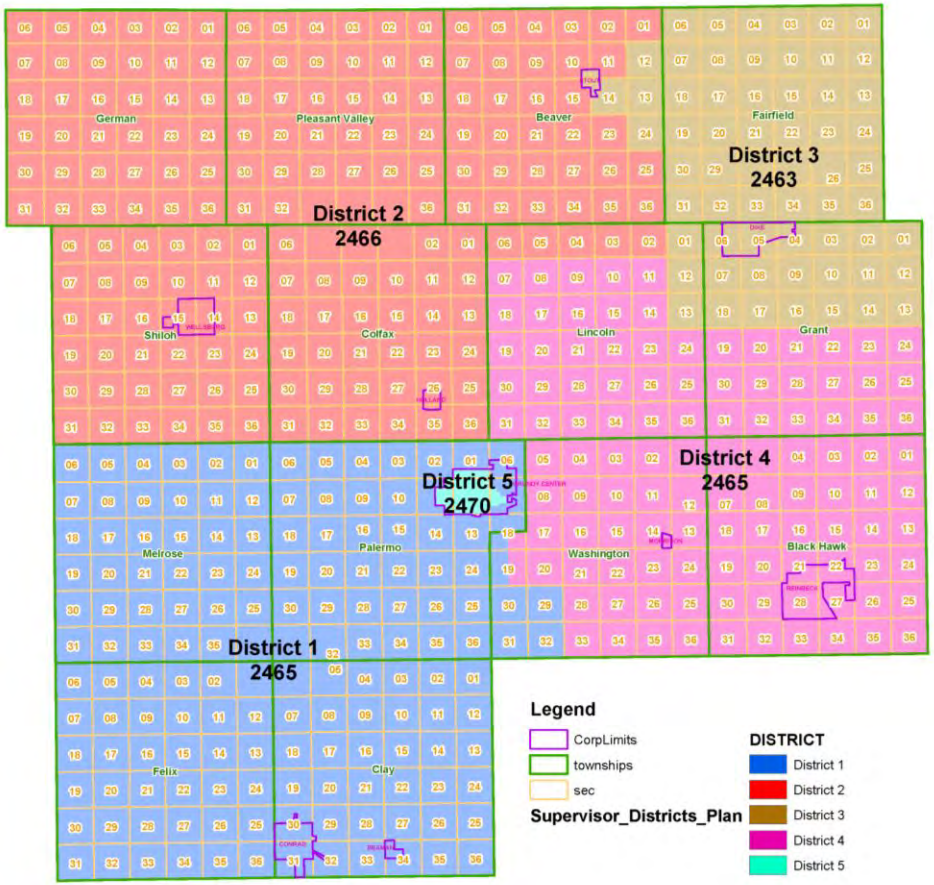
Each of Grundy County's municipalities have a Mayor-Council government structure. Pursuant to Iowa Code 376.2 city council members may serve either 2- or 4- year terms. When city councils are first created these city officials have 2 year terms unless the voters complete a petition and allow the results of an election by local voters, approving the change from 2- to 4- year term. Mayors and city council members are each elected to serve a 2 year term.

By state law, city councils appoint a city clerk to fulfill duties that include publishing meeting minutes, completing budget forms, managing city finances, and responding to resident requests, among other duties. For this plan, city clerks and mayors were involved to provide selected information gathering and gathering input from their respective communities.

NATURAL ENVIRONMENT

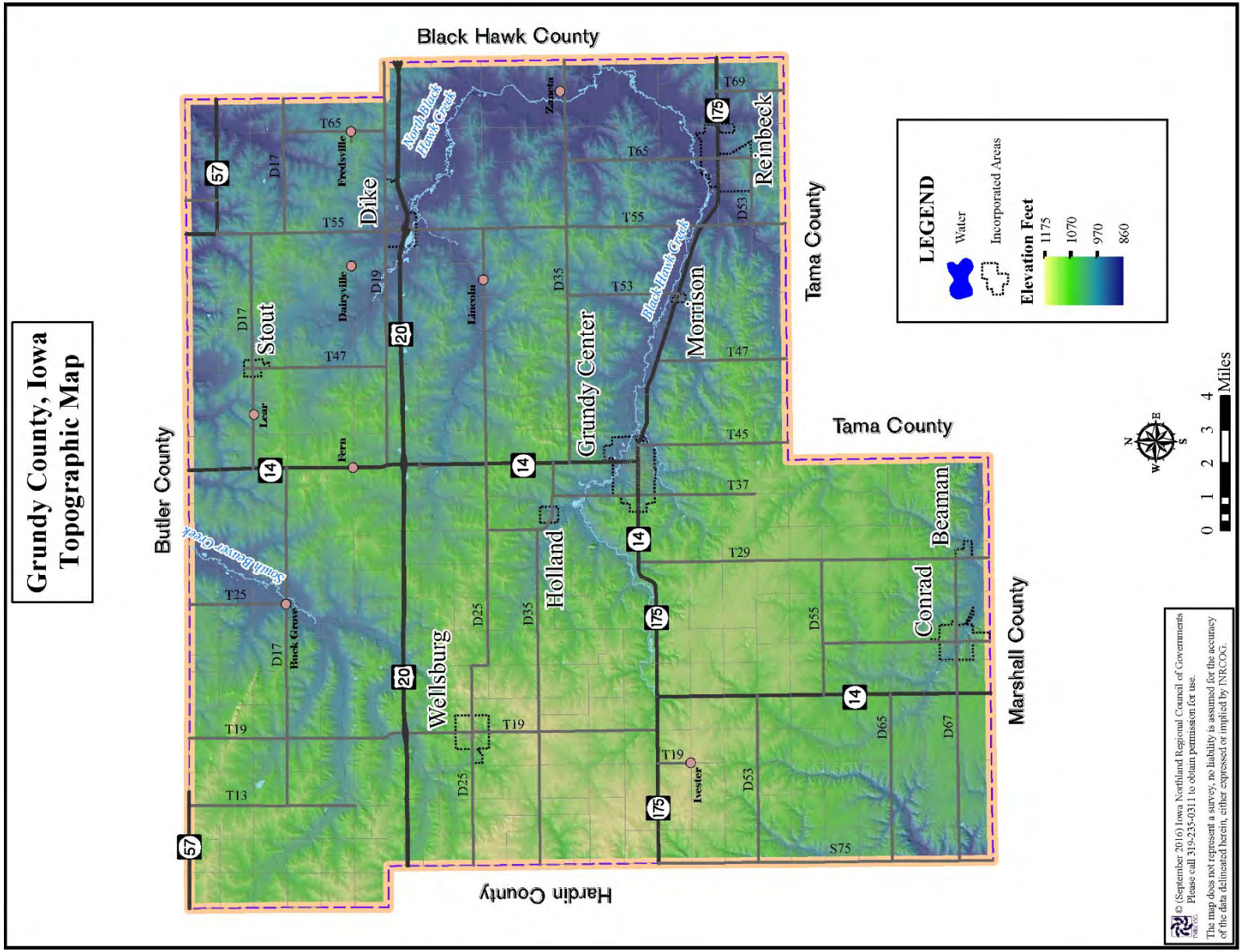
The terrain in Grundy County is generally characterized as a topography which varies from relatively flat to some rolling slopes. This type of typography is ideal for crop production. Agricultural landscapes over the vast croplands of northeast Iowa make up this region. Nearly 75% the land area's terrain has slopes of 5 percent or less. The highest elevation in the county is 1,151 feet above sea level, near the northwest corner of Grundy County. The lowest elevation, 885 feet above the mean sea level, is found in the northwestern corner of the county.

Figure 4: Grundy County Supervisor District Map (2022)



Source: Grundy County Board of Supervisors

Figure 5: Topographic Map of Grundy County, Iowa



Beaver Creek, Black Hawk Creek, and the North Black Hawk Creek are waterways that lie in the Middle Cedar watershed and serve as tributaries to the Cedar River. Beaver Creek runs northward to the northern boundary of Grundy County. Beaver Creek does not run near any county municipalities. Black Hawk Creek flows eastward toward Grundy County's eastern border with Black Hawk County. Black Hawk Creek is a tributary to the Cedar River and flows through or near the cities of Grundy Center, Morrison, and Reinbeck. North Black Hawk Creek flows from Dike into Black Hawk Creek.

SOILS

The planning area is abundantly supplied with a variety of soils. There are seven (7) soil classifications for the planning area according to the United States Department of Agriculture. The soil classification and its description are located below.

1. *Marshan-Coland-Flagler:* Nearly level to moderately sloping, poorly drained and somewhat excessively drained soils that formed in loamy sediment underlain by loamy, sandy, or gravelly alluvial sediment; on stream benches and bottom lands.
2. *Cresco-Kenyon-Clyde*: Nearly level to strongly sloping, moderately well drained and poorly drained soils that formed in loamy sediment and the underlying glacial till; on uplands.
3. *Dickinson-Sparta:* Nearly level to strongly sloping, well drained to excessively drained soils that formed in loamy and sandy material; on uplands.
4. *Dinsdale-Klinger-Maxfield*: Nearly level to moderately sloping, well drained, somewhat poorly drained, and poorly drained soils that formed in loess and the underlying glacial till; on uplands.
5. *Mt. Carroll-Downs-Garwin*: Nearly level to steep, well drained and poorly drained soils that formed in loess; on uplands.
6. *Kenyon-Clyde-Floyd:* Nearly level to stronger sloping, moderately well drained to poorly drained soils that formed in loamy sediment and the underlying glacial till; on uplands.
7. Rockton-Ostrander: Nearly level to moderately sloping, well drained soils that formed in loamy sediment and the underlying glacial till and limestone residuum; on uplands.

CLIMATE

The climate in Grundy County has cold, snowy winters with humid, hot summers. The climate is in the polar front zone which is the battleground of polar and tropical air masses. Grundy County lies in the plains of the upper Midwest far from the moderating influences of a large body of water such as the Great Lakes region. This makes seasonal contrasts quite distinctive and weather highly variable. Ample precipitation throughout the year is increased in the summer by invading maritime tropical air masses from the Gulf of Mexico. Cold winters are dominated by continental polar masses from the Arctic regions.

The annual precipitation average is 33.64 inches. Approximately 73 percent of a year's precipitation falls during the months of April to September. Precipitation can be expected to exceed one-half inch or more 20 days per year, or one-tenth inch or more 56 days a year. Precipitation can occur in amounts of multiple inches within one hour or less during intense rainstorms. These storms, usually associated with extreme humidity, can cause extensive damage to infrastructure. Often, it is the intensity of these rainstorms that are as telling as the frequency or duration. An extremely intense rainfall can render detention basins and small streams useless due to the extreme speed of onset of surface flow.

The annual temperature range is large, typical of a continental climate, with January, the coldest month, averaging 16.4 degrees Fahrenheit. July is the warmest month, averaging 73.4 degrees Fahrenheit.

VEGETATION

The vast majority of rural Grundy County is planted or sowed for corn and soybeans. Grass and brush vegetation are present in uncultivated or undeveloped areas of the county. Trees and grasses are often incorporated with otherwise urbanized areas in the county for aesthetics, shade, or erosion control. According to the U.S. Geological Survey National Land Cover Database of 2016, forestland in Iowa was compared between 2008 and 2016. In Grundy County, forestland grew just slightly with +4.2 acres. The forests of Grundy County have been largely unchanged.

A high percentage of cultivated land produce runoff into waterways and tributaries that feed the Cedar River. There is a lack of active conservation methods being currently implemented. Issues that may evolve from this condition may include unmitigated soil erosion from heavy rainfall events, flash flooding, and high nitrate-nitrogen loading entering Cedar River. This can lead to problems that are discussed later in this plan, including erosion and silting in and around bridges and drainage ditches.

SURFACE WATER SYSTEMS

Three watersheds lie within the county's boundaries. The Middle Cedar watershed covers most of the county. The watersheds are defined below.

1. Middle Cedar Watershed – The majority of Grundy County is covered by the Middle Cedar Watershed
2. Upper Iowa Watershed – The Upper Iowa Watershed covers the southwestern edge of Grundy County.
3. Middle Iowa Watershed – A very small portion of southwest Grundy County is covered by the Middle Iowa Watershed.

The Middle Cedar Watershed Management Authority (MCWMA) is one of eight watersheds in Iowa that have voluntarily formed to assess the conditions of the watershed to identify issues, goals, and objectives for stakeholders in the watershed region.

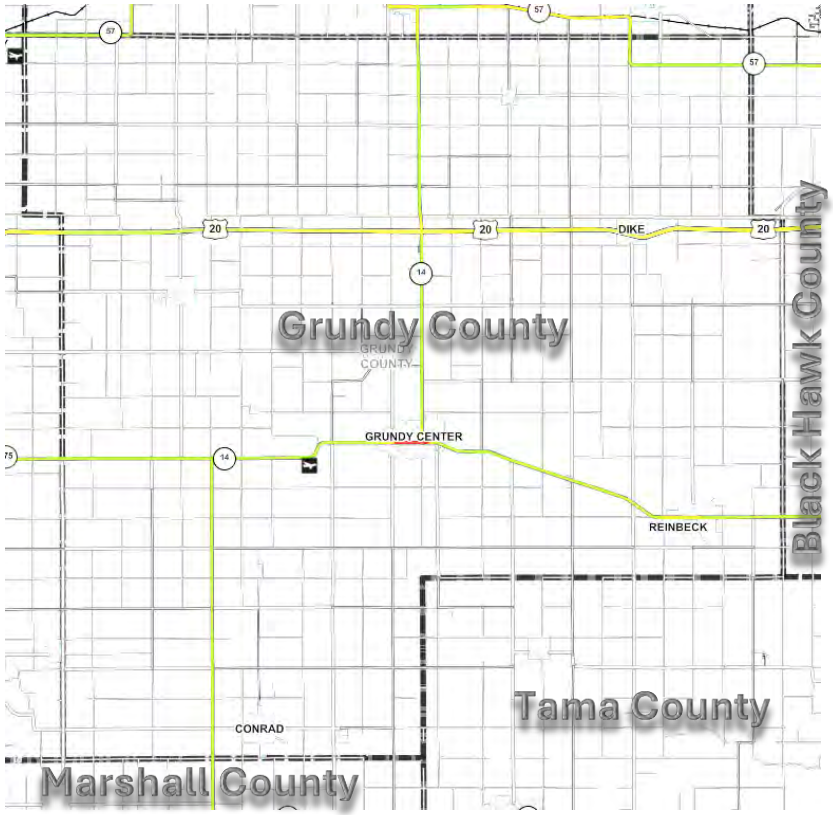
INFRASTRUCTURE

TRANSPORTATION SYSTEMS

Grundy County's transportation network is mainly these roadway types: concrete highways, gravel roads, and blacktop roads. Access to bike and pedestrian trails for transportation is becoming more prevalent in the planning area. Additionally, efforts are being made to plan and extend recreational trails throughout the area.

U.S. Highway 20 crosses the northern portion of the county and serves as a major route for truck and commuter traffic. State Highways present in Grundy County include State Highways 14, 57, and 175. In addition to the State Highway systems, the Secondary Road Department oversees the construction and maintenance of all county roadways and bridges. This does not include roads on the State system such as IA14, IA175, and 4-lane US Hwy 20. Grundy County roads include 195 miles paved, 650 miles granular surfaced, and 15 miles of dirt roadway. There are a total of 223 bridges over 20 ft. in length and 110 bridges less than 20 ft. in length within the county that are inspected and maintained. All bridges are inspected every 2 years.

Figure 6: Pavement Condition Index (PCI) Map of Grundy County



Source: Iowa DOT

2018 Pavement Condition Map – International Roughness Index
Good – Green Color
Fair – Yellow Color
Poor – Red Color

Air travel is an important form of transportation. The Grundy Center Municipal Airport is the only airport available in the county. The airport provides service to private aircraft only.

There are no operating rail roads in Grundy County.

OnBoard public transit is a service provided by the Iowa Northland Regional Transit Commission (INRTC) which coordinates all transportation in the planning region including Grundy County. OnBoard serves the general public. Paratransit vehicles operate in the INRTA fleet for those that need mobile accommodations. Services with OnBoard are dependent on available seats and service timing considerations with drivers.

POTABLE WATER SYSTEMS

The Central Iowa Water Association services rural water in Grundy County. Water service in the planning area is typically provided by private, individual, or common wells. The wells tap rechargeable groundwater aquifers for water. The Iowa Source Water Protection Program documents risks to the potable water for the city of Stout and Reinbeck. Both these wells draw from the Devonian aquifer.

In the City of Stout, there are two documented private wells. An abandoned private well (#26656) is at the northeast corner of 1st Street and Front Street. This is located directly across Front Street from a Tier II chemical storage facility owned by Innovative Agricultural Services. Stout is in a 2-year capture zone with a risk score of 6.

The City of Reinbeck has five private wells: two are active source water wells and three are plugged or unused wells. In 2006, there was a transformer spill documented by Alliant Energy in the 2-year capture zone with a risk score of 5.

In terms of need, the county does not foresee the need for a common or public water system. However, the county does want to protect the groundwater from depletion or contamination to maintain its supply of potable water.

Large rural water mains and storage facilities could supply water for purposes of firefighting. A 6-in water line is needed to supply effective

pressure for firefighting purposes. Smaller lines could serve as potential fill locations for tanker trucks. Further information for each community system can be found in the Appendices.

WASTEWATER TREATMENT FACILITY AND COLLECTION SYSTEM

The primary means of disposing of sewage in the county is by individual, on-site septic systems. These on-site systems include tanks and septic fields for the disposal of household sewage. The County does not envision the need for a common public sewage system. The County, however, does regulate on-site systems through ordinances, inspections, and the Board of Health. City-specific information for each municipal sewer system can be found in the Appendices.

STORM WATER SYSTEMS

There are no established stormwater systems in the planning area.

OTHER UTILITIES

The planning area is serviced by numerous utilities. Table 3 lists the utility providers for each jurisdiction.

Table 3: Primary Providers for Community Utilities

Jurisdiction	Electric	Natural Gas	Telephone/Internet	Cable TV	Water	Sewer	Contracted Sanitation
Beaman	Alliant Energy	Alliant Energy	Heart of Iowa, Mediacom	Heart of Iowa, Mediacom	Central Iowa Rural Water	City of Beaman	Molar Sanitation, Ferch
Conrad	Alliant Energy	Alliant Energy	Heart of Iowa	Heart of Iowa	Central Iowa Water Association, Marshalltown Water Works	City of Conrad	Molar Sanitation
Dike	City of Dike, Grundy County Rural Electric Cooperative	Black Hills Energy	Centurylink, Mediacom, Rise Broadband	Mediacom	Iowa Rural Utility Association	City of Dike	Cooley Sanitation
Grundy Center	Grundy Center Municipal Utility	Black Hills Energy	Grundy Center Municipal Utility	Grundy Center Municipal Utility	City of Grundy Center & Iowa Rural Utility Association	City of Grundy Center	Rite Environmental
Holland	Alliant Energy	Alliant Energy	Windstream, Tyson Communications	Windstream, Tyson Communications	Iowa Rural Utility Association	City of Holland	Blythe Sanitation
Morrison	Alliant Energy	N/A	Tyson Communications	N/A	Iowa Rural Utility Association	Iowa Rural Utility Association	Cooley Sanitation
Reinbeck	Alliant Energy	Alliant Energy	Reinbeck Telecommunications Utility, Mediacom, Windstream	Direct TV, Dish Network, Windstream, Mediacom	City of Reinbeck	City of Reinbeck	Cooley Sanitation
Wellsburg	Alliant Energy	Alliant Energy	Windstream, Tyson Communications	N/A	City of Wellsburg	City of Wellsburg	Blythe Sanitation
Stout	Mid-American Energy	N/A	Century Link, Unggoy Broadbad, Rise	N/A	Iowa Rural Utility Association	Iowa Rural Utility Association	Cooley Sanitation
Grundy Center Community School District	Grundy Center Municipal Utilities	Black Hills Energy	Grundy Center Municipal Utilities	Grundy Cetner Municipal Utility	City of Grundy Center & Iowa Rural Utility Association	Grundy Center Municipal Utilities	Rite Environmental
Dike-New Hartford Community School District	City of Dike	Mid-American Energy	Centurylink, Mediacom, Rise Broadband	N/A	City of Dike	City of Dike	Cooley Sanitation
Grundy County (unincorporated)	Alliant Energy/ Grundy County REC/ Grundy Center Municipal Utilities/ Mid-American Energy	Alliant Energy/ Black Hills Energy/ Heartland Co-op	CenturyLink/ Mediacom/ Rise Broadband/ Grundy Center Municipal Utilities/ T&T communications/ Windstream	Windstream/ Mediacom/ Grundy Center Utilities	Iowa Regional Utilities Association/ Private Wells	Individual Septic	Grundy County Landfill/ private contracted companies

DEMOGRAPHICS

POPULATION

The change in population over the last 20 years is shown in Table 4. Grundy County lost 1% of its population in the last decade. The state of Iowa grew by 4.7% over the same period.

A comparison of the cities in the county is shown in Table 4. Based on changes in the number of people, the cities of Dike and Grundy Center saw the greatest growth in population with 95 and 90 people moving to those cities over the last decade, respectively. Beaman lost the most in terms of population by the number of people and by change in percentage.

Grundy County's unincorporated area decreased by 233 persons or 5.5% in population percentage. In Table 5, the historical trends of population for the entire county have shown a slow decline in the rate of growth in population in 1980.

However, according to population projections from Woods & Poole Economics which considers overall natural replacement rates and regional trends, Grundy County will see a 4.6% gain in the next 10 years and 4.5% gain in the next 20 years.

Table 4: Population Trends for Selected Communities and Population Projections for Grundy County, Iowa

Community	2000 Pop.	2010 Pop.	2020 Pop.	Change in 2010-2020	
				# Persons	%
City of Beaman	210	191	161	-30	-15.7%
City of Conrad	1,055	1,108	1,093	-15	-1.4%
City of Dike	944	1,209	1,304	95	7.9%
City of Grundy Center	2,596	2,706	2,796	90	3.3%
City of Holland	250	282	269	-13	-4.6%
City of Morrison	97	94	98	4	4.3%
City of Reinbeck	1,751	1,664	1,662	-2	-0.1%
City of Stout	217	224	191	-33	-14.7%
City of Wellsburg	716	707	720	13	1.8%
Grundy County (Unincorporated Area)	4,533	4,268	4,035	-233	-5.5%
Grundy County(total)	12,369	12,453	12,329	-124	-1.0%
State of Iowa	2,926,324	3,046,355	3,190,372	144,017	4.7%

Source: U.S. Census Bureau and Iowa Data Center

Population Projections for Grundy County, IA

Year	Grundy County	Percent Change
2030	13,395	+4.60%
2040	13,993	+4.50%

Source: U.S. Census Bureau, Iowa Data Center, and Woods & Poole Economics

Table 5: Total Housing Units in Selected Communities			
Community	**2000**	**2010**	**2020**
City of Beaman	88	85	70
City of Conrad	483	507	530
City of Dike	393	497	521
City of Grundy Center	1,176	1,256	1,088
City of Holland	109	113	121
City of Morrison	47	40	61
City of Reinbeck	769	802	754
City of Stout	77	84	79
City of Wellsburg	363	367	364
Grundy County (Uninc. Area)	1,799	1,779	1,576
Grundy County(total)	5,304	5,530	5,164
State of Iowa	1,232,511	1,336,417	1,273,941
Source: U.S. Census Bureau & American Community Survey			

Table 6: Historic Population Changes for Grundy County		
Year	**Population**	**Change**
1950	13,722	-
1960	14,132	2.99%
1970	14,119	-0.09%
1980	14,366	1.75%
1990	12,029	-16.27%
2000	12,369	2.83%
2010	12,453	0.68%
2020	12,329	-1.00%
Source: U.S. Census Bureau and Iowa Data Center		

Table 7: County and State Data (2020)				
	Grundy County		**Iowa**	
Population Characteristics, 2020	**Count**	**%**	**Count**	**%**
TOTAL POPULATION	12,329	100%	3,190,369	100%
Male	6,044	49%	1,586,092	50%
Female	6,285	51%	1,604,277	50%
Children and Teens (<15 years)	2,428	20%	613,567	19%
65 years and over	1,449	23%	313,898	20%
MEDIAN AGE BY SEX	42.3	-	38.6	-
RACE				
White Population	11,836	96%	2,694,521	85%
Non-White Population or 2 or more races	493	4%	495,848	16%
Economic Characteristics, 2020	**Count**	**%**	**Count**	**%**
Median HH income (dollars)	$71,760	-	$61,836	-
Unemployment Rate	-	2.40%	-	3.90%
Total households	5,164	100%	1,273,941	100%
With earnings	3,968	77%	1,000,684	79%
With Social Security	1,769	34%	400,180	31%
With retirement income	1,028	20%	255,114	20%
With Food Stamp/SNAP benefits	294	6%	124,971	10%
Civilian labor force	6,387	100%	1,677,262	100%
Has mobile vehicle to travel to work	5,095	80%	1,270,600	76%
Walked to Work	147	2%	49,204	3%
Worked from home	582	9%	101,440	6%
Source: U.S. Census Bureau & American Community Survey				

Half of Grundy County's cities and the unincorporated county areas lost population over the last decade from 2010 to 2020. Four cities saw growth which included Wellsburg, Grundy Center Morrison, and Dike. See Figure 8 for growth and decline data from 2010 to 2020. Figure 9 shows an overall rate of change for all cities outside of metropolitan areas in Iowa. For cities less than 500 people, those areas averaged an 8% loss in population. For cities greater than 500 and less than 2,500 in population, the decrease in population hovered above a 2% loss.

VULNERABLE POPULATIONS

According to the 2020 Census, Grundy County's population was 12,329. Children and teens less than 15 years old made up 20% of the population. The elderly population aged 65 years old and over made up 22% of the 2020 population. The county's racial make-up was homogenous with 96% White and 4% non-White or two or more races.

The median household income is $71,760, which is higher than the state's median average of $61,836. The unemployment rate is less than the state of Iowa's rate by 1.5 percentage points. Nearly a third of households have Social Security income and 20% of households have retirement income. About 6% of households have SNAP benefits adding to the state's threshold of 10% of the state's population on SNAP.

Surveys were sent out to community organizations that work with vulnerable populations in Grundy County. Two were returned by Operation Threshold and the Northeast Iowa Area Agency on Aging. The surveys asked questions about how people that these organizations serve may be receiving emergency information such as alerts and preparedness of hazards.

Operation Threshold

Operation Threshold provides social services to the people of Black Hawk County and Grundy County. Housing, crisis and energy

Figure 8: Change of Population in Grundy County 2010-2020

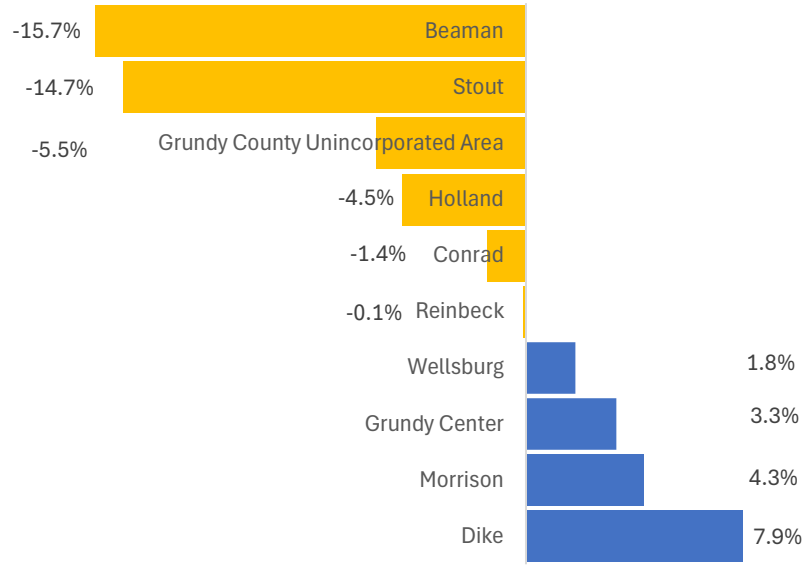
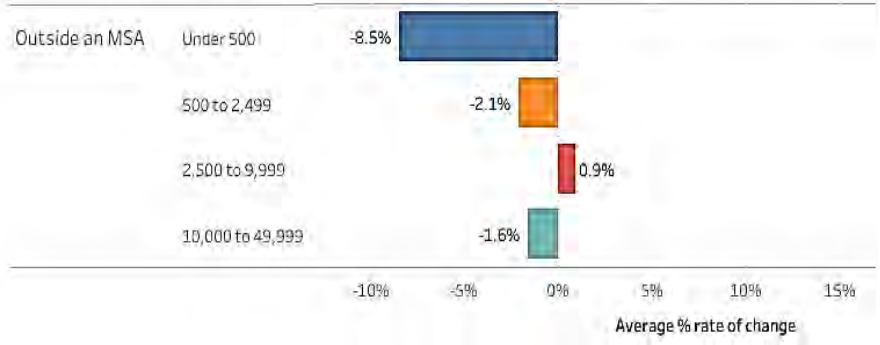


Figure 9: Rates of Change by City Size in Iowa (2010-2020)



Source: Iowa Data Center (2020)

assistance, WIC, weatherization, and disaster case management are a few of the services this organization operates with.

The clients served in Grundy County are:

- Individuals and households with low to moderate incomes
- children (<5 years old)
- Elderly/older adults
- People with physical disabilities

Grundy County is largely car dependent. There are no ride-share apps that operate in the county or a metropolitan bus line/shuttle. The regional bus service does not regularly operate in Grundy Center. For clients that Operation Threshold serves, people get their food needs at convenience stores and food banks.

Approximately half of low income clients have internet at home. They may get emergency information from cable television, internet, and their churches. Operation Threshold does not have a registry of their clients that they keep a record of in case of emergencies and has not yet assisted them to sign up for Alert Iowa notifications. However, homeowners and renters are encouraged about the need to know about flood and hazard insurance for their homes or rental units.

Northeast Iowa Area Agency on Aging (NEI3A)

NEI3A serves individuals or households with low or moderate incomes, elderly or older adults, and people with physical disabilities. The agency has a total of 10,000 clients across 18 counties in northeast Iowa. There are 15 clients in Grundy County and NI3A has an office in Grundy Center at 705 F Ave.

The top 2 modes of transportation known to be used by their clients are their own cars or medical transportation services. More than half have access to the internet at home. Most live alone and over half do not have access to a vehicle. Many get their emergency notifications from cable tv, internet, cell phone alerts, or church. NI3A assist their clients sign up for Alert Iowa.

NEI3A provided additional information on post-disaster information regarding how people, especially older adults, may be affected. During the pandemic, the community lifelines that were most impactful to older low income adults were city services/volunteers, Meals on Wheels, and churches. Following a disaster, older adults may be confused with complicated procedures when applying for administrative support, dealing with the mental and emotional toll of living through a disaster, physically being unable to stand in long lines for periods of time such as a food bank, and not being aware they had no flood/tornado insurance on their homes or rentals.

Requirement 44 CFR §201.6(b)(2): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process must include 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 nonprofit interests to be involved in the planning process.

HOUSING AND DEVELOPMENT TRENDS

According to 2020 American Community Survey 5-year estimates, there were 5,587 total housing units in the county (Table 8). Of these housing units, 4,236 are owner-occupied (82%), 928 are renter-occupied (18%), and 423 are vacant. See Table 8 for housing characteristic data.

The number of housing units in Grundy County decreased from 2010 to 2020. That follows the State of Iowa's decline in housing units for the same period.

About 4% of the housing units in Grundy County are mobile homes, which matches the state's average. Most of these mobile homes are in the unincorporated county area. Besides the unincorporated area, the communities of Conrad and Grundy Center have the greatest number of mobile homes within their jurisdiction (Table 9).

Grundy County has an aging housing stock. Most of the housing stock in Grundy County is older than 1939. Nearly 36% of the housing units in the county are over 60 years old.

Nearly a third of the housing stock (28%) is valued at $50K-$100K. The median value of housing units in Grundy County is $138,000 which is under the state's average housing values of $154,000. The trend for each category shown in Figure 11 for all housing units in the county in 2020.

The monthly housing costs for homeowners and renters are similar to the state's averages in 2020. The average rent is $700, and this value is lower than the state's average rent costs of $800.

Figure 10: Age of Housing in Grundy County 2020

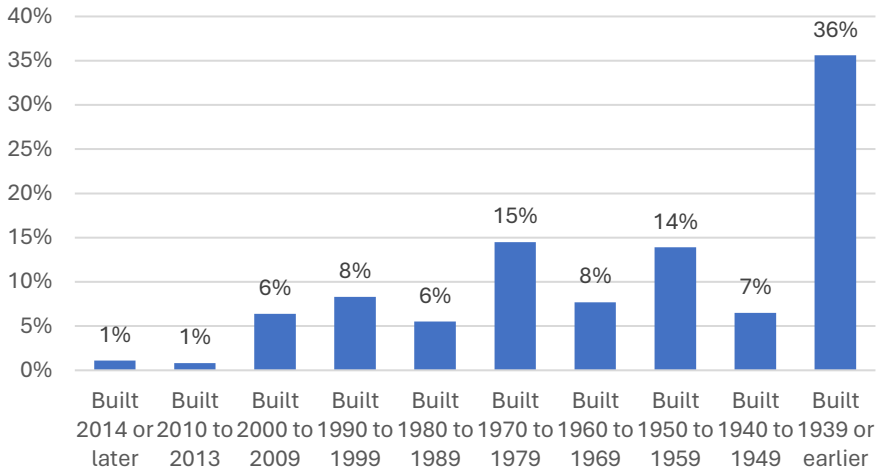


Figure 11: Value of Housing Units in Grundy County 2020

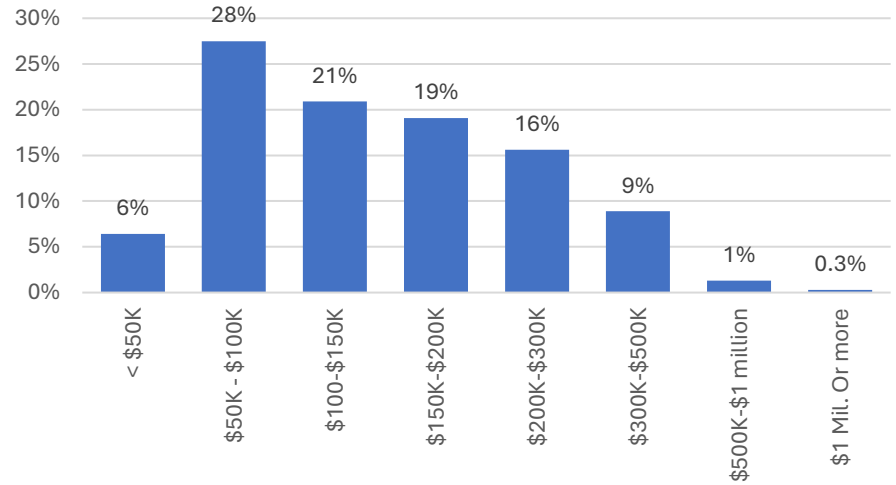


Table 8: County and State Housing Characteristics				
	Grundy County, Iowa		Iowa	
	Estimate	%	Estimate	%
TOTAL OCCUPANCY HOUSING DATA				
Total housing units	5,587	100%	1,407,819	100%
Occupied housing units	5,164	92%	1,273,941	91%
Vacant housing units	423	8%	133,878	10%
UNITS IN STRUCTURE				
Total housing units	5,587	100%	1,407,819	100%
1-unit, detached	4,785	86%	1,028,753	73%
1-unit, attached	71	1%	57,631	4%
2 units	44	1%	31,540	2%
3 or 4 units	284	5%	47,912	3%
5 to 9 units	101	2%	50,186	4%
10 to 19 units	41	1%	54,583	4%
20 or more units	49	1%	85,337	6%
Mobile home	212	4%	51,133	4%
Boat, RV, van, etc.	0	0%	744	0%
HOUSING TENURE FOR OCCUPIED UNITS				
Occupied housing units	5,164	100%	1,273,941	100%
Owner-occupied	4,236	82%	906,967	71%
Renter-occupied	928	18%	366,974	29%
Average household size of owner-occupied unit	2.4	-	2.5	-
Average household size of renter-occupied unit	2.09	-	2.14	-
VEHICLES AVAILABLE				
Occupied housing units	5,164	100%	1,273,941	100%
No vehicles available	184	4%	72,384	6%
1 vehicle available	1,238	24%	373,484	29%

Table 8: County and State Housing Characteristics (Cont.)				
	Grundy County, Iowa		Iowa	
Label	**Estimate**	**%**	**Estimate**	**%**
HOUSE HEATING FUEL				
Occupied housing units	5,164	100%	1,273,941	100%
Utility gas	2,861	55%	773,222	61%
Bottled, tank, or LP gas	1,365	26%	165,909	13%
Electricity	788	15%	296,819	23%
SELECTED CHARACTERISTICS				
Occupied housing units	5,164	100%	1,273,941	100%
Lacking complete plumbing facilities	0	0%	3,671	0%
Lacking complete kitchen facilities	4	0%	11,505	1%
No telephone service available	62	1%	20,472	2%
MEDIAN VALUE OF HOMES				
Median (dollars)	$138,100	-	$153,900	-
SELECTED MONTHLY OWNER COSTS BY TENURE				
Median Value ($) for Homeowner HH	$1,207	-	$1,279	-
Median Value ($) for Renter HH	$469	-	$495	-
MONTHLY HOUSING COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME				
Homeowner Households	2,389	100%	545,689	100%
Paying greater than 35% on Housing	253	11%	75,946	14%
Renter Households	1,824	100%	356,275	100%
Paying greater than 35% on Housing	156	9%	29,092	8%
Median Gross Rent (dollars)	$698	-	$806	-
Source: U.S. Census Bureau & American Community Survey				

Table 9: Total Mobile Homes in Selected Communities		
Community	**2010**	**2020**
City of Beaman	6	0
City of Conrad	33	20
City of Dike	8	0
City of Grundy Center	27	5
City of Holland	2	0
City of Morrison	2	0
City of Reinbeck	8	0
City of Stout	3	1
City of Wellsburg	0	0
Grundy County (Unincorporated Area)	131	145

Source: U.S. Census Bureau & American Community Survey

Table 10: Median Value of Owner-Occupied Housing			
Community	**2010**	**2015**	**2020**
City of Beaman	$82,500	$73,500	$75,400
City of Conrad	$120,600	$121,900	$126,700
City of Dike	$152,300	$165,100	$216,300
City of Grundy Center	$95,600	$104,300	$134,500
City of Holland	$69,200	$70,600	$76,300
City of Morrison	$60,000	$68,800	-
City of Reinbeck	$103,400	$107,400	$128,900
City of Stout	$84,300	$88,500	$102,800
City of Wellsburg	$69,600	$76,300	$77,700
Grundy County (total)	$111,000	$125,700	$143,600
State of Iowa	$119,200	$129,200	$162,800

Source: American Community Survey 5-Yr Estimates

Table 11: Median Gross Rent			
Community	2010	2015	2020
City of Beaman	$525	$629	$663
City of Conrad	$462	$615	$809
City of Dike	$534	$550	$655
City of Grundy Center	$553	$481	$691
City of Holland	$647	$675	-
City of Morrison	-	-	$575
City of Reinbeck	$583	$518	$659
City of Stout	$608	$788	$863
City of Wellsburg	$483	$555	$538
Grundy County (total)	$513	$567	$698
State of Iowa	$525	$697	$806

Source: American Community Survey 5-Yr Estimates

Table 12: Total Building Permits Issued (2010-2020)	
Community	Permits Issued
City of Beaman	1
City of Conrad	4
City of Dike	35
City of Grundy Center	29
City of Holland	0
City of Morrison	0
City of Reinbeck	8
City of Stout	0
City of Wellsburg	4
Grundy County Unincorporated	22
Grundy County, Iowa (Total)	103

Source: U. S. Census Bureau.
Numbers reflect only County Issued Zoning Certificates

The housing value within Grundy County has generally increased from 2010 and 2020 as shown in Table 10. The 2020 American Community Survey estimated median value of a house in Grundy County was estimated at $143,600. This still lower than the state's median value in 2020.

In Table 11, the median gross rents of each community in Grundy County show the rent growing across the board. Grundy County's median gross rent is nearly $110/month less than the State's. Of Grundy County's jurisdictions, the City of Morrison had the cheapest median gross rent, at $575 with a population of 98 in 2020. The City of Stout has the highest median gross rent, at $863 with a population of 191 in 2020.

Table 12 provides a listing of the number of building permits that were issued in 2010-2020. The county issued 177 building permits in this last decade with an associated estimated construction cost of $42,388,000. In 2020, Grundy County issued 20 building permits for a total construction cost of $4,856,416.

ECONOMY

INCOME

The per capita and median household income for the county and its communities are listed in Table 13. The values in Table 13 are adjusted for inflation and shown in 2020 dollars. The county had a per capita income in 2020 of $37,360. The median household income for the entire county, in 2020, was $71,760. The City of Morrison had the lowest per capita income, $23,620; and the City of Wellsburg had the lowest median household income, $46,667.

Table 13: Per Capita & Median Household Income

Community	Per Capita Income		Median Household Income	
	2015	2020	2015	2020
City of Beaman	$25,753	$31,230	$53,750	$63,929
City of Conrad	$23,790	$31,580	$45,313	$57,931
City of Dike	$39,594	$46,490	$67,500	$80,625
City of Grundy Center	$27,805	$31,910	$50,000	$69,432
City of Holland	$24,280	$27,923	$54,375	$60,625
City of Morrison	$24,090	$23,620	$56,250	$51,250
City of Reinbeck	$32,414	$37,536	$50,563	$70,682
City of Stout	$23,085	$27,699	$57,750	$70,625
City of Wellsburg	$25,053	$29,488	$47,019	$46,667
Grundy County	**$31,076**	**$37,360**	**$56,750**	**$71,760**
State of Iowa	$27,950	$33,021	$53,183	$61,836

Source: U.S. Census Bureau and American Community Survey (in 2020 inflation adjusted dollars)

EMPLOYMENT SECTORS

A summary of 2020 employment data for Grundy County and the state of Iowa is shown in Table 14. The industry with the largest share of the county's workforce is in the category of education, health, and social services (26%). Nearly 24% of Iowa's workforce work in this industry and, similarly, this is the largest share of the state's workforce.

Manufacturing is the second highest industry to employ 13% of the workforce in Grundy County. The agricultural, forestry, fishing and hunting, and mining industry employ 8% of the county's workforce. The d the State of Iowa of 4%, which is the largest difference between industry sectors of the workforce for Grundy County and Iowa.

MAJOR EMPLOYERS

Grundy County Memorial Hospital is the largest employer in Grundy County. The hospital is located in Grundy Center. Other major employers include Richelieu Foods, Green Products Company, Pioneer Hybrid, and Total Source Molders.

Grundy County has seven public school districts providing K-12 education and employment. These districts include: Aplington-Parkersburg Community Schools, AGWSR Community Schools, BCLUW Community School, Dike-New Hartford Community School, Eldora-New Providence Community Schools, Gladbrook-Reinbeck Community School, and Grundy Center Community School.

Table 14: Employment Sectors/Industries for Grundy County and Iowa, 2020				
	Grundy County		State of Iowa	
Industry	Workers	%	Workers	%
Agriculture, Forestry, Fishing & Hunting, and Mining	495	8%	60,443	4%
Construction	623	10%	105,449	7%
Manufacturing	801	13%	236,327	15%
Wholesale Trade	191	3%	45,624	3%
Retail Trade	613	10%	185,930	12%
Transportation & Warehousing, and Utilities	302	5%	80,042	5%
Information	80	1%	25,116	2%
Finance, Insurance, Real Estate, and Rental & Leasing	289	5%	124,973	8%
Professional, Scientific, Management, Administrative, and Waste Management Services	386	6%	119,391	7%
Education, Health and Social Services	1,637	26%	391,707	24%
Arts, Entertainment, Recreation, Accommodations and Food Services	245	4%	116,108	7%
Other Services (except public administration)	412	7%	70,677	4%
Public Administration	160	3%	49,737	3%

Source: American Community Survey 5-Year estimates

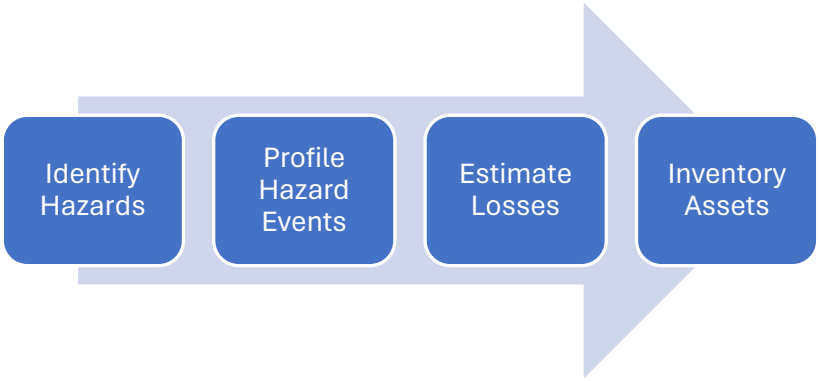
SECTION 3: RISK ASSESSMENT

About

This updated risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The scope of the risk assessment is to estimate potential losses in Grundy County including loss of life, personal injury, property damage, natural and cultural resources, and economic loss from a hazard event.

The risk assessment process allows the community to better understand their potential risk to various hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

The risk assessment draws from the components described in the FEMA publication 386-2, *Understanding Your Risks: Identifying Hazards and Estimating Losses* (2002), which includes a four-part process:



For this section, these parts are divided into three (3) steps in our planning process to meet the risk assessment requirements. Descriptions about each step is below.

1 **Hazard Identification.** Determine the hazards that are a threat to Grundy County and participating jurisdictions. Describe the methodology to assess hazard risk for each community.

2 **Hazard Profiles.** Description, historical occurrences, probability, magnitude, warning time, and duration of hazard event.

3 **Vulnerability Assessment.** Put a value on the existing risk to natural hazards. Risk scores, cost estimates, and an inventory of critical facilities and other community assets at risk are located in this step.

Hazards that vary geographically across the planning area are addressed in greater detail. If the hazard is not explicitly identified for a localized specific area only, hazards area assumed to potentially occur in the entire county area.

Hazard Identification

Hazards for Grundy County in 2023 MJ-HMP Update

1. Animal/Plant/Crop Disease
2. Dam / Levee Failure
3. Drought
4. Earthquake
5. Expansive Soils
6. Extreme Heat
7. Flooding-River
8. Flooding – Flash
9. Grass or Wildland Fire
10. Hazardous Materials Incident
11. Infrastructure Failure
12. Landslides
13. Pandemic Human Disease
14. Radiological Incident
15. Severe Winter Storms
16. Sinkholes
17. Terrorism
18. Thunderstorm- Hail and Lighting
19. Tornado / Windstorm
20. Transportation Incident

These profiles were presented to the planning committee and considered by Grundy County and the jurisdictions in this plan. Using resources and definitions from agencies such as NOAA or NWS, historical weather events within the last 50 years were shared with the committee. Trends and impacts to the northeast Iowa region of the occurrence of each hazard also helped shape an understanding of future events.


Animal/Plant/ Crop Disease


Dam / Levee Failure


Drought


Earthquake


Expansive Soils


Extreme Heat


Grass or Wildland Fire


Hazardous Materials Incident


Infrastructure Failure


Flooding – Flash


Flooding-River


Landslides


Pandemic Human Disease


Radiological Incident


Sinkholes


Terrorism


Transportation Incident


Severe Winter Storms


Thunderstorm- Hail and Lighting


Tornado / Windstorm

Each profile include the following parts about the specified hazard:

1. a definition and description of the hazard,
2. historical data with notable event summaries from 1990 - 2022;
3. probability (likelihood) of hazard occurring in the near future;
4. expected magnitude or severity of an event;
5. potential warning time; and
6. duration of a disaster event.

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

1 Hazard Identification

The hazards identified for Grundy County and its communities were considered by the planning committee in their risk assessment and mitigation action plan strategy. The three types of hazards considered in the 2023 Grundy County MJ-HMP are natural hazards, man-made hazards, and technological hazards.

Natural hazards include those that "are a source of harm or difficulty created by a meteorological, environmental, or geological phenomenon or combination of phenomena (U.D. Department of Homeland Security Risk Lexicon, 2010). In this plan, biological hazards, such as disease, are not classified as natural hazards. However, the biological hazards, and additional hazards, were also identified in this multi-jurisdictional plan based on their occurrence since the previously approved plans were adopted or that may occur in the next five years. Those hazards are man-made or technological hazards.

The planning committee considered two (2) documents in the development of the hazards for this plan update. The first document was the 2023 Iowa Hazard Mitigation Plan in the Iowa Comprehensive Emergency Plan Part B section which lists hazards that were considered by the committee. The other document was the 2017 Grundy County MJ-HMP that this plan was being written to update. All hazards in the previous county hazard mitigation plan were adopted into this plan update and no hazards from the previous 2017 county plan were taken out of consideration.

Next, a risk assessment devised for this plan is explained in the methodology part of this section.

Background: Disaster Declaration History

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. Should the disaster be 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.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The amount and types of damage are the determining factors.

Tables 15 and 16 list federal and state disaster declarations received by Grundy County, respectively. Many of the disaster events were regional or statewide; therefore, reported costs are not accurate reflections of losses to Grundy County and its jurisdictions. Since 1991, Grundy County has received 13 federal disaster declarations. Governor's Disaster

Proclamations are also listed in Table 16, showing from the year 2008 until current. Since 2008 Grundy County received 6 state disaster declarations.

Presidential Declaration History for Grundy County (1991-2020) [Federal]

Source: FEMA

Source: Iowa Homeland Security

Table 15: Presidential Disaster Declaration History for Grundy County

Declared Date	Type	Declaration #
July 1991	Severe Weather	DR-911-IA
April 1993	Flooding	DR-986-IA
June 1993	Flooding	DR-996-IA
July 1998	Severe Weather	DR-1230-IA
July 1999	Flooding	DR-1282-IA
May 25, 2004	Severe Storms, Tornadoes & Flooding	DR-1518
September 2005	Hurricane Katrina	EM-3239
March 14, 2007	Severe Winter Storms	DR-1688
May 27, 2008	Severe Storms, Tornadoes, and Flooding	DR-1763
August 20, 2013	Severe Storms, Tornadoes, and Flooding	DR-4135
August 5, 2014	Severe Storms, Tornados, Straight-line winds, and Flooding	DR-4187-IA
March 23, 2020	COVID-19 Pandemic	DR-4483-IA
August 17, 2020	Severe Storms	DR-4557-IA

Source: FEMA

Table 16: Governor's Disaster Proclamation History for Grundy County (2008-Present)

Declared Date	Type	Proclamation #
April 30, 2008	Severe Storms	2008-04
June 12, 2008	Severe Storms	2008-22
May 29, 2013	Severe Storms & Flooding	2013-07
July 9, 2014	Severe Storms	2014-16
August 12, 2020	Severe Storm	2020-27
March 31, 2023	Severe Weather	2023-08

Source: Iowa Homeland Security

Governor's Disaster Proclamation History for Grundy County (2008-2023) [State]

METHODOLOGY

The risk assessment identifies how people, properties, and structures could be damaged by the event. When a natural hazard occurs and the impacts of its damage to a community are measured, that assessment of the losses may look at the cost of damage to homes and property, number of casualties like the injured or fatalities, or costs to the economy such crop loss. Determining the potential losses due to hazards from this plan were analyzed by participants using the methodology in this plan.

The Planning Committee considered the following for each identified hazard:

- Probability
- Magnitude / Severity
- Warning Time
- Duration

The scores that are determined from these factors are used in the hazard risk score formula below. The final risk score is a number between 1 and 4. With 1 being the least severe hazard and 4 being the most severe hazard. The top hazards from this assessment can be used to build mitigation priorities and inform the strategy developed in this plan.

Hazard Risk Score Formula

Risk Assessment Score Factors and Weighted Score Equation

['Probability' x **45%**] + ['Magnitude or Severity' x **30%**] + ['Warning Time' x **15%**] + ['Duration' x **10%**]

= Final Hazard Assessment Score [1 through 4]

Each city in the county completed a hazard risk assessment for their community. Those are located in the appendices (Appendix A through I) for the respective jurisdiction.

Requirement Title 44 §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

Planning Areas: Rural County Land vs. County City Boundaries

The hazard risk scores are shown for two planning areas within Grundy County:

- **Incorporated County Areas** – including all municipalities with electric, water/sewer services, and roadway. The scores for the hazard risk assessment is averaged across all participating jurisdictions and shown in Table 21.
- **Unincorporated County Areas**- rural county land that may not be serviced by a public water system, sanitary sewer line, waste management curb service, or city road systems. Hazard risk assessment scores are shown in Table 22. The assessment was completed by Grundy County representatives on the planning committee.

The risk assessment for these two areas is separately determined because each has different impacts from natural disasters due to their differences in urban density. Impacts to the built environment in an incorporated municipality is greater because there is simply more infrastructure that may become damaged.

Planning committee participants from county departments contributed to the scores for the risk assessment that would determine risk factors for rural county unincorporated areas. Their experience and knowledge working in unincorporated (rural) areas of the county informed this process such that the hazard assessment may help inform hazard mitigation and decision making for rural county residents and businesses.

In Tables 17, 18, 19, and 20, descriptions for the ratings for these factors is provided. These factors are assessed on a ranking scale between 1 to 4 depending on the severity of each factor. The Hazard Mitigation Planning Committee used a scoring system devised by the Iowa Department of Homeland Security which was shared with the team in the scope of work to assist in this planning development.

Each jurisdiction provided their assessment after being presented with the hazard profiles, data, and historical occurrences of the hazard for the county. Each participating jurisdiction's representative consulted with the Grundy County EMA coordinator in their assessment of the hazard and in accordance with the scoring standards developed in this plan's methodology section.

With each plan update, new information will be incorporated to provide for better evaluation and prioritization of the hazards that affect the county.

Probability

The probability score 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. Many times, historical occurrences can be extrapolated into the future using the best available data, but others, due to the nature of the hazard are more difficult to estimate the probability of future occurrence.

If a hazard or its impacts have been planned for, the probability of future occurrences decreases. Conversely, hazards that have not occurred in the past may present themselves to the community in the future. Table 17 shows the probability scoring criteria.

Table 17: Probability

Rating	Description	
1	*Unlikely*	Less than 10% probability in any given year (up to 1 in 10 chances 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 chances 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 chances of occurring), history of events if 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.

Warning Time

The speed of onset is the amount of warning time available before the hazard occurs. This should be taken as an average warning time. For many of the atmospheric natural hazards there is a considerable amount of warning time as opposed to the human caused accidental hazards that occur instantaneously or without any significant warning time. Table 19 shows the warning time criteria.

Table 19: Warning Time

Rating	Description
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

Magnitude and Severity

The impact severity of a hazard event (past and perceived) is related to the vulnerability. Relevant factors include when the event occurs (year-round, seasonal), the location affected, community resilience, and the effectiveness of the emergency response and disaster recovery efforts. Quantifying impact severity is difficult to address at multiple levels simultaneously. Table 18 shows the Magnitude or Severity scoring criteria.

Table 18: Magnitude or Severity

Rating	Description	
1	*Negligible*	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24hours, and/or injuries/illnesses treatable with first aid
2	*Occasional*	10% to 25% of property severely damaged, shutdown of facilities and service 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 two 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.

Duration

This consists of the typical amount of time that the jurisdiction is impacted by the hazard. As an example, a snowstorm will likely last several hours, whereas a lightning strike would last less than a second. Table 20 shows the duration scoring criteria.

Table 20: Duration

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

HAZARD RISK SCORE SUMMARY

Top Hazards for Grundy County

1. **Cities/Municipalities/Incorporated County Area**

   The top 3 scored hazards among all Grundy County's jurisdictions are:

   1. Tornado/Windstorm
   2. Thunderstorm/Lightening/Hail
   3. Severe Winter Storm

   Individual assessment scores for each jurisdiction can be found in their respective appendix. Descriptions each hazard for all jurisdictions combined is shown in Table 22.

Table 21: Urban – County Hazard Risk Scores (All Cities – Averaged)

Rank (Highest to Low)	Hazards	Probability Average	Magnitude Average	Warning Time Average	Duration Average	Total Hazard Risk Score (1 to 4)
1	Tornado/Windstorm	3.7	2.7	3.3	1.4	**3.1**
2	Thunderstorm/Lightning/Hail	3.8	1.9	2.6	1.5	**2.8**
3	Severe Winter Storm	3.5	1.9	1.5	2.8	**2.6**
4	Extreme Heat	3.3	1.6	1.4	3.5	**2.5**
5	Drought	2.7	1.4	1.0	4.0	**2.2**
6	Flash Flood	2.3	1.7	2.1	2.1	**2.1**
7	Pandemic Human Disease	1.8	2.1	1.3	3.8	**2.0**
8	Infrastructure Failure	1.8	1.4	3.2	2.6	**2.0**
9	Hazardous Materials	1.7	1.4	3.3	1.8	**1.9**
10	River Flood	1.8	1.5	1.7	2.8	**1.8**
11	Transportation Incident	1.6	1.2	3.7	1.6	**1.8**
12	Grass/Wild Land Fire	1.7	1.4	3.1	1.5	**1.8**
13	Terrorism	1.4	1.6	3.6	1.4	**1.8**
14	Animal/Crop/Plant Disease	1.8	1.3	1.4	3.5	**1.8**
15	Expansive Soils	1.5	1.3	1.4	2.6	**1.5**
16	Sinkholes	1.2	1.3	2.9	1.8	**1.5**
17	Earthquake	1.0	1.5	3.5	1.1	**1.5**
18	Landslides	1.2	1.3	2.5	1.8	**1.5**
19	Radiological Indicident	1.0	1.3	2.6	2.4	**1.5**
20	Levee/Dam Failure	1.0	1.3	1.6	1.5	**1.2**

Table 21A: Urban Areas Hazard Risk Score Descriptions					
Ranking	**Hazard**	**Probability**	**Magnitude or Severity**	**Warning Time**	**Duration**
1	Tornado/ Windstorm	Highly Likely - More than 33% probability in any given year	Critical -25% to 50% of property severely damaged, shutdown of facilities and services for at least 2 weeks, and/or casualties that result in permanent disability	Minimal (less than 6 hrs) or No Warning Time	less than 6 hours
2	Thunderstorm/ Lightning/ Hail	Highly Likely - More than 33% probability in any given year	Occasional, 10% to 25% of property severely damaged	6 to 12 hours warning time	Less than a day
3	Severe Winter Storm	Likely - Between 20% to 33% probability (1 in 3)	Occasional, 10% to 25% of property severely damaged	More than 24 hours warning time	Less than a week
4	Extreme Heat	Likely - Between 20% to 33% probability (1 in 3)	Occasional, 10% to 25% of property severely damaged	More than 24 hours warning time	Less than a week
5	Drought	Likely - Between 20% to 33% probability (1 in 3)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	More than 24 hours warning time	More than a week
6	Flash Flood	Occasional - Between 10% to 20% probability (1 in 5)	Occasional, 10% to 25% of property severely damaged	12 - 24 hours warning time	Less than a day
7	Pandemic Human Disease	Occasional - Between 10% to 20% probability (1 in 5)	Occasional, 10% to 25% of property severely damaged	More than 24 hours warning time	More than a week
8	Infrastructure Failure	Occasional - Between 10% to 20% probability (1 in 5)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	6 to 12 hours warning time	Less than a week
9	Hazardous Materials	Occasional - Between 10% to 20% probability (1 in 5)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	6 to 12 hours warning time	Less than a day
10	River Flood	Occasional - Between 10% to 20% probability (1 in 5)	Occasional, 10% to 25% of property severely damaged	12 - 24 hours warning time	Less than a week
11	Transportation Incident	Occasional - Between 10% to 20% probability (1 in 5)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	Minimal (less than 6 hrs) or No Warning Time	Less than a day

Table 21A: Urban Areas Hazard Risk Score Descriptions -Continued.					
Ranking	**Hazard**	**Probability**	**Magnitude or Severity**	**Warning Time**	**Duration**
12	Grass/Wild Land Fire	Occasional - Between 10% to 20% probability (1 in 5)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	6 to 12 hours warning time	less than 6 hours
13	Terrorism	Unlikely - less than 10% probability (1 in 10)	Occasional, 10% to 25% of property severely damaged	Minimal (less than 6 hrs) or No Warning Time	less than 6 hours
14	Animal/Crop/Plant Disease	Occasional - Between 10% to 20% probability (1 in 5)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	More than 24 hours warning time	More than a week
15	Expansive Soils	Occasional - Between 10% to 20% probability (1 in 5)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	More than 24 hours warning time	Less than a week
16	Sinkholes	Unlikely - less than 10% probability (1 in 10)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	6 to 12 hours warning time	Less than a day
17	Earthquake	Unlikely - less than 10% probability (1 in 10)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	6 to 12 hours warning time	less than 6 hours
18	Landslides	Unlikely - less than 10% probability (1 in 10)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	12 - 24 hours warning time	Less than a day
19	Radiological Indicident	Unlikely - less than 10% probability (1 in 10)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	6 to 12 hours warning time	Less than a day
20	Levee/Dam Failure	Unlikely - less than 10% probability (1 in 10)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	12 - 24 hours warning time	Less than a day

2. Rural/Unincorporated Planning Area

The top 3 hazards for Grundy County's unincorporated planning area are:

1. Severe Winter Storm
2. Tornado/Windstorm
3. Transportation Incident

Table 23: Rural - County Hazard Risk Scores (Unincorporated County Area)

Rank (High to Low)	Hazards	Probability	Magnitude or Severity	Warning Time	Duration	Total Hazard Risk Score (1 to 4)
1	Severe Winter Storm	4	4	1	3	**3.5**
2	Tornado/Windstorm	4	3	1	1	**3.0**
3	Transportation Incident	4	1	4	2	**2.9**
4	Extreme Heat	4	2	1	3	**2.9**
5	Animal/Crop/Plant Disease	2	3	3	4	**2.7**
6	Thunderstorm/Lightning/Hail	4	2	1	1	**2.7**
7	Drought	3	2	1	4	**2.5**
8	Radiological Indicident	1	3	4	3	**2.3**
9	Terrorism	1	3	4	3	**2.3**
10	Hazardous Materials	2	1	4	3	**2.1**
11	Infrastructure Failure	2	1	4	3	**2.1**
12	Flash Flood	2	2	2	2	**2.0**
13	River Flood	2	2	1	3	**2.0**
14	Grass/Wild Land Fire	2	1	4	1	**1.9**
15	Pandemic Human Disease	1	3	1	4	**1.9**
16	Earthquake	1	1	1	1	**1.0**
17	Expansive Soils	1	1	1	1	**1.0**
18	Landslides	1	1	1	1	**1.0**
19	Levee/Dam Failure	1	1	1	1	**1.0**
20	Sinkholes	1	1	1	1	**1.0**

Table 22A: Rural County Hazard Risk Scores Descriptions					
Ranking	**Hazard**	**Probability**	**Magnitude or Severity**	**Warning Time**	**Duration**
1	Severe Winter Storm	Highly Likely - More than 33% probability in any given year	Catastrophic - More than 50% of property severely damaged	More than 24 hours warning time	Less than a week
2	Tornado/ Windstorm	Highly Likely - More than 33% probability in any given year	Critical -25% to 50% of property severely damaged, shutdown of facilities and services for at least 2 weeks, and/or casualties that result in permanent disability	More than 24 hours warning time	less than 6 hours
3	Transportation Incident	Highly Likely - More than 33% probability in any given year	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	Minimal (less than 6 hrs) or No Warning Time	Less than a day
4	Extreme Heat	Highly Likely - More than 33% probability in any given year	Occasional, 10% to 25% of property severely damaged	More than 24 hours warning time	Less than a week
5	Animal/ Crop/ Plant Disease	Occasional - Between 10% to 20% probability (1 in 5)	Critical -25% to 50% of property severely damaged, shutdown of facilities and services for at least 2 weeks, and/or casualties that result in permanent disability	6 to 12 hours warning time	More than a week
6	Thunderstorm/ Lightning/ Hail	Highly Likely - More than 33% probability in any given year	Occasional, 10% to 25% of property severely damaged	More than 24 hours warning time	less than 6 hours
7	Drought	Likely - Between 20% to 33% probability (1 in 3)	Occasional, 10% to 25% of property severely damaged	More than 24 hours warning time	More than a week
8	Radiological Incident	Unlikely - less than 10% probability (1 in 10)	Critical -25% to 50% of property severely damaged, shutdown of facilities and services for at least 2 weeks, and/or casualties that result in permanent disability	Minimal (less than 6 hrs) or No Warning Time	Less than a week
9	Terrorism	Unlikely - less than 10% probability (1 in 10)	Critical -25% to 50% of property severely damaged, shutdown of facilities and services for at least 2 weeks, and/or casualties that result in permanent disability	Minimal (less than 6 hrs) or No Warning Time	Less than a week
10	Hazardous Materials	Occasional - Between 10% to 20% probability (1 in 5)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	Minimal (less than 6 hrs) or No Warning Time	Less than a week

Table 22A: Rural County Hazard Risk Scores Descriptions (Continued)					
Ranking	**Hazard**	**Probability**	**Magnitude or Severity**	**Warning Time**	**Duration**
11	Infrastructure Failure	Occasional - Between 10% to 20% probability (1 in 5)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	Minimal (less than 6 hrs) or No Warning Time	Less than a week
12	Flash Flood	Occasional - Between 10% to 20% probability (1 in 5)	Occasional, 10% to 25% of property severely damaged	12 - 24 hours warning time	Less than a day
13	River Flood	Occasional - Between 10% to 20% probability (1 in 5)	Occasional, 10% to 25% of property severely damaged	More than 24 hours warning time	Less than a week
14	Grass/Wild Land Fire	Occasional - Between 10% to 20% probability (1 in 5)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	Minimal (less than 6 hrs) or No Warning Time	less than 6 hours
15	Pandemic Human Disease	Unlikely - less than 10% probability (1 in 10)	Critical -25% to 50% of property severely damaged, shutdown of facilities and services for at least 2 weeks, and/or casualties that result in permanent disability	More than 24 hours warning time	More than a week
16	Earthquake	Unlikely - less than 10% probability (1 in 10)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	More than 24 hours warning time	less than 6 hours
17	Expansive Soils	Unlikely - less than 10% probability (1 in 10)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	More than 24 hours warning time	less than 6 hours
18	Landslides	Unlikely - less than 10% probability (1 in 10)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	More than 24 hours warning time	less than 6 hours
19	Levee/Dam Failure	Unlikely - less than 10% probability (1 in 10)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	More than 24 hours warning time	less than 6 hours
20	Sinkholes	Unlikely - less than 10% probability (1 in 10)	Negligible - less than 10% of property severely damaged, shutdown of facilities and services for < 24 hrs,	More than 24 hours warning time	less than 6 hours

HAZARD PROFILES

Animal/Plant/Crop Disease

Dam / Levee Failure

Drought

Earthquake

Expansive Soils

Extreme Heat

Grass or Wildland Fire

Hazardous Materials Incident

Infrastructure Failure

Flooding – Flash

Flooding-River

Landslides

Pandemic Human Disease

Radiological Incident

Sinkholes

Terrorism

Transportation Incident

Severe Winter Storms

Thunderstorm-Hail and Lighting

Tornado / Windstorm

2 Hazard Profiles

The identified hazards are discussed at length on the following pages and arranged in alphabetical order. Each hazard profile is summarized by the following parts:

- Definition and Description
- Historical Occurrence
- Probability
- Magnitude or Severity
- Warning Time
- Duration.

The hazard description for each profile in this plan features an overall summary including a definition. Each summary features notable impacts in Grundy County.

The historical occurrence of each hazard is shown with past events from 1990 to 2022. For tornados, the historical occurrence is shown from 1960 to 2022.

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

ANIMAL/PLANT/CROP DISEASE

Definition and Description

Diseases that may infect domestic animals, livestock, and crops are present throughout Grundy County. Some contagions are more deadly or serious than others. Especially foreign-born diseases that are not normal for the region or area. This includes pathogen livestock diseases that rapidly spread animal-to-animal or, eventually, herd-to-herd through natural transmission in close quarters. This hazard also includes infestation of pests/insects that harm or destroy native vegetation, crops, species, wildlife, or livestock.

This hazard may affect the entire county.

Historical Occurrences (Ongoing)

Bacterial leaf streak (BLS) in corn was recently identified in Iowa. Bacterial leaf streak is a disease caused by Xanthomonas vasicola pv. vasculorum. The disease has been found in field corn, seed corn, popcorn, and sweet corn. Iowa State University Extension and Outreach has been working with the USDA, Iowa Department of Agriculture and Land Stewardship (IDALS), the Iowa Crop Improvement Association (ICIA) and surveying several counties in the state.

Bacterial leaf streak in corn

To date, Iowa State University has confirmed the bacterial leaf streak disease in six counties in north central and northeast Iowa including Grundy County. Based on data from the Crop Protection Network for crop loss between 2017 and 2022, Iowa had a reported loss of $1.2 million with 11% of crops damaged from aboveground and foliar diseases in 2018.

Emerald Ash Bore (Agrilus planipennis) (EAB)

The Emerald Ash Borer was identified as a significant threat to ash trees throughout the county. Emerald Ash Borer (Agrilus planipennis), or EAB, is a small, metallic-green, invasive wood-boring beetle native to east Asia that attacks and kills ash trees. Adult beetles live on the outside of trees and feed on the leaves during the summer months, while the larvae feed on the living plant tissue underneath the bark of the ash tree. The tunneling and feeding activity of the larvae ultimately kills ash trees.

EAB is 100 percent fatal to native ash trees of any size, age, or stage of health. Millions of ash trees have already been killed in infested areas. Much of Iowa's forestland is densely populated with ash trees. The U.S. Forest Service 2012 inventory indicates that there are 52 million woodland ash trees and 3.1 million urban ash trees. The ash trees make up 6% of woodland trees and up to 70% of urban trees are ash species (Iowa State University Extension Jan. 2011). Ash trees are no longer recommended for planting in the Midwest.

Ash tree damage from infestation of EAB larvae

Table 25: Pathogens that Infect Livestock in Rural Communities

Ruminants These pathogens can occur in cattle, sheep, and goats.		
Anthrax *cattle, sheep, goats*	Contagious caprine pleuropneumonia *sheep*	Peste des petits ruminants *sheep, goats*
Akabane virus *cattle, sheep, goats*	Foot and mouth disease *cattle, sheep, goats*	**Q Fever** cattle, sheep, goats
Bluetongue virus (exotic strain) *cattle, sheep, goats*	Goat and sheep pox *goats, sheep*	Rinderpest *cattle, sheep, goats*
Bovine spongiform encephalopathy (mad cow disease) *cattle*	Heartwater *cattle, sheep, goats*	**Rift Valley fever** *cattle, sheep, goats*
Brucellosis *cattle, sheep, goats*	Lumpy skin disease *cattle*	**Screwworm myiasis** *cattle, sheep, goats*
Coccidioidomycosis cattle, sheep	Malignant catarrhal fever *cattle, wild ruminants*	**Tularemia** *sheep*
Contagious bovine pleuropneumonia *cattle*	**Melioidiosis** *sheep, goats*	**Vesicular stomatitis virus** *cattle*
Swine These pathogens can occur in swine.		
African swine fever	Foot and mouth disease	**Nipah virus**
Brucellosis	**Japanese encephalitis virus**	Rinderpest
Classical swine fever virus (hog cholera)	**Melioidosis**	**Swine vesicular disease**
Coccidioidomycosis	**Menangle virus**	
Horses These pathogens can be found in horses, donkeys, mules, and zebras.		
African horse sickness	**Hendra virus**	**Vesicular stomatitis virus**
Coccidioidomycosis	**Japanese encephalitis virus**	**Viral encephalitis viruses** Eastern Equine Encephalitis virus, Western Equine Encephalitis virus Venezuelan Equine Encephalitis virus
Glanders	**Screwworm myiasis**	**West Nile virus**
Avian These pathogens can be found in chickens, turkeys, wild birds and waterfowl.		
Avian influenza virus	**Exotic Newcastle disease virus**	**Viral encephalitis viruses** Eastern Equine Encephalitis virus, Venezuelan Equine Encephalitis virus
Screwworm myiasis		

Source: Iowa State University Center for Food Security and Public Health

Probability: Likely

Based on historical occurrences and threats provided in Table 23, the probability of this hazard is **likely**.

Pathogens that may infect livestock are listed in Table 23 which is referenced from the 2016 All-Hazards Preparedness for Rural Communities Guide from the Center of Food Security and Public Health at Iowa State University.

Magnitude or Severity: Limited

Agriculture, primarily corn, soybeans, and livestock, is a major contributor to Grundy County's economy. A USDA study determined that in 2017, agricultural products from Grundy County attributed over $266,709,000 in economic output and employed provided 645 jobs in Grundy County.

The severity of a plant, crop, or animal disease depends largely on the disease itself. Effects from a widespread crop disease in Grundy County or the state could result in unprecedented crop damage. The same is true for livestock. This damage to plants, crops, and livestock could have devastating effects on the local and state-wide economy.

Consequences to the animal industry include the welfare of livestock, disruption of trade, restrictions on livestock movement, or loss of consumer confidence in the meat products that are affected. The diseases that may infect the animal industry are largely focused on livestock that include *cattle, sheep, goats, swine, horses, mules, donkeys, chickens, and turkeys*. However, the presence of diseases among wildlife such as migrating geese are of concern and included in the hazard definition.

Based on the 2016 Iowa DNR Tree Inventory for the City of Grundy Center, ash trees make up 17% of the city's trees. Dead ash tree removal is projected to take over 26 years in the city with the 2016 ongoing tree removal budget that the city had. From those projections, the city's budget for ash tree removal remains consistent. As more ash trees die over time from the EAB infestation, the severity and magnitude of this hazard will grow. All ash trees throughout all cities in Grundy County will need to be removed over time and Grundy Center will lose 17% of their total trees.

The magnitude and severity of this hazard would be **limited**.

Warning Time: 2-3 Weeks

Regular updates with data reporting resources such Iowa DNR, USDA, and the Crop Protection Network can help surveil crop diseases that are emerging in the region. It is possible that a small, localized discovery of a new disease could prevent the spread of that disease if properly contained and managed.

The warning time for this hazard can be **2-3 weeks** depending on the types of animals, plants, or crops and severity/nuance of the disease/infestation**.**

Duration: Months and Years

The duration of a plant, crop, or animal disease will last **more than a week**. Most of the time these occurrences last weeks, months, or even years. For the EAB infection, the impact and effect of this is to be felt for many years as more and more ash trees die which need to be removed over time. This is because of the time required to first discover the disease and then develop methods to treat the disease and prevent it from spreading.

DAM/LEVEE FAILURE

Definition and Description

A dam is defined as an artificial barrier with the ability to impound water, wastewater, or any liquid-borne material, for the purpose of storage or control of water. Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation, and recreation. A dam failure is a break in, or imposed threat from, any water retention fixture which may endanger population downstream of the containment area.

A levee is a man-made low ridge or embankment built along the edge of a stream or river channel to prevent flooding of the adjacent land. Artificial levees are typically needed to control the flow of rivers meandering through broad, flat floodplains. Levees are usually embankments of dirt built wide enough so that they will not collapse or be eroded when saturated with moisture from rivers running at usually high levels. Grass or some other dense vegetation is planted on the top of the levee's bank, so erosion is kept to a minimum.

According to the Federal Emergency Management Agency, dams can fail for one or a combination of the following reasons: Overtopping caused by floods that exceed the dam capacity; Deliberate acts of sabotage; Structural failure of materials used in dam construction; Movement and/or failure of the foundation supporting the dam; Settlement and cracking of concrete or embankment dams; Piping and internal erosion of soil in embankment dams; and Inadequate maintenance and upkeep.

A levee failure is the loss of structural integrity of a wall, dike, berm, or elevated soil by erosion, piping, saturation, or under seepage causing water to inundate normally dry areas.

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

The Army Corps of Engineers classifies dams into three categories based on the potential risk to people and property should a failure occur. Table 24 shows these classifications.

The Iowa Department of Natural Resources tracks all dams in the state of Iowa with a height of at least 25 feet or a total storage of at least 50-acre feet of water. The inventory excludes all dams less than six feet high regardless of storage capacity and dams less than 15-acre feet of storage regardless of height.

Table 26: Dam Hazard Potential Classification

High Hazard Potential	Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life.
Significant Hazard Potential	Dams assigned the significant hazard potential classification are those dams where failure or mis-operation results in no probable loss of human life but can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be in areas with population and significant infrastructure
Low Hazard Potential	Dams where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

Source: Army Corps of Engineers National Inventory of Dams

The classification may change over time because of development downstream from the dam since its construction. Older dams may not have been built to the standards of its new classification. Dam hazard potential classifications have nothing to do with the material condition of a dam, only the potential for death or destruction due to the size of the dam, the size of the impoundment, and the characteristics of the area downstream of the dam.

Historical Occurrence: None

There is one state owned dam in Grundy County which is 26 years old. There are no high hazard potential dams with an EAP, nor dams with hydropower. Grundy County has no documented dam or levee failures in the planning area.

Probability: Unlikely

For dams, with the increased attention to sound design, quality construction, and continued maintenance and inspection, dam failure probability is low across the planning area. The probability of a dam failure due to a breach in the structural integrity of the system is also minimal. For the county overall, the hazard risk for all dams in Grundy County is considered unlikely. The Holland Marsh Dam is not required to have an emergency action plan based on the Iowa Dam Safety Program

According to the National Inventory of Dams, there are five dams in the planning area, and they are classified as low hazard (see definition in Table 24). Table 25 is a chart with information for the county's inventory of dams. Figure 12 is a map of the location of the dams throughout the county. According to information available from the Army Corps of Engineers National Levee Database, there are no levees within the planning area

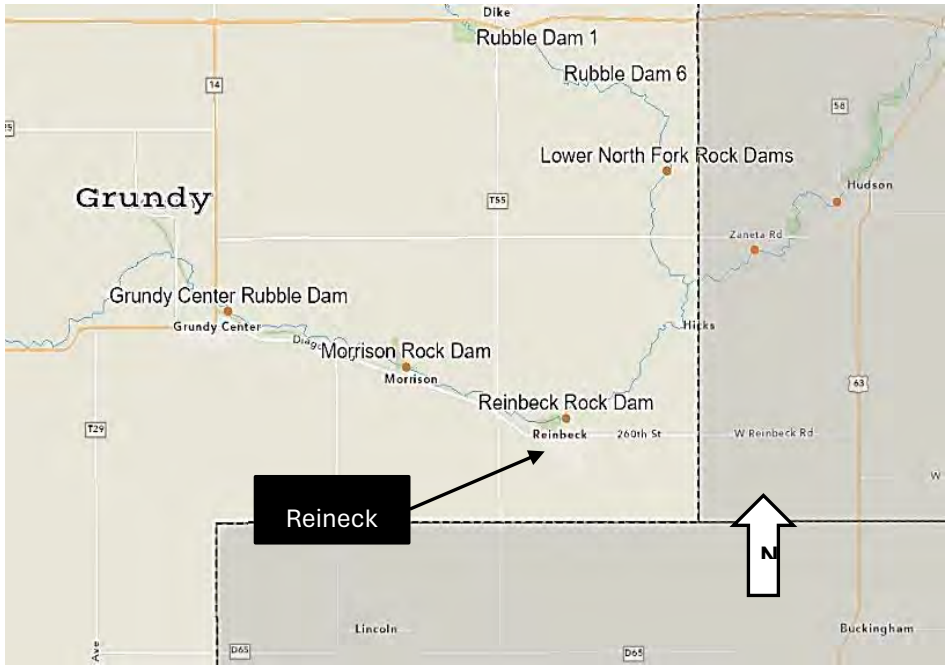


Figure 12: Dam Inventory Map in Planning Area

Source: Iowa DNR

Table 27: Structure Inventory of Dams in Planning Area from the National Inventory of Dams (NID)

Name	NID ID	River	Closest City	Owner of Structure	NID Height (ft.)	NID Storage (Acre-ft)	Type/Primary Purpose	Hazard Potential
Holland Marsh Dam	IA03126	Tr-Holland Creek	Holland	Grundy County Conservation Board	11	53	Earthen Dam for Recreation Purpose	Low
Grundy Center Rubble Dam	-	Blackhawk Creek	Grundy Center	-	3	56	Rubble Dam	Low
Morrison Rock Dam	-	Blackhawk Creek	Morrison	Grundy County Conservation Board	1	90	Rock Dam	Low
Reinbeck Rock Dam	-	Blackhawk Creek	Reinbeck	City of Reinbeck	2	135	Rock Dam	Low
Lower North Fork Rock Dam	-	North Fork Blackhawk Creek	Dike	-	-	87	Rock Dam	Low

Source: Army Corps of Engineers National Inventory of Dams (NID) & Iowa DNR

Given the fact that none of the known levees and berms in the planning area is listed in the Army Corps of Engineers database is an indication that the probability of failure will be unknown without visual assessments. There are an unknown number of rock dams and berms built by landowners and farmers. However, proper inspection, maintenance, design, and construction can limit the probability of a levee failure in the future.

The probability of a catastrophic levee or dam failure is ***unlikely***.

Magnitude or Severity: Negligible

Dams are classified into three categories based on the potential risk to people and property should a failure occur; High, Significant, and Low, see Table 24. As Table 25 indicates, the only dams in the planning area are defined as low hazard dams. The planning area's vulnerability and severity of a dam/levee failure is considered **negligible**.

Of the inventoried dams in the planning area, the severity of damage would be no more than minor crop damage.

Water bursting through a narrow levee breach moves much faster than the floodwaters in the main channel. This type of levee failure can damage structures behind the levee with scour pressures to all structures.

Levee failure has cascading effects beyond flooding or scouring structures where more potential damage may come from secondary hazards. A levee breach potentially floods low points with large volumes of water forming temporary lake that need mechanical pumps to operate and drain an oversaturated low point.

Sudden failure in urbanized areas could cause a catastrophe which was seen in the levee failures in New Orleans during Hurricane Katrina. In an urban setting the severity and duration may expose more people to illnesses and contamination from raw sewage, chemical storage

facilities, underground fuel tanks, or septic systems, which are present in rural county lands.

Warning Time: More than 24 hours

Dam Failure

A dam failure can be immediate, leaving little or no time to warn those downstream of the imminent hazard. The conditions that may bring about a dam failure, i.e. heavy rains and river flooding, can be forecasted days in advance. However, there is no real way to predict at which point a dam will fail until just before the event occurs. Often sirens are activated for immediate evacuation during this event where officials have given out warning of any topping or cresting dams due to heavy rains. Yet, the down flow flooding areas from a potential dam failure in Grundy County does not include any dwellings or structures. There would be no siren activated to alarm of this and likely no one would be in immediate danger of physical harm.

Levee Failure

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

For both dam and levee failure in Grundy County, this would be **more than 24 hours** before it would impact many people.

Duration: Weeks

The length of time that a dam or levee failure would impact the surrounding area depends largely on the amount of water the specific dam or levee held back. The duration of a failure's impact could feasibly range from hours to months to assess the damage and build. This is likely **more than 1 week.**

DROUGHT

Definition and Description

Drought is defined as a period of prolonged abnormally low precipitation producing severe dry conditions. There are four (4) types of drought conditions relevant to Iowa:

1. **Meteorological drought**, which refers to precipitation deficiency. Usually measured in PDSI (Palmer Modified Drought Index)
2. **Hydrological drought**, which refers to declining surface and groundwater supplies. Usually measured in PHDI (Palmer Hydrological Drought Index)
3. **Agricultural drought**, which refers to soil moisture deficiencies and
4. **Socioeconomic drought**, which refers to when physical water shortages begin to affect people.

Rising temperatures, extreme precipitation, drought, and other climate-related events in the Midwest are impacting agriculture, ecosystems, cultural practices, health, infrastructure, and waterways. All the historical drought data in this section addresses meteorological drought and impacts on agricultural production for that period. Table 26 shows the damage to life, property and crop loss impacts during the specified period.

The highest occurrences of drought conditions with recorded events in Iowa are associated with agricultural and meteorological drought because of either low soil moisture or a decline in recorded precipitation. Droughts can be intermittent or widespread which may last from a period of a few weeks or years.

A prolonged drought can have a serious impact on a community's water supply and local economy. Increased demand for water and electricity may result in shortages of resources. Moreover, food

Table 26: Drought Events in Planning Area (2000-2023)

Location	Date	Deaths	Injuries	Property Damage ($)	Crop Damage ($)
Grundy (Zone)	8/1/2001	0	0	$0	$11,350,000
Grundy (Zone)	8/1/2003	0	0	$12,650,000	$0
Grundy (Zone)	7/1/2012	0	0	$0	$45,000,000
Grundy (Zone)	8/1/2012	0	0	$0	$6,000,000
Grundy (Zone)	9/1/2012	0	0	$0	$0
Grundy (Zone)	10/1/2012	0	0	$0	$0
Grundy (Zone)	6/15/2021	0	0	$0	$0
Grundy (Zone)	7/1/2021	0	0	$0	$0
Grundy (Zone)	8/1/2021	0	0	$0	$0
Grundy (Zone)	9/1/2021	0	0	$0	$0
Grundy (Zone)	10/1/2021	0	0	$0	$0
Grundy (Zone)	11/1/2021	0	0	$0	$0
Grundy (Zone)	6/13/2023	0	0	$0	$0
Grundy (Zone)	7/1/2023	0	0	$0	$0
Grundy (Zone)	8/1/2023	0	0	$0	$0
	Total	**0**	**0**	**$12,650,000**	**$62,350,000**

Source: National Centers for Environmental Information

shortages may occur if agricultural production is damaged or destroyed by a loss of crops or livestock. While droughts are generally associated with extreme heat, droughts can and do occur during cooler months.

This hazard affects the entire county.

Historical Occurrence: 4 Recorded Droughts

According to the National Integrated Drought Information System, there have been four recorded drought events with property and crop damage within Grundy County's recent history from 2001 to 2023. The recently recorded events are **August 1995, August 2001, August 2003, and July -August 2012**

A summary of notable periods of extreme droughts are below from 1990 to 2023.

August 1995 - This drought affected the entire state of Iowa. Precipitation was confined to widely scattered thunderstorm activity, which produced a wide variation of monthly rainfall amounts. The summer months of June through August of 1995 ranked 14th warmest in the 123 years data has been collected.

The dry conditions resulted in deterioration of Iowa's corn and soybean crops. Yield losses were greatest over southern Iowa where plantings were delayed by excessive spring rainfall. Reports indicate losses in the corn of between five and 25 bushels per acre with the greatest over the south. Soybean losses were not that great and were generally 5% or less. In dollars this translates to about $420 million in corn and $116 million in soybeans.

August 2001 - Beginning on August 1, 2001 through August 23, 2001, a portion of Iowa (including Grundy County and 50 additional counties) experienced a record drought. In what became a rather tough growing season, drought developed in Iowa during the month of July, and became serious in August. During the early part of the growing season, excessive rainfall caused significant planting delays across the state. Once the crop was planted, cool and cloudy weather settled into the state slowing crop maturation. Once the warm weather finally arrived, rainfall tailed off significantly. Very little rainfall was reported during the month of July; however, crops flourished with the moisture that was available. During the last half of July, temperatures began to soar into the 90s quite regularly. Temperatures were in the 90s to around 100 for most of the first 10 to 12 days of August with virtually no rainfall. Moisture reserves ran out during the critical time of pod filling for the soybeans and at the tasseling for the corn. Another factor that complicated the situation was the soil moisture profile over central and southwest Iowa. After two years of drought, rain began falling during the last fall of 2000 and continued into the spring of 2001. Though soil moisture was replenished in part, a layer of dry soil remained below the moistened layer, preventing root development below the moist layer. Reports indicate losses estimated between one third and one half in parts of central and southwest Iowa. A few locations had verifiable corn crop losses approaching 80%. Overall, losses for the season were closer to the 15% range. Damage to the corn crop was a little over $350 million, with about $225 million in losses to the soybean crop, and about a $2 million loss to the oat crop.

August 2003 - Dry weather settled again over Iowa and Grundy County during August 2003. The last widespread rain occurred on July 9th. An extended period of heat and humidity from the 15th to 25th saw highs in the 90s to over 100 degrees Fahrenheit (F) in some areas. By month's end drought indices had worsened to severe to extreme drought across south central Iowa (52 counties) and at least moderate drought over the remainder of the state. Waterloo had its driest August on record, Des Moines its 3rd driest and Ottumwa its 8th driest. A cold front brought only a brief respite from the intense heat, as temperatures rebounded into the 90s to near 100 degrees F. on the 24-26th. Des Moines Airport reached the century mark for the first time since July 29, reaching 100 F. on the 24th and 101 F. on the 25th. This was followed by a slow cool down as several pushes of cooler air traversed the state. Unfortunately, there was only widely scattered convection across the state on the 27th and 28th, providing little significant drought relief. Light to moderate rainfall on the 31st fell primarily across the southern one half of the state, with the heaviest amounts in the southeast. The end of the month saw numerous records approached or established for an all-time record dry August. In Waterloo, the 0.08" broke the previous dry August record of 0.37" set in 1955, while Des Moines had its 3rd driest August ever with

0.31" (driest 0.14" in 1909). Many stations had from 10 to 25 percent of normal rainfall. The drought in south central Iowa as shown by the Palmer Drought Index reached the Extreme category (-4.09) for the first time in this level by August 30th. Statewide NWS Cooperative station data compiled by the Iowa State Climatologist's office showed August temperatures averaged 74.3 F. or 3.0 degrees above the 30-year (1971-2000) mean, ranking as the 18th warmest in 131 years. Precipitation statewide was 0.96" or 3.23" below than normal, ranking as the driest August on record. June through August was the 65th warmest (72.0 F. or 0.4 degrees above normal) and the 18th driest (9.55" or 1.93" below normal) months. The dry conditions caused deterioration in the states crops. Estimates place yield reductions of about 10% on the corn crop, or a **loss** of about $210 million. Losses on the soybean crop were around 30%, or a loss of about $435 million.

July-October 2012 – Drought conditions that began in late June continued through July and into August. Very warm and dry weather that began in the spring continued through the summer. Temperatures warmed sharply the last few days of June. The heat persisted into August. Temperatures for the month of August were cooler than July, and in fact, just above normal. For the three summer months of June, July, and August, temperatures were among the top 10 warmest on record. Rainfall was in short supply across the state. Much of the state recorded less than 50% of normal rainfall for the month, with a few locations under 25% of normal. The south quarter fared a little better with a few locations receiving close to normal rainfall for the month. In addition, extended periods of temperatures above 90 F combined with dewpoint temperatures falling into the 50s at times, resulted in additional stress. The rapid deterioration of the corn and soybean crop that took place in July slowed as much of the damage had already occurred in July. By the end of the month, officials estimated that 15% of the soybean crop and 20% of the corn crop yield had been lost to the drought. At the current price, the loss total was in excess of $2.6 billion. As of 31 August, the USDA reported that Secretarial Primary Drought Designations had been listed for 42 of the counties in the Des Moines CWA, with the remaining 9 receiving Contiguous Designations. The drought conditions continued into September.

Probability: Highly Likely

According to the National Climactic Data Center (NCDC), Iowa had 14 periods of drought of different levels from 1995-2017. During that period, there was $4.612 billion in crop damage resulting from drought periods and over $645 million in property damage. In 2013, 67 counties were affected by a severe drought which had an impact of $945 million in crop damage. No property damage was noted. Starting in July 2012, all 99 counties in the entire state were in a drought situation. The length of the drought varied from three to nine months in duration. The estimated impact of that drought was over $2.69 billion to crops.

The state of Iowa has been in a state of prolonged drought since 2012. Drought conditions for Grundy County are predicted to persist for the next three months as of the writing of this report. Drought conditions can change rapidly as Grundy County is located in a cross winds climate between regulating bodies of water that have regional effects which are harder to predict. Based on historical data and climate projections by national drought databases, the prolonged drought in Grundy County is expected to continue. This hazard **is highly likely** for Grundy County.

Magnitude or Severity: Critical (25-50% of crop damage)

While the entire planning area would be affected by a drought, those dependent (persons, animals, and crops) on rain would be the most vulnerable. This means that agriculture, agribusiness, and consumers (if the drought lasted long enough or impacted a large area) would be impacted. A drought limits the ability to produce goods and provide services. Because the jurisdictions and rural residents draw their drinking water from groundwater sources, a prolonged severe drought may impact all 14,867 persons if there were to be a dramatic drop in the stream flow coupled with the drop in the water table. In addition, while a drought may not cause structural damage to properties, a drought could cause damage to the city's utilities, especially the water and well system. Fire suppression can also become a problem due to the dryness of the vegetation and possible grass fire risk.

A drought in Grundy County would likely also be affecting most of Iowa and the Midwest region. Because of the dependence on precipitation and water, the agricultural community would be impacted the most. The agricultural areas would be most adversely impacted, but the entire state would likely feel at least some impact economically.

Deaths associated with drought are usually related to a heat wave, which is a separate hazard for this report. Impacts are costly economically, environmentally, and socially. Due to Grundy County's strong agriculturally based economy, including row crops and livestock, the impact of a drought could be **critical**.

Warning Time: Months

Drought warning is based on a complex interaction of many different variables, water uses, and consumer needs. Drought warning is directly related to the ability to predict the occurrence of atmospheric conditions that produce the physical aspects of drought, primarily precipitation and temperature. There are so many variables that can affect the outcome of climatic interactions, and it is difficult to predict a drought in advance. In fact, an area may already be in a drought before it is even recognized. While the warning of the drought may not come until the drought is already occurring, the secondary effects of a drought may be predicted and warned against weeks in advance. Warning time is not a concern with a drought as the onset of drought can take weeks, months, and sometimes even years to feel the effects.

Duration: Prolonged period – years, Annually – 3 to 4 months

The duration of a drought can affect the planning area for days and weeks, months, or longer. The US Drought Monitor updates regular updates for monthly drought outlooks.

EARTHQUAKE

Definition and Description

An earthquake is one of the most destructive geological hazards that can devastate cities or multiple communities over a vast region. The sudden shaking of the geologic foundation can cause a huge loss of life and catastrophically damage property including critical infrastructure. An earthquake is any shaking or vibration of the earth caused by the sudden release of energy usually from geological shifts from tectonic plates or faults.

Earthquakes are generally associated with plate tectonics or volcanic activity, but a third type includes 'artificial earthquakes.' In other words, a large explosion can cause the earth to quake resulting in substantial damage. Man-made operations such as fracking may cause an artificial earthquake. These industrial operations shift pressures by pumping water out of or into the ground.

The Modified Mercalli Intensity Scale is commonly used in the United States by seismologists seeking information on the severity of earthquake effects. Intensity ratings are expressed as Roman numerals between I, at the low end, and XII at the high end. According to FEMA when a Mercalli magnitude II earthquake occurs only a few people might notice movement if they are at rest and/or on the upper floors of tall buildings.

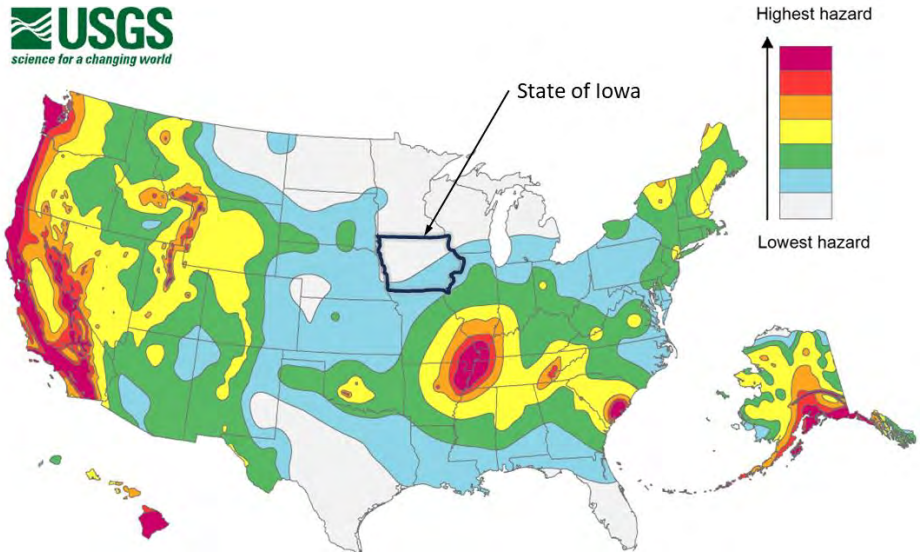
This hazard affects the entire county.

Historical Occurrence: None

Iowa has experienced the effects of only a few earthquakes in the past 175 years. The epicenters of 13 earthquakes have been in the state. The first known occurrence was in 1867 near Sidney in southwest Iowa; the most recent occurrence was in 2004 near Shenandoah in southwest Iowa. The largest Iowa earthquake (Mercalli magnitude VI) occurred near Davenport in southeast Iowa in 1934. None of these events were instrumentally recorded.

Probability: Unlikely (County Wide)

Figure 13: Long Term National Seismic Hazard Map Updated in 2018



Source: USGS Earthquake Hazard Program

According to the Iowa Geological Survey, Plum Creek River Fault Zone and Structural and Stratigraphic Framework of Eastern Iowa study volume Number 13, printed in 1985, there are several areas with faults in Iowa. The two that appear to be closest and could affect the community in this plan are the Plum River Fault Zone and the Fayette Structural Zone. The Fayette Structural Zone runs through the planning area starting north of the City of Waterloo, through the very southeast tip of Grundy County and into Fayette County towards the City of Oelwein, at a diagonal from the southwest to the northeast. The Plum River Fault Zone can be found south of Cedar Rapids and running east towards Rockford, Illinois.

Historic seismicity in the planning area in relation to the regional structural geology from 1800 to present has been slight. Assuming historic trends remain unchanged, the likelihood of an earthquake causing any substantial damage to Grundy County and its jurisdiction is

unlikely. Figure 13 illustrates the probability of an earthquake occurring in Iowa and the planning area.

The committee determined the probability of an earthquake in Iowa to be **unlikely**.

Magnitude or Severity: Limited

Most of Iowa is in a Blue Seismic Zone which is the lowest risk zone in the country.

However, if an earthquake were to occur, the entire planning area, 12,329 persons; 9,878 parcels; and over $1.671 billion in property and land valuations would be vulnerable to damage **(**See Table 27**)**.

The structures most at risk for damage would be those structures built on poor soil, such as a floodplain. It is expected that if an earthquake were to occur, the damage would be limited to the shifting of buildings off their foundations, cracked plaster on walls and ceilings, and perhaps some bowed walls. Underground utilities would be at greater risk of damage during the winter season if the ground were frozen to depths of four feet or greater.

Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake.

The damage associated with earthquakes that have occurred in Iowa would likely be relatively low. However, when considering the highly unlikely worst-case scenario, a larger earthquake would have catastrophic effects on the planning area should it occur.

While no other earthquakes with epicenters in Iowa have been recorded, earthquakes with far away epicenters can have minor effects on the region. For example, in 2002 an earthquake with an epicenter in Alaska caused temporary “black water” to occur in local wells.

Warning Time: Minimal

Unfortunately, earthquakes cannot be predicted in the foreseeable future.

Duration: Several Seconds to Minutes

The duration of an earthquake would be minutes; however, if the earthquake was large enough, the planning area would feel aftershocks for hours – even days later.

Table 27: Assessed Valuations by Land Classification for Grundy County (2022)	
Land Classification	Assessed Value
Agriculture	
Agriculture Land	$525,550,626
Agriculture Buildings	$30,374,580
Residential	
Valuation	$771,204,797
Commercial	
Valuation	$111,586,359
Industrial	
Valuation	$117,631,400
Utilities w/o Gas & Electric	
Valuation	$29,935,397
Exemptions (Military bases, property)	*-$1,100,088*
Total Value for Grundy County *w/o Gas & Elec. Utilities	$1,585,183,071
Total Value for Grundy County with Gas & Elec. Utilities	**$1,671,818,572**
Source: Grundy County Assessor and Iowa Dept. of Management (as of 01/01/22 for FY 2023/24)	

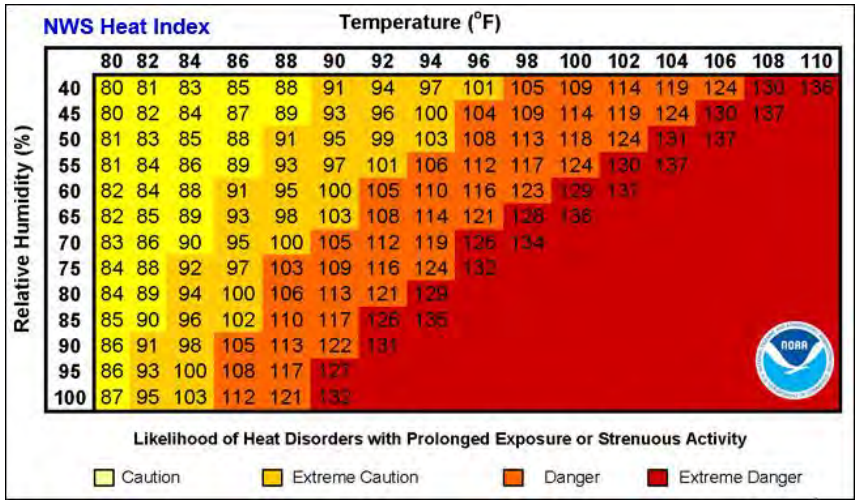
EXTREME HEAT

Definition and Definition

Extreme heat is a weather event where the outside temperatures are abnormally higher than seasonal, or record temperatures are for a given location. This occurs during summer and summer – fall seasons. Conditions for extreme heat include combinations of high humidity, prolonged and excessive hot weather, and actual air temperature. In Iowa, extreme heat is defined as two consecutive days of temperatures over 90 degrees Fahrenheit (F).

A heat wave is an event lasting two or more days of abnormally and uncomfortably hot and unusually humid weather. A heat dome is an atmospheric condition where high atmospheric pressure traps hazy, damp air near the ground.

Figure 14: National Weather Service Heat Index



Source: National Weather Service

Sometimes referred to as the "apparent temperature" the heat index, given in degrees Fahrenheit, is an accurate measure of how hot it really feels when the relative humidity (RH) is added to the actual air temperature.

Midwestern states often feel the most impact from heat waves as humidity is more intense and often leads to more deaths. According to the Department of Health and Human Services and the CDC's 2009 heat prevention guide, the average death rates increase 5% during the first heat waves than following heat waves during a summer. Impacts to people, especially vulnerable populations people increase significantly during heat wave events in the Midwest. Older adults, children, laborers working outside, and people with physical disabilities may feel more impact to their health and safety during a heat wave.

In humans, extreme heat events make individuals much more susceptible to such heat related illnesses as heat cramps, heat exhaustion, heat rash, and heat stroke. Several factors affect the body's ability to cool itself during extremely hot weather. When the humidity is high, sweat will not evaporate as quickly, preventing the body from releasing heat quickly. Other conditions related to heat related illnesses include age, body mass index, heart disease, mental illness, poor blood circulation, sunburns, drug use, and alcohol consumption.

Many similar physical reactions occur in animals during extreme heat events but can go unnoticed by an unobservant caretaker. The susceptibility to heat varies depending on the type of animal and whether they have access to water to avoid dehydration.

Crops often suffer substantially during prolonged heat waves, especially if they occur in conjunction with moderately dry conditions or even drought. This is of particular concern to the community as the area is surrounded by primarily agricultural uses. Crop damage and failure due to heat waves have an effect on a farm economy which would have an impact on the community's overall well-being.

Historical Occurrence: 3 Events since the 1995 Heat Wave

Iowa History

From July 12-14, 1995, Iowa was hit by a heat wave that swept through the Midwest. This was one the deadliest heat waves in recent history

where 830 deaths occurred. Approximately 525 deaths occurred in Chicago where heat related deaths vastly outnumbered national fatality rates due to many factors including the heat island effect.

The highest dew point readings were over the east half of the state. Winds remained light throughout the period and were generally less than 10 mph. High temperatures during the period were generally in the 98°F to 108°F range. The highest known temperature was 109°F in the Council Bluffs area. Most of the west half of the state broke the century mark on the 13th, and nearly every station by the 14th. Overnight low temperatures struggled to reach the middle 70s, with some areas remaining around 80°F. The highest heat indices were in the east half of Iowa, where the higher dew point temperatures were. The highest reading came from Cedar Rapids, IA on the 13th, with a heat index of 131°F by late afternoon.

Three people died from the heat in Iowa, one in Des Moines, one in Marshalltown, and a third in Burlington. A 95-year-old woman died in her home when the temperature in the house climbed above the 110°F mark. She had no air conditioning or fans, and the windows were closed. In Marshalltown, a 71-year-old man died in his unairconditioned home. In a similar way, a 37-year-old man died in his un-airconditioned apartment in downtown Burlington on the 13th.

A significant loss also occurred in livestock during the heat wave. Statewide figures indicate losses approaching the $5-$6 million range. Losses were placed at 4,000 head of cattle, 370 hogs, 1,250,000 chickens, and 250,000 turkeys. On one Webster County farm alone 250,000 laying hens perished on the 2nd day of the heat. Another egg producer had 1.5 million laying hens on two farms, one in Winterset, the other in Guthrie Center. They reported a loss of at least 500,000 hens. Disposal became a serious problem as rendering plants were overwhelmed.

In addition to problems caused to humans and livestock, there were numerous heat buckles reported on streets and highways around the state. Early indications were there was little in the way of crop damage. The combination of light winds and extremely high dew point temperatures helped keep the crops from stressing too much. Heavy dew would form overnight that would last well into the early afternoon hours.

During the month of July, approximately 70 daily maximum temperature records were set at locations from the central and northern Great Plains to the Atlantic coast.

According to the National Centers for Environmental Information, there have been 3 events that occurred in the planning area. About $135,000 in property damage occurred. There has been a high number of crop damage from these heat events, undoubtedly.

Table 28: Extreme Heat Events in Planning Area (1990-2022)

Location	Date	Event Type	Deaths	Injuries	Property Damage	Crops Damage
Grundy (Zone)	8/5/2001	Heat	0	0	$ -	$ -
Grundy (Zone)	7/15/2011	Excessive Heat	0	0	$ 135,000	$ -
Grundy (Zone)	7/18/2019	Excessive Heat	0	0	$ -	$ -
				Total	**$135,000**	**$0**

Source: National Centers for Environmental Information

Probability: Unlikely

Based on historical occurrences of heat and excessive heat events, the probability of another heat or excessive heat event is unlikely for Grundy County.

Magnitude or Severity: Critical

The severity of a heat wave can be life threatening and lead to heat related illnesses. Elderly residents living alone without air conditioning is often the most vulnerable to heat related illnesses and death during heat waves. Construction workers working outside at job sites are more susceptible to heat exhaustion. Babies, young children, and dogs also are at more risk of heat illnesses in hot vehicles.

Within the planning area, it is anticipated that the actual impacts of a heat or excessive heat event would be less severe than what could potentially happen.

More likely, a heat wave would likely result in increased energy consumption as a result of more air conditioning units operating. Increased numbers of people at public places such as malls, movie theaters, and swimming pools is also anticipated. Companies and organizations that rely on outdoor labor would likely see a reduction in productivity. Plant life would suffer severe stress possibly stunting growth, hurting crop yields, and thereby affecting the local economy.

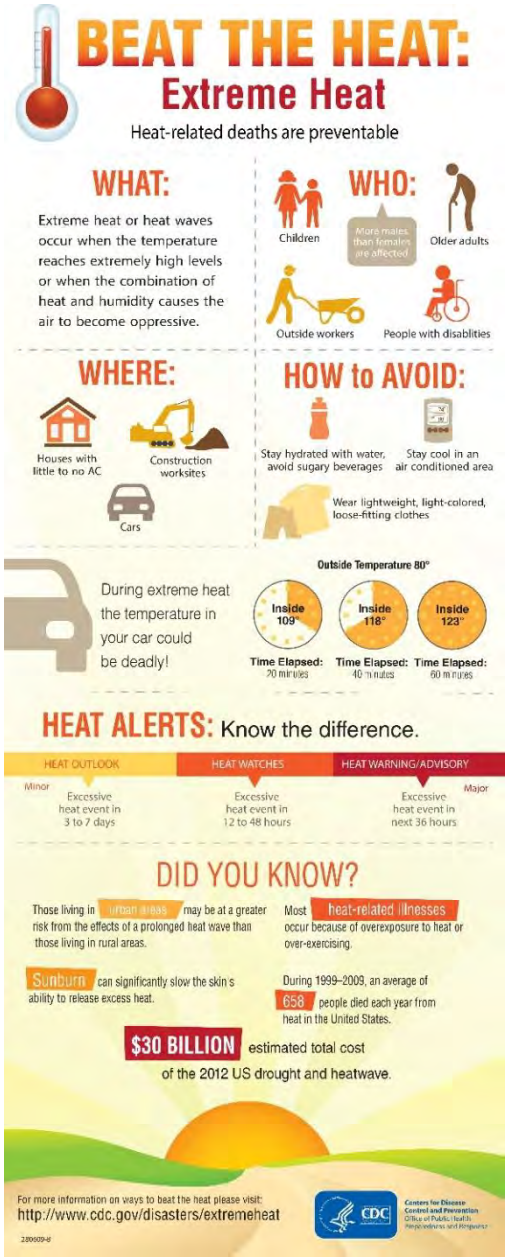
Costs to the planning area may occur when roads, sidewalks, and foundations may buckle due to heat expansion in building materials.

Warning Time: At least 24 hours

Heat waves are generally well forecasted; therefore, the onset speed is at least 24 hours. When temperatures or heat indices rise to dangerous levels, the National Weather Service will initiate alert procedures.

Duration: 2-3 Days

Extreme heat conditions have been known to last days and even weeks with little to no relief.



FLOODING – FLASH

Definition and Description

A flash flood is an event that occurs with little or no warning where water levels rise at an extremely fast rate. Flash flooding results from intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area.

Even with information on soil saturation and predicted rainfalls flash floods can cause unpredictable and dangerous inundation to an affected area. 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.

Historical Occurrence: 18 Recorded Events since 1990

According to data from the National Climatic Data Center (NCDC) there have been 18 events reported between 1990 and October 2023. These floods caused an estimated $2 million in property damage and $660,000 in crop damage. There has been 1 recorded injury from flash flood events in Grundy County.

It should be noted that there can be several flood events that go unrecorded for several reasons. Such as the events do not cause substantial damage to dwellings or structures. However, these events do result in flood costs that the county taxpayers and individual property owners must finance such as repairing scoured drainage channels or removal of sediment and debris across miles of storm drain pipes, outlets, drains, etc.

Table 29: Flash Flood Events in Planning Area

Location	Date	Deaths	Injuries	Property Damage ($)	Reported Crop Damage ($)
Wellsburg	6/8/1999	0	0	$500,000	$50,000
Stout	7/2/1999	0	0	$75,000	$100,000
Countywide	7/10/2000	0	1	$200,000	$250,000
South Portion	5/10/2001	0	0	$75,000	$0
Northwest Portion	8/16/2004	0	0	$10,000	$10,000
Grundy Center	6/22/2007	0	0	$100,000	$250,000
Reinbeck	4/25/2008	0	0	$10,000	$0
Wellsburg	4/25/2008	0	0	$10,000	$0
Fern	8/10/2010	0	0	$25,000	$0
Fern	8/10/2010	0	0	$10,000	$0
Ivester	5/26/2013	0	0	$50,000	$0
Wellsburg	5/26/2013	0	0	$25,000	$0
Holland	5/29/2013	0	0	$450,000	$0
Wellsburg	6/24/2013	0	0	$200,000	$0
Reinbeck	6/29/2014	0	0	$50,000	$0
Beaman Thurman Arpt	6/30/2014	0	0	$100,000	$0
Wellsburg	8/28/2015	0	0	$100,000	$0
Wellsburg	8/28/2015	0	0	$10,000	$0
		0	1	$2,000,000	$660,000

Source: National Centers for Environmental Information (NOAA)

A brief description of notable events that caused property and/or crop damage is provided.

June 1999

A strong upper-level disturbance moved north-northeast into Iowa during the afternoon hours. A very unstable airmass was in place over the state with lifted indices near -10 degrees C. Surface dew points were in the low 70s as high temperatures soared into the upper 80s and 90s. This combined to produce CAPE values near 5000 J/kg. Thunderstorms erupted initially in an east to west line. That line lifted north and as it did produce very heavy rain and some hail of three quarters of an inch to an inch in diameter. A second line formed in a more north to south orientation and moved east across the state. There were also some reports of dime size or larger hail from that line as well. Serious crop damage occurred in Hancock County southeast of Kanawha due to the hail. Crops needed to be replanted in the area. The main problem was with the intersection of the two lines. At the intersection of the two outflow boundaries from the lines a few brief tornadoes occurred. These were more like spin up tornadoes and were very short lived, causing no significant damage. One was in Wright County north of Goldfield, another Humboldt County southwest of Renwick, with yet another in Hancock County southeast of the Kanawha area. As the storms moved through the Lake Mills area in Winnebago County, high winds downed trees and caused vehicle damage. As the evening progressed, the upper-level vorticity maximum was evident in the radar signature. The comma head of the precipitation passes over Black Hawk and Grundy Counties. Reports southeast of Waterloo indicated 3.76 inches of rainfall in a 90-minute period. Meanwhile, the area between Reinbeck and Wellsburg received more than 5 inches of rain in a 3-hour period. Normally, this amount of rain would not be all that serious, however soil conditions in that part of the state were very saturated resulting in significant runoff. Flash flooding occurred in the two counties. Numerous gravel roads were washed out over the northwest part of Butler County with widespread flooding reported between Reinbeck and Wellsburg.

July 1999

Intense rainfall occurred over northeast Iowa. Flash flooding was widespread over northern Grundy, southern Butler, southern Bremer, and most of Black Hawk Counties. A large swath of 6-to-8-inch rainfall occurred over the Beaver Creek basin, causing flash flooding in the area and an eventual flood of near record proportions. County officials reported the flooding as very serious with countless roads and highways under water. Cars were stranded and thousands of basements were flooded by the onslaught of heavy rain. One report indicated several head of cattle lost as they were drowned by the flood waters in Grundy County. No doubt, this was not the only case of livestock loss due to the flooding. Another report from the Dewar area, east of Waterloo, indicated about a block of railroad was washed out. Damage there was reported to 33 houses, a car repair shop, and a tavern. Rainfall was in excess of three inches per hour in many areas. The heaviest rainfall officially was around 9 inches. Some unofficial reports in the Cedar Falls area included up to 9 inches of rainfall in a 90-minute period. The observer at Parkersburg picked up 6.55 inches of rain in under 3 hours. A bucket survey in the area showed rainfall of 11 to 14 inches at a few locations in Butler County. The heavy rain occurred as a series of storms formed and trained over the same areas. The complex of thunderstorms that developed was a back developing complex. Late in the life of the system, one of the storms became severe. This storm displayed a meso circulation on the WSR-88D in Johnston, IA, though it was not all that well formed. The storm was the last in the series of storms and layed down a path of damage. The swath was about 13 miles long, extending across southern Butler and northern Grundy Counties. The damage path looked to be more downburst in nature, though there were reports of a tornado embedded in the flow pattern. The situation was not all that different from the cyclone/tornado system that moved through Boone, Dallas, and Polk

Counties about a year earlier on June 29, 1998. The tornado caused damage to several farmsteads along the road. The worst hit was on farmstead where all the farm buildings were destroyed and only the superstructure of the farmhouse remained. Debris was wrapped up in trees for many miles along the path. One other tornado did occur earlier in the day. The tornado came from one of the supercells over western Iowa. A relatively small tornado touched down in Audubon County west of Hamlin. There was little damage reported with this tornado.

July 2000

Severe weather was limited to the storms and occurred mainly during the early life of the developing mesoscale convective system. There were several reports of winds of around 60 MPH over northern Iowa during the evening hours as the storms moved in initially. Nearly all of the county blacktop roads were under water at one point. There were numerous reports of debris being swept onto roads. Numerous roads were reported in a multi-county area.

One injury occurred during the event in Grundy County. Highway 175 was closed near Reinbeck as water swept a truck off the highway. One man was injured and taken to the hospital. In addition to flooded roads, numerous basements were flooded. Crop damage occurred as farm fields were flooded by the heavy rainfall.

May 2013

Thunderstorms developed rapidly around mid-day and produced very heavy rainfall, as well as high winds and hail. Most of the hail was somewhat limited in spite of the relatively low freezing level of 12,600 feet. Wind and heavy rainfall were the dominant weather type. Hail was limited to penny size up to 1.5 inches in diameter. Several of the storms produced 60 to 70 MPH winds, downing numerous trees and power lines. The most extensive damage was in Butler County.

Winds estimated around 80 MPH caused considerable damage to a containment build and significant structural damage to 18 houses in the town of Greene. Damage in town was around $500,000. A band of 2 to 4 inches of rainfall was observed from southwest through central into northeast Iowa. This caused flash flooding as the rain fell on already saturated soil. There were numerous roads under water from the flood waters.

Officials in Tama County reported that a bridge was washed out, at a cost of $75,000, and at least $150,000 in damage to secondary roads. In Grundy County, initial estimates of damage to county secondary roads were at least $170,000. As of the 29th of May, then-Governor Terry Branstad declared 15 Iowa counties disaster areas due to the storms and flooding. They included Buena Vista, Cherokee, Butler, Floyd, Grundy, Johnson, Iowa, Jasper, Marshall, Mitchell, Plymouth, Poweshiek, Sioux, Tama, Wapello, and Wright.

June 2014

This event was similar to the event of 29 June 1998. Thunderstorms formed over northeast Nebraska by sunrise and continued to propagate east into Iowa. The storms intensified as they moved across the state, into a forward moving MCS. As it strengthened into a Derecho, winds of 70 to 80 MPH were reported over a large swath of the state.

All modes of severe weather occurred. Widespread wind damage was reported to trees, power lines, and structures from the high winds. In addition, very large hail occurred. Some of the larger hail included three-to-four-inch diameter hail in Calhoun County near Rockwell City, and three-and-one-half-inch diameter hail in Warren County at Sandyville. Several tornadoes were confirmed. Very heavy rainfall occurred with the storms. The rain led to flooding and flash flooding in many areas of northern and central Iowa. By the end of the month, a presidential disaster declaration had been made for the following Iowa

counties: Adams, Clarke, Decatur, Mills, Montgomery, Pottawattamie, Ringgold, Taylor, and Wayne. Governor Branstad also requested a disaster declaration for the following 26 Iowa Counties: Allamakee, Buchanan, Buena Vista, Butler, Cherokee, Chickasaw, Clay, Dickinson, Emmet, Fayette, Franklin, Hancock, Humboldt, Ida, Kossuth, Lyon, Osceola, Palo Alto, Plymouth, Pocahontas, Sac, Sioux, Winnebago, Winneshiek, Woodbury, and Wright. The Presidential declaration was granted on 24 July 2014.

Probability: Highly Likely

Considering the historical occurrences of flash flood events, the probability of future flooding events is highly likely in the next five years. Flooding is an annual problem throughout the planning area. While the planning area can experience some degree of flooding throughout the year, the threat of flash flooding is compounded in the late winter and early spring months, as melting snow can overflow streams, rivers, and tributaries. As part of three watersheds (Middle Cedar, Upper Iowa, and Middle Iowa), areas adjacent to the rivers and creeks, and its main tributaries are at significantly higher risk than those areas located away from these features. However, flash flooding can also happen in developed areas that do not have proper drainage systems to carry the melted snow and rainfall away from homes and businesses. The committee determined the probability of a flash flooding event in the planning area to be likely.

Magnitude or Severity: Limited

Flash flooding in the incorporated areas can vary substantially. Homes, businesses, and infrastructure that remain near or in the floodway and 100-year floodplain will be flooded again. In addition to those, low-lying areas in each jurisdiction can be vulnerable to flooding. All incorporated jurisdictions are vulnerable to flash flooding. The jurisdictions of Beaman, Conrad, Dike, Grundy Center, Holland, Morrison, Reinbeck, and Wellsburg have a higher risk of flash flooding due to their proximity to rivers and creeks. Based on data from 2016 (see Table 51) the incorporated areas have 1,752 parcels of land within the 1% floodplain (previously known as the 100- floodplain). Total property values (2016) for these parcels are approximately $334,578,956. This figure includes building, dwelling, and land value. There are an estimated 1,574 parcels in the unincorporated areas of Grundy County within the 1% floodplain (100-year floodplain). The land, building, and dwelling values of these areas are estimated to be 316,307,614.

Warning Time: Less than an hour

Flash flood warnings are disseminated from the National Weather Service, IAWAS, and local officials, who then, in turn, distribute warnings to the affected areas using established procedures. People in the path of flash floods may have time to take appropriate actions to limit harm to themselves and their property. Floods may occur in the form of flash flooding which can occur in a matter of tens of minutes.

Duration: Less than a day

The duration of flash flooding is dependent on the severity of the flooding event. The duration of a flash flooding event would likely be under one day. However, damage, and cleanup from an event may take several days to recover from

FLOODING – RIVER

Definition and Description

River floods are the most common and widespread of all-natural disasters, except fire. Most communities in the U.S. can experience some kind of flooding after spring rains, heavy thunderstorms, winter storm thaws, waterway obstructions, or levee or dam failures. Flooding is a natural and expected phenomenon that occurs annually, usually restricted to specific streams, rivers, or watershed areas.

Historical Occurrence: 36 Recorded Floods

According to the National Climatic Data Center (NCDC), there have been 36 recorded flood events involving the planning area from 1996-2015. Table 31 displays the date, general location, and impact of these floods. Since 1996, floods have caused nearly $1.8 million in property and $21.4 million in crop damage in the area. No deaths or injuries have been reported due to flooding in the area. The following is not intended to be complete historical records of every flood event to have occurred within the planning area, but rather a brief summary of some of the more severe events that have taken place.

Floods of 1993 – Following a record winter snow accumulation and temperatures above normal, a major flooding event occurred in Iowa. Flood warnings were issued for a large part of the Iowa and Cedar River Basins. On March 30th and 31st, widespread half inch to 1-inch rains blanketed the state. This occurred in the flood prone regions of the upper portions of the Iowa and Cedar River Basins. By early May, eight counties had received the federal disaster declaration from the late March and early April flooding. These counties were Black Hawk, Butler, Linn, and Muscatine in the Cedar River basin; Tama and Benton in the Iowa River basin, Buchanan in the Wapsipinicon River basin, and Webster County in the Des Moines River basin. A record crest was observed on the Iowa River at Marshalltown, and initial indications were that Beaver Creek at New Hartford tied the record crest. Several state highways were closed by high water as well as countless county roads. Many of the rivers in the state crested as much as 4 to 8 feet over flood stage. A few towns became isolated and were only accessible by boat. For example, water flooded the downtown areas of Algona, Chelsea, and New Hartford. Former Governor Branstad declared 11 Iowa counties disaster areas and several received federal disaster declaration. Property damages totaled over $50 million, with crop damage totaling over $10 million.

Flood of 2008 – In 2008, separate flood events occurred in the Midwest in January, February, March, April, May, June, July, and September. In June of 2008 historic river flooding occurred across much of eastern Iowa. The setup for flooding began almost a year prior as a long-term wet pattern primed the area for floods. This historic flood caused flooding in the entire Middle Cedar River Watershed.

Table 31 shows the recorded flooding events in Grundy County since 1996.

Probability: Likely in Unincorporated Planning Area

While the planning area can experience some degree of flooding throughout the year, the threat of river flooding is compounded in the late winter and early spring months, as melting snow can overflow streams, rivers, and tributaries. As part of three watersheds (Middle Cedar, Upper Iowa, and Middle Iowa), areas adjacent to the rivers and creeks, and its main tributaries are at significantly higher risk than those areas located away from these features.

Considering the historical occurrence of flooding events and the number of creeks and streams located in planning area, the probability of future river flooding **highly likely**. Flooding is an annual problem throughout some of the planning area. However, unlike other hazards, the probability and impact of flooding varies greatly among the member jurisdictions. The probability of flooding in each jurisdiction is discussed below. The vulnerability assessment conducted for the

planning area in Section 3 was used to determine the probability for jurisdictions' associated risks for river flooding. See Table 30 for the magnitude of impact from a 100-year flood in various areas of the county.

Flood maps for each municipality's planning area in Grundy County are shown in Appendix Q.

GRUNDY COUNTY (UNINCORPORATED)

The probability of river flooding is considered likely. Table 20 shows that approximately 31% of the unincorporated parcels of Grundy County lie within the 100-year flood plain with a 1.0% chance of annual flooding.

BEAMAN

The likelihood of river flooding in Beaman is considered **unlikely**. Wolf Creek travels through the southernmost part of the community but has no immediate dangers of flooding. There are only 6 parcels that would be impacted in the 1.0% annual chance of flooding (100-year flood). No river travels through the city limits and there are only two parcels of land in a floodplain.

CONRAD

The probability of river flooding in Conrad is considered **unlikely**. Wolf Creek travels through the southern portion and western edge of the city. Only 49 parcels, or 9% of the city's parcels, are within the floodplain.

DIKE

The city determined the probability of river flooding to be **unlikely**. The main threat to flooding for Dike is the Grundy County Lake to the southwest of the community, and North Black Hawk Creek that is located just south of the community. With only 4.8% of the parcels that would be affected by a 1.0% annual chance of flooding (100-year flood), it is considered unlikely.

Table 30: Magnitude of Impact by 100-Year Floodplain

Areas	% of Parcels in Area In 100 Year Floodplain	Magnitude or Severity
Grundy County (Unincorporated)	31%	**Critical**
Beaman	<5%	**Negligible**
Conrad	9%	**Negligible**
Dike	<5%	**Negligible**
Grundy Center	<5%	**Negligible**
Holland	10%	**Negligible**
Morrison	5%	**Negligible**
Reinbeck	<5%	**Negligible**
Stout	0	**Negligible**
Wellsburg	<5%	**Negligible**
Dike - New Hartford Community School District (Dike Only)	0%	**Negligible**
Grundy Center Comm. School District	0%	**Negligible**

Source: Grundy County Assessor, FEMA FIRM data

GRUNDY CENTER

Grundy Center has two creeks, Minnehaha Creek and Black Hawk Creek that run to the north and south of the community that pose the greatest threat for the area. With only 2.5% of parcels prone to be affected by a 1.0% annual chance of flooding (100-year flood), it is considered **unlikely** of a flooding event.

HOLLAND

The probability of river flooding in Holland was determined to be **occasional**. The Holland Creek flows to the south and east of the city

limits, with a portion of the river cutting through the western quadrant of the city limits. With about 10.2% of parcels that would be affected by a 1.0% annual chance of flooding (100-year flood), it is considered occasional.

MORRISON

The committee determined the probability of river flooding to be **unlikely**. Black Hawk Creek flows to the north of the community, but it only affects 4 parcels, which results in only 5% of parcels affected by a 1.0% annual chance of flooding (100-year flood).

REINBECK

The probability of river flooding in Reinbeck is unlikely with only 19 parcels being affected by flooding. This means that only 2% of the parcels in Reinbeck would be affected by a 1.0% annual chance of flooding (100-year flood). Black Hawk Creek runs to the north of the community, but mostly in undeveloped areas.

STOUT

The committee determined the probability of river flooding to be unlikely. Zero parcels are affected by a 1.0% annual chance of flooding (100-year flood) due to the lack of creeks, streams, or other waterbodies in the area.

WELLSBURG

The probability of river flooding in Wellsburg is unlikely with only 19 parcels being affected by flooding. This means that only 3.9% of the parcels in Reinbeck would be affected by a 1.0% annual chance of flooding (100-year flood). Small creeks or water run offs run to the south of the community, but mostly in undeveloped areas.

DIKE, DIKE-NEW HARTFORD COMMUNITY SCHOOL DISTRICT

River flooding was determined to be unlikely for Dike. Only 5% of the city is in the 100-year floodplain. The Dike-New Hartford School District also determined the probability of river flooding to be likely, but that was due to 95% of New Hartford being in the floodplain. The school building that is in the city of Dike is not located in the floodplain.

Warning Time

People in the path of river floods may have time to take appropriate actions to limit harm to themselves and their property. River flooding can be forecasted to allow for several hours perhaps even days notification.

Duration

The duration of a flooding event varies based on the severity and location of the flooding event. Duration can range from a few hours to several days or longer.

Table 31: River Flood Events in the Planning Area

Location	Date	D	I	Property Damage ($)	Crop Damage ($)	Location	Date	D	I	Property Damage ($)	Crop Damage ($)
Grundy (Zone)	6/17/1996	0	0	$0	$0	**Grundy (Zone)**	3/23/2001	0	0	$7,500	$0
Grundy (Zone)	2/18/1997	0	0	$0	$0	**Grundy (Zone)**	5/1/2001	0	0	$75,000	$0
Grundy (Zone)	3/9/1997	0	0	$0	$0	**Grundy (Zone)**	6/12/2001	0	0	$25,000	$50,000
Grundy (Zone)	3/19/1997	0	0	$0	$0	**Grundy (Zone)**	7/5/2003	0	0	$10,000	$25,000
Grundy (Zone)	6/21/1997	0	0	$0	$0	**Grundy (Zone)**	5/22/2004	0	0	$100,000	$298,039
Grundy Center	6/20/1998	0	0	$50,000	$5,000	**Grundy (Zone)**	6/26/2005	0	0	$74,070	$50,000
Grundy Center	6/24/1998	0	0	$30,000	$3,000	**Grundy (Zone)**	7/26/2005	0	0	$10,000	$30,000
Grundy Center	6/27/1998	0	0	$50,000	$10,000	**Holland**	3/2/2008	0	0	$25,000	$0
Grundy (Zone)	7/6/1998	0	0	$50,000	$100,000	**Wellsburg**	4/25/2008	0	0	$150,000	$0
Grundy (Zone)	5/16/1999	0	0	$200,000	$25,000	**Grundy (Zone)**	2008	0	0	-	-
Grundy (Zone)	5/21/1999	0	0	$50,000	$10,000	**Wellsburg**	6/12/2010	0	0	$0	$20,000,000
Grundy (Zone)	6/9/1999	0	0	$50,000	$75,000	**Morrison**	5/29/2013	0	0	$250,000	$0
Grundy (Zone)	6/23/1999	0	0	$5,000	$5,000	**Wellsburg**	8/28/2015	0	0	$100,000	$0
Grundy (Zone)	6/1/2000	0	0	$10,000	$5,000	**Wellsburg**	12/14/2015	0	0	$100,000	$0
Grundy (Zone)	6/9/2000	0	0	$25,000	$25,000	**Fredsville (Unincorporated)**	7/1/2018	0	0	$100,000	$500,000
Grundy (Zone)	6/13/2000	0	0	$20,000	$50,000	**Dike**	10/1/2018	0	0	$0	$50,000
Grundy (Zone)	6/24/2000	0	0	$50,000	$75,000	**Wellsburg**	3/14/2019	0	0	$100,000	$0
Grundy (Zone)	7/10/2000	0	0	$50,000	$25,000	**Reinbeck**	6/22/2020	0	0	$0	$0
						Conrad	6/22/2020	0	0	$0	$0
D= Death, I= Injuries							**Total Count=**	**0**	**0**		
							Total cost: value is to nearest $100 =			**$1,766,600**	**$21,416,000**

Source: National Centers for Environmental Information (NOAA)

Magnitude or Severity: Varies (See Table 32)

Potential flooding impacts range from very low to catastrophic depending on the type and location of flooding. Flooding impacts include loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock damage and loss and interruption of business. Table 30 shows the varying magnitude levels of a 100-year flood for each area in the county based on the 100year flood plain boundaries from the FEMA FIRM data maps.

Table 32 displays the value of land, buildings, and dwellings in the 1.0% (100-year) floodplain for the combined incorporated areas and the unincorporated areas of county. The FIRM panel information is current as of 12/20/2019. There have been no major changes in the flooding boundary since the last 2017 Grundy County MJ-HMP.

Grundy County has a flooding risk value of $334.6 million in total damage to land and buildings for Grundy County.

- Incorporated areas that lie within the 1.0% annual chance flood plain boundaries, the flood risk cost is $18.3 million.
- Unincorporated land, the flood risk cost is $316.3 million.
- Total Flood Risk in Grundy County = $334.6 million

The values in Table 32 show the total 2016 value of all parcels within the flood plains of unincorporated county land and within city boundaries in the county.

Table 32: Floodplain Values of Both Incorporated and Unincorporated of Grundy County

	# of Parcels	Land Value	Building Value	Dwelling Value	Total Value
Total Value of All County Land	9,878	$833,905,374	$107,369,363	$522,623,328	$1,463,898,065
Incorporated Areas of County 1.0% Annual Chance Floodplain Values	178	$4,995,237	$6,900,718	$6,375,387	$18,271,342
Unincorporated Area of County 1.0% Annual Chance Floodplain Values	1,574	$274,850,124	$11,362,860	$30,094,630	$316,307,614
Total Value of County Land in 100-Year Annual Chance Floodplain	1,752	$279,845,361	$18,263,578	$36,470,017	$334,578,956

Figures calculated using data from Grundy County GIS Department; Parcel data current as of 01/25/2016

GRASS OR WILDLAND FIRE

Definition and Description

A grass or wildland fire is an uncontrolled fire that threatens life and property especially at the urban and rural interface areas of the state. This is where the urban boundary meets the wooded or grassland areas of Iowa's rural landscapes. The threat of wildland or grass fires on property and urban landscapes are greater than years before. As more development encroaches into undeveloped rural landscapes, the risk of fire to property and life becomes greater.

There are additional factors that increase fire risk in grass or wild land areas. This includes:

- Low humidity and dry vegetation
- Higher climate temperatures
- High wind speeds
- Vegetation density (fire fuel)

Fire is also controlled by landowners and conservationists to maintain and preserve farmlands, prairie lands, or wetlands. However, today climate change is increasing the risk for wildfire in the Midwest as prolonged drought conditions create more flammable landscapes in grasslands and wooded areas that are not "thinned" out of fire fuel such as controlled burns by wildland fire fighters.

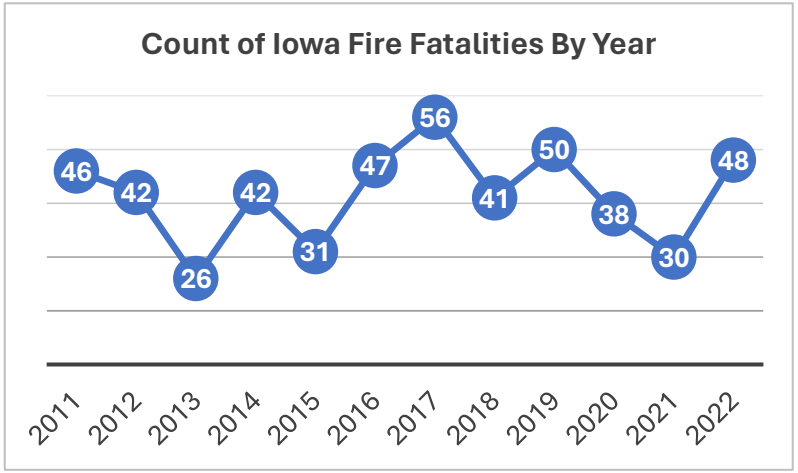
In a five-year period, house fires caused 2,620 deaths and $6.9 billion in property damage (National Fire Prevention Association).

Major wildfires have been occurring in the American West such as California. In 2023, Canadian wildfires torched unprecedented numbers of acres across the border in the north. Although the fire was across international borders and over a thousand miles away from Iowa, the thick smoke plumes stretched across Iowa throughout the late summer season of the year. Air quality dropped dramatically, and warnings were issued related to poor air quality. People with asthma or breathing difficulties were advised to stay indoors. In New York City, the orange filled air filled the region with the air quality was the worst in the world for a period. This same poor air quality occurred in Northern California's cities as the wildfires raged on during the 2020 and 2021 season. Wildland fires often strike secondary hazards such as smoke plumes that stretch over vast areas that create conditions that are hazardous for vulnerable populations and their breathing. Landslides and flash floods are examples of other secondary hazards from wildfires that occur with varying intensity.

Historical Occurrences: None

Iowa has not had a wildfire in recent history. Iowa has had a recorded 48 deaths from fire statewide. The causes of death vary from smoke inhalation to thermal injuries.

Figure 15: Recorded Fatalities from Fires in Iowa from 2011-2022 (Statewide)



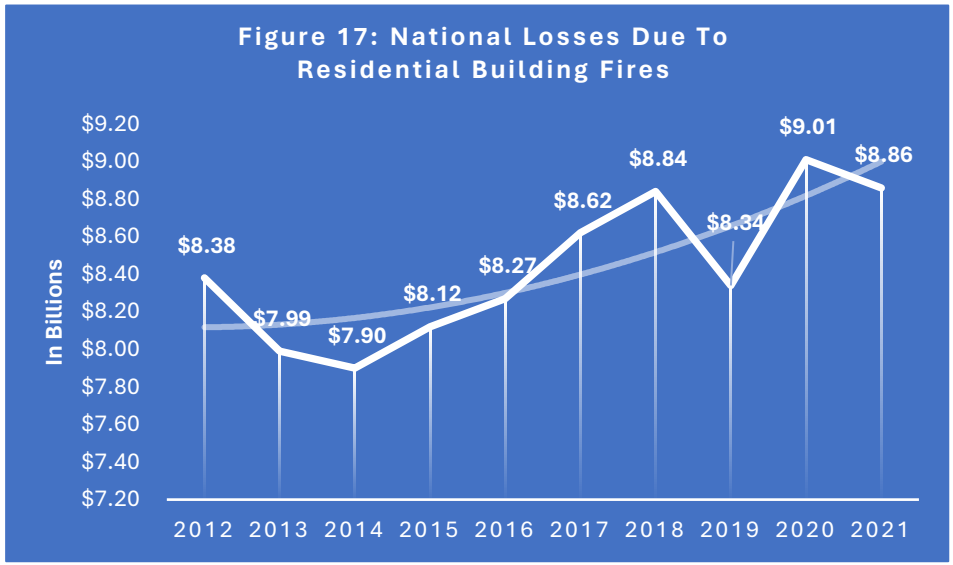
Source: Iowa Department of Public Safety (NFIRS)

Based on National Fire Incident Reporting System (NFIRS) data for Iowa and Grundy County, Iowa reported 42,347 fires between 2015 and 2019. According to the data, residential fires accounted for 12.2% of all fires in Grundy County during this period. Outside fires occurred 35.6% out of the total number of fires..

Figure 16: Fires by Property Type for Iowa and Grundy County (2015-2019).

General Property Use Type	Residential Fires	Non-Residential Fires	Vehicle Fires	Outside Fires	Other Fires
Iowa	24.1%	16.5%	12.8%	38.0%	8.5%
Grundy county	12.2%	32.2%	14.4%	35.6%	5.6%

Note: only counties with more than 10 fires will display general property use type

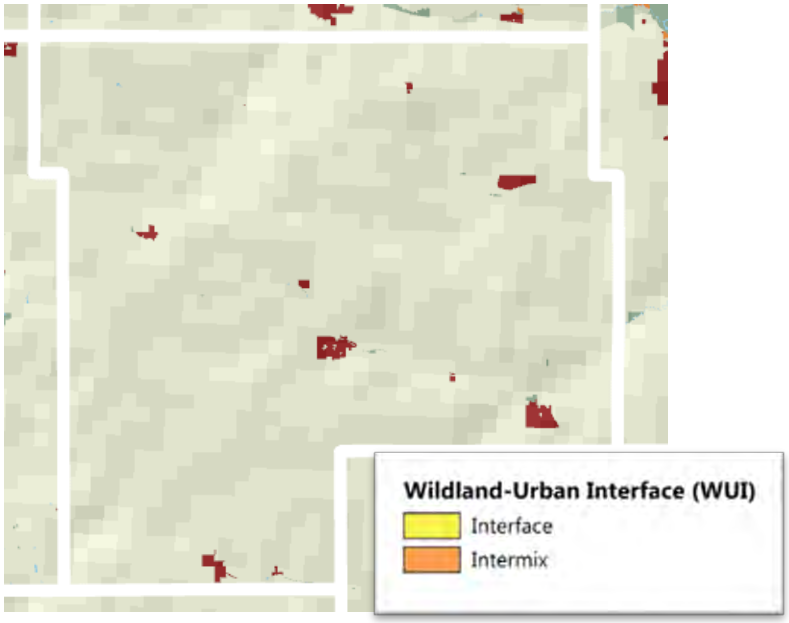


In Figure 17, the dollar losses caused by residential fires total $8.86 billion in 2021, nationally. This is projected to increase based on a polynomial projection trend which is shown in the graph.

Probability: Not Likely

The rural-urban interface is the boundary between a built environment (subdivision, buildings) and natural areas such as forests, grasslands, etc. In Figure 18, the wildland urban interface map for Grundy County shows no threats for wildland or grassland fires for Grundy County's cities.

Figure 18: Grundy County's Wildland-Urban Interface for 2020



Source: (Radeloff et al., 2018)[1]

Magnitude or Severity: Minimal

Potential wildland or grassland fires would be minimal since there is minimal or no measurable wildland-urban interface areas in Grundy County. Potential fires may affect some structures that are being built in subdivisions near woodlands. Only 2.2% of county land is forested.

Warning Time: 1-2 Hours

Potential grassland fires occur in various conditions. High wind and dry drought conditions may increase the risk for grassland fires that may stretch over vast acreages and approach development. Burn bans will go into effect in Grundy County during high, dry wind conditions.

Duration: 1-2 Hours

Most grassland fires will be put out after 1 or 2 hours after responding to them by local fire fighters. Rural response times to fires is greater than urban locations. However, Grundy County has signed mutual aid agreements for fire services with adjacent counties and local jurisdictions.

[1] Radeloff, V. C., D. P. Helmers, H. A. Kramer, M. H. Mockrin, P. M. Alexandre, A. Bar-Massada, V. Butsic, T. J. Hawbaker, S. Martinuzzi, A. D. Syphard, and S. I. Stewart. 2018. Rapid growth of the U.S. Wildland Urban Interface raises wildfire risk. Proceedings of the National Academy of Sciences, 115(13): 3314-3319.

HAZARDOUS MATERIALS INCIDENT

Definition and Description

A HAZMAT (hazardous materials) incident is the accidental release of chemical substances or mixtures which presents a danger to the public health or safety during production or handling at a fixed facility. Fixed hazardous material incidents usually affect a localized area, and the use of planning and zoning can minimize the area of impact.

This hazard includes fixed hazardous materials, pipeline transportation, and transportation of hazardous materials. A HAZMAT or Radiological Transportation Incident is the accidental release of chemical substances or mixtures that presents danger to the public health or safety during transportation. A hazardous substance is one that may cause damage to persons, property, or the environment when released to soil, water, or air. Chemicals are manufactured and used in ever increasing types and quantities. As many as 500,000 products pose physical or health hazards and can be defined as “hazardous chemicals.” Each year, over 1,000 new synthetic chemicals are introduced and transported across the county via semi-truck and train. Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous materials incidents generally affect a localized area, and the use of planning and zoning can minimize the area of impact.

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. A 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 to the pipelines.
Historical Occurrences

Historical Occurrence: 18 Incidents since 2014

According to the Iowa Department of Natural Resources, there were 18 incidences of hazardous materials spills in Grundy County from 2014-2023 (see Table 33). There are no known occurrences of transportation incidents involving radiological material. There are no rail roads through Grundy County so rail freight incidents are none existent.

Transformer oil spills made up the most common number of spill types. Most hazardous substance incidents occurred in Dike. The largest hazardous substances spill was natural gas that occurred on May 11, 2022 in rural county land. Nearly 890,000 cubic feet of natural gas was released. Northen Natural Gas was the responsible party.

Probability: Highly Likely

Large quantities of hazardous materials are transported daily on U.S. Highway 218, Iowa Highway 14, and Iowa Highway 175. Freight transportation transports hazardous materials across these roadways across the county. The U.S Department of Transportation regulates U.S routes and speed limits used by carriers and monitors the types of hazardous materials crossing state lines. Despite increasing safeguards, more and more potentially hazardous materials are being used in commercial, agricultural, and domestic uses and are being transported on neighboring roads, highway and railways. Based on this information, the likelihood of this occurring is more than 33% probability in any given year (event has up to a 1 in 1 chance of occurring).

Magnitude or Severity: Limited

Most of the hazardous materials incidents are localized and contained by trained first responders that work with hazardous materials teams. Depending on the type of hazardous material or the volume spill in the incident, an affected area is likely to include 5 mile radius of most typical spills in rural county areas. More widespread effects occur

when the product contaminates the municipal water supply or water system such as a river, lake, or aquifer.

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

Warning Time: Minimal or None

Properly handled use of toxic, heavy industrial, and hazardous materials will create less likelihood of spills or accidents. Yet, when accidents do happen, response time is crucial since hazardous materials can pose a significant risk to the population. Hazardous materials incidents usually occur very rapidly with little or no warning.

Even if reported immediately, evacuation may not be enough time to move people away from the hazard. During some events, sheltering in - place is the best alternative to evacuation because the material has already affected the area and there is no time to evacuate safely. Public address systems, television, radio, and the NOAA Weather Alert Radios are used to disseminate emergency messages about hazardous materials incidents.

Duration: Less than a day

The duration of a hazardous materials event will vary upon the amount of hazardous material released and location of the incident. A small release of gasoline or agricultural chemical at a fuel station or roadway would close the gas station or road for a couple hours. However, a large spill in an urban community or near a body of water would impact that area and possibly the area down streams for days or weeks – depending upon the type of release.

Table 33: Hazardous Substance Occurrences in Grundy County (2014-2023)					
Date	**Hazard Substance Incident Report #**	**Hazardous Substance**	**Amount**	**Responsible Party**	**Location**
10/21/2022	102122-SLB-1750	Manure Hog	3,000 gallons	Simms Ag (1967CMS)	Grundy Center
7/25/2022	072522-JDD-1540	Fungicide	500 lbs	Andy Processer	Eldora
5/11/2022	051122-JDD-2010	Natural Gas	890,000 cu.ft.	Northern Natural Gas	Unincorporated
11/22/2021	112221-SLB-1945	Anhydrous Ammonia - Industrial use	4,000 lbs	Agvantage FS	Austinville
2/4/2021	020421-DLM-1323	Sulfuric Acid	100 gallons	Liquid Trucking	Wellsburg
11/23/2020	112320-DAK-0742	Diesel Fuel	150 gallons	Great Western Casualty Co.	Dike
8/10/2020	081020-AHB-1624	Transformer Oil (PCB/non PCB)	1 gallon/37 gallons	Alliant Energy	Conrad
11/26/2019	112619-DAK-0845	Diesel Fuel	100 gallons	Bennet Motor Express, LLC	Dike
3/13/2019	031319-RMG-0039	Diesel Fuel	100 gallons	Sin Creek Enterprises	Wellsburg
10/26/2018	102618-CEB-0930	Manure	9,000 gallons	Nick Strohbehn Farms, Inc.	Reinbeck
11/23/2016	112316-DAK-0800	Sludge	1,500 gallons	City of Dike	Dike
9/3/2015	090315-CEB-0835	Hydraulic Oil	80 gallons	Pioneer Hi-Bred International	Reinbeck
6/22/2015	062215-DWW-1330	Transformer Oil (non PCB)	2 gallons	City of Dike	Dike
6/1/2015	060115-GLC-0940	Transformer Oil (non PCB)	5 gallons	City of Dike	Dike
4/6/2015	040615-DLM-1231	Anhydrous Ammonia - Industrial use	500 lbs	Farmers Cooperative (FC)	Dike
11/25/2014	112514-SJW-1345	Diesel Fuel/ Engine Oil	4 gallons/ 1 gallon	MVK Transport Corp.	Wellsburg
9/24/2014	092414-TRL-1428	Gasoline	20 Gallons	Kwik Star	Dike
7/28/2014	072814-RDS-2057	Transformer Oil (non PCB)	1 gallon	Alliant Energy	Conrad
Source: Iowa DNR Hazardous Material Release Database (1/5/2024)					

LANDSLIDES

Definition and Description

Landslides are the downslope movement of earth materials (rock, debris, and soil) at rates that range from inches per year to tens of miles per hour. Some landslides can move faster than a person can run. Landslides can happen with no notice or can take place over a period of days, weeks, or longer. Although gravity acting on an over-steepened slope is the primary reason for a landslide, there are other contributing factors:

- Erosion by rivers, glaciers, or ocean waves create steepened slopes.
- Rock and soil slopes are weakened through saturation by snowmelt or heavy rains.
- Earthquakes create stresses that make weak slopes fail.
- Earthquakes of magnitude 4.0 and greater have been known to trigger landslides.
- Volcanic eruptions produce loose ash deposits, heavy rain, and debris flows.
- Excess weight from accumulation of rain or snow, stockpiling of rock or ore, from waste piles, or from man-made structures may stress weak slopes to failure and other structures.

Landslide problems can be caused by land mismanagement, particularly in mountain, canyon, and coastal regions. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Land-use zoning, professional inspections, and proper design can minimize many landslides, mudflow, and debris-flow problems.

Roadway damage from landslide

Source: Ready Iowa

Historical Occurrence: None

According to the National Climatic Data Center, there have been no reported landslide events in Grundy County between 1996 and 2014. It is possible that landslides have occurred before 1996 or occurred and were not reported; however, there is no data available to determine this.

Probability: Not Likely

Based on the lack of reported landslides in the past, the probability of a landslides occurring in Grundy County is unlikely. Steep sloping areas, especially along waterways as well as areas that have been cleared of shrubbery or timber may have an increased probability. The topography of the planning area, shown in Attachment 2: Topographic Map of the County, provides locations of sloping areas along waterways.

Magnitude or Severity: Minimal

For Grundy County, most of the soils are sloped 0-9 degrees and the land is fairly flat. No major landslides would create huge impacts on

development other than some damage to paved roadways or erosion caused foundation cracking.

Maximum threat exists to those property owners located at the top or bottom of steep sloping areas without trees or shrubbery to absorb excessive amount of moisture. For structures located at the top or bottom of a landslide the severity of impact could be devastating. Earth giving way from underneath a structure could result in the structure giving way also. All ground that does give way will then topple onto the anything located below.

Landslides can damage structures and disrupt electricity, water service, communications, and transportation routes in some areas along riverbanks or in areas where impair development has occurred. Injuries and deaths are very unlikely except in the case of undetected slope failure warning signs in structures overlooking steep slopes.

Warning Time: Day to hours

Great amounts of precipitation and moisture over time will greatly increase the warning time of a landslide event; however, there is no official warning system in place, thus the warning time would be short.

Ready Iowa shares a list of recognizable warning signs below.

- Doors or windows stick or jam for the first time.
- New cracks appear in plaster, tile, brick, or foundations.
- Outside walls, walks, or stairs begin pulling away from the building.
- Slowly developing, widening cracks appear on the ground or on paved areas such as streets or driveways.
- Underground utility lines break.
- Bulging ground appears at the base of a slope.
- Water breaks through the ground surface in new locations.
- Fences, retaining walls, utility poles, or trees tilt or move.
- You hear a faint rumbling sound that increases in volume as the landslide nears. The ground slopes downward in one specific direction and may begin shifting in that direction under your feet.

Duration: Within Hours of Occurring

Landslides are typically over within hours of occurring.

PANDEMIC/ENDEMIC HUMAN DISEASE

Definition and Description

A pandemic is the worldwide spread of a disease (WHO, 2021). An endemic is an outbreak of a disease in the general population that does not occur worldwide but in a particular region, either continental, national, statewide, or countywide. Epidemic, pandemic, and biological disasters are caused by hazards of organic origin, including bacteria, viruses, parasites, mosquitoes carrying disease-causing agents, and toxins or bioactive substances that occur naturally or are deliberately or unintentionally released.

An epidemic is often a sudden increase than the normal levels of a particular disease in the population. This may include diseases of various risk levels including the common cold (rhinovirus/enterovirus). This occurs occasionally for most counties in Iowa.

Many states categorize pandemics as having a low probability of occurring when compared to other natural hazards, but the current pandemic has shown the long-term devastating social and economic consequences. COVID-19 has had disproportionate effects on low-income communities of color and front-line workers. Thus, in addition to having a clear strategy and response plan, it is essential to identify the most vulnerable populations and hazard areas, and to have a strong framework for coordination among emergency management and public health agencies.

Thus, planning can go beyond disaster response but also building community resilience by bolstering healthcare, Internet access, and other needs for direct assistance when it is needed most. Although hazard mitigation plans can help identify the networks and communication strategies needed, they are just one piece of the response framework. There is an important opportunity for state and local emergency management to strengthen responses and coordinate with public health plans for future events that could be like COVID-19, as well as to prioritize identifying and having a plan to protect people and sectors that would be most affected by a pandemic due to structural inequities. Going forward, FEMA and states can work to evaluate outcomes from COVID-19 to devise more effective hazard mitigation plans.

Iowa National Guard staffs COVID-19 testing drive thru in Des Moines (March 2020)

Source: US National Guard

Historical Occurrences

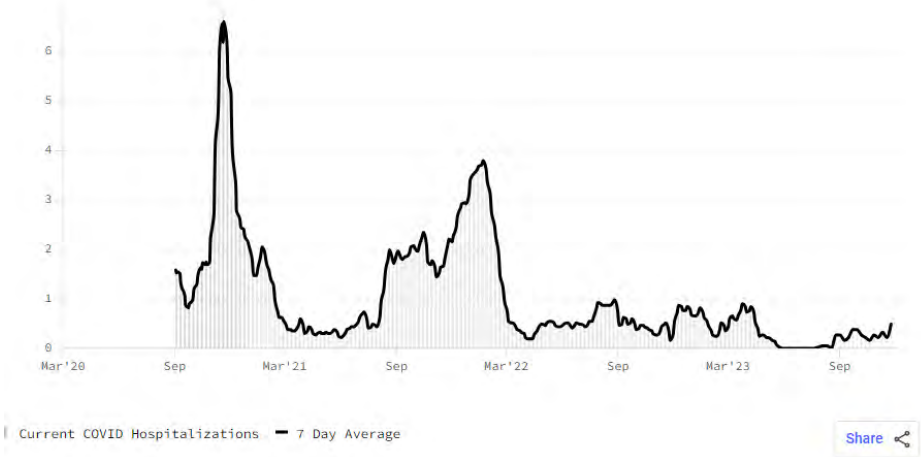
COVID-19

The COVID-19 pandemic began in late 2019/early 2020. The period of recovery for the world is still in process. The COVID-19 virus has not been eradicated and the human population has started to move forward with living with this virus in the population just as the common flu. The effects of COVID-19 on the human body are still being determined and studied including those who face “long-COVID” symptoms. However, public health has helped us understand transmission occurring primarily through respiratory droplets from coughing, sneezing, or sharing very small spaces with little or no ventilation. Mitigation actions that individuals can partake to avoid getting infected include social distance measures and mask wearing in

crowded spaces. There is continuous research about the contagion as an ongoing process.

In Grundy County, hospitalizations due to COVID-19 has remained lower than the national or state average. COVID-19 tracking data is no longer required for hospitals in Iowa. Hospitalizations from reporting sources to the Center of Disease Control are shown below.

Figure 19: Hospitalizations Reported from Grundy County, IA



Source: CDC and New York Times COVID Dashboard

Influenza

Influenza, or flu, is a contagious illness caused by influenza viruses. This contagion is contracted through the respiratory system. The novel influenza virus is ever present in the human population and season outbreaks occur on an annual basis. Reporting of influenza is not mandatory and sources for influenza among the population primarily come from hospitalizations and serious complications from the illness. Iowa Health and Human Services produces a weekly respiratory virus surveillance report for Iowa. Influenza, COVID-19, and other prominent respiratory illnesses are tracked statewide and by counties. Vaccines are the best way to protect against the flu and potentially serious complications.

Probability: Pandemic: Not Likely. Endemic: Occasional.

The Iowa Department of Public Health publishes an annual report on reportable diseases for statewide and county conditions. The prevalence of epidemic respiratory diseases in Grundy County is similar and normal to other counties and statewide patterns so the risk is **occasional**. The probability of pandemic level respiratory diseases is **not likely**.

Magnitude or Severity: Varies.

The severity of a human disease outbreak depends entirely on the disease itself. There are numerous safeguards that have been put into place to help deter an event before it begins, respond to an event once it does occur, and recover from an event as quickly as possible. Examples of such precautions include measures by service agencies (i.e. American Red Cross), government agencies (i.e. Grundy County EMA, State Veterinarian, USDA, etc.), and private medical facilities (i.e. hospitals and clinics) to detect and respond to an event before it becomes an epidemic.

Warning Time: 48 Hours

Warning time for a human disease event ranges from just a few days to no time at all. The onset of a regional or county-wide epidemic could provide minimal or no warning time due to the nature of human diseases in our globalized society. Because of air travel, a disease that spawns in another part of the world could easily reach Grundy County in a matter of days.

Duration: Weeks to Months

The duration of a human disease incident in the planning area would be dependent on the type of disease, notification, and containment of said disease, and treatment. Endemic events may last months to a couple months. Pandemic level events will last months or possibly years depending on the contagion. With COVID-19, the duration of the pandemic lasted between 8 months to a year and half.

SEVERE WINTER STORM EVENTS

Definition and Description

Severe winter storms are weather conditions that affect day-to-day activities. A brief description of various types of severe winter storms is described in Table 33. Winter storms are common during the winter months of October through April. The various types of extreme winter weather cause considerable damage. Heavy snows cause immobilized transportation systems, downed trees, and power lines, collapsed buildings, and loss of livestock and wildlife. Loose snow begins to drift when the wind speed reaches 9 to 10 mph under freezing conditions. The potential for some drifting is substantially higher in open country than in urban areas where buildings, trees, and other features obstruct the wind. Frigid temperatures and wind chills are dangerous to people, particularly the elderly and the very young. Dangers include frostbite or hypothermia. Water pipes, livestock, fish and wildlife, and pets are also at risk from extreme cold and severe winter weather.

Historical Occurrence: 90 Winter Storms since 1990

The planning area has experienced winter storms of some type every winter on record. According to the National Climatic Data Center, from 1990 through 2023, there were 90 winter storm events, including: Blizzard (20), Cold/Wind Chill (8), Heavy Snow (21), Ice Storm (15), and Winter Storm (29). According to this data, there was one death resulting from a winter storm January 1999 where an 87-year-old man from Beaman tragically froze to death when his vehicle became stranded, and he waited for help. It is estimated that these winter storm events have caused nearly $1.3 million in property and $294,000 in crop damage.

TABLE 34: SEVERE WINTER STORM TERMS

Storm Event Type	Description
Blizzard	A winter storm last at least 3 hours which produces sustained winds or frequent guests 35 mph or greater and falling and/or blowing snow reducing visibility to less than ¼ mile
Cold/wind Chill	A period of low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined advisory (typically value is -18®F or colder).
Heavy Snow	Snow accumulation meeting or exceeding the locally/regionally defined 12-and 24-hours warning criteria
Ice Storm	Ice accretion meeting or exceeding locally/regionally defined warning criteria (typical value is ¼ or ½ inch or more)
Winter Storm	A weather event which contains more than one significant hazard (i.e. heavy snow and blowing snow; snow and ice; snow and sleet) and meets or exceeds the locally/regionally defined 12 and/or 24 warning criteria

Source: "National Weather Service Instruction 10-1605" courtesy of the National Climatic Data Center

Table XX displays the reported storm events in Grundy County, according to the National Climatic Data Center for reported Blizzards, Cold/Wind Chill, Heavy Snow, Ice Storms, and Winter Weather. The timeframe covered by the data is from January 1, 1990 through December 7, 2023.

February 2007 remains one of the worst months on record for the accumulation of snowfall. 33.3 inches of snow fell during this month, easily surpassing the previous one-month record for snowfall in the community. The previous record for snowfall in one month was 24.3 inches and occurred in January 1962. What was somewhat unusual about the December 2000 event was that there were no extreme winter storm events, but rather a few less severe snowfall events combined with ongoing below freezing temperatures and strong winds. This resulted in an increasingly difficult job for snow removal crews, as there was less and less area to push snow with each event.

Probability : Highly Likely

Since 1996 there have been 75 recorded storm events in Grundy County. This includes 46 days with an event resulting in property damage and one day with an event resulting in crop damage. The frequency and impact of severe winter storm events varies from year to year. Grundy County did not record any events in 2004 and 2006. However, based on historical occurrences it is **highly likely** a severe winter storm will affect Grundy County on an annual basis, likely multiple times in a year. As can be seen in Table 37, in the past 20 years Grundy County has averaged over three winter storm events per year.

Magnitude or Severity: Critical

Winter storms may slow, delay, or halt transportation networks such as roadway trucking or airports. Slippery roads, low visibility, or heavy snow fall are just a few hazards from severe winter weather that impacts the Midwest annually. People on fixed incomes such as low-income households or retirees are more likely to face critical decisions when cold temperatures plunge in the Midwest or severe wind chill temperatures occur. Studies have shown that people on fixed incomes are more likely to consider the costs of electricity or utility bills when heating or cooling their homes during extreme temperatures. People, such as farmers, who work outdoors, are also at greater risk of being affected by wind chill, extreme low temperature, and wet winter conditions. Unfortunately, based on the large area that these storms can cover and the cascading effects that can accompany them, the entire population and planning area are vulnerable to some type of impact from a winter storm. Low-income households, older adults, retirees, fixed income households, and those who may be vulnerable to power outages from ice storms or downed power lines without a source of heat are extremely vulnerable to severe cold temperatures.

Although the developments in technology have been very beneficial in reducing the long-term negative effects of winter storms, certain dangers still exist. The maximum threat of winter conditions would be realized if it was accompanied by power outages and elimination of travel due to hampered road conditions. This could result in the inability of some of the population to maintain temperatures necessary for the body. In addition, long winter events that eliminate communication could result in the reduction of adequate medical response time.

Warning Time: 6-12 Hours

The National Weather Service has developed effective weather advisories, which are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public up to days in advance. Again, weather prediction capabilities have made significant improvements in the past few years. There are several notifications made by the National Weather Service. These include winter storm watch, winter storm warning, blizzard warning, winter weather advisory, and a frost/freeze advisory. Despite the

advancements in technology, there have been several instances where the actual winter storm event was much more severe than what was forecasted to occur.

Duration: Less than 1 Day

Depending on the type, duration, and the size of the event the entire population could feel the effect of a winter storm. Generally, due to existing snow removal services and other community services the effects of winter storms on incorporated communities in Grundy County are short term; however, the more rural, unincorporated areas tend to be impacted longer due to rural nature of the county. Although more of an inconvenience, and somewhat more dangerous, travel and communication are usually an option in less than 24 hours for any given event.

Table 34: Winter Storm Event History in Planning Area (1990-2023)											
Date	Event Type	Deaths	Injuries	Property Damage ($)	Crop Damage ($)	**Date**	Event Type	Deaths	Injuries	Property Damage ($)	Crop Damage ($)
1/18/1996	Cold/Wind Chill	0	0	$0	$0	**12/21/2000**	Blizzard	0	0	$20,000	$0
1/18/1996	Blizzard	0	0	$0	$0	**12/28/2000**	Heavy Snow	0	0	$5,000	$0
1/26/1996	Heavy Snow	0	0	$0	$0	**2/8/2001**	Ice Storm	0	0	$75,000	$0
1/26/1996	Blizzard	0	0	$0	$0	**2/8/2001**	Winter Storm	0	0	$50,000	$0
1/28/1996	Blizzard	0	0	$0	$0	**3/1/2002**	Heavy Snow	0	0	$5,000	$0
2/1/1996	Cold/Wind Chill	0	0	$0	$0	**3/9/2002**	Blizzard	0	0	$5,000	$0
3/24/1996	Blizzard	0	0	$0	$0	**3/4/2003**	Heavy Snow	0	0	$1,000	$0
5/1/1996	Cold/Wind Chill	0	0	$0	$0	**4/4/2003**	Ice Storm	0	0	$5,000	$0
11/14/1996	Ice Storm	0	0	$0	$0	**4/6/2003**	Winter Storm	0	0	$5,000	$0
12/25/1996	Heavy Snow	0	0	$0	$0	**1/1/2005**	Ice Storm	0	0	$5,000	$0
1/9/1997	Cold/Wind Chill	0	0	$0	$0	**1/4/2005**	Heavy Snow	0	0	$10,000	$0
1/15/1997	Cold/Wind Chill	0	0	$0	$0	**1/22/2005**	Blizzard	0	0	$5,000	$0
2/3/1997	Heavy Snow	0	0	$0	$0	**1/14/2007**	Heavy Snow	0	0	$0	$0
11/14/1997	Heavy Snow	0	0	$4,545	$0	**1/20/2007**	Heavy Snow	0	0	$0	$0
12/21/1997	Ice Storm	0	0	$2,050	$0	**2/24/2007**	Winter Storm	0	0	$250,000	$0
1/4/1998	Ice Storm	0	0	$20,400	$0	**12/1/2007**	Ice Storm	0	0	$10,000	$0
1/20/1998	Heavy Snow	0	0	$10,450	$0	**12/11/2007**	Ice Storm	0	0	$75,000	$0
3/7/1998	Heavy Snow	0	0	$50,000	$0	**2/10/2008**	Cold/Wind Chill	0	0	$0	$0
3/17/1998	Ice Storm	0	0	$5,880	$0	**12/8/2008**	Winter Storm	0	0	$10,000	$0
1/1/1999	Winter Storm	1	0	$10,000	$0	**12/18/2008**	Winter Storm	0	0	$5,000	$0
2/11/1999	Ice Storm	0	0	$5,000	$0	**12/20/2008**	Blizzard	0	0	$0	$0
9/21/1999	Cold/Wind Chill	0	0	$0	$294,118	**12/27/2008**	Ice Storm	0	0	$5,000	$0
1/19/2000	Winter Storm	0	0	$1,000	$0	**1/9/2009**	Heavy Snow	0	0	$0	$0
2/17/2000	Winter Storm	0	0	$10,000	$0	**1/13/2009**	Heavy Snow	0	0	$0	$0
12/10/2000	Winter Storm	0	0	$24,900	$0	**4/5/2009**	Winter Storm	0	0	$20,000	$0
12/18/2000	Blizzard	0	0	$25,000	$0	**12/8/2009**	Heavy Snow	0	0	$10,000	$0

Table 30: Winter Storm Event History in Planning Area (1990-2023)											
Date	Event Type	Deaths	Injuries	Property Damage ($)	Reported Crop Damage ($)	**Date**	Event Type	Deaths	Injuries	Property Damage ($)	Reported Crop Damage ($)
12/9/2009	Blizzard	0	0	$50,000	$0	**2/25/2015**	Heavy Snow	0	0	$0	$0
1/6/2010	Winter Storm	0	0	$25,000	$0	**11/20/2015**	Winter Storm	0	0	$0	$0
1/20/2010	Ice Storm	0	0	$100,000	$0	**12/28/2015**	Winter Storm	0	0	$0	$0
1/25/2010	Blizzard	0	0	$75,000	$0	**2/2/2016**	Winter Storm	0	0	$0	$0
12/11/2010	Blizzard	0	0	$75,000	$0	**2/7/2016**	Blizzard	0	0	$0	$0
12/23/2010	Heavy Snow	0	0	$0	$0	**1/15/2017**	Ice Storm	0	0	$0	$0
1/27/2013	Ice Storm	0	0	$25,000	$0	**3/12/2017**	Winter Storm	0	0	$0	$0
1/30/2013	Winter Storm	0	0	$25,000	$0	**2/8/2018**	Winter Storm	0	0	$0	$0
2/26/2013	Heavy Snow	0	0	$5,000	$0	**3/23/2018**	Winter Storm	0	0	$0	$0
1/26/2014	Blizzard	0	0	$10,000	$0	**1/22/2019**	Winter Storm	0	0	$0	$0
2/20/2014	Blizzard	0	0	$25,000	$0	**1/27/2019**	Winter Storm	0	0	$0	$0
1/5/2015	Heavy Snow	0	0	$0	$0	**2/11/2019**	Winter Storm	0	0	$0	$0
2/1/2015	Winter Storm	0	0	$50,000	$0	**2/16/2019**	Winter Storm	0	0	$0	$0
							TOTAL	1	0	$1,360,225	$294,118

Source: National Centers for Environmental Information (NOAA)

RADIOLOGICAL INCIDENT

Definition and Description

A radiological incident is an occurrence resulting in a release of radiological material at a fixed facility or in transit. An incident resulting in a release of radiological material at a fixed facility includes, but is not limited to, power plants, hospitals, and laboratories. Although the term "nuclear accident" has no strict technical definition, it generally refers to events involving the release of significant levels of radiation. Most commercial nuclear facilities in the United States were developed in the mid-1960s and are designed to withstand an aircraft attack.

"Radioactive materials are composed of atoms that are unstable. An unstable atom gives off its excess energy until it becomes stable. The energy emitted is radiation. Each of us is exposed to radiation daily from natural sources, including the Sun and the Earth. Small traces of radiation are present in food and water. Radiation also is released from man-made sources such as X-ray machines, television sets and microwave ovens. Radiation has a cumulative effect. The longer a person is exposed to radiation, the greater the effect. A high exposure to radiation can cause serious illness or death"[2]

The United States Nuclear Regulatory Commission (USNRC) identifies four types of emergency classifications for nuclear power plants. Table 35 provides a brief description of these types of emergencies.

Historical Occurrence: None

The Duane Arnold Energy Center is located 9 miles northwest of Cedar Rapids. The Duane Arnold Energy Center (DAEC) is a 1,912 MWt boiling water reactor that began operation in 1974. The plant is owned and operated by majority shareholder and owner NextEra Energy Duane

TABLE 36: UN NRC EMERGENCY CLASSIFICATIONS

Type	Description
Unusual Event	Events are in progress or have occurred which indicate potential degradation of the level of safety of the plant or indicate security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety system occurs,
Alert	Events are in the progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life-threatening risk to site personnel or damage to site equipment because of Hostile Action. Any releases are expected to be limited to small fraction of the EPA protection action guides (PAGs)
Site Area Emergency	Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile action that resulted in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the site boundary.
General Emergency	Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA PAG exposure levels offsite for more than the immediate site area.

Source: US Nuclear Regulatory Commission, "Emergency Classification"

[2] https://www.ready.gov/nuclear-power-plants

Arnold, LLC (NextEra). DAEC permanently shut down their reactor on August 10, 2020, when a derecho damaged non-safety related portions of the plant, including the cooling towers.

By letter dated October 12, 2020, NextEra certified that all fuel had been removed from the reactor. NextEra submitted the DAEC Post-Shutdown Decommissioning Activities Report (PSDAR) to the Nuclear Regulatory Commission (NRC) on April 2, 2020. The NRC held an in-person PSDAR public meeting near the plant in Palo, Iowa on September 28, 2021 to obtain public comments on the PSDAR. NRC held a virtual PSDAR public meeting on Oct 6, 2021 for the members of the public that were not comfortable attending an in-person meeting. In the PSDAR, NextEra stated its intention to move all the spent nuclear fuel into dry cask storage by 2023 and place the plant into SAFSTOR, a post-operating state to allow radioactive contamination to decrease and demolition operations safer/easier for disposal. SAFSTOR has started and full decommissioning of the facility is set for 2075. The NRC will continue to provide licensing oversight and inspections of the plant until the plant is completely decommissioned, including inspections of the Independent Spent Fuel Storage Installation (ISFSI) until the spent fuel is permanently removed from the site and the license is terminated.

Transportation of radiological materials is licensed and regulated by the federal government. Since 1990 there have been no rail transportation related radiological incidents in Iowa.

Probability: Unlikely

Operators of facilities that use radioactive materials and transporters of radioactive waste are circumspect in the packaging, handling, and shipment of the radioactive waste; and are closely regulated by a variety of federal, state, and local organizations. Based on the history of no radiological incidents affecting the planning area, the probability of an incident is **unlikely**. A radiological incident is still possible as a secondary hazard event from a derecho or terrorism.

Magnitude or Severity: Catastrophic

There are two active plants located near the Iowa border. The out-of-state facilities are the Cooper Nuclear Power Plant south of Nebraska City, NE near the Missouri River and the Quad Cities Nuclear Power Plant across the Mississippi River. See figure X for a map of locations and a 50-mile radius line. Grundy County is over 100 miles away from the nearest active nuclear power plant in the Quad Cities.

Time, distance, and minimizing radiation exposure to the body by shielding or sheltering is a significant way to reduce or avoid the dangers of radioactive fallout that exists in the environment following an incident. Nuclear radiation above normal levels could be a health and safety consideration because of its ability to damage human cells biologically as well as its long-lasting effect on the environment. Depending on the level of exposure, radiation can cause loss of life, long- and short-term health effects, and property damage from contamination, and disruption of business because of potential evacuations. Therefore, multiple deaths could occur, thereby affecting the operation of essential facilities throughout the community, at least temporarily.

According to Ready.gov there are, “two ‘emergency planning zones.’ One zone covers an area within a 10-mile radius of the plant, where it is possible that people could be harmed by direct radiation exposure. The second zone covers a broader area, usually up to a 50-mile radius from the plant, where radioactive materials could contaminate water supplies, food crops, and livestock.

Radiation exposure can happen two different ways, including: exposure from a release of radioactive material from the plant, such as a plume of radioactive gases and particles. However, the greatest risk to people in the area around a plume is the body’s radiation exposure

from the cloud and particles deposited on the ground, inhalation of radioactive material, and ingestion of radioactive materials.

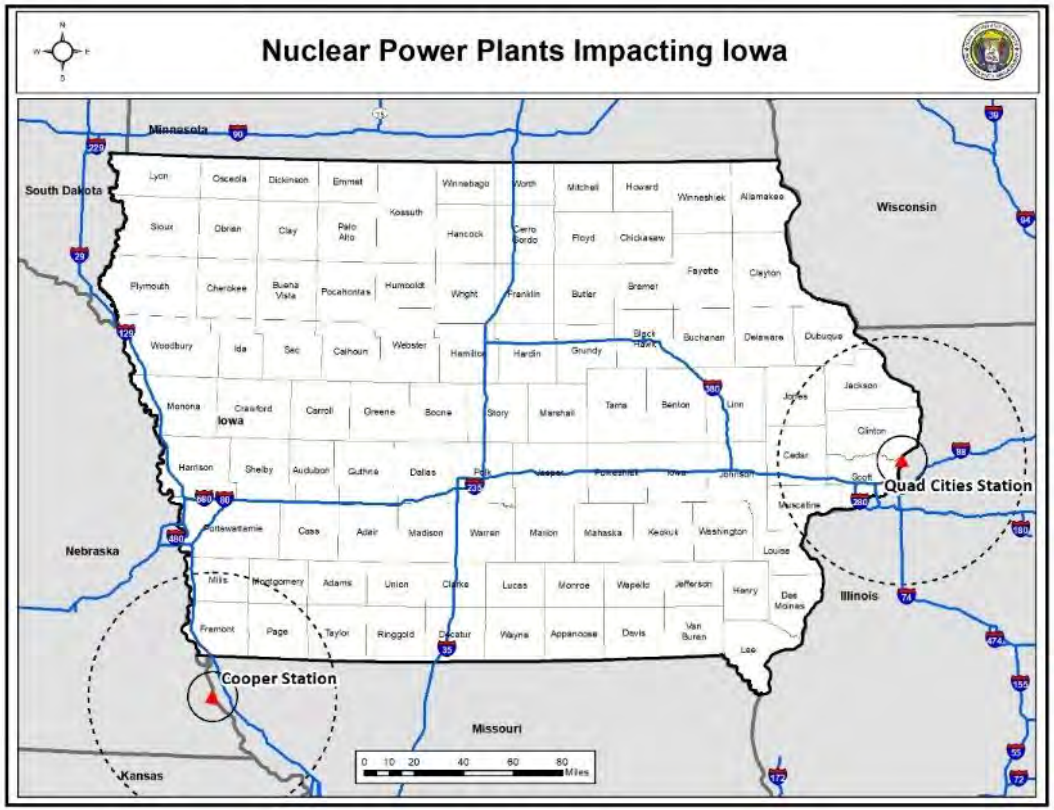
Warning Time: Within An Hour

Ionizing radiation cannot be seen, smelled, heard, or detected with human senses. Detection instruments are needed to indicate the existence of dangerous radiation. Distance from the incident would dictate the amount of time needed to avoid exposure from damaging radiation. Protective actions by state and county officials depend upon environmental conditions and developments at the power plant during an emergency event. In an actual emergency, the public can turn to their local Emergency Alert System Station, NOAA Weather Radios, or through Alert Iowa notifications.

Duration: Long Term Impacts (Years to Decades)

Depending upon the severity of a radiological event, the planning area would be impacted from a few hours to possibility a day or two. In a worst-case scenario event, the duration of the ensuring fallout could last decades.

Figure 20: Nuclear Power Plants Impacting Iowa



Source: Iowa Dept. of Homeland Security

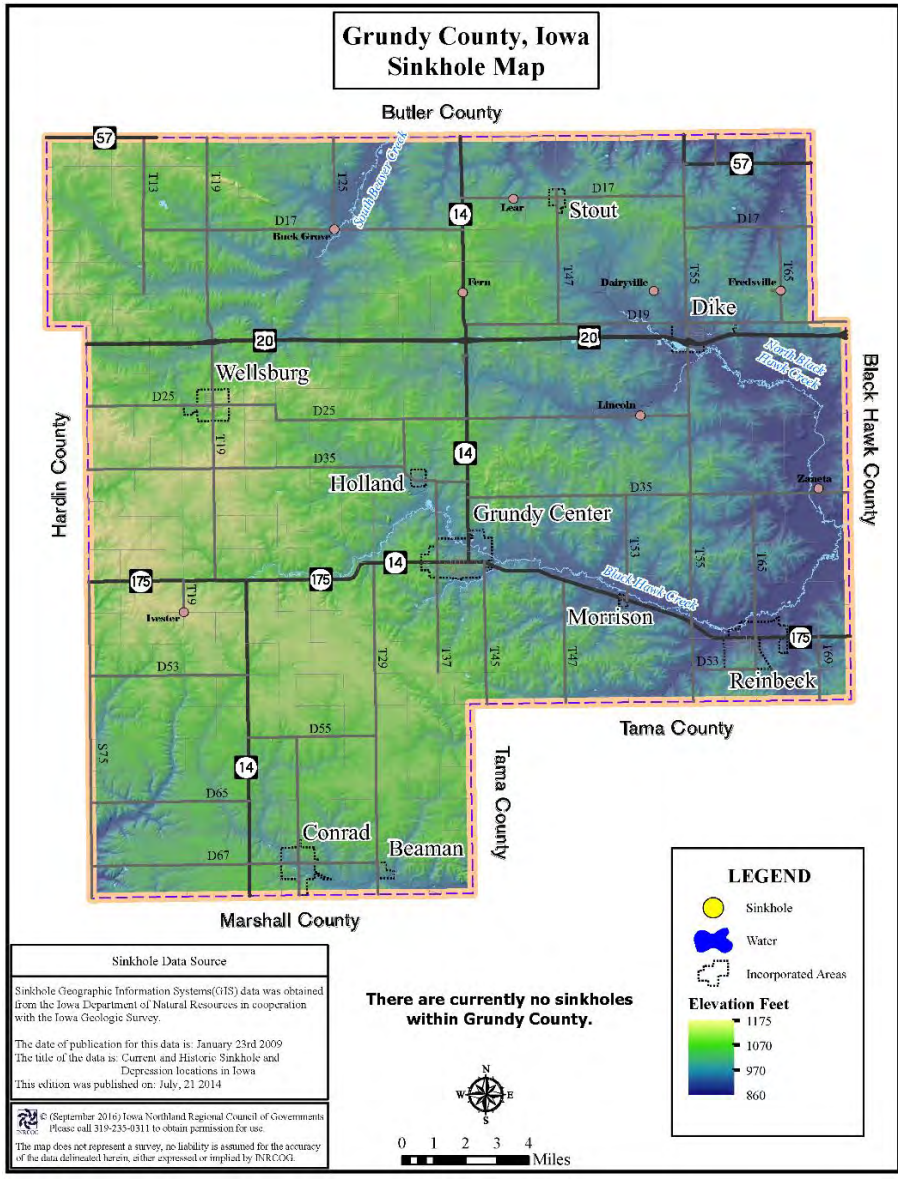
SINKHOLES

Definition and Description

A sinkhole is a sudden collapse of the ground surface due to the removal of subsurface support within the geologic structure that support all ground surfaces. Sinkholes may form as slow depressions in the land which may become drainage sinks. The more quick, abrupt localized collapses may occur when a sink hole prone area opens up due to the weight of a person walking or car driving over the surface. The primary causes of most subsidence are human activities such as underground mining of coal, groundwater/petroleum withdraw, or drainage of organic soils. Sinkholes can aggravate flooding potential due to the lack of outflow drainage elevations around a depression in the topography. A collapse of an abandoned mine or sudden collapse of a karst foundation may destroy buildings, roads, and utilities.

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. “Karst” is landscape underlain by limestone which has been eroded by dissolution, producing ridges, towers, fissures, sinkholes and other characteristic landforms. As the rock dissolves, spaces and caverns develop underground. Sinkholes are dramatic because the land usually stays intact for a while until the underground spaces just get too big. If there is not enough support for the land above the spaces, then a collapse of the land surface can occur. New sinkholes have been correlated to land-use practices, especially from groundwater pumping and from construction and development practices. Sinkholes can also form when natural water-drainage patterns are changed, and new water-diversion systems are developed. Some sinkholes form when the land surface is changed, such as when industrial and runoff-storage ponds are created. The substantial weight of the new material can trigger an underground collapse of supporting material, thus causing a sinkhole.

Figure 21: Sinkhole Map of Grundy County



Source: Iowa DNR

Fixing a sinkhole is likely to be impractical if the void in the Earth is not determined. Even so, filling in a sink hole is expensive and building on top of it again is not practical.

Iowa DNR uses a karst map of northeast Iowa in their determination of permitting large livestock operations. Because of the porous (Swiss cheese-like) nature of karst, water flows quickly through it and receives little filtration. Therefore, to prevent the contamination of an underground water source, karst areas are mapped and any operation that may contaminate the ground is not permitted.

Historical Occurrence: None

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

According to the Iowa Department of Natural Resource's Natural Resources Geographic Information Systems Library, there are zero sinkholes in Grundy County. There are also no abandoned coal mines in Grundy County, according to the Iowa Department of Natural Resource's Natural Resources Coal Mines Map.

Probability: Unlikely

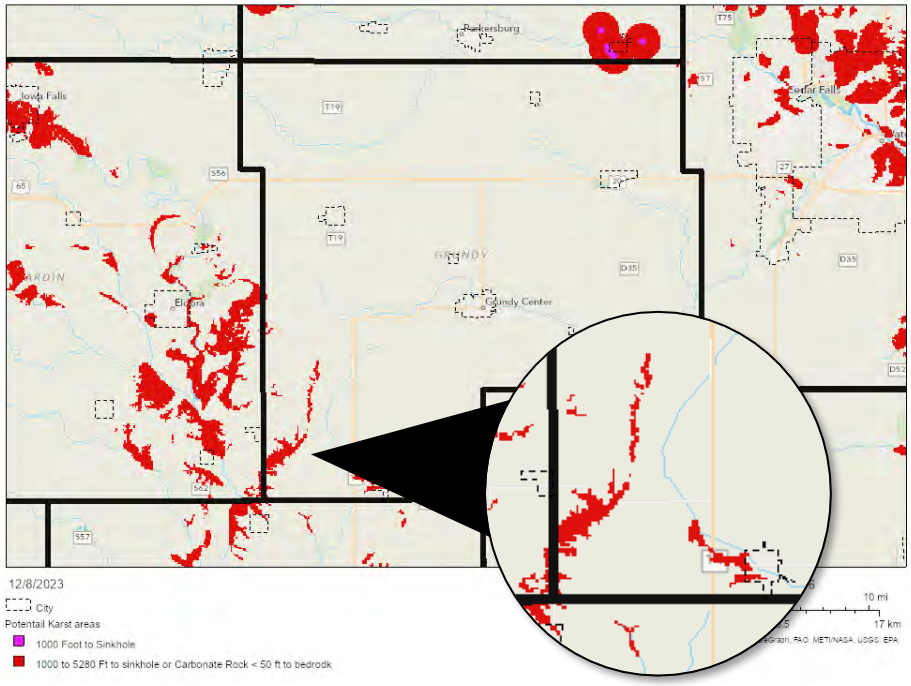
Since there are no known sinkholes in Grundy County, the probability of an occurrence is highly unlikely. Sinkhole probability varies by jurisdiction. The committee determined the probability of a major sinkhole event to be unlikely.

The karst map of northeast Iowa was created by Iowa DNR to provide hazard risks to the region's residents and farming community. The map shows potential karst formations within Grundy County located near the southwest corner. The city of Conrad is in a potential karst area shown in red in Figure 22. Potential karst areas make up less than 10% of Grundy County.

Magnitude or Severity: Negligible

The planning area's vulnerability to property damage, injury, and loss of life as a result of a sink hole is minor. Sinkhole damage is usually contained to a structure. The onset of sink holes is typically slow and can resemble the normal settling of a structure. However, failure to identify a sink hole could increase the homeowner's vulnerability. Building near and or around soils that have the potential to cause sinkholes is highly discouraged to limit future vulnerability.

Figure 22: Karst Map of Grundy County



Source: Iowa DNR

Maximum threat exists to those property owners located at the top of bottom of steep sloping areas without trees or shrubbery to absorb excessive amounts of moisture. For structures located at the top or bottom of a landslide the severity of impact could be devastating. Earth giving way from underneath a structure could result in the structure giving away also. All ground that does give way will then topple onto anything located below.

Unknown sink holes on property located near and around a structure could have a significant impact on the structures in the area if the sink hole were to collapse. Personal property located near the sink hole would also be consumed in the event of a collapse.

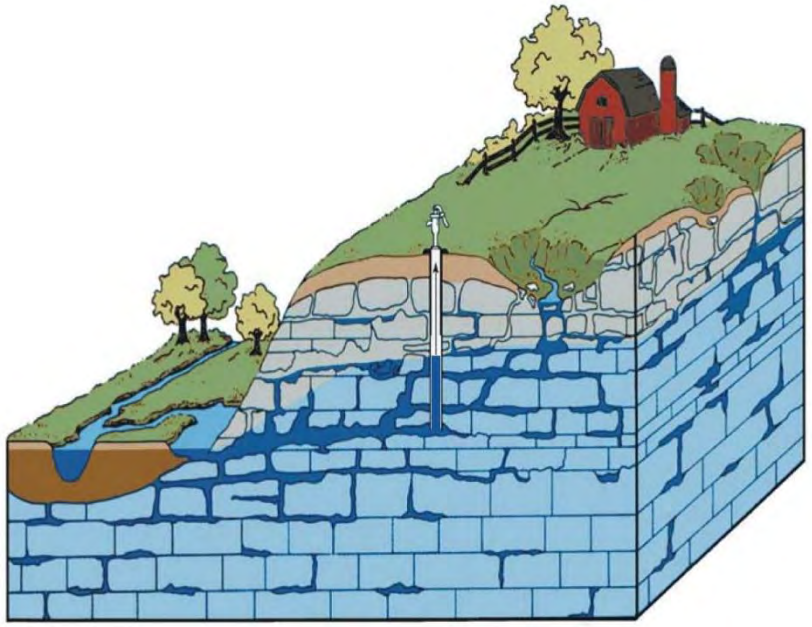
Warning time: Minimal with No Warning Time

Sink holes often grow in a slow yet gradual process. However the most severe occurrence happen with minimal warning time. Land use practices in the area, soil type in addition to several other factors will impact the speed of onset. By identifying these areas city agencies and property owners will be able to implement the necessary precautions to slow and potentially eliminate the development of a sink hole. Catastrophic sinkholes can provide little visible warning, setting in in as little as a few minutes.

Contaminated drinking water in karst rock formations are a problem for shallow bedrock aquifers in northeast Iowa. Karst rock formations have vast networks of underground drainage systems with a direct connection from the surface to the groundwater supply. Shallow aquifers are susceptible to contamination due to close proximity to the ground surface.

Duration: Less than 6 hours

A sinkhole can affect the location in which it occurred for weeks.



Karst Formations Diagram

The direct connection from bedrock to the surface is a high risk for contamination to the groundwater supply and sinkholes (Source: Iowa DNR)

TERRORISM

Definition and Description

Terrorism is the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives *(Federal Bureau of Investigation)*. The Federal Bureau of Investigation (FBI) categorizes terrorism in the United States as one of two types--domestic terrorism or international terrorism. Domestic terrorism is violent, criminal acts committed by individuals and/or groups to further ideological goals stemming from domestic influences, such as those of a political, religious, social, racial, or environmental nature.

Domestic terrorism can be carried out by a lone offender which is often radicalized online and mobilized to violence. Online groups and social media groups recruit and radicalize individuals receptive to their extremist messaging.

International terrorism involves groups or individuals whose terrorist activities are foreign-based and/or directed by countries or groups outside the United States or whose activities transcend national boundaries. A terrorist attack can take several forms, depending on the technological means available to the terrorist, the nature of the political issue motivating the attack, and the points of weakness of the terrorist's target. Bombings have been the most frequently used terrorist method in the United States. Other possibilities include an attack on transportation facilities, an attack against utilities or other public services or an incident involving chemical or biological agents.

Historical Occurrences: None

To date, there have been no known or reported instances of any terrorist attacks having been perpetrated in the planning area.

Probability: Unlikely

U.S. Department of Homeland Security's Homeland Threat Assessment 2024 states that the threat of violence from violent extremists radicalized online will continue to remain high. These actors will continue to be inspired and motivated by a mix of conspiracy theories; personalized grievances; and enduring racial, ethnic, religious, and anti-government ideologies, often shared online.

The probability of any type of terrorism occurring in the planning area is **unlikely**.

Magnitude or Severity: Limited

Potential vulnerabilities for terrorist attacks may include danger to the water supply, bioterrorism, and an attack on a nearby nuclear facility. The severity of impact would largely depend on how quickly the planning area became aware that an event had occurred. The worst-case scenario would occur if the public had no knowledge until all or most of the population had been contaminated or poisoned before a proper response could be made. This could result in widespread sickness and potentially death.

From the 2024 DHS Homeland Threat Assessment, domestic terrorism remains high, and this severity may be limited with shutdowns of facilities or services for more than a week.

Warning Time: Minimal to No Warning Time

Depending on the type of event to occur the speed of onset could vary from immediate (no time) to days, weeks, even years (poisoned water, poisoned food, financial impacts).

Duration: Less a day

The duration of an incident in the planning area would be dependent upon the type and size of the event. A small, remote/isolated incident would have a smaller duration than a large, urban-centered incident which could last for days or even weeks.

TRANSPORTATION INCIDENT

Definition and Description

This hazard includes all modes of transportation - air, highway, railway, and waterway. Thus, transportation includes any incident involving a military, commercial, or private aircraft; single-multi-vehicle incident which requires responses exceeding normal day-to-day capabilities; derailment or a train accident which directly threatens life or property, or which adversely impacts a community's capabilities to provide emergency services; and an event involving any vessel that threatens life or which adversely impacts a community's capability to provide emergency services.

An air transportation incident may involve a military, commercial, or private aircraft. Airplanes, helicopters, and other modes of air transportation are used to transport passengers for business and recreation as well as thousands of tons of cargo. A variety of circumstances can result in an air transportation incident including mechanical failure, pilot error, weather conditions, or an on-board fire could all lead to an incident at or near the airport. Air transportation incidents can occur in remote unpopulated areas, residential areas, or downtown business districts, incidents involving military, commercial, or private locations. An aircraft incident can also occur while the aircraft is on the ground.

A highway transportation incident can be single or multi-vehicle requiring responses exceeding normal day-to-day capabilities. An extensive surface transportation network exists in Iowa; local residents, travelers, business, and industry rely on this network on a daily basis. Thousands of trips a day are made on the streets, roads, highways, and interstates of the county. If the designed capacity of the roadway is exceeded, the potential for a major highway incident increases. Weather conditions play a major factor in the ability of traffic to flow safely in and through the state as does the time of day and week. Incidents involving buses and other high-occupancy vehicles could trigger a response that exceeds the normal day-to-day capabilities of response agencies.

A waterway incident is an accident involving any water vessel that threatens life, property, or adversely affects a community's capability to provide emergency services. Waterway incidents primarily involve pleasure craft on rivers and lakes. In the event of an incident involving a water vessel, the greatest threat would be drowning, fuel spillage, and/or property damage. Water rescue events are largely handled by first responding agencies. Waterway incidents may also include events in which a person, persons, or object falls through the ice on partially frozen bodies of water.

Historical Occurrence: 1,568 crashes from 2015 to 2022

Traffic accidents are common occurrences in the county. According to the Iowa Department of Transportation, Grundy County had 1,568 various types of vehicular crashes from 2015 to 2022 involving 12 fatalities and 58 people seriously injured over the time period.

Table 37: Crash Data for Grundy County (2015-2022)

Year	Crashes	Fatalities	Injuries
2015	184	0	4
2016	163	2	4
2017	199	1	10
2018	208	1	5
2019	242	3	5
2020	170	2	9
2021	210	3	13
2022	192	0	8
TOTAL	**1,568**	**12**	**58**

Source: Iowa DOT Crash Data

Table 38: Conditions Involved in Vehicle Crashes (2015-2022)

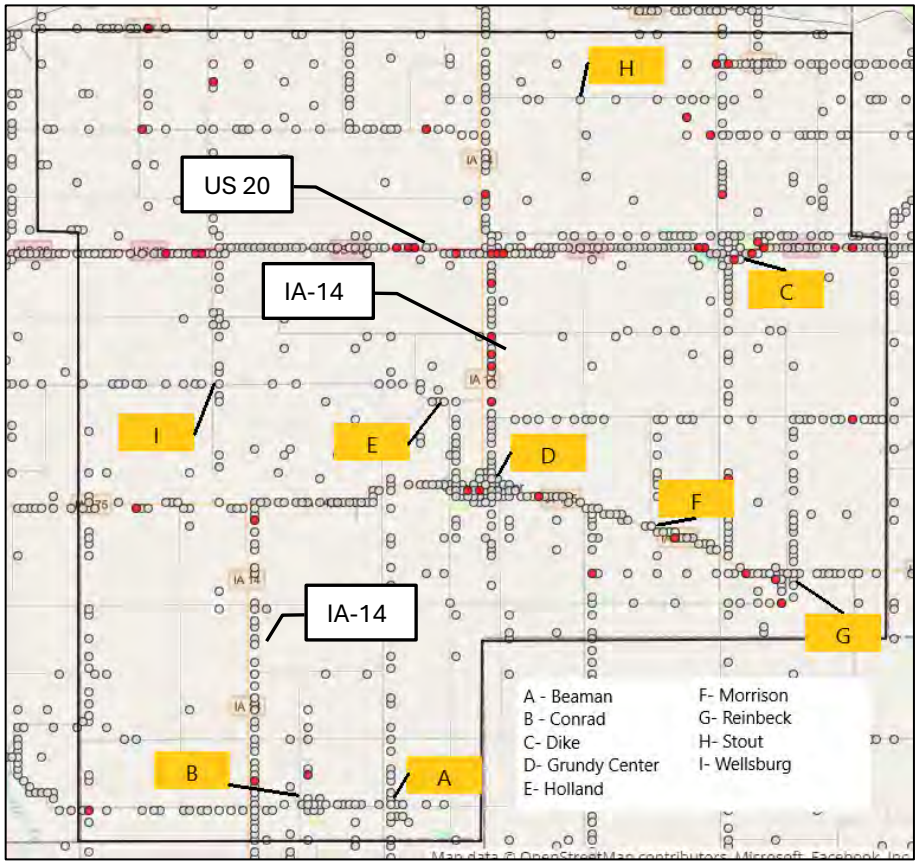
Conditions	Count
Ice, Snowy, or Slushy Roads	239
Heavy Truck Involved	105
Fatality/Seriously Injury Involved	57
All three conditions above	3
Total Crashes (2015-2022)	1,568

Source: Iowa DOT Crash Data

Details on conditions during a vehicle collision or crash over this period reveal that snowy, or slushy road conditions are present during most of these events. Unfortunately, a total of 57 fatality/serious injury related crashes had 12 fatalities. See the table above for conditions involved in vehicle crashes in Grundy County from 2015-2022. There have been no reported boating, rail, or air transportation accidents.

Figure 24 shows the crash locations since 2015. Cities and highways are called out for reference. Crashes with fatalities or severely injured casualties are shown in red.

Figure 24: Crash Locations in Grundy County (2015-2022)



Source: Iowa DOT

Probability: Likely for vehicle crashes, Unlikely for rail or air traffic

Based on historic crash data shown in Table 46, the County can expect several crashes each year, though likely fewer than 250. The probability of an air transportation event is unlikely. Due to having no railroads or navigable streams passing through the county, the probability of either of these events occurring is unlikely.

Magnitude or Severity: Negligible

Many intersections are located throughout the county. There is a chance of a traffic accident, especially with large farm equipment entering and leaving croplands. People driving on major thoroughfares in towns are more vulnerable to traffic accidents as more drivers are on the road and there are changes in the speed limits. However, motorists on the county's rural roadways are also vulnerable to traffic incidents with farm equipment and just the rural nature of the roadway with trucks driving at fast speeds.

All residents of the planning area have the potential to be vulnerable to an air traffic event. Most at risk to air traffic events are those who live or work in flight paths originating from the Grundy Center Municipal Airport, Koch Field, or Waterloo Regional Airport or those near farms that use crop duster airplanes. The number of people on the ground and amount of property damaged from an air plane crash is very limited.

The exact areas that will be affected by a traffic event will likely be small, concentrated, and have a minimal impact on the residents, unless a large or extremely dangerous hazardous material spill should result from the event. An air disaster may impact a larger portion of the county, depending on where the impact occurred and what type of aircraft wrecked. But for the most part, due to the planning area's rural environment, impact would be minimal.

Warning Time: None

Transportation incidents occur within seconds; therefore, there is no time to warn those in the pathway of the harmful effects.

Duration: Less than 1 day

The duration of time a transportation incident would impact on the planning area is dependent upon the type and severity of the incident.

THUNDERSTORM / LIGHTNING / HAIL

Definition and Description

Thunderstorms are common in Iowa and can occur singly, in clusters, or in lines. Thunderstorms can result in heavy rains, high winds (reaching or exceeding 58 mph), tornados, or hail. Thunderstorms are created from a combination of moisture, rapidly raising warm air, and the lifting mechanism such as that caused when warm and cold air masses collide. The SHMT chose to combine previously separated hazards of Thunderstorm/Lightning and Hail. The combined hazard was then scored with the lower of the two values for magnitude as well as warning time. The magnitude reduction was due to the fact that a majority of thunderstorms don't cause state level response, and tracking and prediction of thunderstorms is quite sophisticated.

Associated hazards related to thunderstorms are discussed further as individual hazards (tornado/windstorm and various kinds of flooding). Most thunderstorms produce thunder, lightning, and rain. Severe storms can also produce tornadoes, straight-line winds with microburst above 58 mph, hailstorms, and flooding. The National Weather Service (NWS) considers a thunderstorm severe if it produces hail at least 1-inch in diameter, wind 58 mph or higher, or tornadoes. Straight-line winds that exceed 60 mph are often mistaken for tornadoes.

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

Hailstorms are a product of a severe thunderstorm in which pellets or lumps of ice (of most concern when greater than 1 inch in diameter) fall with rain. Hail is produced in many strong thunderstorms by strong rising currents of air carrying water droplets to a height where freezing occurs, the ice particles grow in size until they are too heavy to be supported by the updraft and fall back to earth. Hail can be smaller than a pea or as large as a softball and can be very destructive to plants and crops. Pets and livestock are particularly vulnerable to hail. Table 39 describes the categories used to classify hailstorms.

Historical Occurrence: Since 1990, 92 thunderstorm events, 93 winter storm events, and 78 hailstorm events occurred

Thunderstorms are common events in Grundy County. Each spring and summer bring many thunderstorms, often accompanied by rain, lightning, high winds, hail, funnel clouds, and tornadoes. The historical occurrences of thunderstorm strong wind events, as recorded by the National Climatic Data Center, for the past 32 years, from 1990 to 2022. This is not a comprehensive list of all thunderstorms in the planning area and does not include tornado or winter storm-designated events, the data provides an indication of the frequency and impact that can be associated with thunderstorms. A Thunderstorm Wind event is defined by the National Weather Service as: "Winds, arising from convection (occurring within 30 minutes of lighting being observed or detected), with speeds of at least 50 knots (58 mph) or winds of any speed producing a fatality, injury, or damage…" NOAA reports that between 1990 and 2022 there were 92 historic thunderstorm wind events to occur. Based on these numbers, Grundy County should expect Thunderstorm Wind Events an average of just over twice per year.

Wind storm events in Table 35 presents 93 events from 1990 to 2022 and recorded windspeeds in knots. Recorded windstorm events caused $2.1 million in property damage and $304,500 in crop damage since 1990.

Hailstorm events in Table 36 shows 78 events since 1990. Hail has caused a recorded cost of $589,000 in property damage and $16.2 million in crop damage over this time period.

On August 10, 2020, a powerful windstorm swept through multiple Midwestern states called a derecho. Iowa sustained the most damage where the highest winds recorded were measured at 126 mph (110 wind knots) which is equivalent to a Category 3 hurricane on the Saffir-Simpson scale. A derecho is a straight-line storm system that can stretch hundreds of miles and move at hurricane force wind speeds. The derecho of 2020 had recorded wind speeds of 70 miles per hour which is equal to a tropical storm and Category 1 hurricane. The

damage from this storm was widespread and was the third costliest natural disaster in 2020 at an estimated cost of $11 billion. Hurricane Laura and the wildfires in the Western U.S. were the first and second costliest natural disasters of 2020.

On August 9, 2009, a storm swept through Wellsburg and Grundy Center that produced $262,000 in property damage and $30,000 in crop damage. The largest hailstorm occurred on August 10, 2001, with recorded hail stone sizes of 51mm which is an H5-H6 hailstorm.

Table 39: TORRO Hailstorm Intensity Scale

Intensity Category	Intensity Category Code	Typical Hail Diameter (mm)	Typical Damage Impacts
Hard Hail	**H0**	5	No damage
Potentially Damaging	**H1**	5-15	Slight general damage to plants, crops
Significant	**H2**	10-20	Significant damage to fruit, crops, vegetation
Severe	**H3**	20-30	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
Severe	**H4**	25-40	Widespread glass damage, vehicle bodywork damage
Destructive	**H5**	30-50	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
Destructive	**H6**	40-60	Bodywork of grounded aircraft dented, brick walls pitted
Destructive	**H7**	50-75	Severe roof damage, risk of serious injuries
Destructive	**H8**	60-90	(Severest recorded in the British Isles) Severe damage to aircraft bodywork
Super Hailstorms	**H9**	75-100	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Super Hailstorms	**H10**	>100	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: The Tornado and Storm Research Organization

Table 40: Strong Windstorm Events in Planning Area (1990-2022)							Continue from bottom left						
Location	Date	Wind Speed (knots	D	I	Property Damage	Crop Damage	Location	Date	Wind Speed (knots	D	I	Property Damage	Crop Damage
Grundy Co.	6/13/1990	75	0	0	-	-	Dike	6/6/2008	65	0	0	$100,000	-
Grundy Co.	6/28/1990	50	0	0	-	-	Grundy Center	6/15/2008	52	0	0	$10,000	-
Grundy Co.	6/28/1990	54	0	0	-	-	Conrad	6/15/2008	53	0	0	$10,000	-
Grundy Co.	6/28/1990	50	0	0	-	-	Grundy Center	7/7/2008	50	0	0	$2,000	-
Grundy Co.	3/22/1991	70	0	0	-	-	Beaman	7/27/2008	52	0	0	$3,000	-
Grundy Co.	3/22/1991	50	0	0	-	-	Wellsburg	6/21/2009	52	0	0	$5,000	-
Grundy Co.	8/10/1992	50	0	0	-	-	Holland	6/21/2009	52	0	0	$3,000	-
Conrad	8/16/1993	50	0	0	$50,000	$5,000	Wellsburg	6/21/2009	52	0	0	$3,000	-
Conrad	4/14/1994	60	0	0	$50,000	-	Wellsburg	8/9/2009	77	0	0	$250,000	$25,000
Conrad	4/14/1994	60	0	0	$50,000	-	Grundy Center	8/9/2009	57	0	0	$10,000	-
Conrad	6/12/1994	50	0	0	$5,000	$50	Grundy Center	8/9/2009	50	0	0	$2,000	$5,000
Reinbeck	7/4/1995	50	0	0	$40,000	$2,000	Holland	8/9/2009	61	0	0	$50,000	$75,000
Conrad	7/19/1995	50	0	0	$5,000	$1,000	Wellsburg	6/25/2010	61	0	0	$3,000	-
Grundy Center	6/20/1997	50	0	0	$3,000	-	Wellsburg	7/1/2011	52	0	0	$5,000	-
Dike	6/20/1997	80	0	0	$500,000	$50,000	Dike	9/2/2011	61	0	0	$10,000	-
Dike	8/23/1997	52	0	0	$5,000	$1,000	Reinbeck	5/2/2012	57	0	0	$5,000	-
Wellsburg	5/15/1998	50	0	0	$10,000	-	Conrad	7/25/2012	52	0	0	$2,000	-
Grundy Center	5/28/1998	61	0	0	$25,000	$1,000	Dike	5/19/2013	52	0	0	$10,000	-
Beaman	6/18/1998	50	0	0	$2,000	-	Ivester	5/20/2013	61	0	0	$5,000	-
Reinbeck	6/27/1998	52	0	0	$1,000	-	Wellsburg	6/24/2013	56	0	0	$40,000	-
Conrad	6/29/1998	61	0	0	$40,000	$5,000	Wellsburg	6/24/2013	61	0	0	$200,000	$50,000
Beaman	6/29/1998	61	0	0	$10,000	$1,000	Fern	6/24/2013	50	0	0	$5,000	-
Wellsburg	5/16/1999	65	0	0	$50,000	-	Dike	7/22/2013	61	0	0	$25,000	$10,000
Conrad	6/13/2000	50	0	0	$10,000	-	Wellsburg	8/1/2013	52	0	0	$2,000	-
Wellsburg	4/21/2001	52	0	0	$3,000	-	Beaman	6/16/2014	52	0	0	-	-
Reinbeck	6/14/2001	52	0	0	$15,000	-	Beaman	6/30/2014	52	0	0	$10,000	-
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Grundy Center	9/7/2001	52	0	0	$5,000	-	**Grundy Center**	6/30/2014	61	0	0	$20,000	$10,000
Reinbeck	9/7/2001	57	0	0	$15,000	$3,000	**Wellsburg**	8/31/2014	56	0	0	$5,000	-
Grundy Center	6/19/2002	52	0	0	$3,000	-	**Wellsburg**	8/31/2014	60	0	0	$5,000	-
Grundy Center	7/4/2003	74	0	0	$30,000	$10,000	**Holland**	8/31/2014	61	0	0	$100,000	$25,000
Grundy Center	7/4/2003	56	0	0	$5,000	-	**Reinbeck**	5/26/2016	56	0	0	$10,000	-
Grundy Center	7/5/2003	50	0	0	$5,000	-	**Grundy Center**	7/17/2016	56	0	0	$5,000	-
Wellsburg	8/3/2004	52	0	0	$2,000	-	**Wellsburg**	9/22/2016	52	0	0	$15,000	-
Dike	8/3/2004	61	0	0	$25,000	$10,000	**Wellsburg**	3/6/2017	61	0	0	$20,000	-
Grundy Center	3/30/2005	52	0	0	$50,000	-	**Wellsburg**	3/6/2017	56	0	0	$10,000	-
Beaman	6/8/2005	50	0	0	$2,000	-	**Wellsburg**	3/6/2017	65	0	0	$25,000	-
Stout	6/29/2005	50	0	0	$1,000	-	**Wellsburg**	3/6/2017	52	0	0	$10,000	-
Grundy Center	3/30/2006	57	0	0	$5,000	-	**Grundy Center**	5/17/2017	56	0	0	$10,000	-
Wellsburg	7/18/2007	61	0	0	$5,000	$10,000	**Holland**	5/17/2017	61	0	0	$10,000	-
Holland	7/18/2007	50	0	0	$5,000	-	**Conrad**	6/6/2018	56	0	0	-	-
Grundy Center	7/18/2007	57	0	0	$20,000	-	**Conrad**	9/9/2019	56	0	0	$5,000	-
Reinbeck	7/18/2007	52	0	0	$5,000	-	**Zaneta**	3/28/2020	50	0	0	-	-
Morrison	7/18/2007	61	0	0	$20,000	$5,000	**Reinbeck**	6/4/2020	52	0	0	-	-
Grundy Center	8/20/2007	52	0	0	$2,000	-	**Reinbeck**	8/10/2020	61	0	0	-	-
Conrad	5/25/2008	52	0	0	$5,000	-	**Grundy Center**	8/10/2020	52	0	0	-	-
Wellsburg	6/6/2008	61	0	0	$5,000	-	**Conrad**	8/27/2022	50	0	0	-	-
						Continue top right							
D = Deaths, I = Injuries									**Total**	**0**	**0**	**$2,109,000**	**$304,050**
Source: National Centers for Environmental Information (NOAA)													

Table 41: Hailstorm Events in Planning Area (1990-2022)							Continue from bottom left						
Location	**Date**	**Magnitude (mm)**	**D**	**I**	**Property Cost**	**Crop Cost**	**Location**	**Date**	**Magnitude (mm)**	**D**	**I**	**Property Cost**	**Crop Cost**
Grundy Co.	5/14/1991	38.1	0	0	$0	$0	**Conrad**	4/13/2006	44.45	0	0	$20,000	$0
Grundy Co.	5/14/1991	19.05	0	0	$0	$0	**Conrad**	4/13/2006	38.1	0	0	$15,000	$0
Grundy Co.	5/17/1991	19.05	0	0	$0	$0	**Grundy Center**	4/13/2006	22.352	0	0	$2,000	$0
Grundy Co.	8/11/1991	19.05	0	0	$0	$0	**Grundy Center**	4/13/2006	22.352	0	0	$2,000	$0
Grundy Co.	7/2/1992	19.05	0	0	$0	$0	**Wellsburg**	6/14/2006	19.05	0	0	$0	$5,000
Conrad	4/14/1994	31.75	0	0	$50,000	$0	**Wellsburg**	4/3/2007	22.352	0	0	$1,000	$0
Grundy Center	4/14/1994	44.45	0	0	$50,000	$0	**Beaman**	4/10/2008	22.352	0	0	$1,000	$0
Conrad	4/25/1994	19.05	0	0	$5,000	$0	**Beaman**	5/25/2008	22.352	0	0	$3,000	$0
Wellsburg	6/26/1994	19.05	0	0	$5,000	$50,000	**Conrad**	6/14/2008	25.4	0	0	$3,000	$5,000
Grundy Center	7/19/1995	19.05	0	0	$1,000	$5,000	**Beaman**	6/14/2008	19.05	0	0	$0	$5,000
Wellsburg	4/8/1999	19.05	0	0	$1,000	$0	**Conrad**	6/15/2008	22.352	0	0	$1,000	$5,000
Conrad	5/18/2000	22.352	0	0	$1,000	$5,000	**Wellsburg**	8/9/2009	63.5	0	0	$250,000	$1,000,000
Grundy Center	5/30/2000	44.45	0	0	$8,000	$5,000	**Grundy Center**	8/9/2009	25.4	0	0	$3,000	$15,000,000
Holland	5/30/2000	19.05	0	0	$0	$5,000	**Dike**	8/10/2009	25.4	0	0	$1,000	$5,000
Conrad	5/31/2000	25.4	0	0	$5,000	$5,000	**Dike**	4/6/2010	25.4	0	0	$5,000	$0
Dike	6/13/2000	25.4	0	0	$5,000	$5,000	**Dike**	4/6/2010	44.45	0	0	$10,000	$0
Conrad	5/9/2001	25.4	0	0	$5,000	$0	**Zaneta**	5/12/2010	19.05	0	0	$0	$0
Conrad	5/10/2001	50.8	0	0	$30,000	$0	**Conrad**	6/18/2010	25.4	0	0	$2,000	$5,000
Beaman	5/10/2001	50.8	0	0	$20,000	$0	**Reinbeck**	6/8/2011	22.352	0	0	$0	$0
Ivester	5/10/2001	25.4	0	0	$3,000	$0	**Dike**	4/9/2013	22.352	0	0	$0	$0
Grundy Center	5/10/2001	44.45	0	0	$10,000	$0	**Fredsville**	4/9/2013	25.4	0	0	$1,000	$0
Stout	6/19/2002	19.05	0	0	$0	$5,000	**Wellsburg**	4/29/2013	22.352	0	0	$0	$0
Grundy Center	5/14/2003	22.352	0	0	$2,000	$0	**Fern**	4/29/2013	22.352	0	0	$0	$0
Grundy Center	5/21/2004	25.4	0	0	$2,000	$5,000	**Fern**	4/29/2013	25.4	0	0	$5,000	$0
Dike	5/21/2004	22.352	0	0	$2,000	$5,000	**Grundy Center**	6/30/2014	22.352	0	0	$0	$5,000
Dike	5/21/2004	44.45	0	0	$5,000	$5,000	**Wellsburg**	5/4/2015	22.352	0	0	$0	$0
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Grundy Center	5/21/2004	22.352	0	0	$2,000	$5,000	**Ivester**	4/15/2017	25.4	0	0	$0	$0
Dike	5/21/2004	25.4	0	0	$3,000	$5,000	**Ivester**	5/25/2018	25.4	0	0	$0	$0
Grundy Center	5/21/2004	44.45	0	0	$10,000	$5,000	**Holland**	6/6/2018	22.352	0	0	$0	$0
Grundy Center	5/21/2004	19.05	0	0	$0	$5,000	**Conrad**	6/6/2018	25.4	0	0	$0	$0
Grundy Center	5/21/2004	44.45	0	0	$10,000	$5,000	**Grundy Center**	6/9/2018	22.352	0	0	$0	$0
Wellsburg	8/3/2004	44.45	0	0	$5,000	$5,000	**Grundy Center**	8/5/2018	25.4	0	0	$0	$0
Wellsburg	8/16/2004	44.45	0	0	$5,000	$5,000	**Reinbeck**	5/31/2019	25.4	0	0	$0	$0
Reinbeck	4/19/2005	19.05	0	0	$0	$0	**Dike**	6/28/2019	25.4	0	0	$0	$0
Grundy Center	4/13/2006	22.352	0	0	$2,000	$0	**Fern**	7/11/2020	25.4	0	0	$0	$0
Wellsburg	4/13/2006	19.05	0	0	$0	$0	**Dike**	6/15/2022	25.4	0	0	$0	$0
Grundy Center	4/13/2006	22.352	0	0	$2,000	$0	**Holland**	8/19/2022	38.1	0	0	$0	$0
Conrad	4/13/2006	38.1	0	0	$15,000	$0	**Holland**	8/19/2022	25.4	0	0	$0	$0
Grundy Center	4/13/2006	19.05	0	0	$0	$0	**Holland**	7/28/2023	25.4	0	0	$0	$0
Continue top right													
D= Deaths, I=Injuries									**TOTAL**	**0**	**0**	**$589,000**	**$16,170,000**

2

Probability: Highly Likely

The probability of a thunderstorm occurring in the planning area and having an impact on some property in the next five years is high. Based from data from the last 10 years, it is estimated that the planning area will experience approximately 2.5 thunderstorms per year that result in wind damage. Thunderstorms without measurable impacts are likely to occur as well. This conclusion is based on the historical occurrences of thunderstorms in the area and the fact that the high wind plains of the upper Midwest region has conditions that contribute to the development of thunderstorms with cross wind patterns. The climate in the area has continental high humidity and therefore has generally enough moisture to form clouds and rain, relatively warm and unstable air that can rise quickly, and fluctuating weather fronts that work to cause uplift in air masses.

Based on Iowa's 1997-2011 average of cloud-to-ground lighting flashes of 645,685 flashes per year, Grundy County should anticipate approximately 5,723 lighting flashes annually. However, reported lighting strikes are not likely to cause damage to property, crops, or casualties.

There is a high probability of hailstorms affecting part and all of the planning area. Based on the historical occurrence of hail events from 2010-2020, the entire planning area can expect to average approximately two to three hail events per year. However, many of these hail events occurred on the same day because of the same storm. Over the last decade (2010-20), 78 hailstorm events occurred over 16 days. Therefore, based on historic data, Grundy County should anticipate multiple hail events (2-3) occurring one day a year.

Magnitude and Severity: Limited

It is anticipated that a severe thunderstorm could impact 100% of the population (currently 12,329 persons) in the planning area. Those individuals most at risk would include:

1. People in automobiles at the time
2. People in mobile homes: (**180 households**)
3. People in group quarters (**150 persons**)
4. Older adults living alone (65 years or older) (**723 households**)

Other people at risk include travelers living "on the road" such as RVs. Livestock are particularly vulnerable to harm from hail. Municipalities impacted by a hailstorm may have hail damage to trees and branches that have fallen. Critical infrastructure such as overhead power lines are also vulnerable to hail damage.

According to available data from the county, there are approximately 9,878 parcels of land within the planning area. The total value (land, building, and dwelling) of these parcels is approximately $1.46 billion. The dollar amount for just buildings is $107,369,363 and dwellings account for $522,623,328. Because of the elements involved with a thunderstorm (tornados, hail, high wind, lightning, heavy rain) those vulnerable are very similar to what was identified in the tornado event analysis (see Tornado/Windstorm Hazard Profile).

Thunderstorms affect relatively small areas when compared to winter storms. A typical thunderstorm is 15 miles in diameter and lasts an average of 20 to 30 minutes. Of the estimated 100,000 thunderstorms that occur each year in the United States, only about 10% are classified as severe. Despite their relatively small size, thunderstorms are large enough to impact the entire community. The severity of the storm would likely determine the extent of any associated damage.

Thunderstorms may occur singly, in clusters, or in lines. Some of the most severe weather occurs when a single thunderstorm affects one location for an extended time. Lightning is a major threat during a thunderstorm. It is the lightning that produces thunder in a thunderstorm. Lightning is very unpredictable, which increases the risk to individuals and property.

In the United States, 75 to 100 people are killed each year by lightning, although most lightning victims do survive. Persons struck by lightning often report a variety of long-term, debilitating symptoms, including memory loss, attention deficits, sleep disorders, numbness, dizziness, stiffness in joints, irritability, fatigue, weakness, muscle spasms, depression, and an inability to sit for long periods. It is a myth that lightning never strikes the same place twice. In fact, lightning will strike several times in the same place during one discharge.

The most severe impacts ofa thunderstorm would be realized when cascading events occurred as a result of the storm. For example, multiple lightning strikes may result in death, fire, destruction of infrastructure, loss of power, communications failure, etc.

The severity of a hailstorm depends on the size and amount of hail. Hail several inches in diameter can cause severe damage to an urbanized area (broken windows, down trees and power lines, and automobile damage). Hail as small as 0.5-inch diameter can cause damage to crops and other plants.

Warning Time: Minimal

The National Weather Service has developed effective weather advisories, which are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public in advance of the storm. Again, weather prediction capabilities have made significant improvements in the past few years. There are several notifications made by the National Weather Service. These include severe thunderstorm watch, severe thunderstorm warning, tornado watch, tornado warning, flash flood watch, and flash flood warning.

Despite these advancements in technology, the potential for a storm to form quickly and without warning still exists. Therefore, the committee staggered the score for the speed of onset. This allowed for the possibility of minimal or no warning time, but also acknowledged that there is generally some warning time before an event occurs.

Alert Iowa is in use in Grundy County for emergency weather alerts that are run by the county emergency management agency staff. In the event of an emergency or severe weather, an alert will be sent to the phone number and/or email address provided by voice, text and/or email. This is a free service provided by Grundy County and the State of Iowa.

Duration: Less than 6 hours

Thunderstorm, lighting, and hailstorms stay in a given area a relatively short time, depending on wind speeds. The duration of an event in one location is likely less than 6 hours.

TORNADO

Description and Definition

A tornado is a violent whirling wind characteristically accompanied by a funnel shaped cloud extending down from a cumulonimbus cloud that progresses in a narrow, erratic path. Rotating wind speeds can exceed 300 mph and travel across the ground at average speeds of 25-30 mph. A tornado can be a few yards to around a mile wide where it touches the ground. An average tornado is a few hundred yards wide. A tornado can move over land for distances ranging from short hops to many miles, causing damage and destruction wherever it descends. The funnel is made visible by the dust sucked up and condensation of water droplets in the center of the funnel.

The tornado funnel is made visible by the dust sucked up and by condensation of water droplets in the center of the funnel. The rating scale used to rate tornado intensity is the Fujita Scale. The Fajita Scale categorizes tornado severity based on observed damage, the six-step scale ranges from F0 (light damage) to F5 (incredible damage). As of February 2007, the National Weather Service uses the Enhanced Fujita Scale (EF Scale). This new scale ranges from EF0-EF5 and is shown in Table 42.

Windstorms are extreme winds associated with severe winter storms, severe thunderstorms, downbursts, and very steep pressure gradients. Windstorms, other than tornados, are experienced in all regions of the United States. It is difficult to separate the various wind components that cause damage from other wind-related natural events that often occur with or generate windstorms. Although Iowa does not experience direct impacts from hurricanes, the state is no stranger to strong, damaging winds.

TABLE 42: ENHANCED FUJITA SCALES FOR TORNADOS

Fujita Scale		Enhanced Fujita Scale			
Scale	3-Second Gust Speed (mph)	Scale	3-Second Gust Speed (mph)	Type of Tornado	Description of Damage
F0	45-78	**EF0**	65-85	Gale	Some damage to chimneys, broken tree branches, push over shallow rooted trees, damage to sign boards
F1	79-117	**EF1**	86-109	Moderate	The lower limit is the beginning of hurricane wind speed, peel surface off roofs, mobile homes pushed off foundations or overturned, moving automobiles pushed off roads
F2	118-161	**EF2**	110-137	Significant	Considerable damage: roofs torn off frame homes, mobile homes demolished, boxcars pushed over, large trees snapped or uprooted, light object missiles generated
F3	162-209	**EF3**	138-167	Severe	Severe damage: roofs and some walls torn off well-constructed houses, trains overturned, most trees in forest uprooted, heavy cars lifted off ground and thrown
F4	210-261	**EF4**	168-199	Devastating	Devastating damage: well-constructed houses leveled, structure with weak foundation blown off some distance, cars thrown and large missiles generated
F5	262-317	**EF5**	200-234	Incredible	Incredible damage: strong frame houses lifted off foundations and carried considerable distance to disintegrate, automobile sized missiles fly through the air in excess of 100 yards, trees debarked, incredible phenomena will occur.

Source: NOAA

Unlike tornadoes, windstorms may have a destructive path that is miles wide and duration of the event could range from hours to days. These events can produce straight line winds more than 64 knots (73 mph) causing power outages, property damage, impaired visibility, and crop damage. It is often difficult to separate windstorms and tornado damage when winds get above 64 knots.

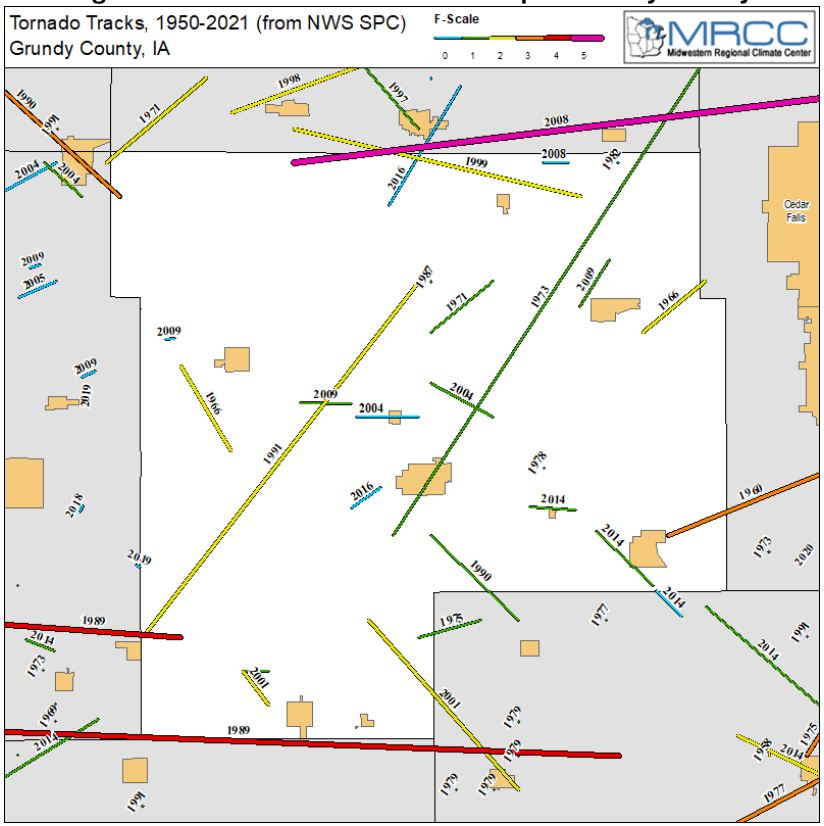
Historical Occurrence: Annual Average of 52 tornados in Iowa

Since 1990 there have been 24 recorded occurrences of tornado events in the planning area. The estimated total of property damage from these tornadoes is $3.6 million while crop damage totals $71,100. The recorded tornado events for the entire planning area can be referenced in detail in Table 38. The first column in Table 38 indicates the location where the tornado touched down, it does not include the communities impacted or where it ended. Data used in this table was collected from the National Centers for Environmental Information. The data gathered indicates reported tornados only and does not account for unreported or misreported information. Accordingly, this information is intended for reference only, and not as a true and accurate historical account. A graphic representation of historic tornado events and the rough path they traveled can be seen in Figure 25.

Windstorms occur in the planning area on an annual basis. High winds are often associated with thunderstorms but can be produced during severe snowstorms or tornados. Table 39 shows the historical occurrences for solely high winds only, while Table 35, in the previous Thunderstorm / Lighting / Hail hazard section includes a table of historical Thunderstorm Wind events.

Since 1990, there have been 35 recorded occurrences of high winds events in the planning area. The estimated total of property damage from solely high wind events has been $1.04 million and $31,100 in crop damage. Table 39 details the high wind events in Grundy County.

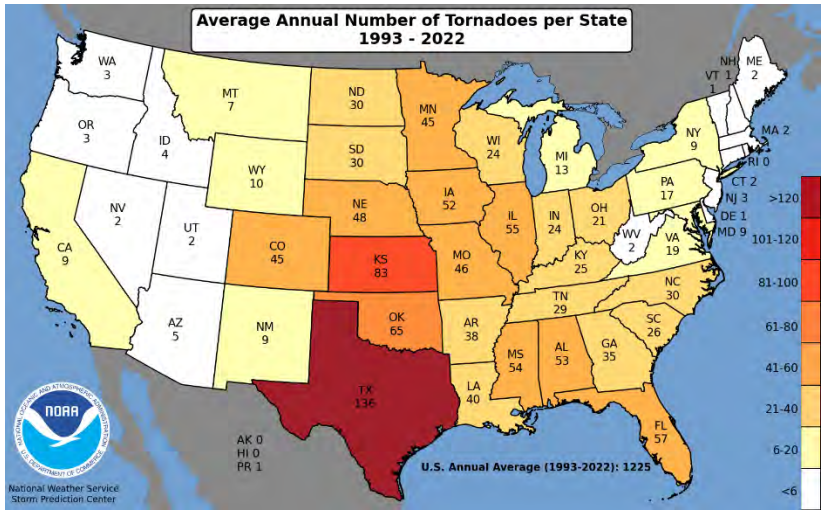
Figure 25: Historical Tornado Path Map of Grundy County



Source: Midwestern Regional Climate Center Tornado Track Tool

In Iowa, the 30-year (1993-2022) annual average of tornados is 52. Compared to other contiguous adjacent states, other than Illinois, Iowa has the most tornados in this region. In Figure 26, the total number of mobile homes are shown for Grundy County. Most mobile homes are located in unincorporated county land. The City of Conrad has the highest number of mobile homes than other municipalities in Grundy County.

Figure 26: Average Number of Tornados Per State (1993-2022)



Source: NOAA

Beaman

There have been 2 tornado events since 1960 within 5 miles of Beaman. In 1989, an EF4 with a width of 150 yards swept south of Beaman for 66 miles. In 2001, an EF2 with a width of 875 yards swept north of Beaman for 8 miles. No casualties were recorded.

Conrad

There have been 3 tornado events since 1960 within 5 miles of Conrad. In 1989, an EF4 with a width of 150 yards swept south of Beaman for 66 miles. In 2001, an EF2 with a width of 200 yards swept east of Conrad for 2 miles. In 2001, an EF1 with a width of 100 yards swept east of Conrad shortly for 1 mile. No casualties were recorded.

Dike

There have been 2 tornado events since 1960 within 5 miles of Dike. In 1973, an EF1 swept through the county for 31 miles with a width of 10 yards. This 1973 EF1 tornado swept directly through Grundy Center. In 2009, an EF1 with a width of 90 yards swept northward just half a mile outside of Dike. No casualties were recorded.

Grundy Center

There have been 5 tornado events since 1960 within 5 miles of Grundy Center. In 1973, an EF1 tornado swept directly through Grundy Center with a width of 10 yards. There were no casualties in this tornado.

In 2004, an EF1 tornado of 100-yard across swept north of the city. In 2004, an EF0 tornado of 50 yards across swept north of the city directly through Holland. In 2016, an EF0 tornado swept west of the city with 25 yards across in width.

There were no casualties in these tornados.

Holland

There have been 6 tornado events since 1960 within 5 miles of Holland.

- In 1971, an EF1 tornado 200 yards across occurred north of the city.
- In 1973, an EF1 tornado traveled across the county for 31 miles and passed Holland about a mile east of the city.
- In 1991, an EF2 tornado passed by Holland about 2 miles west of the city for 20 miles across the county.
- On May 21, 2001, 2 tornados occurred in and around Holland. An EF0 directly swept through Holland and an EF1 swept a mile near the city that day.
- In 2016, an EF0 tornado 25 yards across occurred south of the city about 3 miles away from Holland.

There have been 0 casualties from these tornado events.

Morrison

There have been 4 tornado events within a 5-mile radius of the city of Morrison since 1960.

- In 1973, an EF1 tornado swept directly through Grundy Center with a width of 10 yards. There were no casualties in this tornado as it passed Morrison about 5 miles away from the city.

- In 1990, an EF1 tornado swept south of the city with a width of 30 yards a traveled 6 miles in total.
- On June 29, 2014, an EF1 tornado 100 yards in width swept north of Morrison.
- On July 6, 2014, an EF1 tornado 100 yards in width hit east of the city.

There have been 0 casualties from these tornado events.

Reinbeck

There were 5 tornado events that occurred 5 miles outside of Reinbeck that traveled at least 1 mile in total.

- In 1960, an EF3 tornado started outside of Reinbeck and traveled 30 miles east of Grundy County with a width of 800 yards. There were 6 casualties with 1 death in this tornado.
- On June 29, 2014, an EF1 tornado 100 yards in width swept west of Reinbeck through Morrison.
- On July 6, 2014, an EF1 tornado 100 yards in width hit south just right outside of the city.
- On July 6, 201, an EF0 tornado 20 yards in width swept south of Reinbeck.
- On July 6, 2014, an EF1 tornado 225 yards in width swept in Tama County toward Grundy County.

There were 6 casualties and 1 death since 1960.

Stout

There were 5 tornado events that occurred 5 miles outside of the City of Stout.

- In 1973, an EF1 tornado swept directly through Grundy Center with a width of 10 yards. There were no casualties in this tornado as it passed Stoute about 3 miles away from the city.
- In 1999, an EF2 tornado came closest to Stout with a width of 50 yards and traveling eastward passing a mile north of the city.
- On May 25, 2005, a series of tornados broke out in Iowa. An EF0 tornado was recorded with a width of 50 miles.
- An EF5 tornado with a width of 2,100 yards traveled 51 miles across Iowa striking Parkersburg to the north of Stout. There were 79 casualties including 9 deaths in this tornado.

There were 79 casualties from tornado within 5 miles of Stout from tornado since 1960.

Wellsburg

In Wellsburg there were 4 tornado events that occurred within 5 miles outside of Wellsburg.

- In 1966, an EF2 tornado 100 yards across swept south of the city.
- In 1991, an EF2 tornado 50 yards across swept east of the city.
- On June 21, 2009, an EF2 tornado 70 yards across swept southeast of Wellsburg.
- On June 21, 2009, an EF0 tornado went a short distance about a mile and half east of the city.

Grundy County

In total, there have been approximately 33 tornados from EF0s to an EF3 that claimed 1 life with 7 casualties in 1960. This occurred near Reinbeck. The EF5 in 2009 hit the northside of the county with no recorded losses, however the adjacent county of Butler and the city of Parkersburg saw near total devastation from this EF5 which was less than 5 miles from completely destroying Stout and Wellsburg.

Based on national data on circumstance of tornado fatalities between 1985 and 1997, it was found that 38% of fatalities were occupants of mobile or manufactured homes, 27% were in permanent homes, 11% in vehicles, 9% outdoors (open), 4% in businesses, 4% in structures with long-span roofs, and 2% in schools. These data highlight the high exposure of occupants of mobile and manufactured homes (AR State Hazard Mitigation Plan).

In a 1989 study[3] of deaths and injuries due to tornados, risk factors for injury and death were identified. Poor building anchoring, locations without a basement, people outdoors, and those over the age of 70. The findings in this study are supported by later studies that point to sheltering in buildings with adequate anchoring in an interior building or basement offer better protection during a tornado.

Vulnerable structures in a tornado are mobile homes. Although a mobile home may be structurally "tied down" to withstand strong winds, a mobile home will offer less protection from tornadoes than conventional wood frame structures on concrete footing.

According to data from the 2020 ACS data, there are an estimated 180 mobile homes in the county. The average household size is 2.34 persons. An estimated 422 people reside in mobile homes in the county. A potential tornado may affect the entire county. This puts 422 people at a greater risk than others during a tornado event.

Vulnerable populations in a tornado are those over 70 years of age. For the elderly population, there are an estimated 2,660 adults greater than 65 years old which is 22% of the population. Nearly 14% of the population are older adults (65 years or older) living alone. This is estimated at 723.

From this assessment, nearly 3,682 people in the county are at greater risk than others in a tornado. This accounts for older adults 65 years and older and people living in mobile homes. Both these measures account for nearly 30% of the population.

Currently, both Dike-New Hartford and Grundy Center Community School District have two locations where there is a FEMA certified tornado safe room that is known to exist in the planning area.

In rural Grundy County areas, there are 1,702 structures within the unincorporated area that are vulnerable to tornadoes – land, structures and dwelling units were valued at $1.03 billion in 2016. In 2023 dollars, the total valuation is $1.27 billion.

[3] Carter AO, Millson ME, Allen DE. Epidemiologic study of deaths and injuries due to tornadoes. Am J Epidemiol. 1989 Dec;130(6):1209-18.

Probability: Highly Likely

There have been approximately 33 recorded tornados in the planning area since 1960. That averages, roughly, to a tornado every 2 years. Because tornadoes are sporadic, there cannot be a reliable long-term prediction made as to when or if they may occur. In the last 10 years, 2012-2022, Grundy County has experienced five tornadoes, affecting a total of 9 incorporated cities in Grundy County. The probability of a Tornado/Windstorm event in the planning area **is highly likely.**

If this 10-year average holds, it is highly likely the planning area will likely experience two to three tornados within the next five years. Also, given the historical paths of tornadoes (Attachment 5a) in the planning area, it is likely that future events could impact the same areas. The tornado that happened near Fern was an EF2 but became part of the EF5 tornado that devastated the City of Parkersburg on May 25, 2008. This storm system did a reported total of approximately $100 million worth of property and crop damage.

The probability of a windstorm occurring in the planning area and having an impact on said area in the next year is highly likely. This conclusion is based on the historical occurrences of winds associated with thunderstorms in the area and the fact that the climate in the county is very conducive to the development of thunderstorms and high winds. The climate in the area is of humid continental variety and therefore there is generally enough moisture to form clouds and rain, relatively warm and unstable air that can rise quickly, and fluctuating weather fronts that work to cause uplift in air masses.

Magnitude or Severity: Limited

Tornadoes consist of strong, often destructive, winds. The winds in the strongest tornadoes are the fastest winds experienced anywhere on Earth, with rotation velocities up to 300 mph. Generally, the damage associated with a tornado is greatest within several hundred feet of the column. The maximum threat of a tornado occurs when a tornado stays on the ground for an extended period. The risk becomes even

greater when the tornado event is accompanied by hail, heavy rain, and lightning.

The maximum threat of a windstorm is usually several hundred or thousand feet wide, as they are often associated with large thunderstorm cells. Much of the damage incurred during a windstorm event is often due to the accompanying hail, lightning, and wind shear.

Table 43: Tornado Events in Planning Area (1990-2022)

Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Grundy Co.	6/28/1990	F1	0	0	$2,500,000	$0
Grundy Co.	3/22/1991	F2	0	0	$250,000	$0
Stout	7/2/1999	F2	0	0	$75,000	$3,000
Dike	5/11/2000	F0	0	0	$0	$100
Conrad	5/10/2001	F2	0	0	$150,000	$0
Beaman	5/10/2001	F2	0	0	$35,000	$0
Conrad	5/10/2001	F1	0	0	$50,000	$0
Dike	4/18/2002	F0	0	0	$1,000	$0
Holland	5/21/2004	F0	0	0	$0	$0
Grundy Center	5/21/2004	F1	0	0	$2,000	$3,000
Dike	5/21/2004	F0	0	0	$0	$0
Grundy Center	5/21/2004	F0	0	0	$0	$0
Grundy Center	5/21/2004	F0	0	0	$0	$0
Fern	5/25/2008	EF2	0	0	$300,000	$2,000
Stout	5/25/2008	EF0	0	0	$1,000	$1,000
Wellsburg	6/21/2009	EF0	0	0	$0	$1,000
Dike	6/21/2009	EF1	0	0	$25,000	$2,000
Wellsburg	6/21/2009	EF1	0	0	$10,000	$5,000
Morrison	6/29/2014	EF1	0	0	$30,000	$2,000
Reinbeck	7/6/2014	EF1	0	0	$200,000	$50,000
Reinbeck	7/6/2014	EF0	0	0	$0	$0
Wellsburg	8/31/2014	EF0	0	0	$0	$2,000
Fern	11/28/2016	EF0	0	0	$0	$0
Grundy Center Apt	11/28/2016	EF0	0	0	$0	$0
		TOTAL	**0**	**0**	**$3,629,000**	**$71,100**

Source: National Centers for Environmental Information

Table 43: High Wind Events in Planning Area (1990-2022)							
Location	**Date**	**Event Type**	**Magnitude (knots)**	**Deaths**	**Injuries**	**Property Damage**	**Crops Damage**
Grundy (Zone)	1/17/1996	High Wind	55	0	0	$0	$0
Grundy (Zone)	2/10/1996	High Wind	56	0	0	$0	$0
Grundy (Zone)	3/24/1996	High Wind	54	0	0	$0	$0
Grundy (Zone)	4/25/1996	High Wind	52	0	0	$0	$0
Grundy (Zone)	10/29/1996	High Wind	57	0	0	$0	$0
Grundy (Zone)	4/6/1997	High Wind	55	0	0	$0	$0
Grundy (Zone)	5/5/1997	High Wind	52	0	0	$0	$0
Grundy (Zone)	4/12/1998	High Wind	-	0	0	$50,000	$0
Grundy (Zone)	11/10/1998	High Wind	61	0	0	$300,000	$5,100
Grundy (Zone)	3/17/1999	High Wind	50	0	0	$30,000	$0
Grundy (Zone)	3/8/2000	High Wind	50	0	0	$10,000	$0
Grundy (Zone)	4/7/2001	High Wind	50	0	0	$50,000	$0
Grundy (Zone)	3/9/2002	High Wind	-	0	0	$50,000	$0
Grundy (Zone)	5/11/2002	High Wind	51	0	0	$75,000	$0
Grundy (Zone)	2/11/2003	High Wind	50	0	0	$5,000	$0
Grundy (Zone)	11/12/2003	High Wind	50	0	0	$50,000	$0
Grundy (Zone)	3/7/2004	High Wind	36	0	0	$10,000	$0
Grundy (Zone)	4/18/2004	High Wind	56	0	0	$80,000	$0
Grundy (Zone)	4/27/2004	High Wind	55	0	0	$75,110	$0
Grundy (Zone)	5/24/2004	High Wind	40	0	0	$25,000	$0
Grundy (Zone)	12/12/2004	High Wind	35	0	0	$50,000	$0
Grundy (Zone)	1/22/2005	High Wind	56	0	0	$10,000	$0
Grundy (Zone)	5/12/2005	High Wind	35	0	0	$10,000	$0
Grundy (Zone)	6/8/2005	High Wind	50	0	0	$20,000	$0
Grundy (Zone)	11/12/2005	High Wind	35	0	0	$50,000	$0
Grundy (Zone)	11/15/2005	High Wind	35	0	0	$30,000	$0
Grundy (Zone)	1/24/2006	High Wind	37	0	0	$10,000	$0
Grundy (Zone)	10/26/2008	High Wind	35	0	0	$25,000	$25,000
Grundy (Zone)	10/27/2010	High Wind	35	0	0	$25,000	$0
Grundy (Zone)	11/11/2015	High Wind	35	0	0	$0	$0

Grundy (Zone)	2/19/2016	High Wind	35	0	0	$0	$0
Grundy (Zone)	10/20/2018	High Wind	50	0	0	$0	$0
Grundy (Zone)	4/11/2019	High Wind	51	0	0	$0	$0
Grundy (Zone)	12/15/2021	High Wind	56	0	0	$0	$0
Grundy (Zone)	4/14/2022	High Wind	36	0	0	$0	$0
			Total	**0**	**0**	**$1,040,110**	**$30,100**
Source: National Centers for Environmental Information							

Magnitude or Severity: Limited

Tornadoes consist of strong, often destructive, winds. The winds in the strongest tornadoes are the fastest winds experienced anywhere on Earth, with rotation velocities up to 300 mph. Generally, the damage associated with a tornado is greatest within several hundred feet of the column. The maximum threat of a tornado occurs when a tornado stays on the ground for an extended period. The risk becomes even greater when the tornado event is accompanied by hail, heavy rain, and lightning.

The maximum threat of a windstorm is usually several hundred or thousand feet wide, as they are often associated with large thunderstorm cells. Much of the damage incurred during a windstorm event is often due to the accompanying hail, lightning, and wind shear.

The severity of a tornado event would likely be determined by five primary components:

1) The size of the tornado (see Table 45)
2) The time the tornado stayed in or around the community
3) The time of day of the tornado
4) The density of the population at the point of impact
5) The area of the community that was directly impacted (i.e. a mobile home park or an undeveloped portion of the community).

Table 45: Tornado Scenario Vulnerability Assessment Loss Assumptions

Magnitude	% of total city's assessed value for buildings and land loss due to tornado size
EF0	25%
EF1	25%
EF2	50%
EF3	50%
EF4	100%
EF5	100%
Source: INRCOG	

TABLE 4 : TORNADO SCENARIO FOR GRUNDY COUNTY (ALL PROPERTIES)

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	533	$45,862,590	1.82%
EF1	150 Meters	965	$74,685,315	2.96%
EF2	250 Meters	1350	$108,176,205	8.59%
EF3	500 Meters	2335	$177,439,413	14.08%
EF4	900 Meters	3589	$277,185,313	44.00%
EF5	1100 Meters	3961	$313,065,813	49.69%

Historically, there have been only 0 reported injuries and 0 deaths that occurred because of tornados in the planning area. While there haven't been any deaths or injuries in Grundy County, there have been a startling number in surrounding counties. In addition, another tornado could potentially be dramatically greater than what has been historically experienced in the planning area.

In the event of a tornado, the entire planning area has an extensive network of outdoor warning sirens that, given enough time, allow people to search for suitable shelter. All jurisdictions in the planning area have been active in upgrading these sirens, as many of them are old and unreliable. Grundy County Emergency Management Agency tests the sirens monthly.

For windstorms, impacts can vary from broken tree limbs, broken corn stocks, to the destruction of buildings and other structures depending upon the built environment and the speed of the winds.

Using available data, a tornado scenario was developed for each city and one complete county summary (see Appendix P for hypothetical tornado scenario maps). Estimates of potential damage were based on an EF0 through EF tornado impacting each city. Table 46A through Table 46IJ show the estimated damage values of a hypothetical tornado scenario for each city in the planning area. Parcel values are current as of 2016. The incorporated boundaries are current as of 2020.

The damage estimates show a potential impact by damage level to buildings and land. The losses for each tornado scenario in each city in the county were calculated using the percentages in Table 45.

Figure 30: Mobile Homes in Grundy County (2020)

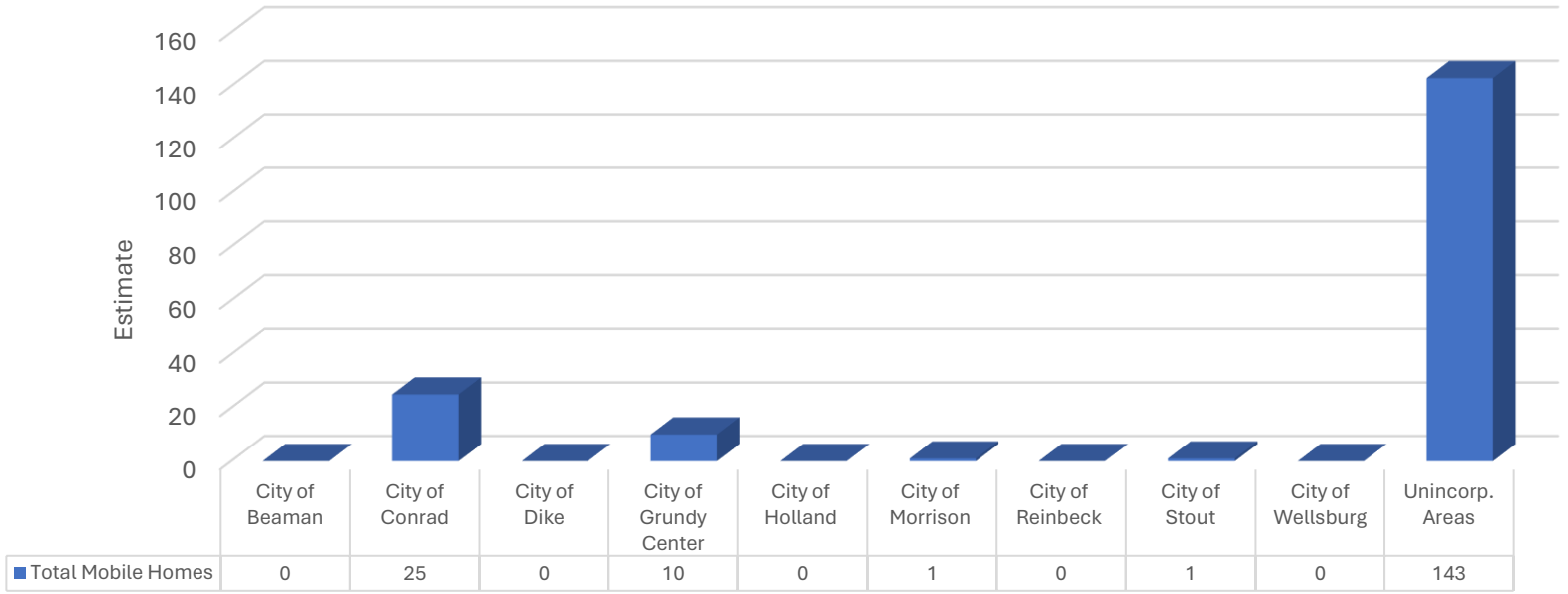


TABLE 46A: TORNADO SCENARIO FOR BEAMAN

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	28	$4,843,540	14.35%
EF1	150 Meters	49	$5,752,210	17.04%
EF2	250 Meters	67	$6,638,980	39.34%
EF3	500 Meters	110	$8,178,450	48.47%
EF4	900 Meters	121	$8,437,420	100.00%
EF5	1100 Meters	121	$8,437,420	100.00%

TABLE 46B: TORNADO SCENARIO FOR CONRAD

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	38	$6,149,400	2.98%
EF1	150 Meters	71	$9,861,510	4.78%
EF2	250 Meters	102	$13,125,780	12.73%
EF3	500 Meters	233	$25,129,290	24.36%
EF4	900 Meters	412	$38,567,640	74.79%
EF5	1100 Meters	453	$44,069,470	85.46%

TABLE 46C: TORNADO SCENARIO FOR DIKE

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	75	$9,322,270	11.60%
EF1	150 Meters	131	$15,259,150	18.98%
EF2	250 Meters	176	$20,461,640	25.45%
EF3	500 Meters	295	$35,770,760	44.50%
EF4	900 Meters	457	$56,027,990	69.70%
EF5	1100 Meters	500	$61,942,460	77.05%

TABLE 46D: TORNADO SCENARIO FOR GRUNDY CENTER

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	109	$7,333,880	1.52%
EF1	150 Meters	195	$14,347,255	2.98%
EF2	250 Meters	296	$22,604,435	9.40%
EF3	500 Meters	557	$40,873,183	17.00%
EF4	900 Meters	986	$78,792,238	65.52%
EF5	1100 Meters	1127	$90,477,208	75.24%

TABLE 46E: TORNADO SCENARIO FOR HOLLAND

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	31	$1,866,400	5.72%
EF1	150 Meters	72	$3,644,270	11.17%
EF2	250 Meters	89	$4,288,910	26.28%
EF3	500 Meters	126	$6,248,610	38.29%
EF4	900 Meters	157	$8,159,380	100.00%
EF5	1100 Meters	157	$8,159,380	100.00%

TABLE 46F: TORNADO SCENARIO FOR MORRISON

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	16	$605,200	5.09%
EF1	150 Meters	31	$1,105,960	9.30%
EF2	250 Meters	43	$1,474,840	24.80%
EF3	500 Meters	71	$2,533,290	42.60%
EF4	900 Meters	80	$2,973,230	100.00%
EF5	1100 Meters	80	$2,973,230	100.00%

TABLE 46G: TORNADO SCENARIO FOR REINBECK

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	79	$6,702,710	2.10%
EF1	150 Meters	148	$10,907,450	3.41%
EF2	250 Meters	221	$21,634,760	13.54%
EF3	500 Meters	409	$32,454,400	20.30%
EF4	900 Meters	652	$46,562,620	58.26%
EF5	1100 Meters	729	$54,268,020	67.90%

TABLE 46H: TORNADO SCENARIO FOR STOUT

Scale	Tornado Width	# of Parcels	Damaged Value	% of City Damaged
EF0	50 Meters	30	$1,839,680	7.31%
EF1	150 Meters	58	$3,140,310	12.47%
EF2	250 Meters	74	$4,107,120	32.62%
EF3	500 Meters	85	$4,516,730	35.87%
EF4	900 Meters	96	$5,174,710	82.20%
EF5	1100 Meters	101	$5,391,460	85.64%

Table 46I: Tornado Scenario for Wellsburg				
Scale	**Tornado Width**	**# of Parcels**	**Damaged Value**	**% of City Damaged**
EF0	50 Meters	65	$5,013,460	4.62%
EF1	150 Meters	132	$7,941,910	7.32%
EF2	250 Meters	188	$10,944,340	20.17%
EF3	500 Meters	294	$16,429,650	30.28%
EF4	900 Meters	402	$22,073,455	81.37%
EF5	1100 Meters	427	$23,519,925	86.70%

Warning Time: 10 to 15 minutes

There are two forms of warning alerts that the National Weather Service issues during a tornado.

A tornado watch is issued when weather conditions indicate an increased risk for sever weather that is capable of producing a tornado.

A tornado warning is issued when a tornado is sighted and/or confirmed by weather radar. Shelter should be taken immediately during this warning.

Although the advancement in radar and forecasting has improved and continues to improve it cannot predict when and where a tornado may strike.

They can, however, inform a community of when the conditions are right for an event to occur. In fact, it is estimated that approximately 95 percent of all tornadoes occur in areas where a tornado watch has been issued. Nevertheless, the five percent of the time that they do not accurately predict is a risk that all people in Grundy County must prepare for.

Tornado and thunderstorm watches can warn of likely conditions hours in advance of an upcoming storm. Although significant advances in meteorological technology have allowed for more effective forecasting.

It is not possible to precisely predict when and where a windstorm will strike. A windstorm's rapid change in direction makes it difficult to say with forecast certainty over the long term. The path the windstorm will continue after it has been identified is also unpredictable with continuously changing atmospheric conditions. Therefore, warning time is very minimal. However, storming weather conditions with atmospheric readings and conditions may activate an emergency thunderstorm watch. Yet activating this feature on Alert Iowa may leave many to ignore the warning over time. So, there is often a more precise knowledge for storm watching, atmospheric readings, and technological integration with storm warning systems will need to be assessed with continuous training and learning about the ongoing advancements in storm/tornado science.

Duration: Less than a day

The duration of the actual event of a tornado or windstorm can range from a few minutes to several hours. However, considering the resulting damage, and the threat this damage poses, some jurisdictions deemed the duration could last up to a week or longer in the case of major infrastructure damage.

3 VULNERABILITY ASSESSMENT

This section will describe the vulnerability for existing and future buildings, infrastructure, and critical facilities in those areas that can be impacted by the prioritized hazards. Since most of the hazards have an undefined hazard area (i.e., affecting an entire community or larger area) the following vulnerability assessment will only address those hazards that affect a specified area – flooding (river and flash).

Due to the county's historical occurrences of tornadoes, this hazard was added to the assessment. The following discussion only considers the assets in the unincorporated areas of the county. An assessment was conducted for each municipality and can be found in their respective appendix.

Identifying Critical Facilities

It is important to know the threats each hazard poses to these facilities. A map of all the critical sites in Grundy County outside of each city's boundaries are shown in Figure 47. The map helps illustrate the inventory of facilities such as electrical substations or fuel storage facilities so that cities and residents may be informed of nearby. The map can help visualize important corridors, concentration of hazardous storage facilities, and critical areas for emergency planning.

The critical facilities for each community are listed in their local hazard mitigation plan in the appendices. The facilities were chosen based on the importance to the operation of a community's way of life. Facilities that would be used for emergency shelters were also shared based on existing designations chosen by that community.

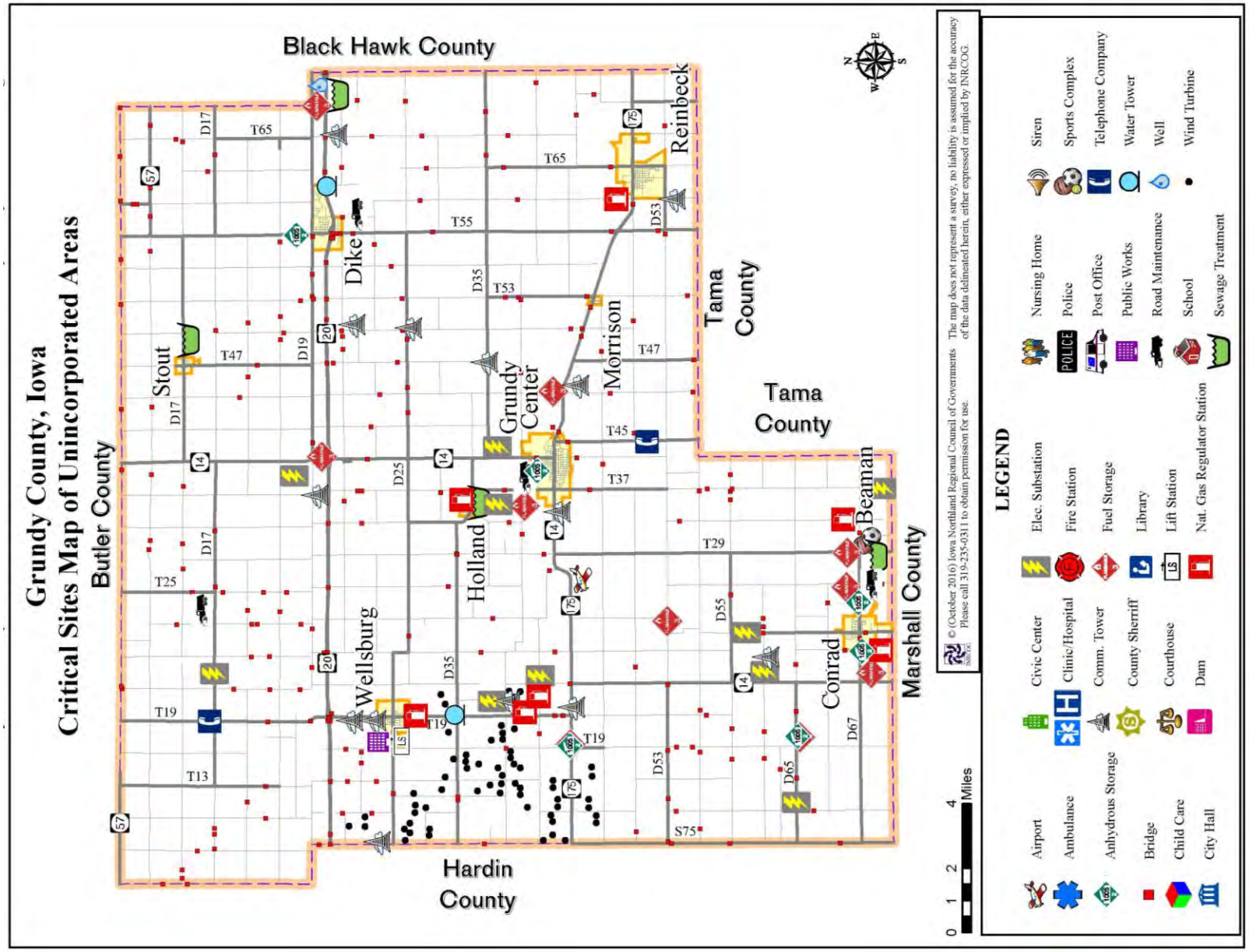
Grundy County's population is projected to grow steadily and slowly in the future. The capacity and needs of residents in Grundy County may change the locations or number of critical facilities in the future. Major changes were analyzed, and no major changes need to be addressed in this MJ-HMP update.

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

Regulation 44 CFR § 201.6(c)(2)(ii)(a): The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;

Table 47: Critical Facilities in Grundy County			
Location	**Facilities**	**Location**	**Facility**
Grundy County Facilities	Courthouse	**Holland**	City Hall
	County Annex Building A		Fire Department
	Sheriff's Office		Heartland Co-op
	Engineering Office		Wastewater Lagoons
	Secondary Road Shed		Colfax Church
	Landfill	**Morrison**	Public Works Garage
Beaman	City Hall		Electrical Substation
	Memorial Hall		Warning Siren
	Water Well		Lift Station
	Fire Department	**Reinbeck**	Water Plant
	Wastewater Lagoons		West View School
	Water Tower		Daycare
	Day Care		Fire Station
Conrad	Fire Station		Sewer Plant
	Wastewater Facility		Parkview Nursing Home
	Water Tower		Schools
	Lift Station		Memorial Building
	City Hall	**Stout**	City Hall
	Library		Fire Station
Dike	City Hall		Wastewater treatment plant
	Wells	**Wellsburg**	City Hall
	Water Tower		Fire Station/EMT
	Wastewater Facility		Library
	Fire Station		School
	Schools		Wastewater treatment plant
Grundy Center	Water Tower		Lift Stations
	Memorial Hospital		Memorial Building
	Courthouse		Electrical Substation
	Fire Station		
	Ambulance Station		
	City Hall		
	Library		
	County Annex Building A		
	Wastewater Facility		

Figure 27: Map of Critical Sites in Grundy County



Property Valuation for Grundy County

Property valuation is a metric of measuring the potential losses that may occur in a hazard event. Table 48 summarizes the values of property in Grundy County by land type. This data is used in the vulnerability analysis to determine the potential losses.

For residential, $771,204,797 is the total assessed value for a potential for loss. Agricultural land is assessed at $525,550,626 and commercial land is assessed at $111,586,359. All industrial land is assessed at $117,631,400. Utilities without gas or electric valuations are assessed at $29,935,397. The entire county's valuation without gas and electric valuations is approximately $1.59 billion. If we take into account gas and electric valuations, the county is valued at a total assessed dollar value of $1.67 billion. This is the total vulnerability in terms of cost for Grundy County.

Table 48: Total Assessed Valuations of Property in Grundy County by Land Type (2020)

Land Type	Assessed Value (2022)
Residential	$771,204,797
Agricultural Land	$525,550,626
Agricultural Buildings	$30,374,580
Commercial	$111,586,359
Industrial	$117,631,400
Utilities W/O Gas & Electric (G&E)	$29,935,397
Total Valuation W/O G&E Utilities	$1,585,183,071
Gas & Electric Utility Valuation	$86,635,501
Total Valuation With G&E Utilities	$1,671,818,572

Source: County Assessor and Iowa Dept. of Management

Requirement 44 CFR §201.6(c)(2)(ii): The plan should describe vulnerability in terms of…(B) An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate.

Estimating Potential Property Losses from a 100-Year Flooding Scenario

A flood scenario was modeled across the county using the 1% annual chance flood hazard zone from FEMA's flood insurance rate maps (FIRM). For this analysis, the impact of flooding for the planning area was calculated with parcel valuation data from the county assessor's office and effective FIRM data. See Appendix Q for the flood maps of each city and the affected parcels in that city from a 100-year annual chance flood event.

The effective FIRM data is dated 12/20/2019. Since the 2017 Grundy County MJ-HMP there have been no major changes in flood boundaries nor development within city boundaries. No levees or dams or changes in water ways have impacted the planning area nor have any infrastructure projects out of the county changed waterways throughout Grundy County. Assuming a similar impact from the 2016 analysis, the values from the 2017 Grundy County's MJ-HMP were adjusted for inflation to 2023 dollars. Cumulative inflation was calculated at 25.3%.

The total cost of a 100-year annual chance flood occurring is summarized in Table 49. Table 49 lists the number properties in the entire county that are located within the 100-year floodplain. There are 1,752 land parcels with a total value of $419,112,283 located within the 100-year floodplain. Land values make up 84% of this total value ($350,549,926).

For rural areas of Grundy County (unincorporated), Table 51 displays the value of 178 parcels within the 100-year floodplain, which are valued at $22,893,992. Land values make up nearly 27% of this value. For city parcels, Table 50 shows a total cost for all cities of $396.333.440 in 2023 dollars for a 100-year annual chance flood event occurring.

Table 49: Grundy County - Entire Planning Area: 100-Year Flood Impacted Properties (2017 and 2023)

	2017 Dollars	2023 Dollars
Number of Parcels	1,752	1,752
Land Value	$279,845,361	$350,549,926
Building Value	$18,263,578	$22,877,977
Dwelling Value	$36,470,017	$45,684,379
Building and Dwelling Value	$54,733,595	$68,562,357
Total Value	$334,578,956	$419,112,283

Source: INRCOG & Grundy County Assessor 2016 dollar values
Note: 2023 Dollars calculated with 25.3% cumulative rate of inflation.

Table 50: Grundy County – Urban Incorporated Planning Area: 100-Year Floodplain Properties

	2017 Dollars	2023 Dollars
Number of Parcels	1,574	1,574
Land Value	$274,850,124	$344,387,205
Building Value	$11,362,860	$14,237,664
Dwelling Value	$30,094,630	$37,708,571
Building and Dwelling Value	$41,457,490	$51,946,235
Total Value	$316,307,614	$396,333,440

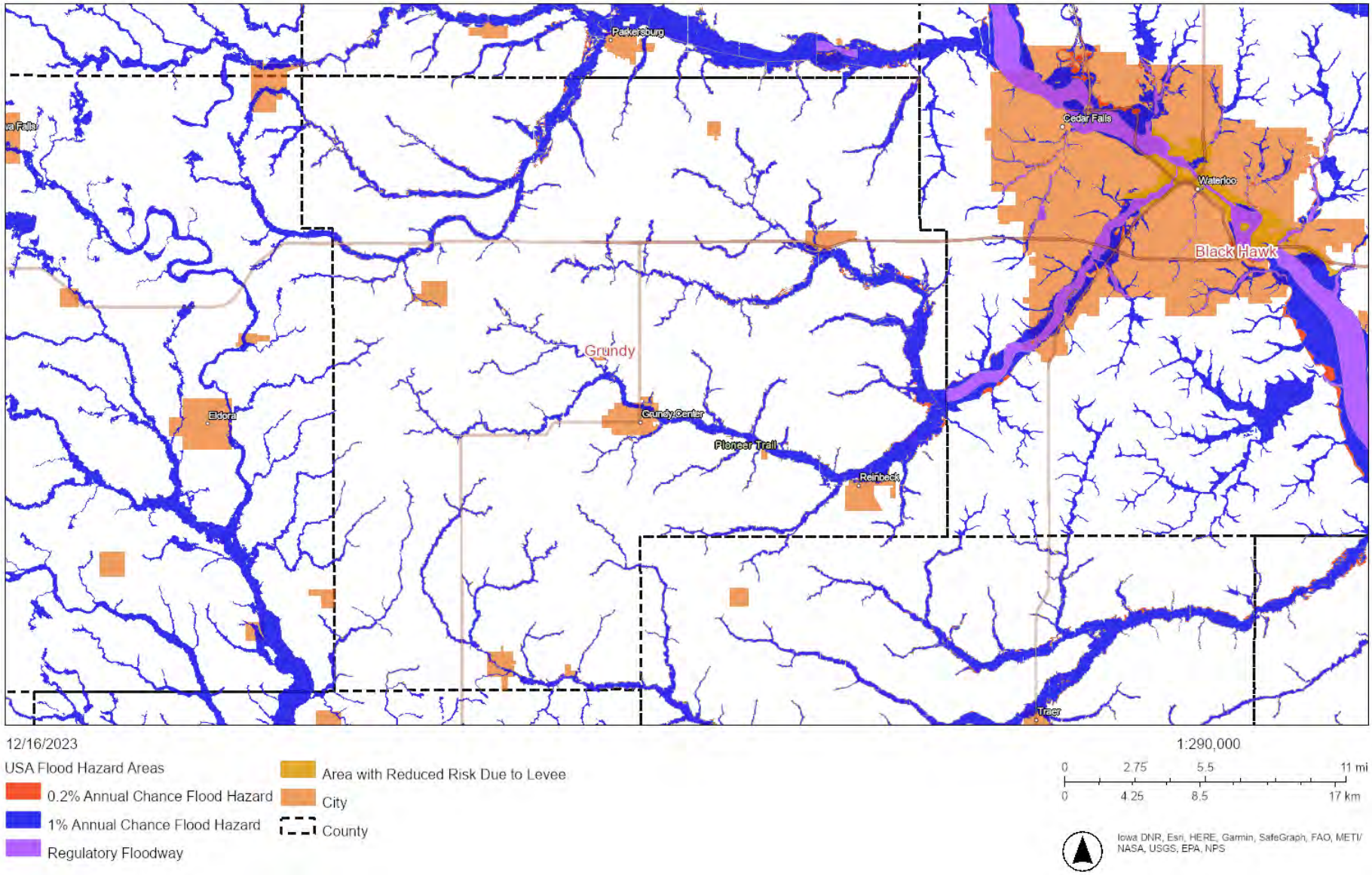
Source: INRCOG & Grundy County Assessor 2016 dollar values
Note: 2023 Dollars calculated with 25.3% cumulative rate of inflation.

Table 51: Grundy County- Rural Unincorporated Planning Area: 100-Year Flood Impacted Properties

	2017 Dollars	2023 Dollars
Number of Parcels	178	178
Land Value	$4,995,237	$6,259,032
Building Value	$6,900,718	$8,646,600
Dwelling Value	$6,375,387	$7,988,360
Building and Dwelling Value	$13,276,105	$16,634,960
Total Value	$18,271,342	$22,893,992

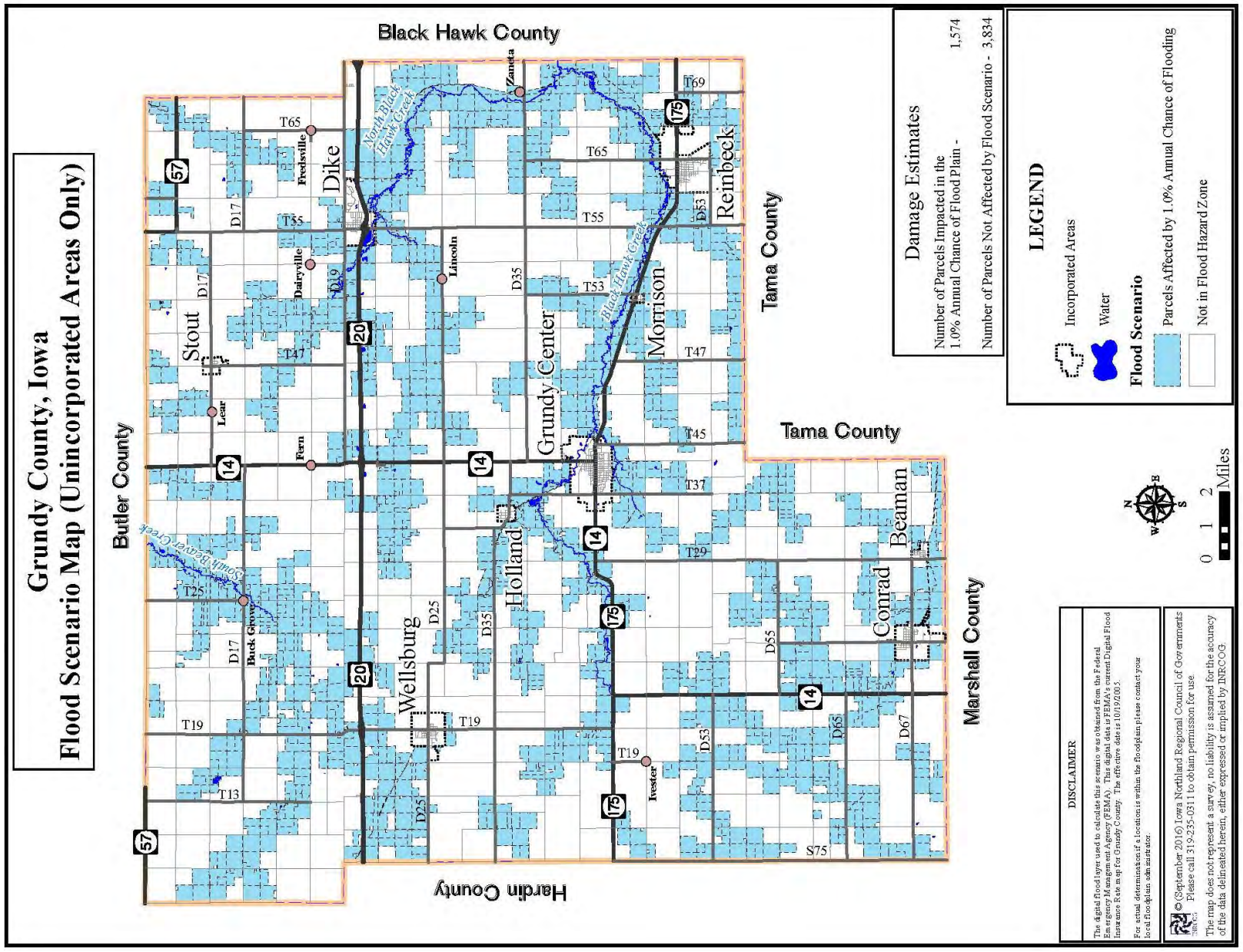
Source: INRCOG & Grundy County Assessor 2016 dollar values
Note: 2023 Dollars calculated with 25.3% cumulative rate of inflation.

Figure 27: FIRM Data Flood Risk Areas in Grundy County



Source: FEMA FIRM Panels Effective 12/20/2019

Figure 28: Flood Impacted Parcels in Grundy County



Tornado Scenario

In a 1989 study[4] of deaths and injuries due to tornados, risk factors for injury and death were identified. Poor building anchoring, locations without a basement, people outdoors, and those over the age of 70. The findings in this study are supported by later studies that point to sheltering in buildings with adequate anchoring in an interior building or basement offer better protection during a tornado.

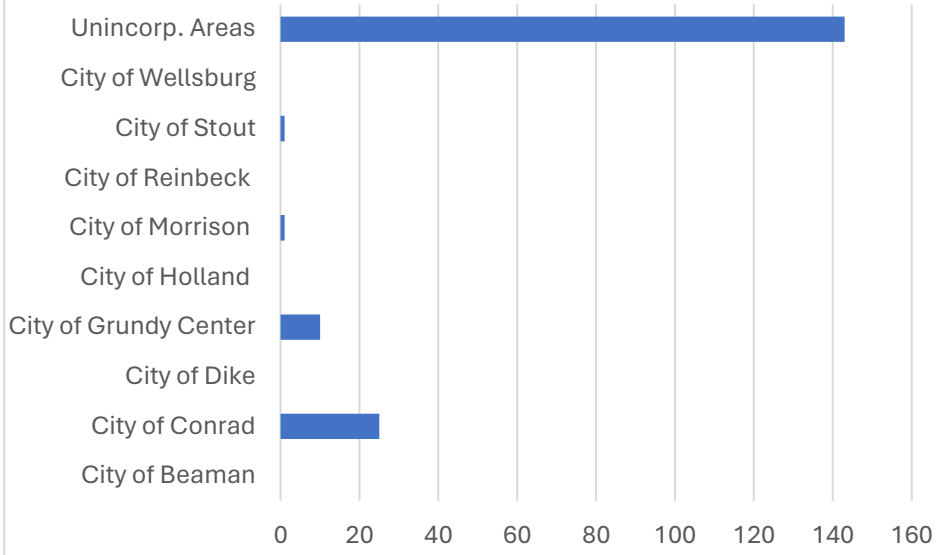
Vulnerable structures in a tornado are mobile homes. Although a mobile home may be structurally "tied down" to withstand strong winds, a mobile home will offer less protection from tornadoes than conventional wood frame structures on concrete footing.

According to data from the 2020 ACS data, there are an estimated 180 mobile homes in the county. The average household size is 2.34 persons. An estimated 422 people reside in mobile homes in the county. A potential tornado may affect the entire county. This puts 422 people at a greater risk than others during a tornado event.

Vulnerable populations in a tornado are those over 70 years of age. For the elderly population, there are an estimated 2,660 adults greater than 65 years old which is 22% of the population in the county. Nearly 14% of the population are older adults (65 years or older) living alone. This is estimated at 723.

From this assessment, nearly 3,682 people in the county are at greater risk than others in a tornado. This accounts for older adults 65 years and older and people living in mobile homes. Both these measures account for nearly 30% of the population.

Figure 30: Mobile Homes in Grundy County (2020)



Currently, both Dike-New Hartford and Grundy Center Community School District have two locations where there is a FEMA certified tornado safe room that is known to exist in the planning area.

In rural Grundy County areas, there are 1,702 structures within the unincorporated area that are vulnerable to tornadoes – land, structures and dwelling units were valued at $1.03 billion in 2016. In 2023 dollars, the total valuation is $1.27 billion

[4] Carter AO, Millson ME, Allen DE. Epidemiologic study of deaths and injuries due to tornadoes. Am J Epidemiol. 1989 Dec;130(6):1209-18.

Figure 31: Path of Tornado Scenario Model for Grundy County (Prepared by INRCOG)

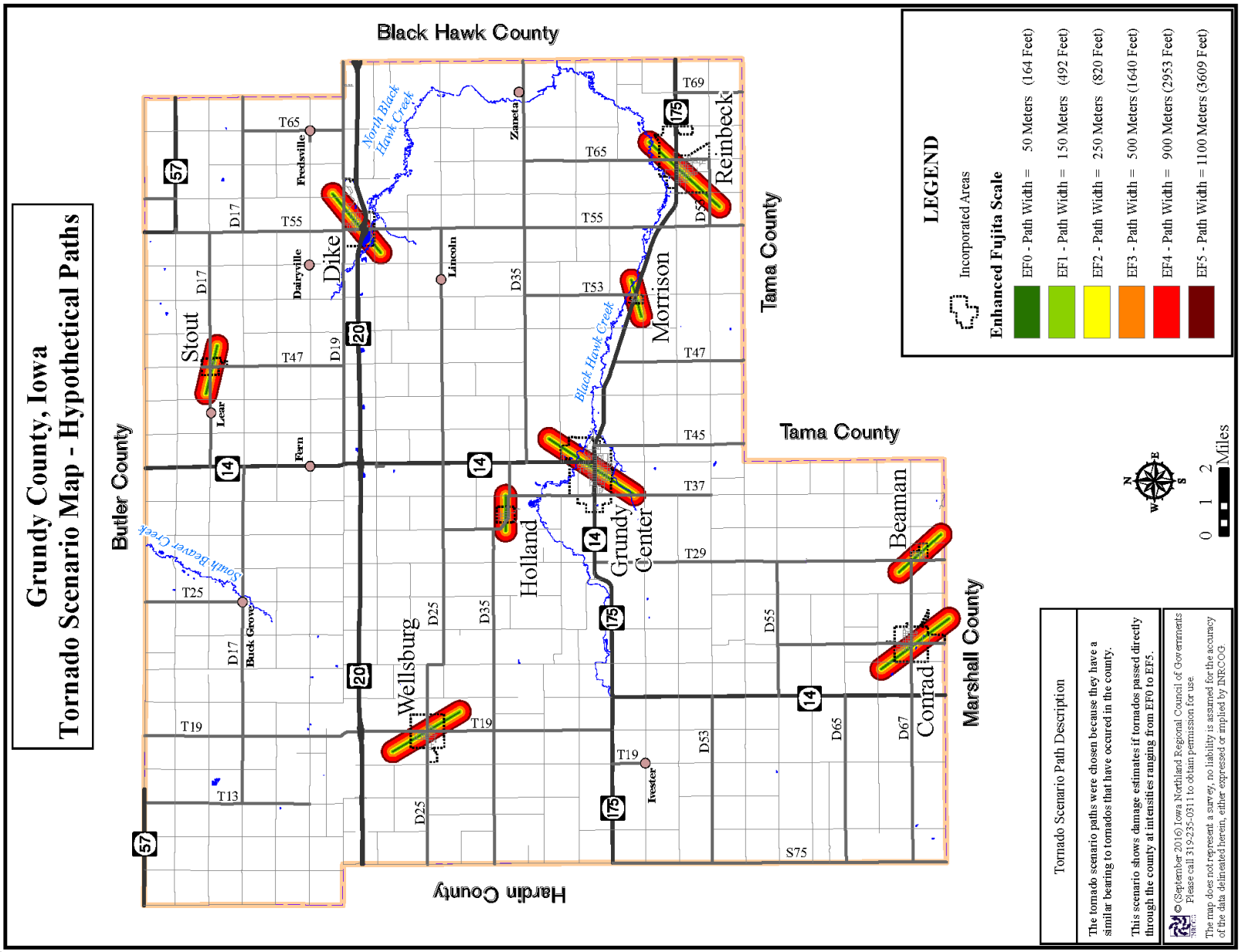
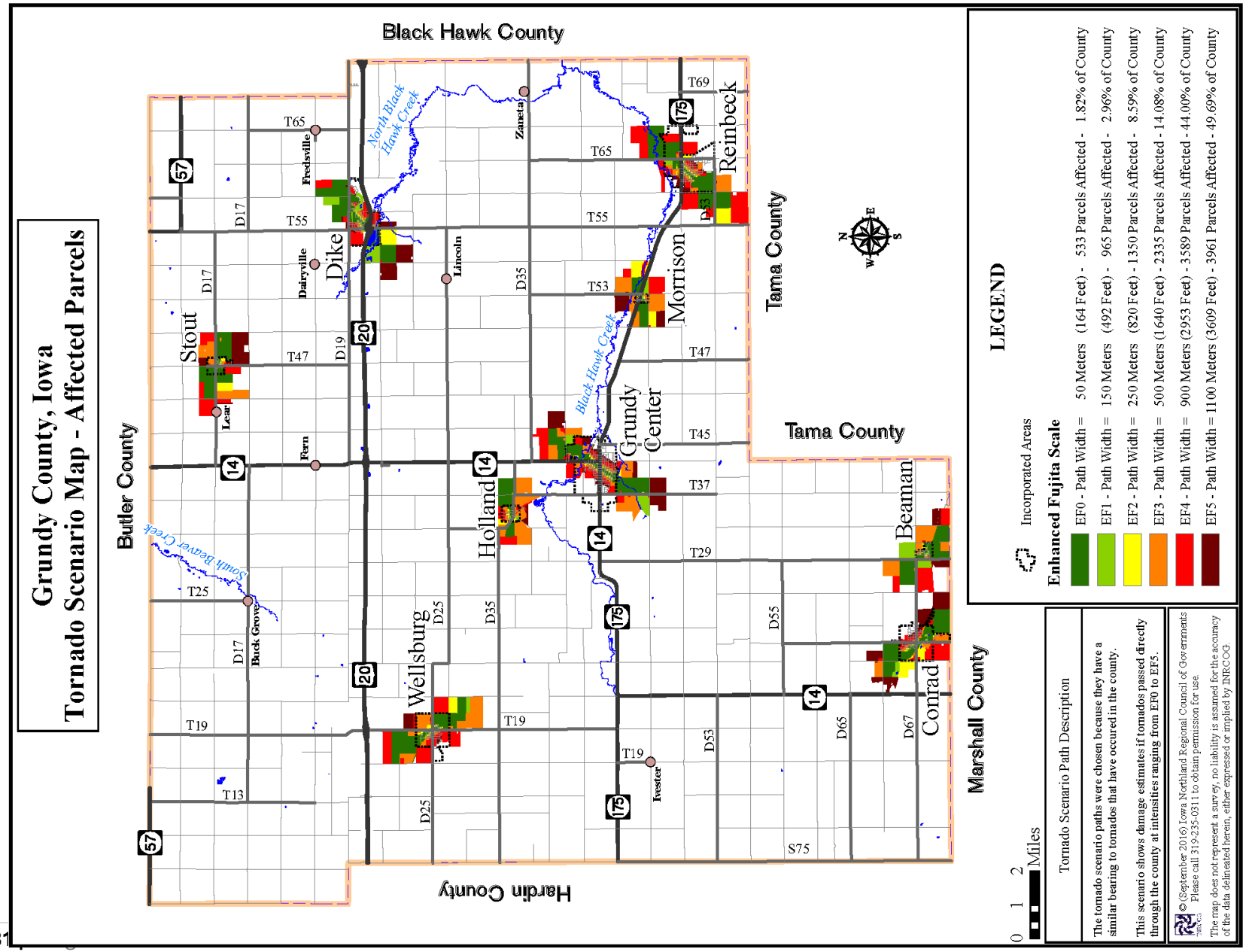


Figure 32: Map of Affected Parcels from Tornado Scenario in Grundy County



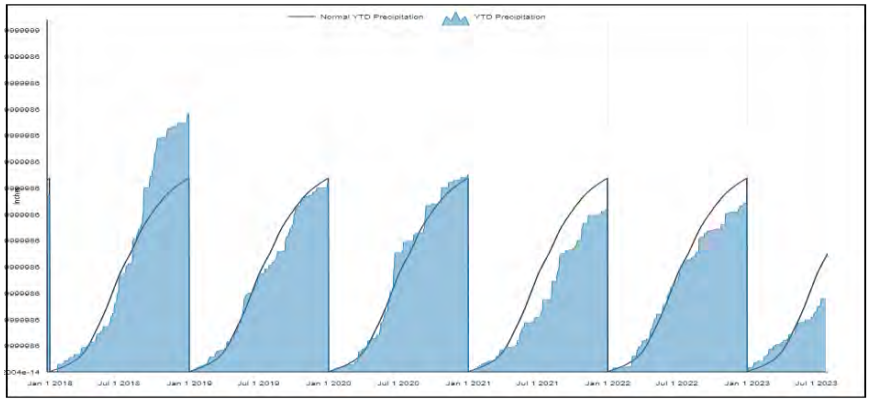
FUTURE DEVELOPMENT

Future development within identified hazard areas can change the threat level of an area by placing critical facilities, businesses, transportation networks, utilities, and populations within areas prone to risk from hazards such as floods. Such patterns in city development are curbed to mitigate predicted future hazards through the use of mitigation tools such as state building codes and local land use regulations (zoning, subdivision, floodplain management, etc.). These tools will help to mitigate the impacts of hazards on new and future development.

Climate Change Trends in Grundy County

Recent guidance issued by FEMA in the Local Mitigation Planning Handbook (44 CFR 201.4 (c) (2) (i)) directs that the risk assessment in the state hazard mitigation plan describe the effects of future conditions, including climate change (e.g., long-term weather patterns, average temperature, and sea levels), on the type, location and range of anticipated intensities of identified hazards.

Figure 33: Historical precipitation data (2018-July 2023)



Source: U.S. Climate Resilience Toolkit Climate Explorer (Version 3.1)

The graph shows YTD precipitation for Grundy County between 2018 and 2023. The solid line shows normal accumulative precipitation for the county annually. Based on this data, precipitation is likely to continue to decrease and fall below normal trends in the coming years.

Top climate concerns for Grundy County

- Changed seasonal patterns may affect agricultural productivity.
- Extreme temperatures on the hottest days of the year are projected to increase by 7°F.
    - Historically, extreme temperatures in Grundy County averaged 92°F.
- Annual counts of intense rainstorms – those that drop two or more inches in one day — are projected to increase by 0%.
    - Historically, Grundy County averaged 0 intense rainstorms per year.
- An average of 1 more dry spell — a period of consecutive days without precipitation — is projected per year
    - Historically, Grundy County averaged 14 dry spells per year

These are the top regional hazards for Grundy County, IA, according to the 2018 National Climate Assessment. These statements compare projections for the middle third of this century (2035-2064) with average conditions observed from 1961-1990.

NFIP AND REPETITIVE LOSS PROPERTIES

This hazard mitigation plan is an attempt to reduce loss by identifying potential natural or man-made hazards. Following a natural disaster or hazard event, rebuilding the impacted area without making or addressing necessary changes or improvements to reduce future impacts from future events is not a sustainable or reasonable method for rebuilding communities. Returning to pre-disaster conditions will not improve or reduce the hazard risk for the area.

FEMA defines a repetitive loss structure as a NFIP-insured building that has experienced two paid flood losses in a 10-year period in which each loss is $1,000 or more. Reconstructing a structure to its pre-disaster condition sets the building to the same risk of damage as before. Investments in rebuilding communities after the disaster will consider this history of damage and loss. There was one (1) repetitive loss property in Grundy County. This was located in rural unincorporated land. The total value of the payout was $17,137.

Planning with hazard mitigation activities breaks this cycle of continuous and costly reinvestment for an area facing the same or greater risk to damage and losses. Redevelopment ensures investments can reduce future losses that protect life, property, and community life. Table 53 shows which jurisdictions participate in the National Flood Insurance Program (NFIP).

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Table 52: Repetitive Loss Properties

	# of Properties	$ of Loss
Grundy County	1	$17,137
Beaman	0	-
Dike	0	-
Conrad	0	-
Grundy Center	0	-
Holland	0	-
Morrison	0	-
Stout	0	-
Reinbeck	0	-
Wellsburg	0	-
Source: FEMA CEPTool		

Table 53: NFIP Status of Jurisdictions in Grundy County (2023)

Jurisdiction	Participates in NFIP?	Community ID	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Reg-Emer Date
Grundy County	Yes	190870B		10/19/2005	12/20/2019	4/21/2006
Beaman	Yes	190400B	8/22/1975	10/19/2005	12/20/2019	10/19/2005
Dike	Yes	190402B	7/25/1975	8/19/1986	12/20/2019	8/19/1986
Conrad	Yes	190401B	4/16/1976	10/19/2005	12/20/2019	3/30/2009
Grundy Center	Yes	190403B	7/2/1976	10/19/2005	12/20/2019	10/19/2005
Holland	Yes	190404B	7/2/1976	7/17/1986	12/20/2019	7/17/1986
Morrison	No	190953B		10/19/2005	12/20/2019	12/20/19 (S)
Stout	-	-	-	-	-	-
Reinbeck	Yes	190646B	12/10/1976	10/19/2005	12/20/2019	1/29/2008
Wellsburg	Yes	190680B	10/8/1976	10/19/2005	12/20/2019	4/21/2006
Note: (S) - suspended from program						

SECTION 4: MITIGATION STRATEGY

GOALS FOR REDUCING HAZARD RISK

The planning committee reviewed the County's Hazard Mitigation Plan Goals from the 2017 plan. The planning committee elected to continue forward with the same set of goals from the plan update (Goals 1 through 7). Goals 1 through 7 were approved by Grundy County's Board of Supervisors in 2017. Additional goals included in this plan update are Goals 8, 9, and 10.

Grundy County's emergency management planning coordinator and the county hazard mitigation participants contributed to the formation of these goals. These goals focus on either eliminating or reducing county wide risk to hazards through actions, activities, or programs that will focus on lessening the impact of hazards on people, property, community life, and the local economy. These broad-based goals were developed to address a multitude of hazards and encompass a variety of mitigation activities.

This updated multi-jurisdictional hazard mitigation plan includes the following goals for Grundy County's hazard mitigation efforts are:

Goal 1: Minimize to the greatest possible extent the number of injuries and/or loss of life associated with all identified hazards.

Goal 2: Reduce or eliminate property damage due to the occurrence of disasters.

Goal 3: Identify ways that response operations, in the event of a disaster, can be improved.

Goal 4: Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.

Goal 5: Develop strategies that can be used to reduce the community's overall risk to the negative effects of natural, technological, and man-made disasters.

Goal 6: Reconvene the planning committee on an annual basis to review the plan document, check for compliance with the plan goals, and track progress in achieving the mitigation strategies.

Goal 7: Maintain the Countywide Multi-Jurisdictional format for future plan updates.

Goal 8: Re-institute the Grundy County Disaster Planning Committee to expand the county disaster plan from an IT-specific department plan and integrate it with other county departments.

Goal 9: Locate an emergency auxiliary site away from the Grundy County Courthouse that will serve as the County's backup IT (information technology) location with potential office space and backup power.

Goal 10: Engage with the public to inform residents about Grundy County programs (i.e.. Alert Iowa and the Sheriff's Drug Box) through social media, available newspapers and flyers, radio, TV, and other events.

Requirement 44 CFR §201.6(c)(3)(i) [The mitigation strategy] must include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

CURRENT HAZARD MITIGATION ACTIONS AND UPDATES

For this plan, all the activities or actions to be implemented can be categorized in 5 broad types.

1. **Emergency services**
2. **Education and awareness programs**
3. **Natural system protection and nature-based solutions**
4. **Structure and infrastructure projects**
5. **Local plans and regulations**

See Table 54 for definitions and examples of each category. Detailed information for each incorporated community can be found in their respective Appendix.

Each category of hazard mitigation activities is in the associated sections which includes a summary of the county's capabilities to implement these efforts such as existing departments or organizations, emergency response vehicles, and what kind of services they provide.

Table 54: Categories of Action Types in Hazard Mitigation Strategy

Mitigation Action Category	Description	Examples	
EMERGENCY SERVICES	Actions that protect people and property during and immediately after a disaster or hazard event.	• *Warning Systems* • *Emergency response services* • *Protection of critical facilities*	
EDUCATION AND AWARENESS PROGRAM	These types of actions keep residents informed about potential natural disasters.	• *Alert Iowa* • *Radio or television ads* • *Social media outreach*	• *Websites* • *Real estate disclosures,* • *Outreach to underserved or vulnerable communities*
NATURAL SYSTEM PROTECTION AND NATURE-BASED SOLUTIONS	Actions that minimize damage and losses by preserving or restoring the functions of natural systems. This type of action can include green infrastructure and low impact development, nature-based solutions.	• *Sediment/erosion control* • *Stream restoration* • *Greenways*	• *Source water protection plans* • *Wetland preservation* • *Prairie land-controlled burns*
STRUCTURES AND INFRASTRUCTURE PROJECTS	Actions that either modify existing buildings or structures to protect them from a hazard, or removal from a hazard area.	• *Acquisitions of flood prone properties* • *Installing utilities underground*	• *Safe rooms* • *Storm drain infrastructure such as concrete culverts* • *Structural retrofits*
LOCAL PLANS AND REGULATIONS	Actions by administrative or regulatory processes which direct how land and buildings are developed and built. These actions include regulations by public entities to reduce hazard losses.	• *Comprehensive land use plans* • *Land use ordinances* • *Development review procedures a*	• *Building codes and enforcement* • *Open space preservation* • *Storm water management regulations*

Mitigation Action Type:
EMERGENCY SERVICES

EMERGENCY MANAGEMENT AGENCY

Grundy County's Emergency Management Coordinator is based out of the city of Grundy Center. The Emergency Management Coordinator works in conjunction with local fire, rescue, police, and government officials to draft and implement workable emergency action plans in the community. The current Grundy County Emergency Management Coordinator and contact information is:

Chase Babcock, Emergency Management Coordinator
705 8th Street, Grundy Center, Iowa 50638
Phone: (319) 824-5924
Email: chase.babcock@grundycountyiowa.gov

LAW ENFORCEMENT

The Grundy County Sheriff's Office provides law enforcement for all the unincorporated areas of the County along with assisting the cities that have their municipal police force. The Grundy County Sheriff's Office has 28E service agreements to provide law enforcement patrols with the communities of Beaman, Holland, Morrison, Stout, and Wellsburg. The sheriff's office provides a response time to these cities up to 30 minutes and will provide extra people power when notified by the city.

FIRE PROTECTION

Grundy County is divided into Fire Districts with 8 Fire Departments having coverage for every square mile of the County.

Fire Departments serving Grundy County are:

- Beaman
- Conrad
- Dike
- Grundy Center
- Holland
- Reinbeck
- Stout
- Wellsburg

AMBULANCE SERVICES

Grundy County is divided into ambulance districts which are the same as the fire district map. Ambulance providers for Grundy County are Grundy Center, Beaman, Conrad, Wellsburg, Dike, and Reinbeck.

The County also receives mutual aid services for ambulance services from Mercy One Ambulance Services in Waterloo. Grundy Center Ambulance services is a department of the City of Grundy Center. This agreement helps expand and utilize the existing capacity of other cities to help protect the residents of Grundy County.

BEAMAN CONRAD EMERGENCY RESPONSE TEAM (BCERT)

BCERT was formed in 1987. They respond to both Conrad and Beaman fire territories and elsewhere when requested. Average response time is 6 minutes with up to 150 calls per year. The calls range from standard medical, accidents, assisting fire fighters and mutual aid with other departments. BCERT does not charge for the service they provide.

Table 55: Inventory Table of Emergency Response Vehicles or Major Equipment

Jurisdiction	Contact Name	Items	
Beaman Conrad Emergency Response Team (BCERT)	Jordan Hoy, Chief	1 - Rescue Van	
Beaman	Bryan Moeller, Chief	2 – Grass Rig 1 - Gator	2 - Pumpers 1 - Tanker
Conrad	Chad Hufeld, Chief	1-Grass Rig 1-Blazer	1-Pumper 1-Tank
Dike	Marv Geiken, Chief	2-Ambulances 1-Gater 1-Pumper	1-Rescue/Pumper 2-Tankers 1-Boat
Grundy Ambulance	Dwight Gliem, Chief	3-Ambulances 1-Gator	
Grundy Fire	Nathan Kappel, Chief	1-Grass Rig 1-Support/Rescue 1-Pumper	1-Rescue/Pumper 1-Tanker 1-Command Trailer
Holland	Roger Carr, Chief	2-Grass Rigs 1-Rescue	1-Pumper 1-Tanker
Reinbeck	Chris Heasley, Chief	2-Ambulances 1-Rescue 1-Grass Rig 1-Ranger	1-Pumper 1-Pumper Tanker 2-Tankers
Stout	Jim Folkerts, Chief	1-Grass Rig 1-Support	1-Pumper 1-Tanker
Wellsburg	Greg Winger, Chief	2-Ambulances 2-Grass Rigs 1-Rescue P/U	1-Gater 1-Pumper 2-Tankers

Source: Grundy County EMA

MEDICAL FACILITIES

Grundy County has one hospital within its boundaries – Grundy County Memorial Hospital in Grundy Center. Grundy Memorial Hospital is in Grundy Center and is the only medical facility with an ER unit located in the County. Grundy Memorial Hospital is a 25-bed hospital with an emergency care unit open 24/7/365.

Grundy Memorial Hospital ranks amongst the top 5% of hospitals nationwide for their quality measures and patient experience scores. They also have been ranked among the nation's Top 20 Most Recommended Rural Hospitals.

Grundy Memorial Hospital in Grundy Center, Iowa

Patients are transported to Mercy One Medical Center in Waterloo (35 miles away) when Grundy Memorial is at capacity or unable to receive the patient. Area hospitals include:

- Mercy One Cedar Falls Medical Center, Cedar Falls;
- Waverly Municipal Hospital, Waverly;
- Franklin General Hospital, Hampton;
- Floyd county Memorial Hospital, Charles City;
- Mercy Medical Center North Iowa, Mason City;
- UnityPoint Health, Marshalltown.

HAZMAT

All Grundy County jurisdictions contract with Northeast Iowa Response Group for response to hazardous material spills. The Northeast Iowa Response Group is a division of Waterloo Fire Rescue as is the Hazardous Materials Regional Training Center. The Training Center provides training to fire departments and companies from around the state and country. This center serves as a hazardous materials quick response unit to Black Hawk County, surrounding counties, and many municipalities in a ten-county region. The Unit provides local fire departments with hazard materials emergency procedures thus reducing additional contamination. An evacuation plan is also in place in conjunction with the activities of the local department. Contact information for the facility is as follows: Hazardous Materials Regional Training Center, 1925 Newell Street, Waterloo, Iowa 50707, Phone: (319) 291-4275, Toll Free: (800) 291-4682, Fax: (319) 291-4285.

The jurisdictions also partner the Northeast Iowa Response Group for assistance in responding to any methamphetamine labs located in the city limits. The Response Group assists the Police Departments in containment of the site and disposal of hazardous chemicals.

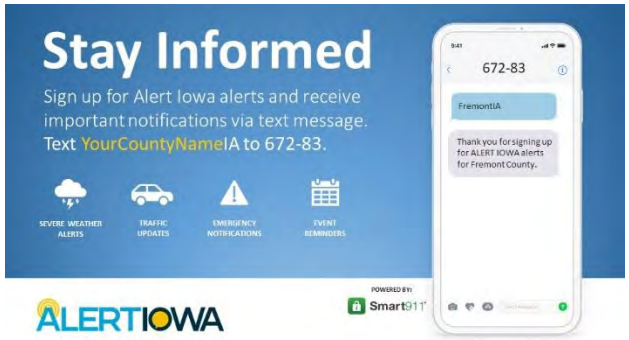
Requirement 44 CFR §201.6(c)(3)(ii): A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

WARNING SYSTEMS

Alert Iowa

Grundy County uses the Alert Iowa notification system that is utilized statewide. Alert Iowa serves as the statewide mass notification and emergency messaging system and is operated by Iowa Homeland Security and Emergency Management. Alert Iowa's features are controlled through the Grundy County Emergency Management Agency and is available to all county residents. Residents can customize their alert settings including the type of alerts they would get.

Alert Iowa allows for emergency notifications via landline telephones, cell phones, email, text messages, and social media. This is useful for communities that may not have an operating warning siren or may not hear the sirens. The County will use its emergency notification network for all of the following events: **blizzards, flash flooding, severe thunderstorms, and tornadoes.** There is an optional way to receive the same alert for events such as: excessive heat warnings, hazardous materials warnings, heavy snow warning, high wind warnings, ice storm warnings, law enforcement warnings, shelter in place warnings, sleet warnings, wind chill warnings, and winter storm warnings.



Tornado Sirens

Each city in Grundy County has tornado sirens that are operated and maintained by a local committee/body of people who schedule monthly tests. The activation systems of warning systems vary by city. Some cities have a digital system that activates according to wind speeds and atmospheric readings in the area that detects strong conditions for tornados. Other cities operate from a single source by a user.

Mitigation Action Type:
NATURAL SYSTEM PROTECTION AND NATURE-BASED SOLUTIONS

FLOODPLAIN MANAGEMENT IN GRUNDY COUNTY

On July 16th, 1990, Grundy County became an active member in the National Flood Insurance Program (NFIP) by adopting its initial floodplain ordinance. The Federal Insurance Administration manages the insurance component of the NFIP and works closely with FEMA's Mitigation Directorate, which oversees the floodplain management aspect of the program.

Mitigation Action Type:
EDUCATION AND AWARENESS PROGRAMS

Information regarding how to protect oneself in the event of a tornado is largely publicized in the form of flyers, radio, newspaper, and television announcements. The County provides basic safety information for various hazard events (i.e., tornados) and what to do before, during, and after an event.

Mitigation Action Type:
STRUCTURE AND INFRASTRUCTURE PROJECTS

COUNTY ENGINEER AND SECONDARY ROADS DEPARTMENT

The Grundy County Engineer's Office is tasked with the maintenance of all roads within Grundy County. It is managed by Gary Mauer, County Engineer. The Department has 27 employees with 22 assigned to the Maintenance Division and 5 to the Engineering Division. The Code of Iowa requires that the Board of Supervisors appoint a Registered Professional Engineer as department head. The Engineer, along with

the Assistant to the Engineer and Technician, Road Superintendent and Office Manager, directs both the construction and maintenance activities.

TORNADO SAFE ROOMS

Safe rooms are designed according to FEMA standards. They can withstand wind gusts of up to 250 mph and resist the impact of a 15-pound 2-by-4 board traveling horizontally at 100 miles per hour.

Beginning in September 2014 and completed in May 2015, a safe room was built at the southeast corner of the Grundy Center secondary school building. This safe room has a capacity of 483 people and can withstand winds of 260 miles per hour. Students will be able to evacuate and stay in this safe room during a tornado. This safe room is open to the public during a sporting event to protect fans and players.

The Dike-New Hartford Community School District completed the construction improvements to their school campus following the passing of a bond measure. The projects include the creation of secure entrances at Dike and New Hartford (DNH) elementary schools and DNH High School, as well as the addition of storm shelter safe-room spaces to both campuses.

Students in Grundy Center Secondary School Classroom/Safe Room

Source: North Tama Telegraph Sept 2014

Mitigation Action Type:

NATURAL RESOURCE PROTECTION MITIGATION ACTIONS

THE MIDDLE CEDAR WATERSHED MANAGEMENT AUTHORITY

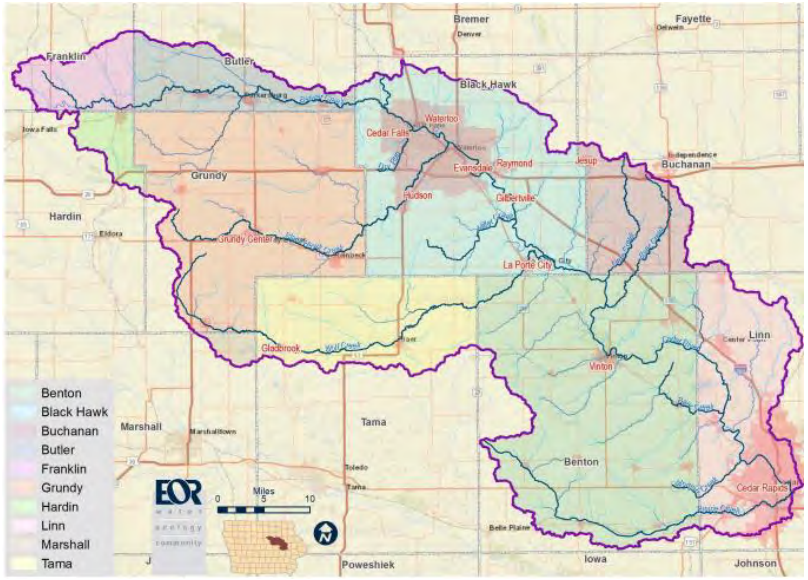
Grundy County entered a 28E agreement with the Middle Cedar Watershed Management Authority in 2016. The agreement authorizes the Watershed Management Authority to perform all the following duties:

1. Assess the flood risks in the watershed.
2. Assess the water quality in the watershed.
3. Assess the options for reducing flood risk and improving water quality in the watershed.
4. Monitor federal flood risk planning and activities.
5. Educate residents of the watershed area regarding water quality and flood risks.
6. Allocate money made available to the watershed for the purposes of flood mitigation.
7. The watershed management authority does not have the authority to acquire property by eminent domain.

The Middle Cedar Watershed Management Authority created a Watershed Management Plan in 2020 which outlines recommendations for municipalities within the watershed region. One project has been implemented in Grundy County.

A local farmer restored wetlands on some acres of his cropland for the benefit of recharging the groundwater supply and reducing agricultural runoff with tiling. Participation and implementation of the watershed plan is voluntary.

Figure 34: Middle Cedar Watershed Management County Coverage Map



Source: 2020 Middle Cedar Watershed Management Plan

Grundy County has been working to acquire and restore wetlands. Grundy County's Conservation Board is working on implementing and meeting the goals in the watershed management plan.

Outside of Grundy County, greenbelts are being developed along the north fork of Black Hawk Creek and the south fork of Beaver Creek. These will restore native grass, reduce runoff loss of soil nutrients, and create continuous corridors for the benefit of native species habitats and recreation.

THE EMERALD ASH BORER INFESTATION IN GRUNDY COUNTY

Grundy County has been working on its invasive species removal of the Honeysuckle, along with the removal of dead ash trees caused by the 2014 Emerald Ash Borer invasion. This was noted as one of the biggest challenges for cities within the County to deal with in the foreseeable future. Tree removal service costs were approximately estimated at $5,000 per tree. For cities that have dozens of dying or dead ash trees, that is a cost many cannot meet at one time. Cities have been interested in funding options, collaborating opportunities, or phasing this effort in public right of way based on their existing capacity.

Workers removing dead ash trees caused by Ash Borer infestation in Cedar Rapids, Iowa

Source: Cedar Rapids Gazette (Nov. 2023)

Mitigation Action Type:
PLANNING AND REGULATION

FLOOD PROTECTION MITIGATION ACTIONS

Grundy County currently has a Floodplain Management Ordinance which is administered by the County Zoning Administrator. All inquiries pertaining to construction areas in a floodplain are directed to the Administrator's Office and follow NFIP guidelines. The Federal Government completed new FIRM maps, as of October 19, 2005 for Grundy County. Grundy County has and enforces Zoning Ordinances. They issue building permits for the unincorporated areas only. The County does issue Zoning Certificates for land areas under 35 acres.

The Zoning and Subdivision Ordinance was adopted by the Grundy County Board of Supervisors in 1997 (updated 2009) and is administrated by the County Zoning Administrator.

Requirement 44 CFR §201.6(c)(3): 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.

PLANNING AND REGULATORY DOCUMENTS

The cities in Grundy County also use several zoning and ordinance tools. Table 49 provides a compilation of the current planning regulatory documents in place for each city in Grundy County.

Table 57: Current Planning and Regulatory Documents for Selected Communities

	Jurisdiction									
Planning and Regulation Documents	**Beaman**	**Conrad**	**Dike**	**Grundy Center**	**Holland**	**Morrison**	**Reinbeck**	**Stout**	**Wellsburg**	**Unincorporated Grundy County**
Previous Hazard Mitigation Plan Participant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Comprehensive Plan	No	Yes	Yes	Yes	No	No	Yes	No	No	Yes
Building Code	No	No	No	Yes	No	No	No	No	Yes	No
Zoning Ordinance	No	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes
Subdivision Regulations	No	Yes	Yes	No	No	No	Yes	No	Yes	Yes
Floodplain Management Ordinance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Tree-Trimming Ordinance	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	No
Storm Water Ordinance	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No
Snow Removal Ordinance	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No

Source: Community Representative

HAZARD MITIGATION STRATEGY FOR GRUNDY COUNTY

Each participating jurisdiction in this plan update created their own local hazard mitigation strategy when this plan was initially developed. The local hazard mitigation for each city and school district is in the appendices and each plan contains the associated action plan strategy for implementation.

The planning committee for this plan developed a strategy within this document which would prioritize mitigation actions based on the number of hazards address, estimated costs, timeline for completing or implementing the action or program, and priority level determined from a cost-benefit approach. Fire chiefs and ambulance services directors have a valuable understanding of existing capabilities of their local emergency response units in Grundy County. City leaders and staff responded to these contributing factors of their existing and new hazard mitigation activities.

Each contributing factor in the development of this implementation plan is presented in Tables 51 through 55 of this Plan.

PRIORITY LEVEL

Committee representatives determined the priority level of all mitigation actions within this strategy based on resources and capabilities. The priority level was informed through discussions among planning committee members who considered potential benefits of implementing the activity, some hurdles that the city may face in implementing the action step, and the drawbacks of implementation.

The priority ranking is:

- **High**
- **Medium**
- **Low**

for each identified mitigation activity.

Requirement 44 CFR §201.6(c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

TIMELINE

The planning committee determined the length of time that it would take to carry out initiating the action, policy, or program. The timeframe designations describe the length of time to carry out implementing the mitigation activity. For mitigation actions that describe preparing a plan or deploying a program, the timeframe would describe the implementation process of writing the plan or starting the program such as planning, assembling staff, and gathering funding. The timeframe does not describe the length of time the program is to be administered. For example, the timeframe for developing a response plan to assist vulnerable populations needing evacuation during a flooding event would describe the time it would take to prepare an actual planning document and not carry out the specific response during said emergency.

Mitigation Action Timeline	Timeframe Description
Short Term	1-5 years
Mid-Term	5-10 Years
Long-Term	More than 10 Years
COMPLETED or Active	Action Item Has Been Completed (and/or implemented as a regular, ongoing service/program/policy)

If the action item was updated as completed, then the action item has been implemented. This may be one time action item or a regular, ongoing service/program/policy. The implementation strategy in this plan is focused solely on implementing any necessary mitigation

measures or implementing the program/policy, etc to be maintained and regulated by the designated agency.

ESTIMATED COST

Although in the long-term hazard mitigation actions will save money by avoiding the loss of lives or property damages, in the short-term each action will have an associated cost. The City will rely heavily on local funding sources to fulfill most of the plan obligations; however, they will also seek funds from State and Federal agencies for both pre- and post-disaster mitigation activities.

The estimated cost(s) for each mitigation action, program, or project is either: Minimal, Low, Moderate, or High depending upon various factors.

Requirement 44 CFR §201.6(c)(3)(iii): An action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization will include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Estimated Cost Level	Description
Minimal	Cost estimate is $10,000 or less based on using current staff, time commitment, continuous of current duties, proposed action/program/ project, and funding sources.
Low	Cost estimate for the project range from $10,001 - $99,999 based on existing proposed treatment, time commitment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
Moderate	Cost estimate for the project range from $100,000 - $299,999 based on existing conditions, time commitment, proposed action/ program/project, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.), and funding sources.
High	Cost estimate for project range is $300,000 or higher based on existing conditions, time commitment, proposed action/program/project, any further study that is needed, level of engineering, project components (permits, acquisition, coordination, etc), and funding sources

Table 59: Hazard Mitigation Category Descriptions and Examples

Mitigation Category	Description	Examples
Emergency Services	Actions that protect people and property during and immediately after a disaster or hazard event.	Warning Systems, emergency response services, protection of critical facilities
Education and Awareness Program	These types of actions keep residents informed about potential natural disasters.	Alert Iowa, Radio or television ads, social media outreach, websites, real estate disclosures, outreach to underserved or vulnerable communities
Natural system protection and nature-based solutions	Actions that minimize damage and losses by preserving or restoring the functions of natural systems. This type of action can include green infrastructure and low impact development, nature-based solutions.	Sediment and erosion control, stream restoration, greenways, source water protection plans, wetland preservation, prairie land-controlled burns
Structures and Infrastructure Projects	Actions that either modify existing buildings or structures to protect them from a hazard, or removal from a hazard area.	Acquisitions of flood prone properties, undergrounding utilities, structural retrofits, safe rooms, storm drain infrastructure such as culverts
Local Plans and Regulations	Actions by administrative or regulatory processes which direct how land and buildings are developed and built. These actions include regulations by public entities to reduce hazard losses.	Comprehensive land use plans, land use ordinances, development review procedures, building codes and enforcement, open space preservation, storm water management regulations

NOTES FOR MITIGATION ACTION TABLES

ALL = All Hazards
A/P/CD = Animal/Plant/Crop Disease
D/L = Dam/Levee Failure
D= Drought
E= Earthquake
ES= Expansive Soils
EH= Extreme Heat
GWF= Grass/Wildland Fire
HMI= Hazard Materials Incident
IF= Infrastructure Failure
FF= Flash Flooding
FR= Flooding- River
L= Landslides
PHD= Pandemic Human Disease
RI= Radiological Incident
S= Sinkholes
SWS= Severe Winter Storm
T= Terrorism
TI= Transportation Incident
T/H/L= Thunderstorm/Hail/Lightning
T/W= Tornado/Windstorm
* Denotes primary agency responsible

Table 59: Emergency Services Mitigation Actions						
Actions that protect people and property during and immediately after a disaster or hazard event.						
Priority	**Mitigation Action/Program/Project**	**Assoc. Hazard**	**Primary Agency Responsible for Implementation**	**Timeline**	**Estimated Cost (s)**	**Hazard Mitigation Goal(s) #**
High	Maintain Well-Trained Personnel (Fire, First Responders, Police, EMS, Weather Spotters, and other Critical Services – includes Multi-Jurisdictional Training and Cooperation for all Hazards)	FF, FR, T/H/L, T/W, HMI, T	Individual Departments*; County EMA, Ambulance Service, Police Departments, Sheriff	Active; updated annually	Minimal	1, 2, 3, 4, 5, 7
High	Develop Plan / Procedures to Assist At-Risk Populations during an Event (Transport to Shelters, Home Visits, etc.)	EH, FF, FR, SWI, T/H/L, T/W, HMI, D/L	County EMA* and Public Health	Active	Minimal	1, 5
High	Establish an Emergency Notification System and Conduct Drills	All	County EMA*	Completed	Minimal	1,2,3, 5, 7
High	Locate a 3rd location away from the courthouse and make that location suitable for serving as an IT back-up. Location should contain potential office space, and back-up power.	All	EMA	Short-Term	Minimal	3, 9
High	Identify and Improve Security at Critical Facilities	T	Board of Supervisors*	Active	Low	1, 5
Medium	Develop and Maintain an Emergency Response Plan that is not IT-Specific	All	County EMA*	Active; updated annually	Minimal	1, 2, 4, 5, 6
Medium	Continue Agreement with NE Iowa Response Group and participate in local regional preparedness group.	HMI, RI, TI,	Board of Supervisors*	Active, annually	Minimal	3, 5
Medium	Maintain Bulk Supply and Storage of Critical Elements (Fuels, Water, Nonperishable Food, etc.)	EH, FF, FR, SWS, T/H/L, T/W, D/L, T	Board of Supervisors, County EMA*	Active	Moderate	4, 5
Low	NOAA Weather Radio Awareness Program	All	County EMA*	Active, repetitive	Minimal	1, 2, 5, 6, 7
Low	Develop a Water Rationing Plan	D	County EMA and Public Health	Short-Term	Low	4

Table 60: Education and Awareness Programs Mitigation Actions
These types of actions keep residents informed about potential natural disasters.

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Date for Completion	Estimated Cost (s)	Hazard Mitigation Goal(s) #
High	Create an email list serv for outreach and website postings	All	Individual Depts.*	Short-Term	Minimal	10
High	Engage with the public and track social media site interactions/visits for measuring impact	All	EMA	Short-Term	Minimal	10
High	Determine ad campaign costs/estimates at movie theater and billboards for outreach posts	All	EMA*, Individual Depts.	Short-Term	Minimal	10
High	Establish & Conduct a Public Awareness & Education Program (Notices, Newsletters, Brochures, Website, Warnings, Shelter Information, Importance of Vaccinations, Hazard Information, At-Home Improvements - plant trees, rain barrels, etc.)	D, EH, FF, FR, GWF, PHD, SWS, T/H/L, T/W, HMI, IF, D/L	County EMA* and Public Health	Active	Minimal	1, 2, 6, 7

Table 61: Natural System Protection and Nature-Based Solutions Mitigation Actions
Actions that minimize damage and losses by preserving or restoring the functions of natural systems. This type of action can include green infrastructure and low impact development, nature-based solutions

Priority	Mitigation Action/Program/Project	Associated Hazard	Primary Agency Responsible for Implementation	Timeline	Estimated Cost	Hazard Mitigation Goal(s) #
High	Develop Groundwater Protection Plan or Drinkable Water Distribution Plan (inspections, testing, security, etc.)	D, FF, FR, PHD, HMI, TI, T	County Environmental Health*	Active	Minimal	1, 5
High	Maintain Membership of National Flood Insurance Program	FF, FR	Board of Supervisors*	Active	Minimal	5
High	Maintain a Community-Wide Household Hazardous Waste Disposal Site or Event	HMI, PHD	Board of Supervisors*	Active	Moderate	4
Low	Maintain Roadside Vegetation Management Program	L	County Engineer	Active	Low	5

Table 62: Structure and Infrastructure Projects Mitigation Actions						
Actions that either modify existing buildings or structures to protect them from a hazard, or removal from the hazard area.						
Priority	**Mitigation Action/ Program/ Project**	**Associated Hazard**	**Primary Agency Responsible for Implementation**	**Timeline**	**Estimated Cost (s)**	**Hazard Mitigation Goal #**
High	Install Signage at Critical Transportation Sites (i.e., RR, Dangerous Intersections, etc.)	FF, FR, GWR, SWW, T/H/L, T/W, HMI, D/L, TI,	County Engineer*	Active	Minimal	1, 5
High	Provide an Adequate Number of Safe Rooms/Tornado Rooms for General Public Use	T/H/L, T/W, T	Board of Supervisors*	Active	Minimal	1
High	Determine a prioritized list of buildings that would need a redundant power supply in terms of need and investigate funding these projects	T/H/L, T/W, T, RI	EMA	Short-Term	Minimal	3, 9
Low	Flood Proof Critical Facilities	FF, FR, D/L	Board of Supervisors	Short-Term	Low	2
Low	Develop & Enforce an Inspection & Repair Program for Public Infrastructure	E, EH, FF, FR, T/W, D/L	County Engineer	Active	Moderate	1, 2, 5
Low	Either Purchase & Remove Structures in 100-YR Floodplain or Elevate Structures to at Least 1-FT Above 100-YR Floodplain, or Both	FF, FR, D/L	County EMA, Board of Supervisors	Active	Moderate	1, 2, 5

Table 63: Local Plans and Regulations Mitigation Actions

Actions by administrative or regulatory processes which direct how land and buildings are developed and built. These actions also include regulations by public entities to reduce hazard losses.

Priority	Mitigation Action/Program/Project	Assoc. Hazard	Primary Agency Responsible for Implementation	Timeline	Estimated Cost (s)	Hazard Mitigation Goal #
High	Organize and hold regular Grundy Count Disaster Planning Committee Meetings	All	EMA, Board of Supervisors	Short-Term	Minimal	1, 2, 3, 5, 6, 7, 8
High	Develop and Maintain Command Procedures & Center	All	County EMA*	Active	Minimal	1, 5
High	Promote County Wellness Activities and Public Health Department efforts in wellness	PHD	County Public Health*	Active, repetitive	Minimal	1
High	Develop a Clean Up/Recovery Procedure / Plan	FF, FR, SWS, T/H/L, T/W, HMI, DL, T	County EMA*	Active, updated annually	Minimal	4
High	Ensure Schools and Other Buildings / Structures with Large Populations have Evacuation Plans	FF, FR, T/H/L, T/W, HMI, T	County EMA*	Active	Minimal	1, 2
High	Locate Off-Site Backup Auxiliary Location for an emergency office location with back up electricity for IT	All	Board of Supervisors, EMA*	Active	High	4, 5
High	Develop and Maintain Continuity of Operations Plan (COOP)	PHD, T/H/L, T/W, HMI, T	Board of Supervisors*	Active	High	4, 6

Table 63: Local Plans and Regulations Mitigation Actions						
Priority	**Mitigation Action/Program/Project**	**Assoc. Hazard**	**Primary Agency Responsible for Implementation**	**Timeline**	**Estimated Cost (s)**	**Hazard Mitigation Goal #**
Medium	Identify & Maintain Relationships with Users of Hazardous Materials/Chemicals & Radiological Substances	HMI, RI, TI,	County EMA*	Active, annually	Minimal	1, 2, 5
Medium	Ensure Tier II Reports are Completed and Reported per Applicable Laws	HMI, RI, TI,	County EMA*	Active, annually	Minimal	3, 5
Medium	Complete and Maintain Secondary Off-Site Dispatch Center	All	Grundy County Sheriff*	Active	Low	1, 4, 5
Low	Maintain Mutual Aid Agreement with Surrounding Communities and IMAC	All	County EMA*	Active	Low	4
Low	Maintain and Update Bioterrorism Response Plan	PHD, T	County EMA*	Active	Minimal	1, 2, 4, 5
Low	Conduct necessary Studies, Engineering, Construction, etc. on Existing Infrastructure that are in Need (i.e., Ridge Road, T55 Bridge, etc.)	E, EH, FF, FR, T/W, D/L	County Engineer and EMA	Short-Term	Medium	1, 2, 5

SECTION 5 – PLAN MAINTENANCE

MONITORING, EVALUATING, AND UPDATING THE PLAN

FUTURE AMENDMENTS/UPDATING THE PLAN

This is an update to the 2017 Grundy County Multi-Jurisdictional Hazard Mitigation Plan. A plan update is to occur every five (5) years. This 2023 plan is to be commenced upon FEMA Certification.

Future Amendments:

Any future amendments to the plan shall occur only after an official Public Notice has been posted in a local publication announcing a Public Hearing on the matter.

After the public has had the opportunity to review the proposed amendments the City Council, School Board, and/or Board of Supervisors may, by resolution, choose to accept any amendment to the plan. Once a City Council and/or Board of Supervisors has adopted the amendment, the remaining elected board of each participating municipality shall hold a public hearing to receive public input on the amendment prior to local adoption.

All amendments made to this plan should be shared with each participating jurisdiction, the Grundy County Emergency Management Agency and the Iowa Department of Homeland Security and Emergency Management Division.

Future Updates:

At a minimum, this Plan will be evaluated for consistency with FEMA and IHSEMD requirements and formally updated every five (5) years. However, it is strongly encouraged that the mitigation strategies for each community be reviewed and revised (if necessary) following disasters to determine if the recommended actions are still appropriate given the impacts of an event.

THE IMPLEMENTATION PROCESS & FUNDING RECOMMENDATIONS

This set of recommendations are intended to provide options for local governments to incorporate the hazard mitigation actions from their prospective strategies developed in this planning process. Using the capability assessments conducted for each jurisdiction. These recommendations are to support and inform city or county stakeholders with hazard mitigation planning.

1. **Phasing Projects Over Budget Cycles**

   In the implementation strategies in this plan, the estimated costs varied from minimal to high costs for each action item created by the planning committee and their representatives. Phasing is a process by which the completion of a project occurs over several budget cycles. Distributing the estimated costs of each mitigation action will make each action item more attainable over time.

2. **Capital Improvement Programs**

   It is recommended that this updated hazard mitigation plan be incorporated into the City's or County's annual Capital Improvements Program update procedure.

3. **Local Match Commitments**

   For most grants, there are commitments required or encouraged by funders which may allow your grant applications/requests to be considered. For projects that require a local match commitment, the Council or Board of Supervisors should begin setting aside appropriate resources to meet their match liability.

4. **Strategic Planning and Prioritization**

   It is recommended that projects created by each city's and/or county's planning committee participants be shared with city clerks, managers, boards, and department heads so that projects or programs in each jurisdiction's implementation strategy may be prioritized for funding through the jurisdictions' budgeting process.

5. **Hazard Mitigation Grant Program**

   The information presented in the Plan may be used as documentation for grant applications for FEMA's Hazard Mitigation Grant Program (HMGP). This grant funding is available after a presidentially declared disaster.

   In this program, homeowners and businesses cannot apply for a grant. However, a local community may apply for funding on their behalf. All participating jurisdictions must complete the development of each of their respective local hazard mitigation plans found in the Appendices of this plan. All jurisdictions must adopt hazard mitigation plans through resolutions to receive funding for a hazard mitigation project application. All resolutions are in the Appendices of this plan.

   For more information on the HMGP application and program, visit https://www.fema.gov/grants/mitigation/hazard-mitigation

EVALUATION & REVIEW PROCESS

The Grundy County Emergency Management Coordinator and governing bodies from all jurisdictions are responsible for the Hazard Mitigation Plan and implementation of the goals and actions contained herein and may seek assistance from other city or county staff, Council of Governments, and consultants to accomplish mitigation projects.

Requirement 44 CFR §201.6(c)(4)(i): [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.

Reconvene Annually

The plan should be reviewed annually to determine program effectiveness or at a minimum, shall be reviewed and updated within five years of the FEMA approval date. To assist in the review process, the Hazard Mitigation Committee may reconvene annually upon the request of the Grundy County Emergency Management Coordinator. The planning committee would be comprised of representatives from each participating jurisdiction as well as from neighboring communities, schools, businesses, nonprofits, agencies, and other interested parties. Together they will be charged with reviewing and evaluating implementation progress of the mitigation plan. A public notice should be posted at all city and county government buildings and in the local newspapers inviting the public to participate as members of the Committee and/or to review the Plan and provide comments. Following the committee's completion of the annual review process, the findings of the review and recommended changes, if applicable, will be presented during a City Council and Board of Supervisors meeting.

Evaluation Tools

The Grundy County Hazard Mitigation Plan Review Tool in Appendix R provides a public meeting evaluation form to assist in the review, evaluation, and updating process. In Appendix M, the details on the updates or progress by each jurisdiction is provided. The updates in that appendix was provided by participants from the previous plan before this updated plan. Previous participants of the 2017 Grundy County MJ-HMP participated and developed an updated to their local hazard mitigation plan per FEMA requirements to qualify for pre-disaster mitigation funding. Since many activities fall under the normal duties of most city governments (e.g. funding and maintaining emergency services), not many activities were deleted.

Several communities in Grundy County are limited both in size and capacity to implement mitigation programs. Under the confines of these limited resources, some jurisdictions chose to drop a variety of previously defined mitigation actions, as they were determined to longer be a priority or were not feasible.

Continued Public Participation

Grundy County's emergency management coordinator has been proactive in creating working relationships among all communities and the county's emergency management resources. Cities had not typically been tasked to initiate meetings with the public to discuss hazard mitigation issues. This has been the purview of the Emergency Management Office's activities among cities to conduct meetings whereby the cities and public are invited to cover disaster response and recovery issues. Common issues discussed included tornado sirens, tornado safe rooms, emergency generators, storm spotter training, and other training needs. The coordinator ensures each jurisdiction regularly refers to their HMP in their assistance to cities. The coordinator also encourages cities to actively participate in any HMP development meetings and continue or maintain the monitoring of implementation strategy created by their participating members to their respective hazard mitigation plans.

Cities can expect Grundy County's EMA coordinator to reach each jurisdiction for updates in the mail and email and to check for regular updates on the county website. To ensure that the public remains involved in the future implementation of this Plan, it shall remain available at all participating city halls, school districts, and the county courthouse. An electronic PDF copy of this plan will be posted on the Iowa Northland Regional Council of Government's website as well, at www.inrcog.org/pub.

Requirement 44 CFR §201.6(c)(4)(iii): Discussion on how the community will continue public participation in the plan maintenance process.

This plan shall be made available to any party who requests to see it. In the event the Hazard Mitigation Committee is reconvened by the County Emergency Management Coordinator, the process of which has been previously discussed, the public will be notified and provided an opportunity to participate in planning meetings and submit comments. The public will be notified in accordance with Iowa's Open Meeting and Records Laws (Iowa Code Chapters 21 and 22), said meetings will be open to the public and all records shall be available for inspection. The coordinator will continue to work with each participating jurisdiction in ensuring the plan goals are followed and that these jurisdictions are properly prepared for any disaster that may come.

Required Five (5) Year Update

All local jurisdictions seeking to remain eligible for mitigation project grant funding are required to review and revise their hazard mitigation plans to reflect changes in development and progress in their local mitigation efforts. All plans must be resubmitted to the State Hazard Mitigation Officer for initial review and coordination. Per Goal # 7 in this county hazard mitigation plan, future hazard mitigation plans should seek conformity to the multi-jurisdictional process. In this multi-jurisdictional hazard mitigation planning process, the Grundy County Emergency Management coordinator was the plan lead for effort. Designating the county EMA coordinator for future updates begins with the grant application. In this plan, the county applied and awarded a plan development grant from FEMA. Any future coordinator should seek this additional grant funding for future updates.

Integrating the MJ-HMP Plan into other Planning Documents

Each jurisdiction should consider the findings from this document when updating or writing new planning documents. As deemed appropriate by the community government, this plan should be incorporated into existing or proposed development of Comprehensive Plans, Land-Use Plans and other appropriate plans or programs. Each jurisdiction should integrate and consider their goals as well as their current and future mitigation action steps with existing and future jurisdictional plans. INRCOG incorporates the hazard mitigation plans with each jurisdiction's comprehensive land use plan, housing needs assessment, long term transportation plans, urban renewal plans, existing and future zoning and subdivision ordinances, as well as building code.

Regulation 44 CFR §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 plans or capital improvement plans, when appropriate.

APPENDICES TABLE

APPENDIX L: Plan Adoption Resolutions

APPENDIX M: Updates to 2017 Grundy County HMP Strategies by Jurisdiction

2023 GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

APPENDIX M

UPDATES ON 2017 LOCAL HAZARD MITIGATION STRATEGY AND PREVIOUS MITIGATION ACTIVITIES

COUNTY, CITIES, AND SCHOOL DISTRICT RESPONSES

City of Beaman 2023 HMP Update Responses

Return to:
Isaiah Corbin, INRCOG
229. E Park Ave. Waterloo, IA 50703
icorbin@inrcog.org / ph: 319.235.0311 / Fax: 319.235.2891

BEAMAN 2017 IMPLEMENTATION STRATEGY - UPDATE	
Mitigation Action/Program/Project	**Project/Program Status** (Specific actions, completed, not completed, % done, why not implemented, etc.)
Educate the public	*Locations where public is notified: city website, Facebook page, posting at clerk's office, post office, bank. Any changes are amended in the city ordinance.*
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	*Law enforcement contracted with county sheriff; BECERTS ambulanced located Conrad*
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	*Fire dept -scheduled training and equipment replacement*
Provide emergency shelters for evacuees	*None*
Maintain mutual aid agreements	*City of Conrad – fire department*
Maintain tree trimming program	*Trees reviewed annually; trimmed as needed; response to need.*
Determine locations for potential heating shelters and volunteer organization	*Community hall- heating and cooling, cooking facilities, bathrooms, no showers on site* *Regularly tested generators hooked to natural gas.*
Encourage utility providers and developers to place all utilities underground	*Yes*
Purchase and maintain backup generators	*Community hall, lift station, H2O shed – regularly tested*
Maintain public works equipment	*Part time city employed, maintenance personnel.* *Repair as needed.*

City of Beaman 2023 HMP Update Responses

Notify the media on shelter locations	N/A
Make sure residents keep sidewalks clear of snow and ice	Sidewalks not required.
Maintain use of snow fences in the city/county	As needed.
Use surge protectors to prevent electrical damage to critical and sensitive equipment	In place.
Backup all digital data	Contracted with Heart of Iowa
Purchase NOAA weather radios	N/A
Enforce and update building codes, as needed	Contracted building inspector, adopted state codes.
Maintain storm spotter training for local fire departments/deputies and EMS crews	Maintained.
Continue enforcement of city sump pump discharge ordinance	By contracted water operated.
Maintain a list of potential storm sewer projects	Reviewed annually; maintained by contracted H2O and sewer
Make available a cleanup crew for after a storm	Volunteers coordinated by fire dept and city personnel
Maintain law enforcement monitoring of large storage supplies	N/A

City of Beaman 2023 HMP Update Responses

Acquire necessary response and detection equipment for city/county employees	Radios updated for fire dept.
Encourage lead based paint and asbestos removal	N/A
Provide a local hazardous waste drop-off site	Plan: add to Facebook and Website
Maintain mutual aid agreements with the Northeast Iowa response Group	?
Keep HAZMAT manuals/information current and easily accessible	City clerks office and fire dept.
Maintain, test, and replace warning sirens	Maintenance as needed. Regularly scheduled testing
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	N/A
Encourage and maintain enrollment in emergency notification system	Yes
Construct or designate a safe room or storm shelter	Cost a factor. No safe room.
Encourage home owners to keep emergency kits	N/A
Encourage backup power generation for local telephone systems and cellular operations	Provided by Heart of Iowa.
Maintain or install GPS units in all emergency service and city/county vehicles	N/A

City of Beaman 2023 HMP Update Responses

Maintain automatic TTY TDD machines for emergency personnel and city/county employees	N/A
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	N/A
Continue training and promotion of the Incident Command System	Fire department
Complete continuity of government plan	In progress
Encourage use of Iowa One call before digging	N/A
Upgrade radio communications equipment as needed	New Units purchased
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Fire dept Council
Improve standard operating procedures for schools	No school in town
Seek to improve communications with other agencies	
Continue enforcement of city sump pump discharge ordinance	Yes
Maintain a list of potential storm sewer projects	Yes – city 5 year plan
Make available a cleanup crew for after a storm	Volunteer – coordinated by city maintenance and fire chief

Maintain law enforcement monitoring of large storage supplies	N/A
Acquire necessary response and detection equipment for city/county employees	
Encourage lead based paint and asbestos removal	
Provide a local hazardous waste drop-off site	Not practical
Maintain mutual aid agreements with the Northeast Iowa response Group	Yes
Keep HAZMAT manuals/information current and easily accessible	City clerks office and fire station
Maintain, test, and replace warning sirens	Scheduled testing
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	As needed
Encourage and maintain enrollment in emergency notification system	Yes
Construct or designate a safe room or storm shelter	Cost ineffective
Encourage home owners to keep emergency kits	
Encourage backup power generation for local telephone systems and cellular operations	Heart of Iowa

Maintain or install GPS units in all emergency service and city/county vehicles	Yes
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	-
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	-
Continue training and promotion of the Incident Command System	Yes
Complete continuity of government plan	
Encourage use of Iowa One call before digging	Yes
Upgrade radio communications equipment as needed	Recently upgraded -grant funded
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Yes
Improve standard operating procedures for schools	No school in town
Seek to improve communications with other agencies	
Keep supply of backup radios and cellphones	Back up radio
Maintain list of county emergency contacts	Clerks office Fire dept

City of Beaman 2023 HMP Update Responses

Keep the county updated on personnel changes	As needed
Continue cooperation between city roads department and local fire departments during snow emergencies	Same personnel
Pursue partnership with rural water as the system expands	In place: city H2O purchased from rural H2O
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	-
Continue an annual inspection program for commercial and industrial properties	-
Continue fire prevention program	-
Improve water system to enhance firefighting capacity/ability	Considered when installed
Maintain membership in the NFIP	
Maintain, enforce and update floodplain ordinance	Has been done
Acquire more water pumps	
Continue with improvement to the storm water system	On 5 Year Plan
Prevent inflow and infiltration into the sanitary sewer	Ongoing

Educate the public on maintaining their sump pumps	–
Maintain and keep storm drains clear of debris	Regular city maintenance
Stockpile sand and sandbags	
Identify, purchase and remove structures from flood hazard areas	N/A – only part of city in flood plain is a pasture and small section of a co-op
Initiate and enforce burn ban in times of drought or as needed	Initiated by Grundy County
Maintain and improve signals/signage along roadways and at railroad crossings	N/A
Establish alternative transportation routes should a road need to be closed	As needed
Purchase emergency signs to be used in case of an incident	Stored in city shed
Enforce no parking designations at special events	As needed
Identify fallout shelter locations	At one time designated at co-op.
Keep communication lines open with Nuclear Plant in Palo, IA	
Maintain and/or develop a wellhead protection program	All water purchased from rural H20. All wells pulled.

Monitor wells in areas of identified contamination	One well within city limits. Monitored by homeowner. Not used past 2 years.
Monitor the drinking water supply	Regular testing following DNR revocation
Identify and map areas of past contamination	
Maintain and/or develop storm water management program	
Eliminate and cap private and abandoned wells in the city	Completed. Currently 1 well on outskirts within an acreage. Regular testing by us and testing program.
Eliminate the use of septic tank systems in the city limits	Completed – 1 septic leech system on outskirt. New system installed 2022. Monitored by county sanitation.
Follow monitoring requirements set forth by the Iowa DNR	Lagoons
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	Follow DNR specifications
Maintain and update anti-virus software	Agreement with Heart of Iowa
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	-
Review and update fire codes as necessary	-
Continue to cooperate with pipeline owners and operators to ensure locations are marked	N/A – pipeline 2.5 miles n. of town

Purchase a new tanker and/or pumper	**Completed** **Emergency vehicle**
Encourage community to plant shade trees	
Provide fans and/or cooling shelter	**Cooling shelter at hall**
Maintain air conditioner(s) in community buildings	**Maintained**
Keep a supply of drinking water to distribute	
Encourage the public to receive vaccinations	
Cooperate with any countywide mass vaccination plan	
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	
Restrict water usage should it be necessary	
Encourage the use of proper materials and construction techniques	
Educate city personnel to identify risk areas	
Install tiling to help water move away from structures	**As needed**

Enforce a curfew	None
Continue regular bridge inspections	1 bridge. Inspected annually by state inspector.
Place barricades to close dangerous bridges	Barricades and cones available. Recently purchased
Maintain embargos/weight limits as necessary	Posted by state inspector
Identify and inventory potential sinkhole sites	
Educate city personnel to handle a sinkhole situation	Yes
Secure the area (around a sinkhole)	
Inspect any utility lines that are near a sinkhole	
Enforce the local zoning ordinances	Yes
Clear ditches, streams, and waterways on a regular basis	
Encourage floodproofing/elevating structures in the floodplain	No structure in flood plain
Update flood maps/flood studies for areas throughout the county	Updated 2020?

City of Beaman 2023 HMP Update Responses

Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	1 bridge over small creek within city limits but not near residential or commercial areas. When replaced will be a box culvert.
Establish transportation evacuation routes and protocols	As needed
Develop sandbagging procedures for the community	Not needed
Develop and maintain staging area for dumping during cleanup	As needed
Continue cooperation with county in developing flood mitigation efforts	Yes
Purchase additional parkland in order to increase greens space and reducing surface flow	N/A – city is landlocked
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	
Inform the public of reputable and ill reputable contractors following disasters	Must have permits
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	
Maintain and update emergency response plans	As required
Maintain lists of personnel and equipment available to use with response plans	
Maintain communication with county contacts	List at clerks office and fire dept.

Maintain NIMS compliance	***Yes***

City of Conrad 2023 HMP Update Responses

Return to:
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CONRAD 2017 IMPLEMENTATION STRATEGY - UPDATE	
Mitigation Action/Program/Project	**Project/Program Status** (Specific actions, completed, not completed, % done, why not implemented, etc.)
Educate the public	*Ongoing*
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	*Ongoing*
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	*Ongoing, safety gear replacement regularly occurs each year*
Provide emergency shelters for evacuees	*Fire dept has safe room, 3-5 years to secure a generator for city hall during emergencies for residents*
Maintain mutual aid agreements	*Sheriff's office, township for Fire and EMS (agreements)*
Maintain tree trimming program	*Ongoing*
Determine locations for potential heating shelters and volunteer organization	*Refer to emergency shelter comments, generator in city hall is the current goal for this item*
Encourage utility providers and developers to place all utilities underground	*New subdivision has utilities going underground, ONGOING*
Purchase and maintain backup generators	*Refer to emergency shelter comments*

Maintain public works equipment	Ongoing, annually reviewed by maintenance
Notify the media on shelter locations	N/A
Make sure residents keep sidewalks clear of snow and ice	Ongoing, sidewalks that go no-where are responded to based on calls
Maintain use of snow fences in the city/county	N/A
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Complete
Backup all digital data	Complete
Purchase NOAA weather radios	Complete
Enforce and update building codes, as needed	Refer to state building codes
Maintain storm spotter training for local fire departments/deputies and EMS crews	N/A
Continue enforcement of city sump pump discharge ordinance	Directly dumped into storm sewer, no ordinance to prevent this specifically, nuisance is responded to otherwise if feasible those are directed to the storm sewer
Maintain a list of potential storm sewer projects	Complete – 5 year capital improvement plan and reviewed annually
Make available a cleanup crew for after a storm	Complete – public works staff responds to this

Maintain law enforcement monitoring of large storage supplies	N/A – not a large supply if existing
Acquire necessary response and detection equipment for city/county employees	N/A
Encourage lead based paint and asbestos removal	N/A
Provide a local hazardous waste drop-off site	N/A
Maintain mutual aid agreements with the Northeast Iowa response Group	N/A
Keep HAZMAT manuals/information current and easily accessible	Located at fire dept
Maintain, test, and replace warning sirens	Tested annually
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Replace 1 within 3 years
Encourage and maintain enrollment in emergency notification system	Yes – listed at mitigation action with Chase Babcock
Construct or designate a safe room or storm shelter	Fire dept has safe room
Encourage home owners to keep emergency kits	Fire dept has talked about this but never done anything
Encourage backup power generation for local telephone systems and cellular operations	N/A

Maintain or install GPS units in all emergency service and city/county vehicles	None
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	None
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	None – reach out to radio stations and Facebook for dissemination
Continue training and promotion of the Incident Command System	Ask Chase
Complete continuity of government plan	None
Encourage use of Iowa One call before digging	Ongoing
Upgrade radio communications equipment as needed	Recently updated within the last year – complete
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Maintain their logs
Improve standard operating procedures for schools	None
Seek to improve communications with other agencies	None
Keep supply of backup radios and cellphones	None
Maintain list of county emergency contacts	At fire station

Keep the county updated on personnel changes	None
Continue cooperation between city roads department and local fire departments during snow emergencies	Ongoing – public works remain in contact during snow emergencies
Pursue partnership with rural water as the system expands	Iowa Regional Utilities Association
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Fire dept wish list item
Continue an annual inspection program for commercial and industrial properties	Water sprinkler system inspection conducted annually in commercial and industrial buildings
Continue fire prevention program	Fire dept
Improve water system to enhance firefighting capacity/ability	New southside waterline to create redundancy service, fire is hooked up into municipal services
Maintain membership in the NFIP	Not applicable
Maintain, enforce and update floodplain ordinance	Yes this has been updated
Acquire more water pumps	Sanitary sewer pumps
Continue with improvement to the storm water system	Ongoing
Prevent inflow and infiltration into the sanitary sewer	Complete – recently worked with DNR

Educate the public on maintaining their sump pumps	N/A
Maintain and keep storm drains clear of debris	Yes, ongoing. Maintenance crews monitor.
Stockpile sand and sandbags	N/A
Identify, purchase and remove structures from flood hazard areas	None
Initiate and enforce burn ban in times of drought or as needed	Ongoing
Maintain and improve signals/signage along roadways and at railroad crossings	Ongoing
Establish alternative transportation routes should a road need to be closed	Ongoing
Purchase emergency signs to be used in case of an incident	Complete
Enforce no parking designations at special events	Main Street closed for events – Ongoing
Identify fallout shelter locations	N/A
Keep communication lines open with Nuclear Plant in Palo, IA	N/A – closed down site
Maintain and/or develop a wellhead protection program	1 capped and removed, other 1 has been capped. (aware of 2 wells w/in city)

Monitor wells in areas of identified contamination	N/A
Monitor the drinking water supply	Daily, Rural Water and City staff tests monthly
Identify and map areas of past contamination	N/A
Maintain and/or develop storm water management program	Not in writing
Eliminate and cap private and abandoned wells in the city	Private wells – homeowners maintain them
Eliminate the use of septic tank systems in the city limits	None in town known
Follow monitoring requirements set forth by the Iowa DNR	Ongoing
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	Iowa DNR to prevent erosion for project in city
Maintain and update anti-virus software	Complete – ongoing and updated automatically
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Public works has cameras for drop offs of recyclables and bins
Review and update fire codes as necessary	Part of ordinance – ongoing
Continue to cooperate with pipeline owners and operators to ensure locations are marked	N/A

Purchase a new tanker and/or pumper	3 years prior – FEMA grant has been applied for to replace the tanker. No funds to pay for this and debt capacity reached. – "Backburner"
Encourage community to plant shade trees	Yes - $4K grant for planting trees on city owned property
Provide fans and/or cooling shelter	Fire station
Maintain air conditioner(s) in community buildings	Yes and replaced as needed
Keep a supply of drinking water to distribute	N/A
Encourage the public to receive vaccinations	N/A
Cooperate with any countywide mass vaccination plan	N/A
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Refer to Chase
Restrict water usage should it be necessary	Would if needed
Encourage the use of proper materials and construction techniques	City engineer monitors and contracts with CGA
Educate city personnel to identify risk areas	Monitored by public works
Install tiling to help water move away from structures	N/A

Enforce a curfew	None
Continue regular bridge inspections	County personnel completes inspections
Place barricades to close dangerous bridges	N/A
Maintain embargos/weight limits as necessary	N/A
Identify and inventory potential sinkhole sites	N/A
Educate city personnel to handle a sinkhole situation	N/A
Secure the area (around a sinkhole)	N/A
Inspect any utility lines that are near a sinkhole	N/A
Enforce the local zoning ordinances	Ongoing
Clear ditches, streams, and waterways on a regular basis	N/A – county areas or property owner responsible
Encourage floodproofing/elevating structures in the floodplain	No buildings in floodplain – existing buildings rebuilt elevated structure
Update flood maps/flood studies for areas throughout the county	County initiates this responsibility

Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	N/A
Establish transportation evacuation routes and protocols	Alternate routes exist
Develop sandbagging procedures for the community	N/A
Develop and maintain staging area for dumping during cleanup	N/A
Continue cooperation with county in developing flood mitigation efforts	Ongoing
Purchase additional parkland in order to increase greens space and reducing surface flow	N/A
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	N/A
Inform the public of reputable and ill reputable contractors following disasters	N/A
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	N/A
Maintain and update emergency response plans	Fire Dept
Maintain lists of personnel and equipment available to use with response plans	Fire Dept
Maintain communication with county contacts	Yes when needed

Maintain NIMS compliance	County does this – N/A

City of Dike 2023 HMP Update Responses

Return to:
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DIKE 2017 IMPLEMENTATION STRATEGY - UPDATE	
Mitigation Action/Program/Project	**Project/Program Status** (Specific actions, completed, not completed, % done, why not implemented, etc.)
Educate the public	*We are actively finding ways to keep public updated*
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	*Active – completed every month and trainings + meeting for fire/ambulance. Also HAZMAT training yearly.*
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	*Ongoing training*
Provide emergency shelters for evacuees	*City hall/community hall available*
Maintain mutual aid agreements	*Ongoing yearly*
Maintain tree trimming program	*Ongoing – city maintenance trims and removes trees when needed*
Determine locations for potential heating shelters and volunteer organization	*Would use city hall and community hall*
Encourage utility providers and developers to place all utilities underground	*Ongoing project that the city is working on*
Purchase and maintain backup generators	*City has a permanent generator for city electric but only older part of town, not Fox Ridge since Alliant*
Maintain public works equipment	*Always active making repairs and replacements*

City of Dike 2023 HMP Update Responses

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Notify the media on shelter locations	We would notify news stations along with EMS/Sheriff
Make sure residents keep sidewalks clear of snow and ice	Snow ordinance is in place
Maintain use of snow fences in the city/county	We put up snow fences around the city
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Surge protectors are used in all city buildings
Backup all digital data	All data is backed up daily offsite
Purchase NOAA weather radios	We have NOAA radios
Enforce and update building codes, as needed	We have codes in place and review
Maintain storm spotter training for local fire departments/deputies and EMS crews	Training/review every year
Continue enforcement of city sump pump discharge ordinance	We have an ordinance in place
Maintain a list of potential storm sewer projects	Ongoing – review of projects by council and superintendent
Make available a cleanup crew for after a storm	Ongoing with city and EMS
Maintain law enforcement monitoring of large storage supplies	City works with Grundy County Law Enforcement

City of Dike 2023 HMP Update Responses

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Acquire necessary response and detection equipment for city/county employees	Always reviewing and replacing equipment if needed
Encourage lead based paint and asbestos removal	Follows county and state
Provide a local hazardous waste drop-off site	None in town
Maintain mutual aid agreements with the Northeast Iowa response Group	Active
Keep HAZMAT manuals/information current and easily accessible	Fire & EMS stays up to date
Maintain, test, and replace warning sirens	Active. Tests are done monthly during spring/summer.
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	2 sirens maintained for Fox Ridge area and new siren 2020 by city hall.
Encourage and maintain enrollment in emergency notification system	City staff enrolled and encourages citizens to enroll
Construct or designate a safe room or storm shelter	City hall/community hall
Encourage home owners to keep emergency kits	Ongoing education and works with county
Encourage backup power generation for local telephone systems and cellular operations	
Maintain or install GPS units in all emergency service and city/county vehicles	Ongoing project

City of Dike 2023 HMP Update Responses

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Maintain automatic TTY TDD machines for emergency personnel and city/county employees	
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Ongoing review – mayor and city clerk work together on information
Continue training and promotion of the Incident Command System	Fire department does this
Complete continuity of government plan	Ongoing with updates/reviews
Encourage use of Iowa One call before digging	Ongoing with reminders/education
Upgrade radio communications equipment as needed	Fire/EMS updates as needed
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Fire/EMS updates as needed
Improve standard operating procedures for schools	Works with school administration – ongoing
Seek to improve communications with other agencies	Always working on and updating
Keep supply of backup radios and cellphones	Need to Update
Maintain list of county emergency contacts	Update when changes are made
Keep the county updated on personnel changes	Update when change occur

City of Dike 2023 HMP Update Responses

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Continue cooperation between city roads department and local fire departments during snow emergencies	Ongoing and updating with the department
Pursue partnership with rural water as the system expands	We work with Central Iowa Water
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Always educating and fire dept. offer [smoke detector, fire extinguisher, sprinkler system] checks
Continue an annual inspection program for commercial and industrial properties	Need to implement a program
Continue fire prevention program	Yearly program with fire department
Improve water system to enhance firefighting capacity/ability	Ongoing project with city and fire dept
Maintain membership in the NFIP	Unknown
Maintain, enforce and update floodplain ordinance	Ordinance is in place
Acquire more water pumps	Need to update
Continue with improvement to the storm water system	Ongoing project
Prevent inflow and infiltration into the sanitary sewer	New plant with build with current technology
Educate the public on maintaining their sump pumps	Ongoing with an ordinance in place

City of Dike 2023 HMP Update Responses

Return to:
Isaiah Corbin, INRCOG
229. E Park Ave. Waterloo, IA 50703
icorbin@inrcog.org / ph: 319.235.0311 / Fax: 319.235.2891

Maintain and keep storm drains clear of debris	City staff checks and maintains
Stockpile sand and sandbags	City has sand if needed
Identify, purchase and remove structures from flood hazard areas	
Initiate and enforce burn ban in times of drought or as needed	Ordinance in place regarding burning and works with local county
Maintain and improve signals/signage along roadways and at railroad crossings	None
Establish alternative transportation routes should a road need to be closed	City superintendent take care of when needed
Purchase emergency signs to be used in case of an incident	Updating signage this year and next years
Enforce no parking designations at special events	Signage and blockades are used during events
Identify fallout shelter locations	City hall/ community hall
Keep communication lines open with Nuclear Plant in Palo	[Not relevant]
Maintain and/or develop a wellhead protection program	?
Monitor wells in areas of identified contamination	?

City of Dike 2023 HMP Update Responses

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Monitor the drinking water supply	Water is tested daily by city staff.
Identify and map areas of past contamination	Need to see if we have logs for this
Maintain and/or develop storm water management program	Ordinance is in place
Eliminate and cap private and abandoned wells in the city	
Eliminate the use of septic tank systems in the city limits	
Follow monitoring requirements set forth by the Iowa DNR	City continues to work with DNR
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	Unknown
Maintain and update anti-virus software	Updates often
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	We have a few cameras in town
Review and update fire codes as necessary	
Continue to cooperate with pipeline owners and operators to ensure locations are marked	
Purchase a new tanker and/or pumper	New fire truck 2022-2023 year

City of Dike 2023 HMP Update Responses

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Encourage community to plant shade trees	*Ongoing project*
Provide fans and/or cooling shelter	*City hall/community hall*
Maintain air conditioner(s) in community buildings	*City staff checks/maintains*
Keep a supply of drinking water to distribute	*Water tower*
Encourage the public to receive vaccinations	*Unknown*
Cooperate with any countywide mass vaccination plan	
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	*Works with county and state officials*
Restrict water usage should it be necessary	*City would send out request to the public*
Encourage the use of proper materials and construction techniques	*Building code is enforced*
Educate city personnel to identify risk areas	*Always looking*
Install tiling to help water move away from structures	*City staff would work on this type of project*
Enforce a curfew	*Ordinance is in place*

City of Dike 2023 HMP Update Responses

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Continue regular bridge inspections	County
Place barricades to close dangerous bridges	County
Maintain embargos/weight limits as necessary	County
Identify and inventory potential sinkhole sites	Public works would handle
Educate city personnel to handle a sinkhole situation	Training and education of staff
Secure the area (around a sinkhole)	Public works would secure
Inspect any utility lines that are near a sinkhole	Public works and Grundy REC would work together
Enforce the local zoning ordinances	Ordinances are in place
Clear ditches, streams, and waterways on a regular basis	City staff has been working on this
Encourage floodproofing/elevating structures in the floodplain	Ongoing
Update flood maps/flood studies for areas throughout the county	County EMS and city would work together
Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	County

City of Dike 2023 HMP Update Responses

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Establish transportation evacuation routes and protocols	City would work with county, EMS, and sheriff
Develop sandbagging procedures for the community	Need to update
Develop and maintain staging area for dumping during cleanup	City superintendent would have a location
Continue cooperation with county in developing flood mitigation efforts	Ongoing work w/ county
Purchase additional parkland in order to increase greens space and reducing surface flow	
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Update as needed when new employees
Inform the public of reputable and ill reputable contractors following disasters	
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	
Maintain and update emergency response plans	Update as needed
Maintain lists of personnel and equipment available to use with response plans	Update as needed
Maintain communication with county contacts	Update and check in as needed
Maintain NIMS compliance	

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STOUT 2017 IMPLEMENTATION STRATEGY - UPDATE	
Mitigation Action/Program/Project	**Project/Program Status** (Specific actions, completed, not completed, % done, why not implemented, etc.)
Educate the public	Complete-We send newsletters to residents, post in the post office, and post on the city facebook.
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	Complete-Our fire department does in house trainings as well as takes advantage of the trainings through ICAP. NA to law enforcement and ambulance crew
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	Complete-Needs are monitored by the department and provided as needed
Provide emergency shelters for evacuees	Complete-In an emergency situation our fire department would be opened up to our residents.
Maintain mutual aid agreements	Complete-Mutual aid agreements are handled within the fire department.
Maintain tree trimming program	Complete-We have an individual who monitors the trees and lets us know if there are any that are creating issues, we follow through them to remove or cut them.
Determine locations for potential heating shelters and volunteer organization	Complete-The fire department would be opened when needed.
Encourage utility providers and developers to place all utilities underground	NA- as of now this opportunity is not available to Stout residents.
Purchase and maintain backup generators	Complete-The fire department has portable generators as well as a generator on one of the pump trucks.

Maintain public works equipment	Complete- All of our equipment is maintained by a local shop as recommended
Notify the media on shelter locations	Complete -The clerk has a pin code to post with KWWL should we need to open up a shelter location
Make sure residents keep sidewalks clear of snow and ice	Complete
Maintain use of snow fences in the city/county	Not complete
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Complete
Backup all digital data	Complete- all files are backed up to a cloud as well as an external drive
Purchase NOAA weather radios	Complete
Enforce and update building codes, as needed	Complete-Council and mayor review
Maintain storm spotter training for local fire departments/deputies and EMS crews	Complete- The fire department handles their training
Continue enforcement of city sump pump discharge ordinance	25% complete- Phase one of a sump pump drainage is completed and active. The city has plans to complete more areas in town. Where sump pumps are discharging is monitored.
Maintain a list of potential storm sewer projects	25% Complete- the city has had a survey to identify problem areas.
Make available a cleanup crew for after a storm	Complete-

Maintain law enforcement monitoring of large storage supplies	Complete- the City has a contract with the Grundy County Sheriff
Acquire necessary response and detection equipment for city/county employees	Complete
Encourage lead based paint and asbestos removal	Complete
Provide a local hazardous waste drop-off site	Not complete or available
Maintain mutual aid agreements with the Northeast Iowa response Group	Not complete
Keep HAZMAT manuals/information current and easily accessible	Complete
Maintain, test, and replace warning sirens	Complete
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Complete
Encourage and maintain enrollment in emergency notification system	Complete
Construct or designate a safe room or storm shelter	Complete
Encourage home owners to keep emergency kits	Complete
Encourage backup power generation for local telephone systems and cellular operations	Not Complete-We do not operate the utilities available in town

Maintain or install GPS units in all emergency service and city/county vehicles	Complete
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	Not Complete- NA
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Complete
Continue training and promotion of the Incident Command System	Complete
Complete continuity of government plan	Complete
Encourage use of Iowa One call before digging	Complete
Upgrade radio communications equipment as needed	Complete
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Complete
Improve standard operating procedures for schools	NA- We do not have a school in town
Seek to improve communications with other agencies	Complete
Keep supply of backup radios and cellphones	Not Completed
Maintain list of county emergency contacts	Complete

Keep the county updated on personnel changes	Complete
Continue cooperation between city roads department and local fire departments during snow emergencies	Complete
Pursue partnership with rural water as the system expands	Complete- We currently have a partnership with IRUA
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Complete
Continue an annual inspection program for commercial and industrial properties	NA- No commercial or industrial properties
Continue fire prevention program	Complete
Improve water system to enhance firefighting capacity/ability	Complete
Continue with improvement to the storm water system	In progress
Prevent inflow and infiltration into the sanitary sewer	IRUA handles the sanitary sewer system
Educate the public on maintaining their sump pumps	Complete
Maintain and keep storm drains clear of debris	Complete
Stockpile sand and sandbags	Not Complete- in progress

Identify, purchase and remove structures from flood hazard areas	Complete
Initiate and enforce burn ban in times of drought or as needed	Complete
Maintain and improve signals/signage along roadways and at railroad crossings	Complete- Signage is replaced and repaired as need in town. We do not have a railroad crossing.
Establish alternative transportation routes should a road need to be closed	Complete
Purchase emergency signs to be used in case of an incident	Complete
Enforce no parking designations at special events	Complete
Identify fallout shelter locations	Not Complete
Keep communication lines open with Nuclear Plant in Palo, IA	In progress
Maintain and/or develop a wellhead protection program	Complete
Monitor wells in areas of identified contamination	Complete
Monitor the drinking water supply	Complete- the city follows all necessary regulations set by the DNR
Identify and map areas of past contamination	No areas of contamination

Maintain and/or develop storm water management program	In progress
Eliminate and cap private and abandoned wells in the city	Complete
Eliminate the use of septic tank systems in the city limits	Complete
Follow monitoring requirements set forth by the Iowa DNR	Complete
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	Complete
Maintain and update anti-virus software	Complete
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	In progress
Review and update fire codes as necessary	complete
Continue to cooperate with pipeline owners and operators to ensure locations are marked	Complete
Purchase a new tanker and/or pumper	Complete
Encourage community to plant shade trees	Complete
Provide fans and/or cooling shelter	Complete

Maintain air conditioner(s) in community buildings	Complete
Keep a supply of drinking water to distribute	Not complete
Encourage the public to receive vaccinations	Complete
Cooperate with any countywide mass vaccination plan	Complete
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	Complete
Restrict water usage should it be necessary	Complete
Encourage the use of proper materials and construction techniques	Complete
Educate city personnel to identify risk areas	Complete
Install tiling to help water move away from structures	In progress
Enforce a curfew	NA
Identify and inventory potential sinkhole sites	Not completed-in progress
Educate city personnel to handle a sinkhole situation	Not Completed-in progress

Secure the area (around a sinkhole)	NA
Inspect any utility lines that are near a sinkhole	NA
Enforce the local zoning ordinances	Complete
Clear ditches, streams, and waterways on a regular basis	In progress-25% complete
Encourage floodproofing/elevating structures in the floodplain	Complete
Update flood maps/flood studies for areas throughout the county	NA
Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	In progress-25% complete
Establish transportation evacuation routes and protocols	Complete
Develop sandbagging procedures for the community	Not Complete
Develop and maintain staging area for dumping during cleanup	Complete
Continue cooperation with county in developing flood mitigation efforts	In progress
Purchase additional parkland in order to increase greens space and reducing surface flow	NA- There isn't any addition parkland

Set a designated number of people to be trained in post-disaster record keeping/damage assessments	***Complete***
Inform the public of reputable and ill reputable contractors following disasters	***Complete***
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	***Complete***
Maintain and update emergency response plans	***Complete***
Maintain lists of personnel and equipment available to use with response plans	***Complete***
Maintain communication with county contacts	***Complete***
Maintain NIMS compliance	***Complete***

City of Grundy Center 2023 HMP Update Responses

Return to:
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GRUNDY CENTER 2017 IMPLEMENTATION STRATEGY - UPDATE	
Mitigation Action/Program/Project	**Project/Program Status** (Specific actions, completed, not completed, % done, why not implemented, etc.)
Educate the public	**Active: public access channel, social media accounts, fire prevention, school resource officer at school**
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	**Active: EMS offers formal education to meet state standards, all department**
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	**As needed: new ambulance in 2018, new squad car 2021, new fire truck in 2019, New AED's and mass casualty, new "Jaws of Life" 2021**
Provide emergency shelters for evacuees	**Active: tornado shelter @ school, tornado shelter at city hall, add generator to city hall**
Maintain mutual aid agreements	**Active: Annual mutual aid agreements updated with county**
Maintain tree trimming program	**Active**
Determine locations for potential heating shelters and volunteer organization	**Active: city hall and fire/EMS building used for heating shelters**
Encourage utility providers and developers to place all utilities underground	**Active**
Purchase and maintain backup generators	**Active: fire owns generator and will do monthly checks**
Maintain public works equipment	**Active**

City of Grundy Center 2023 HMP Update Responses

Notify the media on shelter locations	**Active: utilize public channel 11, post on social media, post on city website, flyer in utility bill or welcome packet**
Make sure residents keep sidewalks clear of snow and ice	**Active – city ordinance**
Maintain use of snow fences in the city/county	
Use surge protectors to prevent electrical damage to critical and sensitive equipment	**Active: Battery backup/surge protector on all city computers. Check and purchase if needed.**
Backup all digital data	**Active: cloud backup, offsite servers for EMS**
Purchase NOAA weather radios	**Active: radio in city hall and police department**
Enforce and update building codes, as needed	**Active**
Maintain storm spotter training for local fire departments/deputies and EMS crews	**Active: certified training per dept policies**
Continue enforcement of city sump pump discharge ordinance	**Active – city ordinance**
Maintain a list of potential storm sewer projects	**Active**
Make available a cleanup crew for after a storm	**Active: public works, fire, police department, and volunteers**
Maintain law enforcement monitoring of large storage supplies	

City of Grundy Center 2023 HMP Update Responses

Acquire necessary response and detection equipment for city/county employees	**Active: police, fire, EMS use radio and pagers w/ dispatch**
Encourage lead based paint and asbestos removal	**Active**
Provide a local hazardous waste drop-off site	**City of Grundy does not offer waste drop off**
Maintain mutual aid agreements with the Northeast Iowa response Group	**Active: mutual aid agreements up to date**
Keep HAZMAT manuals/information current and easily accessible	**Active**
Maintain, test, and replace warning sirens	**Active: tested monthly**
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	**Active: an audible test to be done 2x per year**
Encourage and maintain enrollment in emergency notification system	**City of Grundy promotes the use of Grundy County system**
Construct or designate a safe room or storm shelter in a community facility. Construct a tornado safe room in a Grundy Center School District facility.	**Already completed**
Encourage home owners to keep emergency kits	**Implement a list for home emergency kits; post on social media when complete**
Encourage backup power generation for local telephone systems and cellular operations	**Available through GCMU**
Maintain or install GPS units in all emergency service and city/county vehicles	**Active: police department is on MACH (emergency dispatcher/fleet locator software)**

City of Grundy Center 2023 HMP Update Responses

Maintain automatic TTY TDD machines for emergency personnel and city/county employees	**Local TTY is through county dispatch**
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	**Active: mayor is PIO w/ using dept hands for specific questions or needs**
Continue training and promotion of the Incident Command System	**Active: all emergency department have NIMS training. Implement city officials to have NIMS training.**
Complete continuity of government plan	**Active/ ongoing**
Encourage use of Iowa One call before digging	**Active**
Upgrade radio communications equipment as needed	**Active/ongoing through county dispatch**
Regularly review and amend fire and medical HAZMAT response standard operating procedures	**Active: Fire/EMS/Police annual report for HAZMAT ops**
Improve standard operating procedures for schools	**Emergency procedures has been updated**
Seek to improve communications with other agencies	**Active: Communication through county dispatch**
Keep supply of backup radios and cellphones	**Active: have extra radius w/ depts. Implement master phone list updated yearly**
Maintain list of county emergency contacts	**Active: county dispatch has list. Implement: review annually**
Keep the county updated on personnel changes	**Active/ongoing: list of all fire/police/EMS members go to county dispatch**

City of Grundy Center 2023 HMP Update Responses

Continue cooperation between city roads department and local fire departments during snow emergencies	**Active: fire dept monitors hydrant to be cleared**
Pursue partnership with rural water as the system expands	**Active – current meter**
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	**Active – fire prevention training and Ag day**
Continue an annual inspection program for commercial and industrial properties	**State fire inspector**
Continue fire prevention program	**Active: fire promotes fire prevention yearly**
Improve water system to enhance firefighting capacity/ability	**Active: just completed project**
Maintain membership in the NFIP	
Maintain, enforce and update floodplain ordinance	**Active**
Acquire more water pumps	**[Not needed]**
Continue with improvement to the storm water system	**Active**
Prevent inflow and infiltration into the sanitary sewer	**Active**
Educate the public on maintaining their sump pumps	**Active**

City of Grundy Center 2023 HMP Update Responses

Maintain and keep storm drains clear of debris	**Active**
Stockpile sand and sandbags	**Active**
Identify, purchase and remove structures from flood hazard areas	**No structures**
Initiate and enforce burn ban in times of drought or as needed	**Active**
Maintain and improve signals/signage along roadways and at railroad crossings	**Active**
Establish alternative transportation routes should a road need to be closed	**Active**
Purchase emergency signs to be used in case of an incident	**Active**
Enforce no parking designations at special events	**Ongoing – get temporary closings as needed**
Identify fallout shelter locations	**None**
Keep communication lines open with Nuclear Plant in Palo, IA	**Plant is closed**
Maintain and/or develop a wellhead protection program	**Wells are capped**
Monitor wells in areas of identified contamination	**N/A**

City of Grundy Center 2023 HMP Update Responses

Monitor the drinking water supply	**Active**
Identify and map areas of past contamination	**Active**
Maintain and/or develop storm water management program	**Active**
Eliminate and cap private and abandoned wells in the city	**N/A**
Eliminate the use of septic tank systems in the city limits	**N/A**
Follow monitoring requirements set forth by the Iowa DNR	**Active**
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	**Active**
Maintain and update anti-virus software	**Active**
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	**Speak to EMA**
Review and update fire codes as necessary	**Active and ongoing: utilize state codes and give recommendations**
Continue to cooperate with pipeline owners and operators to ensure locations are marked	**Active: all locations are marked**
Purchase a new tanker and/or pumper	**Active and ongoing: new truck has been ordered with 18 month delivery**

City of Grundy Center 2023 HMP Update Responses

Encourage community to plant shade trees	**Active: Grundy Center has reactivated tree board**
Provide fans and/or cooling shelter	**Active and ongoing: city hall, schools and hospital are cooling shelters**
Maintain air conditioner(s) in community buildings	**Active: planned maintenance**
Keep a supply of drinking water to distribute	**Implement a plan for FEMA to bring in water**
Encourage the public to receive vaccinations	**Active and ongoing: Grundy County public health**
Cooperate with any countywide mass vaccination plan	**Active and ongoing: Grundy County public health**
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	**Active and ongoing: Grundy County public health**
Restrict water usage should it be necessary	**Possible?**
Encourage the use of proper materials and construction techniques	**Active: city code has been updated**
Educate city personnel to identify risk areas	**Active: dept heads to educate employees to identify risks**
Install tiling to help water move away from structures	**Active**
Enforce a curfew	**Active and ongoing: mayor would call for curfew and police dept would enforce**

Continue regular bridge inspections	
Place barricades to close dangerous bridges	
Maintain embargos/weight limits as necessary	
Identify and inventory potential sinkhole sites	
Educate city personnel to handle a sinkhole situation	**OK**
Secure the area (around a sinkhole)	**OK**
Inspect any utility lines that are near a sinkhole	
Enforce the local zoning ordinances	
Clear ditches, streams, and waterways on a regular basis	
Encourage floodproofing/elevating structures in the floodplain	
Update flood maps/flood studies for areas throughout the county	
Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	

City of Grundy Center 2023 HMP Update Responses

Establish transportation evacuation routes and protocols	
Develop sandbagging procedures for the community	
Develop and maintain staging area for dumping during cleanup	
Continue cooperation with county in developing flood mitigation efforts	
Purchase additional parkland in order to increase greens space and reducing surface flow	
Regularly inspect dams	
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	
Inform the public of reputable and ill reputable contractors following disasters	
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	**Active: mitigation meeting**
Maintain and update emergency response plans	**Active: mitigation meeting**
Maintain lists of personnel and equipment available to use with response plans	**Active and ongoing: city wide equipment list updated yearly**
Maintain communication with county contacts	

Maintain NIMS compliance	**Active: police dept has implemented NIMS training for all depts.**

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HOLLAND 2017 IMPLEMENTATION STRATEGY - UPDATE	
Mitigation Action/Program/Project	**Project/Program Status** (Specific actions, completed, not completed, % done, why not implemented, etc.)
Educate the public	
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	- **City and Fire department. No ambulance department.**
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	- **Fire department only**
Provide emergency shelters for evacuees	**City office/ fire station. Is one needed? Required? – Council and Fire Dept.**
Maintain mutual aid agreements	- **Grundy Co EMA**
Maintain tree trimming program	
Determine locations for potential heating shelters and volunteer organization	
Encourage utility providers and developers to place all utilities underground	
Purchase and maintain backup generators	**Ongoing – Grundy Co EMA/Fire Dept/City Council**
Maintain public works equipment	**Ongoing- city council**

Notify the media on shelter locations	- **Grundy Co Sheriff/EMA & City Council**
Make sure residents keep sidewalks clear of snow and ice	- **City council**
Maintain use of snow fences in the city/county	- **None**
Use surge protectors to prevent electrical damage to critical and sensitive equipment	- **City Council**
Backup all digital data	**Ongoing – City Council**
Purchase NOAA weather radios	
Enforce and update building codes, as needed	**Ongoing**
Maintain storm spotter training for local fire departments/deputies and EMS crews	- **Fire Dept. and County EMA**
Continue enforcement of city sump pump discharge ordinance	
Maintain a list of potential storm sewer projects	- **Ongoing - City council**
Make available a cleanup crew for after a storm	**ALL**
Maintain law enforcement monitoring of large storage supplies	

City of Holland 2023 HMP Update Responses

Acquire necessary response and detection equipment for city/county employees		
Encourage lead based paint and asbestos removal		
Provide a local hazardous waste drop-off site		- **G.C. Landfill**
Maintain mutual aid agreements with the Northeast Iowa response Group		- **Board of Supervisors, EMA**
Keep HAZMAT manuals/information current and easily accessible		- **Fire Dept**
Maintain, test, and replace warning sirens	**Ongoing**	- **City**
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels		- **City**
Encourage and maintain enrollment in emergency notification system	**Ongoing**	
Construct or designate a safe room or storm shelter		- **City council**
Encourage home owners to keep emergency kits		- **Grundy County EMA/All**
Encourage backup power generation for local telephone systems and cellular operations		- **City Council**
Maintain or install GPS units in all emergency service and city/county vehicles		- **ALL**

Maintain automatic TTY TDD machines for emergency personnel and city/county employees	- **Sheriff**	
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster		
Continue training and promotion of the Incident Command System		
Complete continuity of government plan		
Encourage use of Iowa One call before digging		
Upgrade radio communications equipment as needed	- **Grundy County EMA/Fire Dept**	
Regularly review and amend fire and medical HAZMAT response standard operating procedures	- **None**	**Grundy County EMA/ Fire Dept.**
Improve standard operating procedures for schools		**N/A**
Seek to improve communications with other agencies		
Keep supply of backup radios and cellphones		**Radios – Fire Dept.**
Maintain list of county emergency contacts		**Grundy County EMA**
Keep the county updated on personnel changes		**ALL**

Continue cooperation between city roads department and local fire departments during snow emergencies		- **Public Works** - **City Council**
Pursue partnership with rural water as the system expands		
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes		
Continue an annual inspection program for commercial and industrial properties		
Continue fire prevention program		**Fire Dept**
Improve water system to enhance firefighting capacity/ability	**Ongoing**	
Maintain membership in the NFIP		
Maintain, enforce and update floodplain ordinance	**Active**	- **City Council**
Acquire more water pumps		**Grundy County EMA, Public works and fire dept.**
Continue with improvement to the storm water system	**Ongoing**	
Prevent inflow and infiltration into the sanitary sewer		
Educate the public on maintaining their sump pumps	**Ongoing**	

City of Holland 2023 HMP Update Responses

Maintain and keep storm drains clear of debris	**None**	**N/A**
Stockpile sand and sandbags		
Identify, purchase and remove structures from flood hazard areas		
Initiate and enforce burn ban in times of drought or as needed		**city council and GC EMA**
Maintain and improve signals/signage along roadways and at railroad crossings	**None**	**N/A**
Establish alternative transportation routes should a road need to be closed		
Purchase emergency signs to be used in case of an incident		
Enforce no parking designations at special events		**City council**
Identify fallout shelter locations		
Keep communication lines open with Nuclear Plant in Palo, IA		
Maintain and/or develop a wellhead protection program	**Ongoing**	
Monitor wells in areas of identified contamination	**Ongoing**	

City of Holland 2023 HMP Update Responses

Monitor the drinking water supply		
Identify and map areas of past contamination	**None**	**N/A**
Maintain and/or develop storm water management program		
Eliminate and cap private and abandoned wells in the city		
Eliminate the use of septic tank systems in the city limits	**None**	**N/A**
Follow monitoring requirements set forth by the Iowa DNR	**Ongoing**	
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District		
Maintain and update anti-virus software	**Ongoing**	**City Council**
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	**Ongoing**	**County Sheriff and EMA**
Review and update fire codes as necessary		
Continue to cooperate with pipeline owners and operators to ensure locations are marked	**N/A**	
Purchase a new tanker and/or pumper	**Ongoing**	**Fire Dept**

Encourage community to plant shade trees
Provide fans and/or cooling shelter
Maintain air conditioner(s) in community buildings
Keep a supply of drinking water to distribute
Encourage the public to receive vaccinations
Cooperate with any countywide mass vaccination plan
Monitor disease outbreak news from the CDC and Iowa Department of Public Health
Restrict water usage should it be necessary
Encourage the use of proper materials and construction techniques
Educate city personnel to identify risk areas
Install tiling to help water move away from structures
Enforce a curfew

- **City council**

Continue regular bridge inspections	**Active**	**County Engineer**
Place barricades to close dangerous bridges		**County Sheriff**
Maintain embargos/weight limits as necessary		**County Engineer**
Identify and inventory potential sinkhole sites	**Ongoing**	**City Council**
Educate city personnel to handle a sinkhole situation		
Secure the area (around a sinkhole)		
Inspect any utility lines that are near a sinkhole		
Enforce the local zoning ordinances		
Clear ditches, streams, and waterways on a regular basis		
Encourage floodproofing/elevating structures in the floodplain		
Update flood maps/flood studies for areas throughout the county		
Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding		**County Engineer**

Establish transportation evacuation routes and protocols	**Active**
Develop sandbagging procedures for the community	**Active**
Develop and maintain staging area for dumping during cleanup	**Active**
Continue cooperation with county in developing flood mitigation efforts	**Active**
Purchase additional parkland in order to increase greens space and reducing surface flow	**Active**
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	**Active**
Inform the public of reputable and ill reputable contractors following disasters	**Active**
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	**Active**
Maintain and update emergency response plans	**Active**
Maintain lists of personnel and equipment available to use with response plans	**Active**
Maintain communication with county contacts	**Active**
Maintain NIMS compliance	**Active**

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MORRISON 2017 IMPLEMENTATION STRATEGY - UPDATE	
Mitigation Action/Program/Project	**Project/Program Status** (Specific actions, completed, not completed, % done, why not implemented, etc.)
Educate the public	Provide monthly meeting minutes in three locations which includes relevant information
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	N/A
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	N/A
Provide emergency shelters for evacuees	N/A
Maintain mutual aid agreements	Active, sheriff and fire dept annual agreements.
Maintain tree trimming program	Active, on as needed basis. Alliant Energy maintains trees by power lines.
Determine locations for potential heating shelters and volunteer organization	Completed - Location: City Hall
Encourage utility providers and developers to place all utilities underground	Active
Purchase and maintain backup generators	N/A

Maintain public works equipment	N/A
Notify the media on shelter locations	N/A
Make sure residents keep sidewalks clear of snow and ice	Active
Maintain use of snow fences in the city/county	Active, council install every fall
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Completed
Backup all digital data	In Progress
Purchase NOAA weather radios	N/A
Enforce and update building codes, as needed	N/A
Maintain storm spotter training for local fire departments/deputies and EMS crews	Active, have registered storm spotter in city
Continue enforcement of city sump pump discharge ordinance	N/A
Maintain a list of potential storm sewer projects	N/A
Make available a cleanup crew for after a storm	Active, volunteers of the city council

Maintain law enforcement monitoring of large storage supplies	N/A
Acquire necessary response and detection equipment for city/county employees	N/A
Encourage lead based paint and asbestos removal	N/A
Provide a local hazardous waste drop-off site	On-going, Location: Grundy County Landfill Site
Maintain mutual aid agreements with the Northeast Iowa response Group	Complete, contract with Reinbeck Fire Dept.
Keep HAZMAT manuals/information current and easily accessible	Active
Maintain, test, and replace warning sirens	Active, test in conjunction with Reinbeck Fire Dept.
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Active
Encourage and maintain enrollment in emergency notification system	Active
Construct or designate a safe room or storm shelter	N/A
Encourage home owners to keep emergency kits	N/A
Encourage backup power generation for local telephone systems and cellular operations	N/A

Maintain or install GPS units in all emergency service and city/county vehicles	N/A, no vehicles
Maintain automatic TTY TDD machines for emergency personnel and city/county employees	N/A
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	N/A
Continue training and promotion of the Incident Command System	N/A
Complete continuity of government plan	Active
Encourage use of Iowa One call before digging	Active
Upgrade radio communications equipment as needed	N/A
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Active, Reinbeck Fire Dept
Improve standard operating procedures for schools	N/A
Seek to improve communications with other agencies	Active
Keep supply of backup radios and cellphones	N/A
Maintain list of county emergency contacts	Active

Keep the county updated on personnel changes	Active
Continue cooperation between city roads department	Active
Pursue partnership with rural water as the system expands	Active, Iowa Rural Utility Association
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Active
Continue an annual inspection program for commercial and industrial properties	N/A
Continue fire prevention program	On-going, Reinbeck Fire Dept
Improve water system to enhance firefighting capacity/ability	Active
Maintain membership in the NFIP	N/A
Maintain, enforce and update floodplain ordinance	Active, updated 2023
Acquire more water pumps	N/A
Continue with improvement to the storm water system	Active
Prevent inflow and infiltration into the sanitary sewer	Active, IRUA

Educate the public on maintaining their sump pumps	N/A
Maintain and keep storm drains clear of debris	Active
Stockpile sand and sandbags	N/A
Identify, purchase and remove structures from flood hazard areas	N/A
Initiate and enforce burn ban in times of drought or as needed	Active
Maintain and improve signals/signage along roadways and at railroad crossings	Active
Establish alternative transportation routes should a road need to be closed	Active
Purchase emergency signs to be used in case of an incident	Active
Enforce no parking designations at special events	Active
Identify fallout shelter locations	N/A
Keep communication lines open with Nuclear Plant in Palo, IA	N/A: plant decommissioned, no-longer needed
Maintain and/or develop a wellhead protection program	N/A

Monitor wells in areas of identified contamination	N/A
Monitor the drinking water supply	Active, IRUA
Identify and map areas of past contamination	N/A
Maintain and/or develop storm water management program	Active
Eliminate and cap private and abandoned wells in the city	N/A
Eliminate the use of septic tank systems in the city limits	Complete, IRUA
Follow monitoring requirements set forth by the Iowa DNR	N/A
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	Active
Maintain and update anti-virus software	Active
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	N/A
Review and update fire codes as necessary	N/A
Continue to cooperate with pipeline owners and operators to ensure locations are marked	N/A

Purchase a new tanker and/or pumper	N/A
Encourage community to plant shade trees	N/A
Provide fans and/or cooling shelter	N/A
Maintain air conditioner(s) in community buildings	N/A
Keep a supply of drinking water to distribute	N/A
Encourage the public to receive vaccinations	N/A
Cooperate with any countywide mass vaccination plan	N/A
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	N/A
Restrict water usage should it be necessary	N/A
Encourage the use of proper materials and construction techniques	N/A
Educate city personnel to identify risk areas	N/A
Install tiling to help water move away from structures	Active

Enforce a curfew	N/A
Continue regular bridge inspections	N/A
Place barricades to close dangerous bridges	N/A
Maintain embargos/weight limits as necessary	N/A
Identify and inventory potential sinkhole sites	N/A
Educate city personnel to handle a sinkhole situation	N/A
Secure the area (around a sinkhole)	N/A
Inspect any utility lines that are near a sinkhole	N/A
Enforce the local zoning ordinances	Active
Clear ditches, streams, and waterways on a regular basis	Active
Encourage floodproofing/elevating structures in the floodplain	Active
Update flood maps/flood studies for areas throughout the county	N/A

Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	Active
Establish transportation evacuation routes and protocols	N/A
Develop sandbagging procedures for the community	N/A
Develop and maintain staging area for dumping during cleanup	Active
Continue cooperation with county in developing flood mitigation efforts	Active
Purchase additional parkland in order to increase greens space and reducing surface flow	N/A
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Active
Inform the public of reputable and ill reputable contractors following disasters	Active
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Active
Maintain and update emergency response plans	N/A
Maintain lists of personnel and equipment available to use with response plans	N/A
Maintain communication with county contacts	Active

Maintain NIMS compliance	N/A

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REINBECK 2017 IMPLEMENTATION STRATEGY - UPDATE	
Mitigation Action/Program/Project	**Project/Program Status** (Specific actions, completed, not completed, % done, why not implemented, etc.)
Educate the public	Active. Education through the school and other programs in the city
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	Active. Fire and EMS training is done once a month. Law enforcement is done through county.
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	Active. Materials and equipment are purchased and updated on a timely basis. Just purchased new helmets.
Provide emergency shelters for evacuees	Active. The community building and churches serve as emergency shelter. Just installed a new generator at the community building that will run A/C too.
Maintain mutual aid agreements	Active. Agreements are with township and surrounding towns.
Maintain tree trimming program	Active. Ordinance is in place. Notification is sent to homeowners as needed. City trims if left undone.
Determine locations for potential heating shelters and volunteer organization	Active. Memorial building, schools, and churches. New generator at Memorial Building will now run A/C
Encourage utility providers and developers to place all utilities underground	Active. Cable providers are doing more underground. Alliant Energy upgraded their utilities 5 years ago.
Purchase and maintain backup generators	Active. Generators are at water and sewer plants, city hall, and Memorial Building. These generators are serviced yearly.
Maintain public works equipment	Equipment is purchased as budgets allow. Purchase a new dump truck last year. Put in 18,000 in skid loader this year to service and repair any thing needed.

Notify the media on shelter locations	Active. When needed and as happens.
Make sure residents keep sidewalks clear of snow and ice	Active. Ordinance in place. Homeowners are notified and city clears if left undone.
Maintain use of snow fences in the city/county	Active. Use snow fence on Blackhawk Street. County does theirs.
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Active. Surge protectors are used as well as cloud based backups.
Backup all digital data	Active. Cloud backups are done daily.
Purchase NOAA weather radios	Active. Through fire and EMS
Enforce and update building codes, as needed	N/A Do not have a building code enforcer.
Maintain storm spotter training for local fire departments/deputies and EMS crews	Active. The county has classes every year.
Continue enforcement of city sump pump discharge ordinance	Active. Ordinance in place. Enforcement not being done at this time.
Maintain a list of potential storm sewer projects	Active. Storm sewer project was completed on the west end of town a couple years ago. A new project is in progress on the east end of town.
Make available a cleanup crew for after a storm	Active. City crew and fire department
Maintain law enforcement monitoring of large storage supplies	N/A Grundy County Sheriff

City of Reinbeck 2023 HMP Update Responses

Acquire necessary response and detection equipment for city/county employees	County sheriff and fire departments
Encourage lead based paint and asbestos removal	N/A Refer residents to Marshalltown
Provide a local hazardous waste drop-off site	N/A refer residents to Black Hawk Landfill
Maintain mutual aid agreements with the Northeast Iowa response Group	Active
Keep HAZMAT manuals/information current and easily accessible	Active. Materials are at city hall.
Maintain, test, and replace warning sirens	Active. Tests are done the last Monday of each month at 7:00 from March – Oct. Just repaired 1 siren.
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	Active. Installed a new siren on the south end of town in 2016 and just repaired another one.
Encourage and maintain enrollment in emergency notification system	Not at this time
Construct or designate a safe room or storm shelter	N/A
Encourage home owners to keep emergency kits	No
Encourage backup power generation for local telephone systems and cellular operations	Active. Reinbeck telecommunication utility has back up.
Maintain or install GPS units in all emergency service and city/county vehicles	City employees use cell phones.

Maintain automatic TTY TDD machines for emergency personnel and city/county employees	No.
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Active. In Emergency Management Plan.
Continue training and promotion of the Incident Command System	Active.
Complete continuity of government plan	
Encourage use of Iowa One call before digging	Active. All city digs are called into One Call. Building Permits state to call one call before digging.
Upgrade radio communications equipment as needed	Active.
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Active. 5 Years through INRCOG
Improve standard operating procedures for schools	N/A
Seek to improve communications with other agencies	Active.
Keep supply of backup radios and cellphones	Active. Extra radios – dedicated EMS cell phone
Maintain list of county emergency contacts	Active
Keep the county updated on personnel changes	Active.

City of Reinbeck 2023 HMP Update Responses

Continue cooperation between city roads department	Active. As needed.
Pursue partnership with rural water as the system expands	Active. Rural water is the city's water supply backup.
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Active.
Continue an annual inspection program for commercial and industrial properties	N/A
Continue fire prevention program	Active. Every October
Improve water system to enhance firefighting capacity/ability	Active. Ongoing as budget allows. A new hydrant is being installed at Corteria as part of the stormwater project.
Maintain membership in the NFIP	Unknown
Maintain, enforce and update floodplain ordinance	Active.
Acquire more water pumps	Active. City owns trash pumps.
Continue with improvement to the storm water system	Active. The stormwater project we are currently doing will help with flooding. Storm sewers are cleaned annually.
Prevent inflow and infiltration into the sanitary sewer	Will start slip lining as budget allows.
Educate the public on maintaining their sump pumps	No.

City of Reinbeck 2023 HMP Update Responses

Maintain and keep storm drains clear of debris	Active. Cleaned annually as needed.
Stockpile sand and sandbags	Active. Have bags but they are not filled.
Identify, purchase and remove structures from flood hazard areas	Active.
Initiate and enforce burn ban in times of drought or as needed	Active. Bans are issued through the county.
Maintain and improve signals/signage along roadways and at railroad crossings	Active. No railroad crossings.
Establish alternative transportation routes should a road need to be closed	Active. Coordinated with County and DOT
Purchase emergency signs to be used in case of an incident	Active.
Enforce no parking designations at special events	Active.
Identify fallout shelter locations	N/A
Keep communication lines open with Nuclear Plant in Palo	Maybe through EMS
Maintain and/or develop a wellhead protection program	Active. Established in the city code.
Monitor wells in areas of identified contamination	Active. Our wells are inspected and not in area of contamination.

City of Reinbeck 2023 HMP Update Responses

Monitor the drinking water supply	Active. Daily tests are taken according to DNR standards.
Identify and map areas of past contamination	N/A
Maintain and/or develop storm water management program	Active. Snyder & Associates have prepared a storm assessment and we are doing our 2nd project.
Eliminate and cap private and abandoned wells in the city	N/A
Eliminate the use of septic tank systems in the city limits	In progress. Septics are used on the South End of Black Hawk Street.
Follow monitoring requirements set forth by the Iowa DNR	Active
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	No
Maintain and update anti-virus software	Active. Installed on computer.
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	Have done some.
Review and update fire codes as necessary	No
Continue to cooperate with pipeline owners and operators to ensure locations are marked	N/A
Purchase a new tanker and/or pumper	When needed

Encourage community to plant shade trees	No
Provide fans and/or cooling shelter	Some available
Maintain air conditioner(s) in community buildings	Active. New air conditioner and generator to run it.
Keep a supply of drinking water to distribute	Some
Encourage the public to receive vaccinations	N/A county nurse
Cooperate with any countywide mass vaccination plan	Through Grundy County
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	If needed
Restrict water usage should it be necessary	Active
Encourage the use of proper materials and construction techniques	Active
Educate city personnel to identify risk areas	Active
Install tiling to help water move away from structures	Have in some areas
Enforce a curfew	Active. Enforcement through sheriff's office

Continue regular bridge inspections	N/A
Place barricades to close dangerous bridges	N/A
Maintain embargos/weight limits as necessary	N/A
Identify and inventory potential sinkhole sites	N/A
Educate city personnel to handle a sinkhole situation	N/A
Secure the area (around a sinkhole)	N/A
Inspect any utility lines that are near a sinkhole	N/A
Enforce the local zoning ordinances	Active. Updated the zoning ordinance with the last 5 years.
Clear ditches, streams, and waterways on a regular basis	N/A
Encourage floodproofing/elevating structures in the floodplain	Active
Update flood maps/flood studies for areas throughout the county	Active.
Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	N/A

City of Reinbeck 2023 HMP Update Responses

Establish transportation evacuation routes and protocols	N/A
Develop sandbagging procedures for the community	Active.
Develop and maintain staging area for dumping during cleanup	Active.
Continue cooperation with county in developing flood mitigation efforts	Active.
Purchase additional parkland in order to increase greens space and reducing surface flow	No Plans.
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	City clerk, fire dept., EMS
Inform the public of reputable and ill reputable contractors following disasters	Active
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	No
Maintain and update emergency response plans	Active
Maintain lists of personnel and equipment available to use with response plans	Active
Maintain communication with county contacts	Active
Maintain NIMS compliance	Active

City of Wellsburg 2023 HMP Update Responses

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WELLSBURG 2017 IMPLEMENTATION STRATEGY - UPDATE	
Mitigation Action/Program/Project	**Project/Program Status** (Specific actions, completed, not completed, % done, why not implemented, etc.)
Educate the public	*On-going as necessary.*
Continue training and education for fire departments, law enforcement agencies and ambulance crew personnel	*Active*
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	*Active*
Provide emergency shelters for evacuees	*Active*
Maintain mutual aid agreements	*Active*
Maintain tree trimming program	*On-going as necessary*
Determine locations for potential heating shelters and volunteer organization	*Completed*
Encourage utility providers and developers to place all utilities underground	*Not Completed*
Purchase and maintain backup generators	*Completed*
Maintain public works equipment	*Active*

City of Wellsburg 2023 HMP Update Responses

Notify the media on shelter locations	As needed during Emergencies
Make sure residents keep sidewalks clear of snow and ice	Active
Maintain use of snow fences in the city/county	On-going
Use surge protectors to prevent electrical damage to critical and sensitive equipment	Active
Backup all digital data	Active
Purchase NOAA weather radios	Completed
Enforce and update building codes, as needed	Active
Maintain storm spotter training for local fire departments/deputies and EMS crews	On-going
Continue enforcement of city sump pump discharge ordinance	In-progress
Maintain a list of potential storm sewer projects	Not Completed
Make available a cleanup crew for after a storm	Active
Maintain law enforcement monitoring of large storage supplies	Active

City of Wellsburg 2023 HMP Update Responses

Acquire necessary response and detection equipment for city/county employees	*On-going*
Encourage lead based paint and asbestos removal	*On-going*
Provide a local hazardous waste drop-off site	*On-going*
Maintain mutual aid agreements with the Northeast Iowa response Group	*Active*
Keep HAZMAT Incident manuals/information current and easily accessible	*On-going*
Maintain, test, and replace warning sirens	*On-going*
Install new warning sirens where needed or replace warning sirens with insufficient decibel levels	*On-going*
Encourage and maintain enrollment in emergency notification system	*On-going*
Construct or designate a safe room or storm shelter	*Completed*
Encourage home owners to keep emergency kits	*Not Completed*
Encourage backup power generation for local telephone systems and cellular operations	*Not Completed*
Maintain or install GPS units in all emergency service and city/county vehicles	*Not Completed*

City of Wellsburg 2023 HMP Update Responses

Maintain automatic TTY TDD machines for emergency personnel and city/county employees	N/A
Enhance Standard Operating Procedures for dissemination of information/press releases in the event of a disaster	Not Completed
Continue training and promotion of the Incident Command System	Not Completed
Complete continuity of government plan	Not Completed
Encourage use of Iowa One call before digging	Active
Upgrade radio communications equipment as needed	Active
Regularly review and amend fire and medical HAZMAT response standard operating procedures	Active
Improve standard operating procedures for schools	
Seek to improve communications with other agencies	Active
Keep supply of backup radios and cellphones	Active
Maintain list of county emergency contacts	Active
Keep the county updated on personnel changes	On-going

City of Wellsburg 2023 HMP Update Responses

Continue cooperation between city roads department and local fire departments during snow emergencies	Active
Pursue partnership with rural water as the system expands	Completed
Encourage residents to keep smoke detectors, sprinkler systems and fire extinguishers maintained in their homes	Not Completed
Continue an annual inspection program for commercial and industrial properties	Not Completed due to lack of funding for the position
Continue fire prevention program	Active
Improve water system to enhance firefighting capacity/ability	Completed
Maintain membership in the NFIP	Active
Maintain, enforce and update floodplain ordinance	Active
Acquire more water pumps	Completed
Continue with improvement to the storm water system	Not Completed
Prevent inflow and infiltration into the sanitary sewer	Active
Educate the public on maintaining their sump pumps	Not Completed

City of Wellsburg 2023 HMP Update Responses

Maintain and keep storm drains clear of debris	Active
Stockpile sand and sandbags	On-going
Identify, purchase and remove structures from flood hazard areas	N/A
Initiate and enforce burn ban in times of drought or as needed	Completed as needed
Maintain and improve signals/signage along roadways and at railroad crossings	On-going as necessary
Establish alternative transportation routes should a road need to be closed	On-going as necessary
Purchase emergency signs to be used in case of an incident	Active
Enforce no parking designations at special events	Active
Identify fallout shelter locations	Not Completed
Keep communication lines open with Nuclear Plant in Palo, IA	On-going
Maintain and/or develop a wellhead protection program	N/A no wells
Monitor wells in areas of identified contamination	N/A no wells

City of Wellsburg 2023 HMP Update Responses

Monitor the drinking water supply	Active
Identify and map areas of past contamination	N/A
Maintain and/or develop storm water management program	Not Completed
Eliminate and cap private and abandoned wells in the city	Active
Eliminate the use of septic tank systems in the city limits	Not Completed
Follow monitoring requirements set forth by the Iowa DNR	Active
Carry out conservation measures such as erosion control and work with the following organizations: Extension, NRCS, Farm Bureau, EPA, DNR, and Soil and water Conservation District	On-going when projects arise
Maintain and update anti-virus software	Active
Secure vulnerable targets, as identified by the LEPC and County EMA with alarms, security cameras and fences	N/A
Review and update fire codes as necessary	Active
Continue to cooperate with pipeline owners and operators to ensure locations are marked	N/A
Purchase a new tanker and/or pumper	Completed

City of Wellsburg 2023 HMP Update Responses

Encourage community to plant shade trees	Not Completed
Provide fans and/or cooling shelter	Active
Maintain air conditioner(s) in community buildings	Active
Keep a supply of drinking water to distribute	Not Completed
Encourage the public to receive vaccinations	Not Completed
Cooperate with any countywide mass vaccination plan	Not Completed
Monitor disease outbreak news from the CDC and Iowa Department of Public Health	On-going
Restrict water usage should it be necessary	As necessary
Encourage the use of proper materials and construction techniques	Active
Educate city personnel to identify risk areas	Not Completed
Install tiling to help water move away from structures	Not Completed
Enforce a curfew	Not Completed

City of Wellsburg 2023 HMP Update Responses

Continue regular bridge inspections	Active
Place barricades to close dangerous bridges	As necessary
Maintain embargos/weight limits as necessary	On-going
Identify and inventory potential sinkhole sites	N/A
Educate city personnel to handle a sinkhole situation	N/A
Secure the area (around a sinkhole)	N/A
Inspect any utility lines that are near a sinkhole	N/A
Enforce the local zoning ordinances	Active
Clear ditches, streams, and waterways on a regular basis	As necessary
Encourage floodproofing/elevating structures in the floodplain	Active
Update flood maps/flood studies for areas throughout the county	On-going
Identify bridges and culverts than can cost effectively be reengineered to reduce future flooding	Active

City of Wellsburg 2023 HMP Update Responses

Establish transportation evacuation routes and protocols	As necessary
Develop sandbagging procedures for the community	Not Completed
Develop and maintain staging area for dumping during cleanup	As necessary
Continue cooperation with county in developing flood mitigation efforts	Not Completed
Purchase additional parkland in order to increase greens space and reducing surface flow	Not Completed
Set a designated number of people to be trained in post-disaster record keeping/damage assessments	Not Completed
Inform the public of reputable and ill reputable contractors following disasters	As necessary
Encourage all communities to participate in their Local Emergency Planning Commission (LEPC)	Not completed
Maintain and update emergency response plans	Not Completed
Maintain lists of personnel and equipment available to use with response plans	Not Completed
Maintain communication with county contacts	Active
Maintain NIMS compliance	Not Completed

APPENDIX N: Planning Committee Meeting Materials & Public Notices

2023 GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE

APPENDIX N

PLANNING COMMITTEE MEETING MATERIALS & PUBLIC NOTICES

- PUBLIC MEETING AGENDA-

Grundy County Multi-Jurisdictional
Hazard Mitigation Plan Meeting #1

Date: Thursday, May 25, 2023

Time: 1:30 PM

Place: Grundy County Annex Building
706 G Avenue, Grundy Center, Iowa

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1. Welcome and Introductions
2. The planning process, scope of work, and schedule
3. Review and update Community Profiles
4. Review existing Mitigation Action Steps
5. Discuss evaluation standards for updating Action Steps
6. Adjourn

THIS IS A PUBLIC MEETING

MEMBERS OF THE COMMUNITY ARE INVITED TO ATTEND AND PARTICIPATE IN THIS MEETING

WHAT IS A HAZARD MITIGATION PLAN?

The Hazard Mitigation Plan is a planning tool funded with Federal, State and Local funds.

COUNTYWIDE PLAN BUDGET

FEMA - $36,000 – 90%
State - $4,000 – 10%
Local - $0,000 – 00%
Total - $40,000

Mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event.

Mitigation, also known as prevention (when done before a disaster), encourages long-term reduction of hazard vulnerability. The goal of mitigation is to decrease the need for response as opposed to simply increasing the response capability. Mitigation can save lives and reduce property damage, and is cost-effective and environmentally sound. This, in turn, can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities, reduce exposure to liability, and minimize community disruption."

WHAT IS THE PURPOSE OF THE HAZARD MITIGATION PLAN?

1. To satisfy federal requirements established by FEMA. By doing so, Grundy County, as well as the participating communities and school districts, will become eligible for other mitigation grant dollars made available through FEMA.

2. To mitigate negative impacts and reduce the county's vulnerability to natural and man-made hazards.

WHAT IS THE PURPOSE OF THE HAZARD MITIGATION PLAN UPDATE?

A HMP is required to be updated every 5 years per section 201.6(c)(4)(i) of 44CFR to maintain a community's eligibility for state and federal disaster assistance and future mitigation project funding. Besides financial opportunities, other benefits to communities for conducting natural hazard mitigation planning include:

- An increased understanding of natural and man-made hazards faced by communities;
- Opportunity to create more sustainable and disaster-resistant communities;
- Financial savings through partnerships that support planning and mitigation efforts;
- Focused use of limited resources on hazards that have the biggest impacts on a community; and
- Reduced long-term impacts and damages to human health and welfare.
- Reduced or mitigated negative impact and damage to structures and subsequent reduced repair costs.

Proposed Public Meetings for the Grundy County 2023 Multi-Jurisdiction Hazard Mitigation Plan Update

Meeting	Date	Time	Tentative Agenda
Kickoff	Wednesday May 25, 2023	1:30-2:30 PM	Previous Action Steps review
Work Session 1	TBD	TBD	Review Community Profiles/Action Steps
Work Session 2	TBD	TBD	Update 2017 Action Steps Review hazard analysis and scoring
Work Session 3	TBD	TBD	Previous HMP Goals review
Work Session 4	TBD	TBD	Review Community Goals and Action Steps
Work Session 5	TBD	TBD	Update Community Goals and Action Steps
Work Session 6	TBD (if needed)	TBD	Finalize outstanding items
Plan Review	TBD	TBD	Finalize Plan

All meetings will be held at:

Grundy County Annex Building Meeting Room
706 G Avenue
Grundy Center, IA

If a meeting date, time, or location necessitates change, attempts will be made to contact all planning committee members. The change will also be indicated in the public notices.

Questions or concerns should be directed to Isaiah Corbin at the Iowa Northland Regional Council of Governments, at 319-235-0311 or icorbin@inrcog.org

COMMUNITY PROFILE INFORMATION

INRCOG is conducting research and updating each community profile and developing a composite description including, socio-economic, historic, and geographic profiles to provide a context for understanding the mitigation actions that will be implemented to reduce vulnerability within the planning area. Participating jurisdiction(s) will provide information, review drafts, and approve. The Multi-Jurisdictional HMP will have a composite profile at the beginning and individual jurisdictions in the appendices.

Information from each participating jurisdiction will focus on:

- Natural Environment
- Transportation – major transportation routes, traffic, types
- Community Services – Providers for Telephone, Cable, Natural Gas, Electricity, Water/Sewer, etc.
- Population Identification and Trends – U.S. Census
    - At Risk Groups- more likely to require assistance during times of disaster; therefore are considered, generally speaking, more “at-risk” than the remaining population.
- Housing & Residential Development Trends: building permits, existing number, valuations
- Commercial and Industrial Development Trends: building permits, existing number, valuations, and planned developments
- Government Owned Buildings, Facilities, and Infrastructure: existing number and valuations or replacement cost
- Critical Facilities: Name, Location (i.e., mobile homes, healthcare facilities, daycares, infrastructure, government buildings, nursing homes/retirement communities, shelters, etc.)
- Existing Local Programs, Policies, Ordinances, and Regulations
- Current or Previous Mitigation Activities: Prevention, Property Protection, Public Education/Awareness, Structural Projects, Emergency Services, and Natural Resource Protection.
- Fire Insurance Rating
- National Flood Insurance Program: participate or not
    - Special Flood Hazard Area
        - Identification of Residential, Commercial, and Industrial structures located in the Special Flood Hazard Area (# only)
        - National Flood Insurance Program participation
        - Identification of Repetitive Loss Structures (# only)
        - Identification of National Flood Insurance Program policies in effect (#only)
- Previous Plans and Studies
- City Services – Police, Fire, Medical services, Warning systems, HAZMAT

EVALUATING PREVIOUSLY IDENTIFIED HAZARD MITIGATION ACTION STEPS

Hazard mitigation plan updates must reflect the progress of previously identified local mitigation efforts. The plan must describe the status of hazard mitigation actions in the previous plan by identifying those that have been completed or not completed. For actions that have not been completed, the updated plan needs to indicate the current status. Uncompleted action steps must either describe whether the action is no longer relevant or be included as part of the updating action plan.

This evaluation demonstrates the progress made in the past five years in achieving goals and implementing action outlined in mitigation strategies.

Below is some sample language to describe existing action steps. As necessary, include a few brief sentences for action step updates.

Example Status Updates

- Active (When / How often)
- Active, Repetitive (how often)
- To be implemented as needed (under what circumstances)
- Not completed (actions taken, % done, holdup)
- Last updated (Date)
- Last maintenance (Date)
- Completed (Date)
- Completed, will be continued
- Dropped (Why)

STATUS UPDATES MUST A BRIEF DESCRIPTION (1-2 SENTENCES) OF WHAT HAS BEEN ACCOMPLISHED OR WHY THE ACTION WAS NOT BEEN COMPLETED

EXAMPLE CITY 2012-2017 IMPLEMENTATION STRATEGY - UPDATE	
Mitigation Action/Program/Project	**Project/Program Status** (Specific actions, completed, not completed, % done, why not implemented, etc.)
Educate the public	*Active; provide severe weather updates on public access channel; include flyers in city mailings twice a year; Set up safety/weather response booth at city festival each year; County EMA implements Weather Radio program*
Purchase Additional Warning Sirens for Underserved Areas of Community	*Active; city will continue to purchase new or replace sirens as needed. No sirens purchased in past five years*
Maintain and acquire materials and equipment for fire departments, law enforcement agencies and ambulance crew personnel	*As needed; New police car purchased in 2013; new Jaws of Life purchased for FD in 2014; raising funds for new ambulance equipment*
Join or Maintain Membership of National Flood Insurance Program	*Completed, active; city has maintained membership in NFIP*
Maintain mutual aid agreements	*Active, repetitive; Annual mutual aid agreements updated with neighboring jurisdictions for police, fire, and EMS assistance; Agreement also in place with NE Iowa Response Group*
Maintain tree trimming program	*Ordinance in place; city staff trims trees as needed seasonally*
Maintain Bulk Supply and Storage of Critical Elements (Fuels, Water, Nonperishable Food, etc.)	*To be implemented as needed, bulk fuel available and supplies maintained at old City Hall*
Provide an Adequate Number of Safe Rooms/Tornado Rooms for General Public Use	*Not completed; lack of funding*
Purchase and maintain backup generators	*As needed; no generators purchased – limited funding*

- PUBLIC MEETING AGENDA-

Grundy County Multi-Jurisdictional
Hazard Mitigation Plan Meeting #2

Date: Thursday, July 29, 2023

Time: 3:00 PM

Place: Grundy County Annex Building
706 G Avenue, Grundy Center, IA

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1. Welcome and Introductions
2. Review Kick-Off Meeting Information
3. Review and update status of Existing Mitigation Action Steps
4. Introduction to Defined Hazards
5. Review definitions, hazard analysis and scoring
6. Adjourn

THIS IS A PUBLIC MEETING

MEMBERS OF THE COMMUNITY ARE INVITED TO ATTEND AND PARTICIPATE IN THIS MEETING

Community Profile Handout: Community of _____

Please update the following information about your community

PRIMARY PROVIDERS FOR COMMUNITY UTILITIES						
Electric	**Natural Gas**	**Telephone/ Internet**	**Cable TV**	**Water**	**Sewer**	**Sanitation**

Current Planning and Regulatory Documents (Yes or No)								
Previous HMP	**Comprehensive Plan**	**Building Code**	**Zoning Ordinance**	**Subdivision Regulations**	**Floodplain Management Ordinance**	**Tree-Trimming Ordinance**	**Storm Water Ordinance**	**Snow Removal Ordinance**

Designated Shelters in Planning Area	

Vulnerable Populations in Planning Area	

Critical Facilities in Planning Area	

Hazard Definitions

The following 13 hazards are identified in the statewide 2018 Iowa Hazard Mitigation Plan. The specific hazards for each type are listed alphabetically.

Drought

Drought is defined as a period of prolonged abnormally low precipitation producing severe dry conditions. There are four (4) types of drought conditions relevant to Iowa: Meteorological drought, which refers to precipitation deficiency; Hydrological drought, which refers to declining surface and groundwater supplies; Agricultural drought, which refers to soil moisture deficiencies; and socioeconomic drought, which refers to when physical water shortages begin to affect people.

The highest occurrences of drought conditions with recorded events in Iowa are associated with agricultural and meteorological drought as a result of either low soil moisture or a decline in recorded precipitation. Droughts can be spotty or widespread and last from a few weeks to a period of years. A prolonged drought can have a serious impact on a community's water supply and economy. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged or destroyed by a loss of crops or livestock. While droughts are generally associated with extreme heat, droughts can and do occur during cooler months.

According to the National Integrated Drought Information System, there have been four recorded drought events with impact on areas within Grundy County from 2021 to now. Recorded drought dates include: August 2001, August 2003, and July-October 2012, August 2021.

Earthquake

An earthquake is any shaking or vibration of the earth caused by the sudden release of energy that may impose a direct threat on life and property. It is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. This shaking can cause buildings and bridges to collapse; disrupt gas, electric, and phone service; it sometimes triggers landslides, flash floods, and fires. The three (3) general classes of earthquakes are, tectonic, volcanic, and artificially produced.

Iowa as a whole has experienced the effects of only a few earthquakes in the past 175 years. The epicenters of 13 earthquakes have been located in the state. The first known occurrence was in 1867 near Sidney in southwest Iowa; the most recent occurrence was in 2004 near Shenandoah in southwest Iowa. The largest Iowa earthquake (Mercalli magnitude VI) occurred near Davenport in southeast Iowa in 1934. None of these events were instrumentally recorded.

Expansive Soils

Expansive soils are soils and soft rock that tend to swell or shrink excessively 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. The hazard occurs in many parts of the Southern Central, and Western United States. However, because the hazard develops gradually and seldom presents a threat to life, expansive soils have received limited attention, despite their costly effects**.** Similar to every other community in Iowa, the roadways in this planning area are affected by expansive soils. This hazard is most evident by potholes that cause damage to local roadways and vehicles.

Extreme Heat

Conditions for extreme heat are defined by summertime weather that is substantially hotter and/or more humid than average for a location at that time of year. This includes temperatures (including heat index) in excess of 100 degrees Fahrenheit for at least three (3) successive days of 90+ degrees Fahrenheit. The heat index is a number in degrees Fahrenheit that tells how hot it really feels when relative humidity is factored into actual air temperature. Exposure to full sunshine can increase the heat index by at least 15 degrees. The National Weather Service can issue a Heat Advisory or Excessive Heat Warning. Between 2000 and 2023 Iowa experienced 22 extreme heat events.

Flooding - Flash

A flash flood is an event that occurs with little or no warning where water levels rise at an extremely fast rate. Flash flooding results from intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area. The table to the right is historical flash flooding events since 2000 from the National Climatic Data Center. No deaths and 1 injury have been recorded with these events.

Historical Occurrences of Flash Flooding in Grundy County				
Location	**Date**	**Type**	**Property Damage**	**Crop Damage**
Countywide	07/10/2000	Flash	200K	250K
South Portion	05/10/2001	Flash	75K	-
NW Portion	08/16/2004		10k	10k
Gurndy Center	06/22/2007		100k	250k
Reinbeck	04/25/2008		10k	-
Wellsburg	04/25/2008		10k	-
Fern	08/10/2010		25k	-
Fern	08/10/2010		10k	-
Ivester	05/26/2013		50k	-
Wellsburg	05/26/2013		25k	-
Holland	05/29/2013		450k	-
Wellsburg	06/24/2013		200k	-
Reinbeck	06/29/2014		50k	-
Beaman	06/30/2014		100k	-
Wellsburg	08/28/2015		100k	-
Wellsburg	08/28/2015		10k	-

Grass/Wild land Fire

A grass or wild-land fire is an uncontrolled fire that threatens life and property in a rural or a wooded area. Grass and wild-land fires are more likely to occur when conditions are favorable, such as during periods of drought when natural vegetation is drier and more combustible. According to the National Climatic Data Center, no wildfires have been recorded in Iowa since record keeping began in 1950.

Landslide

Landslides occur when susceptible rock, earth, or debris moves down a slope under the force of gravity and water. Landslides may be very small or very large, and can move at slow to very high speeds. A natural phenomenon, landslides have been occurring in slide-prone areas of Iowa since long before the state was created. Landslides can occur due to rainstorms, fires, or human activities that modify slope and drainage. There have been no occurrences of landslides in the planning area.

Levee/Dam Failure

Dam/Levee failure is the uncontrolled release of water resulting from a structural failure in a dam, wall, dike, berm, or area of elevated soil that causes flooding. Possible causes of the breach could include flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, terrorism, erosion, piping, saturation, or under seepage. According to the National Inventory of Dams, there is one dam in Grundy County: Holland Marsh Dam to the west of Holland.

Flooding - Riverine

River flooding is a rising or overflowing of a tributary or body of water that covers adjacent land not usually covered by water when the volume of water in a stream exceeds the channel's capacity.

River floods are the most common and widespread of all natural disasters, except fire. Most communities in the U.S. can experience some kind of flooding after spring rains, heavy thunderstorms, winter storm thaws, waterway obstructions, or levee or dam failures. Often it is a combination of these elements that causes damaging floods. Floods can be slow-, or fast-rising but generally develop over a period of days. Flooding is a natural and expected phenomenon that occurs annually, usually restricted to specific streams, rivers or watershed areas. There have been 23 flooding events in Grundy County since 2000 causing $1.282 million in property damage and $21.183 million in crop damage.

Severe Winter Storm

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

Grundy County has experienced winter storms of some type every winter on record. According to the National Climatic Data Center, there have been 15 heavy snow and ice events reported in Grundy County since 2000. Over that same time, there have been ten reported "extreme" low temperature and wind-chill events reported in the county.

Sinkholes

A sinkhole is the loss of surface elevation due to the removal of subsurface support. Sinkholes range from broad, regional lowering of the land surface to abrupt localized collapse. The primary causes of most subsidence are human activities such as underground mining of coal, groundwater/petroleum withdraw, or drainage of organic soils. Sinkholes can aggravate flooding potential, collapse of an abandoned mine may destroy buildings, roads and utilities.

It was determined that the probability of sinkholes in the planning area is unlikely. The area does not have the soil classifications for sinkholes.

Thunderstorm/Lighting/Hail

Thunderstorms are common in Iowa and can occur singly, in clusters, or in lines. Thunderstorms can result in heavy rains, high winds (reaching or exceeding 58 mph), tornados, or hail. Thunderstorms are created from a combination of moisture, rapidly raising warm air, and the lifting mechanism such as that caused when warm and cold air masses collide. Thunderstorms occur in the community on an annual basis. According to the National Climatic Data Center, since 2000, there have been 69 recorded Thunderstorm and High Wind events in Grundy County. During these events there was approximately $1.263 million worth of property damage and $238,000 dollars of crop damage.

Tornado/Windstorm

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

Windstorms, other than tornados, are experienced in all regions of the United States. It is difficult to separate the various wind components that cause damage from other wind-related natural events that often occur with or generate windstorms. Unlike tornadoes, windstorms may have a destructive path that is miles wide and duration of the event could range from hours to days. These events can produce straight line winds in excess of 64 knots (73 mph) causing power outages, property damage, impaired visibility, and crop damage. It is often difficult to separate windstorms and tornado damage when winds get above 64 knots.

Windstorms occur in the planning area on an annual basis. High winds are often associated with thunderstorms, but can be produced during severe snow storms or tornados. According to the National Climatic Data Center, the County has had 25 high wind events reported since 2000. These events caused $650,110 in property damage and $25 thousand in crop damage.

Since 2000 there have been 10 recorded occurrences of tornado events in the planning area. The estimated total of property damage from these tornadoes is $804,000 while crop damage totaled $68,100. The two most notable of these events occurred in 2008 when a tornado passed over Fern resulting in $300,000 in property damage and $2,000 in crop damage and 2014 in Reinbeck resulting in $200,000 in property damage and $50,000 in crop damage.

HAZARD ANALYSIS / RISK ASSESSMENT

HAZARD IDENTIFICATION

The 2018 Iowa Hazard Mitigation Plan includes 13 types of hazards in three categories for the state. The new list of hazards is in the table below. This includes fourteen natural hazards, five technological hazards, and one human caused hazard.

2018 Iowa Hazard List
Drought
Earthquake
Expansive Soils
Extreme Heat
Flooding - Flash
Grass/Wildland Fire
Landslide
Levee/Dam Failure
Flooding - Riverine
Severe Winter Storm
Sinkholes
Thunderstorm/Lighting/Hail
Tornado/Windstorm

In order to properly assess current mitigation strategies, develop new future mitigation strategies, and identify needed mitigation projects, the Committee needs to determine the hazards that impact their community. It is important to note that the focus of mitigation is on reducing long-term risks of damage or threats to public health and safety caused by hazards and their effects. Thus, in some cases the hazards identified for mitigation will not include all of, or the same hazards, identified for preparedness, response, or recovery. Also, not all hazards will impact all the participating communities and can be of different magnitude.

HAZARD RISK ASSESSMENT METHODOLOGY

The risk assessment identifies how people, properties, and structures would be damaged by one of the listed hazard events. If the hazard can harm people or damage their homes and other structures, they are vulnerable. Finding the weak points in the system, for example, identifying building types that are vulnerable to damage and anticipating the loss in high-risk areas, will help the community decide what mitigation measure should be undertaken and how to implement the activities they select.

The Hazard Mitigation Planning Committee will use the following factors in determining the hazard risk assessment. The Planning Committee needs to consider the following each identified hazard:

- Probability
- Magnitude / Severity
- Warning Time
- Duration

The scores for each of the factors will be weighted using the formula below to develop the final hazard assessment score.

(Probability x.45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10) = Final Hazard Assessment Score

Probability

The probability score 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. Many times, the historical occurrence can be extrapolated into the future using best available data, but others, due to the nature of the hazard are more difficult to estimate the probability of future occurrence. If a hazard or its impacts have been mitigated against, the probability of future occurrences decreases. Conversely, hazards that have not occurred in the past may present themselves to the community in the future.

PROBABILITY		
Score	**Description**	
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 if 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

The magnitude of the impact of a hazard event (past and perceived) is related directly to the extent that hazards affect the State and is measured using technical measures specific to the hazard. This is also a function of when the event occurs (year-round, seasonal), the location affected (both geographically and non-geographically determined), the resilience of the community, and the effectiveness of the emergency response and disaster recovery efforts.

MAGNITUDE / SEVERITY		
Score	**Description**	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service 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 two 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

The speed of onset is the amount of warning time available before the hazard occurs. This should be taken as an average warning time. For many of the atmospheric natural hazards there is a considerable amount of warning time as opposed to the human caused accidental hazards that occur instantaneously or without any significant warning time.

WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

Duration

This consists of the typical amount of time that the jurisdiction is impacted by the hazard. As an example, a snowstorm will likely last several hours, whereas a lightning strike would last less than a second.

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

Hazard Risk Assessment Summary for: _____

Hazards	Probability	Magnitude/Severity	Warning Time	Duration
Drought				
Earthquake				
Expansive Soils				
Extreme Heat				
Flooding - Flash				
Grass/Wildland Fire				
Landslide				
Levee/Dam Failure				
Flooding - Riverine				
Severe Winter Storm				
Sinkholes				
Thunderstorm/Lighting/Hail				
Tornado/Windstorm				

Completed by:_____

Please complete the scores for Probability, Magnitude/Severity, Warning Time, and Duration based on the numeric criteria provided above. The weights in the assessment formula will be factored in later to generate the final risk assessment score.

- PUBLIC MEETING AGENDA-

Grundy County Multi-Jurisdictional
Hazard Mitigation Plan Meeting #3

Date: Thursday, July 27, 2023

Time: 3:00 PM

Place: Grundy Center Annex Building
706 H Avenue
Grundy Center, IA

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1. Welcome and Introductions
2. Review Previous Meetings Information
3. Finish Updating Hazards, Hazard Analysis, and Risk Assessment
4. Discuss Climate Change Trends in Grundy County
5. Adjourn

THIS IS A PUBLIC MEETING

MEMBERS OF THE COMMUNITY ARE INVITED TO ATTEND AND PARTICIPATE IN THIS MEETING

Human And Technological Hazards

Animal/Crop/Plant Disease

Some diseases that affect livestock may include (but not limited to) West Nile Virus, Equine Infectious Anemia, Johne's Disease, Foot Rot, Coccidiosis, Pinkeye, Anaplasmosis, Anthrax, Bluetongue, Brucellosis, Trichomoniasis, Tuberculosis, Pseudorabies, Brucellosis, Porcine Reproductive Respiratory Syndrome, Brucella ovis, Ovine Progressive Pneumonia, Scrapie, Micoplasma, Newcastle, Vesicular Stomatitis, Chronic Wasting Disease (CWD), Exotic Newcastle Disease and Rabit calicivirus disease.

Some common plant diseases include cedar-apple and related rusts, anthracnose, oak wilt, Verticillium wilt, ash decline, Sphaeropsis blight of pine, Rhizosphaera of spruce, Cytospora of spruce, black knot of plum, and environmental or abiotic disease, and Dutch Elm disease among others.

Lastly, though not technically a disease, the threat from the Emerald Ash Borer poses an ever-increasing threat to ash trees in Grundy County. According to the Iowa Department of Natural Resources, Bremer County and Black Hawk County, which both are close in proximity to Grundy County, have confirmed Emerald Ash Borer infestations. The damage caused by this invasive species is comparable to diseases such as Dutch elm disease. The State has implemented a state-wide quarantine as of 2014.

In 2015, Iowa experienced significant impacts to our avian populations when highly pathogenic avian influenza (HPAI) affected 77 sites in Iowa in 18 counties across the state. The more than 33 million affected birds had to be euthanized and disposed of, the facilities had to be sanitized, and the stocks replaced once assurances were made that the disease would not recur. The direct economic impact of replacing the affected birds was in excess of $83.6 million. This figure does not include unemployment during the timeframe of the disaster nor the cost of euthanizing and disposal of the carcasses. In March 2022, the avian flu affected 10 commercial chicken/turkey operations with most pathogenic infections coming from wild geese/bird populations who migrate.

Hazardous Materials

This hazard encompasses fixed hazardous materials, pipeline transportation, and transportation of hazardous materials. This can include the accidental release of flammable or combustible, explosive, toxic, noxious, corrosive, oxidizable, irritant, or radioactive substances or mixtures that can pose a risk to life, health, or property, possibly requiring evacuation. From 2017 to 2023, there were 12 fixed facility spills in Grundy County.

Pandemic Human Disease

In March 2020, the World Health Organization declared the COVID-19 outbreak a pandemic. The subsequent variants of the virus have spread through the general population. Vaccines and boosters exist now for the COVID-19 virus. Grundy County reached their goal of vaccinating 70%

of the population (at least 12 years old). Our understanding of the virus is growing and we know there are factors to indicate higher transmission risks and vulnerable populations. The COVID-19 activity level is currently low for Grundy County. There were 815 COVID-19 deaths from 2022-23 and 144 deaths from influenza from 2022-23 based on the weekly reporting from the Iowa Department of Health and Human Services.

The Iowa Disease Surveillance System collects reports and surveilles 50 common communicable diseases in the human population. There have been annual outbreaks of influenza that have affected Iowans. IDPH reports show that the peak impact of the various strains of the flu occur from January through March with an occasional occurrence from August through October.

Infrastructure Failure

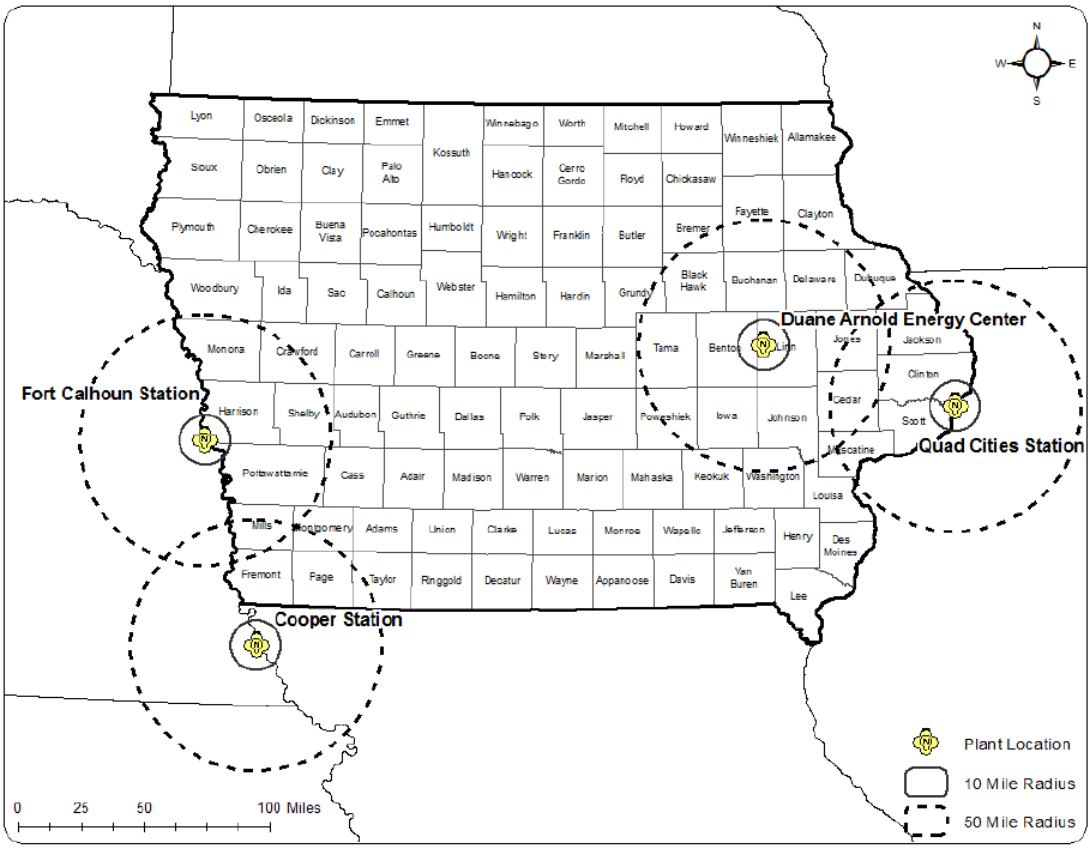
This hazard encompasses a variety of occurrences, including communication failure, energy failure, structural failure, and structural fire. This includes an extended interruption, widespread breakdown, or collapse (part or all), of any public or private infrastructure, that threatens life and property. One potential cause of infrastructure failure is space weather/solar flare. Another potential cause is age of structure such as a bridge that collapses. The warning time for the conditions that bring about infrastructure failures, such as a severe thunderstorm which could potentially cause a power outage, is relatively long and could be longer than a day.

Radiological

A radiological incident is an occurrence resulting in a release of radiological material at a fixed facility or in transit. An incident resulting in a release of radiological material at a fixed facility includes, but is not limited to, power plants, hospitals, and laboratories. Although the term "nuclear accident" has no strict technical definition, it generally refers to events involving the release of significant levels of radiation. Most commercial nuclear facilities in the United States were developed in the mid-1960s and are designed to withstand aircraft attack. With this level of design they should withstand most natural hazards, but events that occurred in 2011 at the Fukushima nuclear plant in Japan illustrate the possibilities of what can happen in a worst-case scenario. The Japanese plant may have been able to withstand either the earthquake or the tsunami, but both hazards together caused release of radioactive materials.

Iowa has one nuclear power plant located within its borders; the Duane Arnold Energy Center (DAEC) is located near Palo in Linn County. Three additional nuclear facilities border Iowa. These facilities are the Ft. Calhoun Nuclear Generating Station located across the Missouri River north of Omaha, Neb., the Cooper Nuclear Station south of Nebraska City, Neb., and across the Mississippi River at the Quad Cities Nuclear Generating Station. The map below identifies the location of each facility as well as the 10-mile and 50-mile planning buffers.

Nuclear Power Impact, 2018. Source: HSEMD



Terrorism

This hazard encompasses a wide variety of human-caused threats including enemy attack, biological terrorism, agroterrorism, chemical terrorism, conventional terrorism, cyber terrorism, and radiological terrorism. Use of conventional weapons and explosives against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion, or ransom is conventional terrorism. Hazard effects 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, incremental structural failures, etc. Conventional terrorism can also include tactical assault or sniping from remote locations.

Transportation Incidents

This hazard encompasses air transportation, highway transportation, railway transportation, and waterway incidents. A transportation incident is described as an accident involving any mode of transportation that directly threatens life, property damage, injury, or adversely impacts a community's capabilities to provide emergency services. Most transportation incidents are of short duration and limited impact.

HAZARD ANALYSIS / RISK ASSESSMENT

HAZARD IDENTIFICATION

The 2023 Iowa Hazard Mitigation Plan includes 13 types of hazards in three categories for the state. The new list of hazards is in the table below. This includes thirteen natural hazards, five technological hazards, and one human caused hazard.

2023 Iowa Hazard List (Human caused or Technological)
Animal/Crop/Plant Disease
Hazardous Materials
Pandemic Human Disease
Infrastructure Failure
Radiological Incident
Transportation Incident
Terrorism

In order to properly assess current mitigation strategies, develop new future mitigation strategies, and identify needed mitigation projects, the Committee needs to determine the hazards that impact their community. It is important to note that the focus of mitigation is on reducing long-term risks of damage or threats to public health and safety caused by hazards and their effects. Thus, in some cases the hazards identified for mitigation will not include all of, or the same hazards, identified for preparedness, response, or recovery. Also, not all hazards will impact all the participating communities and can be of different magnitude.

HAZARD RISK ASSESSMENT METHODOLOGY

The risk assessment identifies how people, properties, and structures would be damaged by one of the listed hazard events. If the hazard can harm people or damage their homes and other structures, they are vulnerable. Finding the weak points in the system, for example, identifying building types that are vulnerable to damage and anticipating the loss in high-risk areas, will help the community decide what mitigation measure should be undertaken and how to implement the activities they select.

The Hazard Mitigation Planning Committee will use the following factors in determining the hazard risk assessment. The Planning Committee needs to consider the following each identified hazard:

- Probability
- Magnitude / Severity
- Warning Time
- Duration

The scores for each of the factors will be weighted using the formula below to develop the final hazard assessment score.

(Probability x.45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10)
= Final Hazard Assessment Score

<u>Probability</u>

The probability score 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. Many times, the historical occurrence can be extrapolated into the future using best available data, but others, due to the nature of the hazard are more difficult to estimate the probability of future occurrence. If a hazard or its

impacts have been mitigated against, the probability of future occurrences decreases. Conversely, hazards that have not occurred in the past may present themselves to the community in the future.

PROBABILITY		
Score	**Description**	
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 if 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

The magnitude of the impact of a hazard event (past and perceived) is related directly to the extent that hazards affect the State and is measured using technical measures specific to the hazard. This is also a function of when the event occurs (year-round, seasonal), the location affected (both geographically and non-geographically determined), the resilience of the community, and the effectiveness of the emergency response and disaster recovery efforts.

MAGNITUDE / SEVERITY		
Score	**Description**	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged, shutdown of facilities and service 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 two 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

The speed of onset is the amount of warning time available before the hazard occurs. This should be taken as an average warning time. For many of the atmospheric natural hazards there is a considerable amount of warning time as opposed to the human caused accidental hazards that occur instantaneously or without any significant warning time.

WARNING TIME	
Score	**Description**
1	More than 24 hours warning time.
2	12 to 24 hours warning time.
3	6 to 12 hours warning time
4	Minimal or no warning time (up to 6 hours warning)

Duration

This consists of the typical amount of time that the jurisdiction is impacted by the hazard. As an example, a snowstorm will likely last several hours, whereas a lightning strike would last less than a second.

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

Hazard Risk Assessment Summary for: _____

Hazards	Probability	Magnitude/Severity	Warning Time	Duration
Animal/Crop/Plant Disease				
Hazardous Materials				
Pandemic Human Disease				
Infrastructure Failure				
Radiological Incident				
Transportation Incident				
Terrorism				

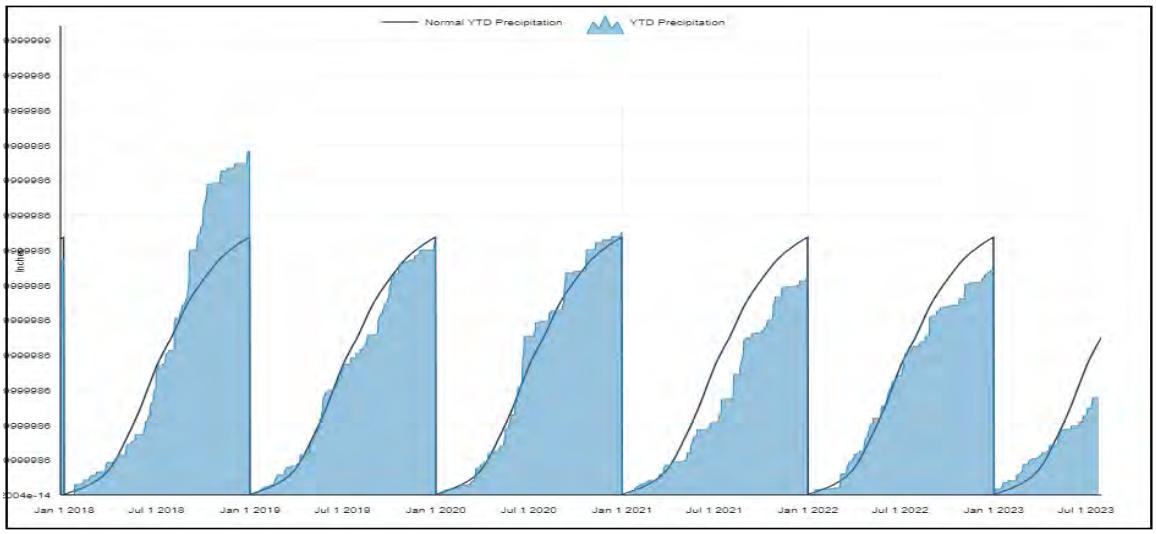
Completed by:_____

Please complete the scores for Probability, Magnitude/Severity, Warning Time, and Duration based on the numeric criteria provided above. The weights in the assessment formula will be factored in later to generate the final risk assessment score.

Climate Change Trends in Grundy County

Recent guidance issued by FEMA in the *Local Mitigation Planning Handbook* (*44 CFR 201.4 (c) (2) (i)*) directs that the risk assessment in the state hazard mitigation plan describe the effects of future conditions, including climate change (e.g., long-term weather patterns, average temperature and sea levels), on the type, location and range of anticipated intensities of identified hazards.

Historical precipitation data (2018-July 2023)



Source: U.S. CLIMATE RESILIENCE TOOLKIT CLIMATE EXPLORER (VERSION 3.1)

The graph above shows YTD precipitation for Grundy County between 2018 and 2023. The solid line shows normal accumulative precipitation for the county annually. Based on this data, precipitation is likely to continue to decrease and fall below normal trends in the coming years.

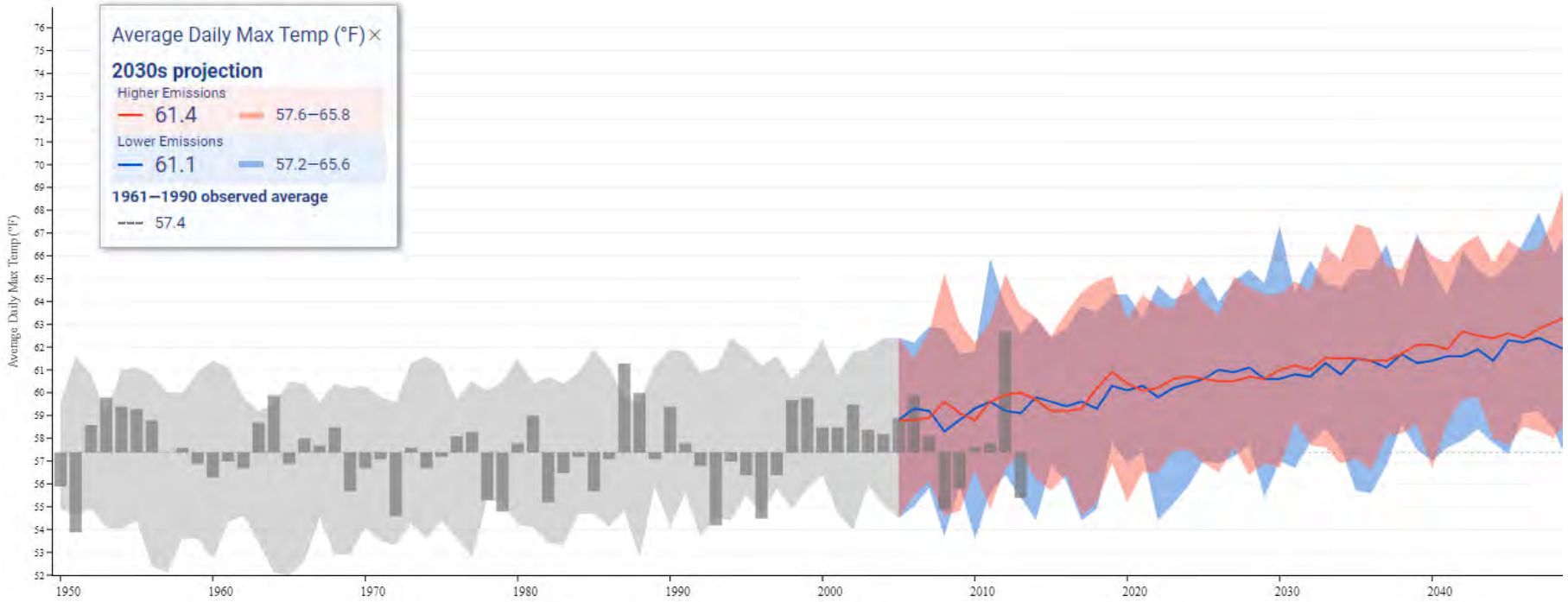
Top climate concerns for Grundy County

Top regional hazards for Grundy County, IA, according to the 2018 National Climate Assessment. These statements compare projections for the middle third of this century (2035-2064) with average conditions observed from 1961-1990.

- **Changed seasonal patterns** may affect agricultural productivity.
- **Extreme temperatures** on the hottest days of the year are projected to increase by 7°F.
    - *Historically, extreme temperatures in Grundy County averaged 92°F.*
- Annual counts of **intense rainstorms** – those that drop two or more inches in one day — are projected to increase by 0%.
    - *Historically, Grundy County averaged 0 intense rainstorms per year.*
- An average of 1 more **dry spell** — a period of consecutive days without precipitation — is projected per year
    - *Historically, Grundy County averaged 14 dry spells per year.*

Source: NOAA's Climate Program Office (n.d.). The Climate Explorer. U.S. Climate Resilience Toolkit. https://crt-climate-explorer.nemac.org/

Average Daily Maximum Temp – Historic Trends and Future Trends



Source: U.S. CLIMATE RESILIENCE TOOLKIT CLIMATE EXPLORER (VERSION 3.1)

Red – Indicates higher greenhouse gas emissions for Grundy County

Blue – Indicates lower greenhouse gas emissions for Grundy County

Note: A projection for 2030 shows a 0.3 degree F difference between lowered vs higher emissions for Grundy County.

Source: NOAA's Climate Program Office (n.d.). The Climate Explorer. U.S. Climate Resilience Toolkit. https://crt-climate-explorer.nemac.org/

- PUBLIC MEETING AGENDA-

Grundy County Multi-Jurisdictional
Hazard Mitigation Plan Meeting #4

Date: Thursday, August 31, 2023

Time: 3:00PM

Place: Grundy County Annex Building

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1) Welcome
2) Review Previous Meeting Information
3) Complete identification of vulnerable populations/buildings/cultural landmarks
4) Review Community Profiles (critical sites map, etc)
5) Begin capabilities assessment based on 4 categories (planning & regulatory, administrative & technical, financial, and educational & outreach)
6) Assignments for next meeting:
   (a) Review Existing Mitigation Goals/Action/Activities from 2017 HMP Plan to prepare updating and prioritizing action items at next meeting
7) Adjourn

THIS IS A PUBLIC MEETING

MEMBERS OF THE COMMUNITY ARE INVITED TO ATTEND AND PARTICIPATE IN THIS MEETING

2023 Grundy County Multi-Jurisdictional Hazard Mitigation Plan

NOTE: THIS WAS AN INCOMPLETE DRAFT AT THE TIME OF MEETING - NOT REFLECTING FINAL HAZARD RISK ASSESSMENT RESULTS FOR 2023 GRUNDY COUNTY MJ-HMP

Hazard Assessment Scores

Hazards	Beaman	Conrad	Dike	Grundy Center	Holland	Morrison	Reinbeck	Stout	Wellsburg	Grundy Center School District	Grundy County Conservation Board	Grundy County Engineer	Grundy County Supervisor	Grundy County Public Health	Grundy County Ambulance	Grundy County - Emergency Coordinator	Overall Final Hazard Assessment Score Among all Jurisdictions in Grundy County
Tornado/Windstorm	2.35	0.00	4.00	3.20	3.20	2.80	3.40	0.00	2.65	0.00	3.25	0.00	0.00	0.00	0.00	2.95	**1.74**
Thunderstorm/ Lightning/ Hail	2.65	0.00	2.40	2.90	2.90	3.40	3.40	0.00	2.75	0.00	3.25	0.00	0.00	0.00	0.00	2.65	**1.64**
Severe Winter Storm	2.65	0.00	2.55	2.85	2.85	1.80	2.30	0.00	2.40	0.00	2.65	0.00	0.00	0.00	0.00	2.85	**1.43**
Extreme Heat	2.10	0.00	3.15	2.65	2.65	1.60	2.65	0.00	2.40	0.00	2.75	0.00	0.00	0.00	0.00	2.85	**1.43**
Transportation Incident	2.95	0.00	0.00	2.75	1.55	0.00	0.00	0.00	1.90	2.75	1.45	2.75	2.90	0.00	0.00	2.90	**1.37**
Animal/Crop/Plant Disease	2.50	0.00	0.00	3.15	1.75	0.00	0.00	0.00	2.50	1.45	1.30	3.15	2.65	0.00	0.00	2.65	**1.32**
Flash Flood	2.05	0.00	2.50	2.35	2.35	2.15	2.70	0.00	1.75	0.00	1.85	0.00	0.00	0.00	0.00	2.00	**1.23**
Infrastructure Failure	1.00	0.00	0.00	2.40	2.10	0.00	0.00	0.00	2.30	2.05	2.80	2.40	2.10	0.00	0.00	2.10	**1.20**
Hazardous Materials	1.90	0.00	0.00	2.20	2.10	0.00	0.00	0.00	1.80	2.75	1.75	2.50	2.10	0.00	0.00	2.10	**1.20**
Pandemic Human Disease	2.70	0.00	0.00	2.35	1.75	0.00	0.00	0.00	2.50	2.05	1.60	2.35	1.90	0.00	0.00	1.90	**1.19**
Drought	1.30	0.00	2.50	2.65	2.65	1.30	1.75	0.00	1.75	0.00	2.05	0.00	0.00	0.00	0.00	2.50	**1.15**
River Flood	2.85	0.00	2.20	1.95	1.95	2.10	2.25	0.00	1.10	0.00	1.65	0.00	0.00	0.00	0.00	1.65	**1.11**
Radiological Indicident	1.45	0.00	0.00	2.25	1.65	0.00	0.00	0.00	1.30	1.75	2.50	2.25	2.25	0.00	0.00	2.25	**1.10**
Terrorism	3.00	0.00	0.00	2.65	0.00	0.00	0.00	0.00	1.45	1.55	0.00	3.30	2.70	0.00	0.00	2.25	**1.06**
Grass/Wild Land Fire	0.00	0.00	2.20	2.00	2.00	2.15	1.00	0.00	1.75	0.00	1.00	0.00	0.00	0.00	0.00	1.90	**0.88**
Expansive Soils	0.00	0.00	1.65	2.65	2.65	1.70	1.00	0.00	1.30	0.00	1.00	0.00	0.00	0.00	0.00	1.00	**0.81**
Landslides	0.30	0.00	2.05	2.10	2.10	1.40	1.15	0.00	1.20	0.00	1.00	0.00	0.00	0.00	0.00	1.00	**0.77**
Earthquake	0.00	0.00	2.05	1.45	1.45	2.35	1.10	0.00	1.45	0.00	1.00	0.00	0.00	0.00	0.00	1.00	**0.74**
Sinkholes	0.00	0.00	2.30	1.55	1.55	2.05	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	**0.72**
Levee/Dam Failure	0.30	0.00	2.20	0.00	1.55	0.00	1.35	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	**0.46**

*Range is from 1 (low risk) to 4 (high risk)

Overall Final Hazard Assessment Score Ranked Among all Jurisdictions in Grundy County	Hazard	
1.74	Tornado/Windstorm	*Highest Risk
1.64	Thunderstorm/ Lightning/ Hail	
1.43	Severe Winter Storm	
1.43	Extreme Heat	
1.37	Transportation Incident	
1.32	Animal/Crop/Plant Disease	
1.23	Flash Flood	
1.20	Infrastructure Failure	
1.20	Hazardous Materials	
1.19	Pandemic Human Disease	
1.15	Drought	
1.11	River Flood	
1.10	Radiological Indicident	
1.06	Terrorism	
0.88	Grass/Wild Land Fire	
0.81	Expansive Soils	
0.77	Landslides	
0.74	Earthquake	
0.72	Sinkholes	
0.46	Levee/Dam Failure	*Lowest Risk

Factors that Determine the Severity of a Hazard

Scale (Multiplier)

Probability	+	Magnitude or Severity	+	Warning Time	+	Duration	=	Risk Score
1	Unlikely	1	Negligible	1	More than 24 hours warning time	1	Less than 6 hours	
2	Occasional	2	Limited	2	12 to 24 hours warning time	2	Less than 1 day	
3	Likely	3	Critical	3	6 to 12 hours warning time	3	Less than 1 week	
4	Highly Likely	4	Catastrophic	4	Minimal or no warning time (up to 6 hours w	4	More than 1 week	

Unweighted Risk Assessment Table

Probability \ Duration	1	2	3	4	Warning Time
4	10	12	14	16	4
3	8	10	12	14	3
2	6	8	10	12	2
1	4	6	8	10	1
	1	2	3	4	

Magnitude or Severity

Weighted Risk Assessment Table

Probability \ Duration	0.1	0.2	0.3	0.4	Warning Time
1.8	2.8	3.2	3.6	4	0.6
1.35	2.2	2.6	3	3.4	0.45
0.9	1.6	2	2.4	2.8	0.3
0.45	1	1.4	1.8	2.2	0.15
	0.3	0.6	0.9	1.2	

Magnitude or Severity

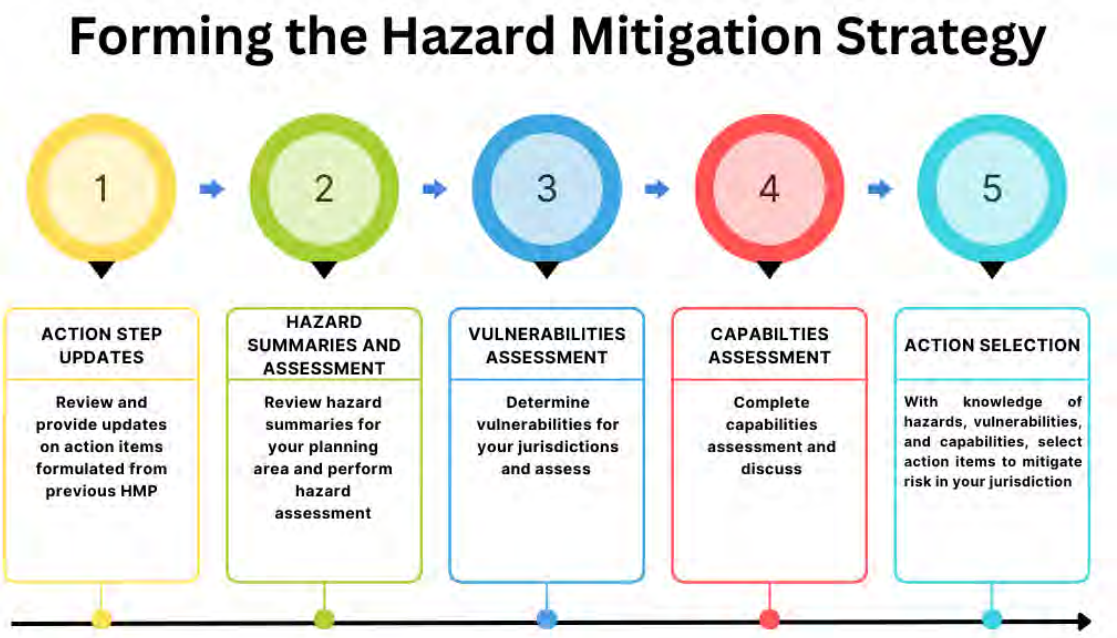
Factors Weighted

45%	Probability
30%	Magnitude or Severity
15%	Warning Time
10%	Duration
100%	

Grundy County 2023 Multi-Jurisdictional Hazard Mitigation Plan

Planning Committee Meeting #4

August 31, 2023



At **Step 1**, each jurisdiction gave an update on their mitigation action strategy from the previous 2017 HMP. There are no points taken or evaluations given for each jurisdiction on this part. This is intended to help the jurisdiction assess their previous action steps to mitigate hazard risk by updating the plan owner (Grundy County and INRCOG) on the status of any progress.

At **Step 2**, hazards were chosen based on Iowa's Latest Hazard Mitigation Plan. Hazard profiles were prepared and shared with the planning committee. Next, we each completed a hazard risk assessment using a scoring sheet prepared by INRCOG. Results from this assessment are attached. If you have incomplete score data, please contact Chase Babcock or Leon Begay to submit planning materials (ie. worksheets) to ensure participation is met for mitigation plan.

At **Step 3,** vulnerabilities were identified by each jurisdiction and listed in a Community Profile sheet. Capabilities were also identified with the identification of existing plans for each jurisdiction.

At **Step 4** (TODAY), a capabilities assessment is to be completed or started by each jurisdiction that will help construct a strategy.

Next meeting, we will begin **step 5** to bring in all hazard profile information, hazard assessments, vulnerability identification, and capabilities assessment information to select action items to mitigate risk in each of your jurisdictions.

Local Mitigation Planning Workshop #4

Capability Assessment Worksheet

Local mitigation capabilities are existing authorities, policies, programs, and resources that reduce hazard impacts. They could also be used to carry out hazard mitigation activities. We will use this worksheet to identify which capabilities your community has. *No community will have all of these capabilities*. There may be partners or stakeholders that you work with who are able to supplement your local programs and staff.

Four (4) Categories of Capability Types

Planning and Regulatory - Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards.

Administrative and Technical - Administrative and technical capabilities include staff and their skills and tools that can help with carrying out mitigation actions. If you do not have local staff, consider how state and regional partners can help.

Financial - Find out if your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Education and Outreach - Identify education and outreach programs and methods already in place that could be used to carry out mitigation activities and share hazard-related information.

Mitigation Strategy

Worksheet 4: Capability Assessment

Local mitigation capabilities are existing authorities, policies, programs, and resources that reduce hazard impacts or could help to carry out hazard mitigation activities. Use this worksheet to list which capabilities your community already has and how they can be built on. No community will have all of these capabilities. You may work with partners or stakeholders who can supplement your local programs and staff.

In the tables below, note which capabilities apply. Consider some of the prompts to describe a little bit about each capability.

PLANNING AND REGULATORY

Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards.

Capability Type	In Place	Notes
Plans	**Yes/No**	**Does the plan address hazards? Can the plan be used to implement mitigation actions? When was it last updated?**
Capital Improvements Plan		
Climate Change Adaptation Plan		
Community Wildfire Protection Plan		
Comprehensive/Master Plan		
Continuity of Operations Plan		
Economic Development Plan		
Land Use Plan		
Local Emergency Operations Plan		
Stormwater Management Plan		
Transportation Plan		

Capability Type	In Place	Notes
Other (describe)		
Land Use Planning and Ordinances	**Yes/No**	**Is the ordinance an effective measure for reducing hazard impacts? Is it adequately administered and enforced?**
Acquisition of land for open space and public recreation use		
Building code		
Flood insurance rate maps		
Floodplain ordinance		
Substantial Damage Plan		
Natural hazard specific ordinance (stormwater, steep slope, wildfire)		
Subdivision ordinance		
Zoning ordinance		
Other		
How can these capabilities be expanded and improved to reduce risk?		

ADMINISTRATIVE AND TECHNICAL

Administrative and technical capabilities include staff and their skills. They also include tools that can help you carry out mitigation actions. If you do not have local staff, consider how state and regional partners can help.

Capability Type	In Place	Notes
Administrative	**Yes/No**	**Is staffing adequate to enforce regulations?** **Is staff trained on hazards and mitigation?** **Is coordination between agencies and staff effective?**
Chief Building Official		
Civil Engineer		
Community Planner		
Emergency Manager		
Floodplain Administrator		
GIS Coordinator		
Planning Commission		
Other		
Technical	**Yes/No**	**Has capability been used to assess/mitigate risk in the past?**
Grant writing		
Hazard data and information		
GIS analysis		
Mutual aid agreements		
Other		
How can these capabilities be expanded and improved to reduce risk?		

FINANCIAL

Note whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Capability Type	In Place	Notes
Funding Resource	**Yes/No**	**Has the funding resource been used in past and for what type of activities? Could it be used to fund future mitigation actions?**
Capital improvements project funding		
Community Development Block Grant		
Federal funding programs (non-FEMA)		
Fees for water, sewer, gas, or electric services		
Impact fees for new development		
State funding programs		
Stormwater utility fee		
Other		
How can these capabilities be expanded and improved to reduce risk?		

EDUCATION AND OUTREACH

Identify education and outreach programs and methods already in place that could be used to carry out mitigation activities and communicate information about hazards.

Capability Type	In Place	Notes
Program/Organization	Yes/No	How widespread are each of these in your community?
Community newsletters		

Capability Type	In Place	Notes
Hazard awareness campaigns (such as Firewise, Storm Ready, Severe Weather Awareness Week, school programs, public events)		
Local news		
Organizations that represent/advocate for/interact with underserved and vulnerable communities		
Social media		
Other		
How can these capabilities be expanded and improved to reduce risk?		

- PUBLIC MEETING AGENDA-

Grundy County Multi-Jurisdictional
Hazard Mitigation Plan Meeting #5

Date: Thursday, September 28, 2023

Time: 3:00PM-4:30PM

Place: Kling Memorial Library 708 7th Street Grundy Center, IA - Meeting Room

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1) Welcome
2) Update on our timeline
   a) Timeline of MJ-HMP
3) Local HMP goals
   (a) Problem Statements
   (b) New Mitigation Actions
   (c) Prioritize Mitigation Actions for Implimentation Plan
4) Questions and Discussion
5) Adjournment

THIS IS A PUBLIC MEETING

MEMBERS OF THE COMMUNITY ARE INVITED TO ATTEND AND PARTICIPATE IN THIS MEETING

Sept 29, 2023
Grundy County MJ-HMP Planning Meeting #5

AGENDA ITEM 2

2a) Timeline of MJ-HMP 2023

- Sept 2023
  - Jurisdictions approval, revise, add mitigation goals to their local HMP
- October 2023
  - Approval of Local Hazard Mitigation Plan and Resolutions to Be Adopted/Passed
  - Draft of 2023 Grundy County MJ-HMP to be near completion
- November 2023
  - Approval of Local Hazard Mitigation Plan and Resolutions to Be Adopted/Passed
  - Planning document to be ready
- Dec 2023
  - Submit Grundy County Hazard Mitigation Plan for approval by Board of Supervisors
- January 2024
  - Submit 2023 GC HJ-HMP for approval to Iowa DHS and FEMA approval
- February 2024
  - Address potential comments and resubmit for approval
  - Approval of MJ-HMP

Agenda Item 3

Discussion on Changes to Goal Development for Jurisdictions

2017Grundy County Goals for the Multi-Jurisdictional Hazard Mitigation Plan

1. Minimize to the greatest possible extent the number of injuries and/or loss of life associated with all identified hazards.
2. Reduce or eliminate property damage due to the occurrence of disasters.
3. Identify ways that response operations, in the event of a disaster, can be improved.
4. Return the community to either pre-disaster or improved conditions in a timely manner in the wake of a disaster.
5. Develop strategies that can be used to reduce the community's overall risk to the negative effects of natural, technological, and man-made disasters.
6. Reconvene the planning committee on an annual basis to review the plan document, check for compliance with the plan goals, and track progress in achieving the mitigation strategies.
7. Maintain the Countywide Multi-Jurisdictional format for future plan updates.

Local HMP Goals Requirements

- Per hazard mitigation plan requirements, the plans must:
  - Include goals to reduce/avoid long term vulnerabilities to the identified hazards.
  - Be consistent with the hazards identified and described in the risk assessment.
  - Either reaffirm or update goals based on current conditions
  - Taking into account any updated or new risk assessments
  - Taking into account any changes in state or local priorities

Problem Statements for Mitigation Types

A problem statement is a clear explanation of the obstacles or issues that are at hand, why it matters, and who it impacts.

- Use risk assessment results to identify top hazards (priority)
- Use vulnerability assessment, community data of vulnerable population to understand who is being impacted. (who it impacts)
- Problem statements also are concise and short
- Problem statements do not need to explain cause or imply causes to the problem.

Goals for Mitigation Types

Write the problem statements as goals.

- Goals can start with action verbs (Ensure, Protect, Build, Maintain, Increase, etc)
- Goals that involve metrics should have the target number in the goal of where you want to be in the long term.
- Goals should be attainable. Is it possible?
- Goals should be aligned with current priorities.
    i. Your comprehensive land use plan, mission statements, flood mitigation plans, etc
    ii. Refer to your Community Profile and Capability Assessment
- Strive for SMART Goals: Specific, Measurable, Attainable, Relevant, Timely

Example:

Problem statement:	Our city's sirens are working however they have exceeded their end-of-life use and property tax revenue will not cover replacement within the next 3 years.
Goal:	Get residents to register on Alert Iowa emergency system.
SMART Goal:	Educate our residents on emergency alert system resources and get 50% of residents registered on Alert Iowa in 3 years.

Hazard Mitigation Goals:

- Are long term visions of what the community wants to achieve as a desired future state ***which must involve reducing or avoiding losses (life, property, local economy, environment) due to hazards.***
- Must be clear.
- Each goal should address at least one hazard or multiple hazards.

All mitigation goals should somehow reduce losses due to hazards and address at least 1 hazard.

Mitigation Type: Local Plans and Regulations *Actions by administrative or regulatory processes which direct how land and buildings are developed and built. These actions also include regulations by public entities to reduce hazard losses.*	Examples - Comprehensive plans - Land use ordinances	- Development Review - Building Codes and Enforcement	-Open Space preservation -Stormwater management regulations

Problem Statement:

Potential Mitigation Action:	Timeline	Estimate Cost	Goal	Priority

Problem Statement:

Potential Mitigation Action:	Timeline	Estimate Cost	Goal	Priority

Mitigation Type: Structure and Infrastructure Projects *Actions that either modify existing buildings or structures to protect them from a hazard, or removal from the hazard area.*	Examples - Acquisitions of structures in flood prone areas	- Undergrounding utilities - Structural retrofits	- Safe rooms - Culverts

Problem Statement:

Potential Mitigation Action:	Timeline	Estimate Cost	Goal	Priority

Problem Statement:

Potential Mitigation Action:	Timeline	Estimate Cost	Goal	Priority

Mitigation Type: Natural system protection and nature-based solutions *Actions that minimize damage and losses by preserving or restoring the functions of natural systems. This type of action can include green infrastructure and low impact development, nature-based solutions*	Examples - Sediment and erosion control - Stream restoration - Greenways - Rain gardens	- Controlled burns for prairie restoration & grass fire prevention	- Source water protection plans - Wetland preservation

Problem Statement:

Potential Mitigation Action:	Timeline	Estimate Cost	Goal	Priority

Problem Statement:

Potential Mitigation Action:	Timeline	Estimate Cost	Goal	Priority

Mitigation Type: Education and Awareness Programs *These types of actions keep residents informed about potential natural disasters.*	Examples - Ready Iowa - Radio or television spots - Social media outreach - Websites w/ maps & info	- Real estate disclosure - Outreach to underserved/marginalized communities	- Outreach materials that are accessible (non-English/large print)

Problem Statement:				
Potential Mitigation Action:	Timeline	Estimate Cost	Goal	Priority
Problem Statement:				
Potential Mitigation Action:	Timeline	Estimate Cost	Goal	Priority

Mitigation Type: Emergency Services *Actions that protect people and property during and immediately after a disaster or hazard event.*	Examples - Warning systems - Emergency response services	- Protection of critical facilities.	

Problem Statement:

Potential Mitigation Action:	Timeline	Estimate Cost	Goal	Priority

Problem Statement:

Potential Mitigation Action:	Timeline	Estimate Cost	Goal	Priority

2023 GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE

APPENDIX N

COPIES OF PUBLIC NOTICES FOR PLANNING COMMITTEE MEETINGS HELD DURING THE DEVELOPMENT PROCESS OF THE 2023 MJ-HMP UPDATE

GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN PLANNING MEETING

The Federal Emergency Management Agency (FEMA) recently awarded Grundy County a Hazard Mitigation Planning Grant. Funds will be used to update the multi-jurisdictional Hazard Mitigation Plan. The purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by FEMA. FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.

This meeting will review materials from the 2017 plan, determine goals, begin identifying potential mitigation activities, and discuss and assess potential hazards. The meeting will take place on Thursday, June 29, 2023 at 3:00 PM at the Grundy County Annex Building Meeting Room, 706 G Avenue, Grundy Center, Iowa.

If you have any questions, please feel free to contact Isaiah Corbin at INRCOG, (319) 235-0311.
Published in the Sun Courier Jun 16, 2023

L80228

HAZARD MITIGATION PLAN MEETING

GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN PLANNING MEETING

The Federal Emergency Management Agency (FEMA) recently awarded Grundy County a Hazard Mitigation Planning Grant. Funds will be used to update the multi-jurisdictional Hazard Mitigation Plan. The purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by FEMA. FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.

This meeting will review materials from the 2017 plan, determine goals, begin identifying potential mitigation activities, and discuss and assess potential hazards. The meeting will take place on Thursday, June 29, 2023 at 3:00 PM at the Grundy County Annex Building Meeting Room, 706 G Avenue, Grundy Center, Iowa.

If you have any questions, please feel free to contact Isaiah Corbin at INRCOG, (319) 235-0311.

Leon Begay, INRCOG

Published in The Grundy Register on June 22, 2023

PROOF OF PUBLICATION

STATE OF IOWA } **ss.**
Grundy County

I, the undersigned, being duly sworn, depose and say, that I am Matthew Grohe, CEO of the Grundy Register, a weekly newspaper printed in the English language, published at Grundy Center in Grundy County, State of Iowa, and that the annexed Hazard Mitigation Plan Meeting Grundy County

notice was published in said paper once each week for 1 consecutive weeks, the first publication thereof was on the 22 day of June, 2023, the second on the _____ day of _____, 20___, the third on the _____ day of _____, 20___, the fourth on the _____ day of _____, 20___,

Matthew Grohe

Matthew Grohe, CEO

Subscribed and sworn to before me and in my presence the 28th day of June, 2023,

Mary M. Gamble

Notary Public; In and for the State of Iowa

NOTARIAL SEAL IOWA

MARY M. GAMBLE
Commission Number 847624
My Commission Expires
April 25, 2026

Printer's Fees, $ 18.32

PUBLIC NOTICE

GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN 3RD PLANNING MEETING

The Federal Emergency Management Agency (FEMA) recently awarded Grundy County a Hazard Mitigation Planning Grant. Funds will be used to update the multi-jurisdictional Hazard Mitigation Plan. The purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by FEMA. FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.

This third meeting will review material discussed at previous meetings, discuss and update potential hazards and their risk assessment, identify vulnerable buildings and populations, update community profiles, and review current and possible future mitigation strategies. The meeting will take place on Thursday, July 27, 2023 at 3:00 PM at the Grundy Co Annex Building, 706 H Avenue, Grundy Center, Iowa.

If you have any questions, please feel free to contact Isaiah Corbin at INRCOG, (319) 235-0311.

Published in The Grundy Register on Thursday, July 20, 2023

PROOF OF PUBLICATION

STATE OF IOWA } **ss.**
Grundy County }

I, the undersigned, being duly sworn, depose and say, that I am Matthew Grohe, CEO of the Grundy Register, a weekly newspaper printed in the English language, published at Grundy Center in Grundy County, State of Iowa, and that the annexed Public notice for Hazard Mitigation planning meeting in Grundy County

notice was published in said paper once each week for 1 consecutive weeks, the first publication thereof was on the 20th day of July, 2023, the second on the _____ day of _____, 20___, the third on the _____ day of _____, 20___, the fourth on the _____ day of _____, 20___,

Matthew Grohe

Matthew Grohe, CEO

Subscribed and sworn to before me and in my presence the 25 day of July, 2023.

Jamie Hearn

Notary Public; In and for the State of Iowa

NOTARIAL SEAL IOWA

Jamie Hearn
Commission Number 836187
My Commission Exp. December 10, 2024

Printer's Fees, $ 19.91

SUN COURIER
Serving the communities of Gladbrook, Reinbeck and Garwin

AFFIDAVIT OF PUBLICATION

STATE OF IOWA
Grundy County, ss.

I, Melissa Wendland, being first duly sworn, on oath depose and say that Sun Courier Newspaper, LLC is a corporation for pecuniary profit organization under the law of the State of Iowa, with its principal place of business in Grundy and Tama Counties; that the "Sun Courier" is a Weekly newspaper of general circulation in Grundy and Tama County, Iowa printed wholly in the English language and published by said corporation at the city of Marshalltown, in Marshall County, Iowa; that I am the Office Manger of said corporation and a full time employee of the said newspaper, and have personal knowledge of the facts stated herein; that the Notice hereto attached in the above entitled action was published in the regular daily edition of the said "Sun Courier" once each week for:

1 consecutive weeks on the days and dates as follows, to-wit:

16 Jun 2023

Statutory fees for publishing said notice are:

$15.36

Melissa Wendland

Sworn to before me and subscribed in my presence by the said Melissa Wendland, this 16 day of June 2023

Annette Mackay

ANNETTE MACKAY
Commission Number 830781
My Commission Expires
3-17-2024

Annette Mackay, Notary Public
Marshall County, Iowa
Commission No. 830781
Commission Expires March 17, 2024

GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN PLANNING MEETING

The Federal Emergency Management Agency (FEMA) recently awarded Grundy County a Hazard Mitigation Planning Grant. Funds will be used to update the multi-jurisdictional Hazard Mitigation Plan. The purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by FEMA. FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.

This meeting will review materials from the 2017 plan, determine goals, begin identifying potential mitigation activities, and discuss and assess potential hazards. The meeting will take place on Thursday, June 29, 2023 at 3:00 PM at the Grundy County Annex Building Meeting Room, 706 G Avenue, Grundy Center, Iowa.

If you have any questions, please feel free to contact Isaiah Corbin at INRCOG, (319) 235-0311.
Published in the Sun Courier Jun 16, 2023

L80228

SUN COURIER
Serving the communities of Clutbrook, Reinbeck and Garwin

AFFIDAVIT OF PUBLICATION

STATE OF IOWA
Grundy County, ss.

I, Melissa Wendland, being first duly sworn, on oath depose and say that Sun Courier Newspaper, LLC is a corporation for pecuniary profit organization under the law of the State of Iowa, with its principal place of business in Grundy and Tama Counties; that the "Sun Courier" is a Weekly newspaper of general circulation in Grundy and Tama County, Iowa printed wholly in the English language and published by said corporation at the city of Marshalltown, in Marshall County, Iowa; that I am the Office Manger of said corporation and a full time employee of the said newspaper, and have personal knowledge of the facts stated herein; that the Notice hereto attached in the above entitled action was published in the regular daily edition of the said "Sun Courier" once each week for:

1 consecutive weeks on the days and dates as follows, to-wit:

16 Jun 2023

Statutory fees for publishing said notice are:

$15.36

Melissa Wendland

Sworn to before me and subscribed in my presence by the said Melissa Wendland, this 16 day of June 2023

Annette Mackay

ANNETTE MACKAY
Commission Number 830781
My Commission Expires
3-17-2024

Annette Mackay, Notary Public
Marshall County, Iowa
Commission No. 830781
Commission Expires March 17, 2024

GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN PLANNING MEETING

The Federal Emergency Management Agency (FEMA) recently awarded Grundy County a Hazard Mitigation Planning Grant. Funds will be used to update the multi-jurisdictional Hazard Mitigation Plan. The purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by FEMA. FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.

This meeting will review materials from the 2017 plan, determine goals, begin identifying potential mitigation activities, and discuss and assess potential hazards. The meeting will take place on Thursday, June 29, 2023 at 3:00 PM at the Grundy County Annex Building Meeting Room, 706 G Avenue, Grundy Center, Iowa.

If you have any questions, please feel free to contact Isaiah Corbin at INRCOG, (319) 235-0311.
Published in the Sun Courier Jun 16, 2023

L80228

SUN COURIER
Serving the communities of Gladbrook, Reinbeck and Garwin
AFFIDAVIT OF PUBLICATION

STATE OF IOWA
Grundy County, ss.

I, Melissa Wendland, being first duly sworn, on oath depose and say that Sun Courier Newspaper, LLC is a corporation for pecuniary profit organization under the law of the State of Iowa, with its principal place of business in Grundy and Tama Counties; that the "Sun Courier" is a Weekly newspaper of general circulation in Grundy and Tama County, Iowa printed wholly in the English language and published by said corporation at the city of Marshalltown, in Marshall County, Iowa; that I am the Office Manger of said corporation and a full time employee of the said newspaper, and have personal knowledge of the facts stated herein; that the Notice hereto attached in the above entitled action was published in the regular daily edition of the said "Sun Courier" once each week for:

1 consecutive weeks on the days and dates as follows, to-wit:

22 Sep 2023

Statutory fees for publishing said notice are:

$23.00

Melissa Wendland

Sworn to before me and subscribed in my presence by the said Melissa Wendland, this 22 day of September 2023

ANNETTE MACKAY
Commission Number 830781
My Commission Expires
3-17-2024

Annette Mackay

Annette Mackay, Notary Public
Marshall County, Iowa
Commission No. 830781
Commission Expires March 17, 2024

2023 GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE 5th PLANNING MEETING

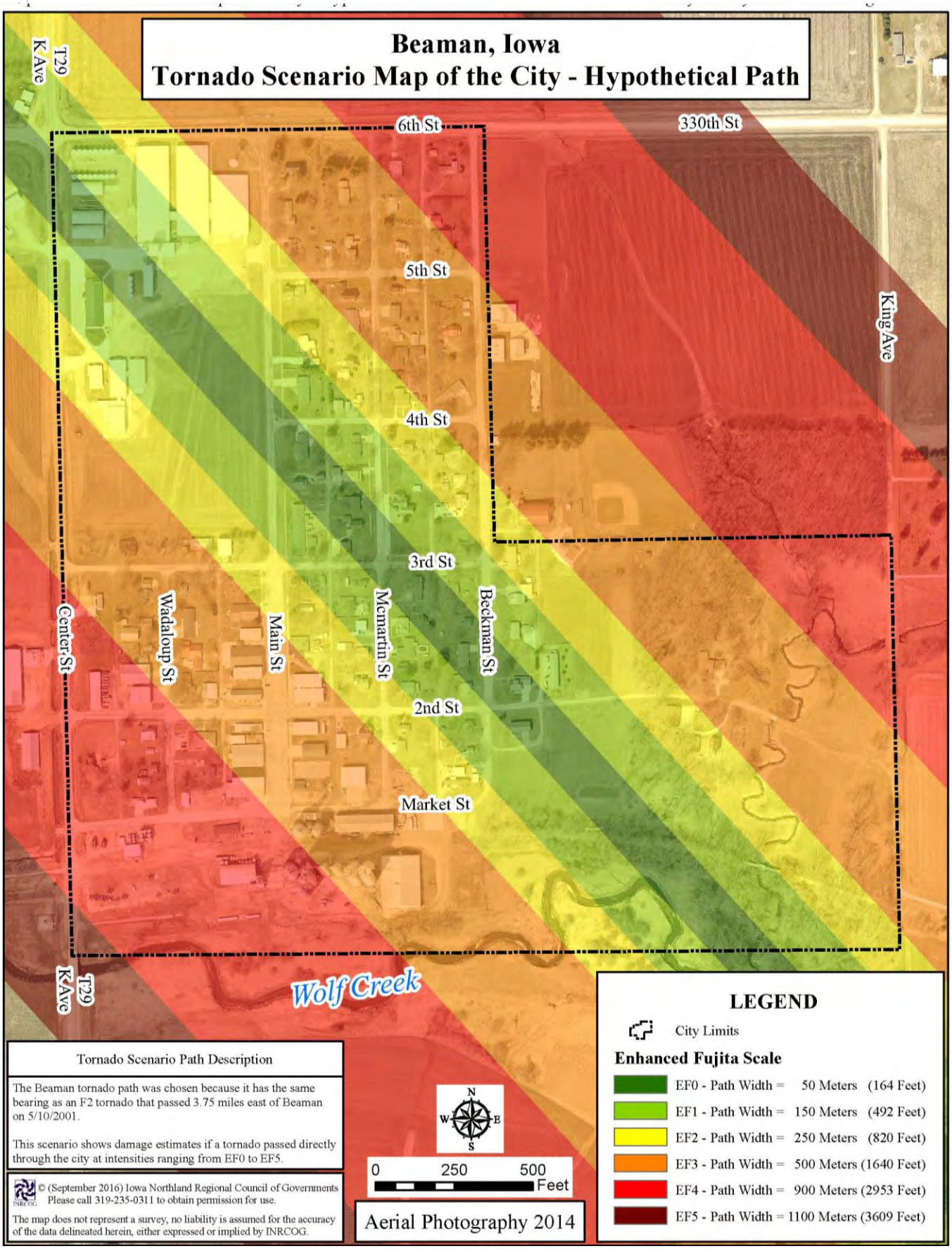
The Federal Emergency Management Agency (FEMA) recently awarded Grundy County a Hazard Mitigation Planning Grant. Funds will be used to update the multi-jurisdictional Hazard Mitigation Plan. The purpose of the plan is two-fold. The plan is a federal requisite to remain eligible for other mitigation grant programs offered by FEMA. FEMA mandates the plan be updated every five (5) years. Second, the plan is designed to create hazard mitigation strategies which can reduce negative impacts caused by natural and man-made hazards within the county and the incorporated jurisdictions.

This fifth meeting will culminate previous planning meetings and focus on the framework for updating and developing components of the mitigation strategy by each jurisdiction. First, the goals of the hazard mitigation plan will be discussed and approved by participating jurisdictions. Then, risk assessment findings will be incorporated into the mitigation strategy. The meeting will take place on Thursday, September 28, 2023 at 3:00 PM in the large meeting room of the Kling Memorial Library located at 708 7th Street, Grundy Center, IA.

If you have any questions, please feel free to contact Leon Begay at INRCOG,
(319) 235-0311.
Published in the Sun Courier Sep 22, 2023

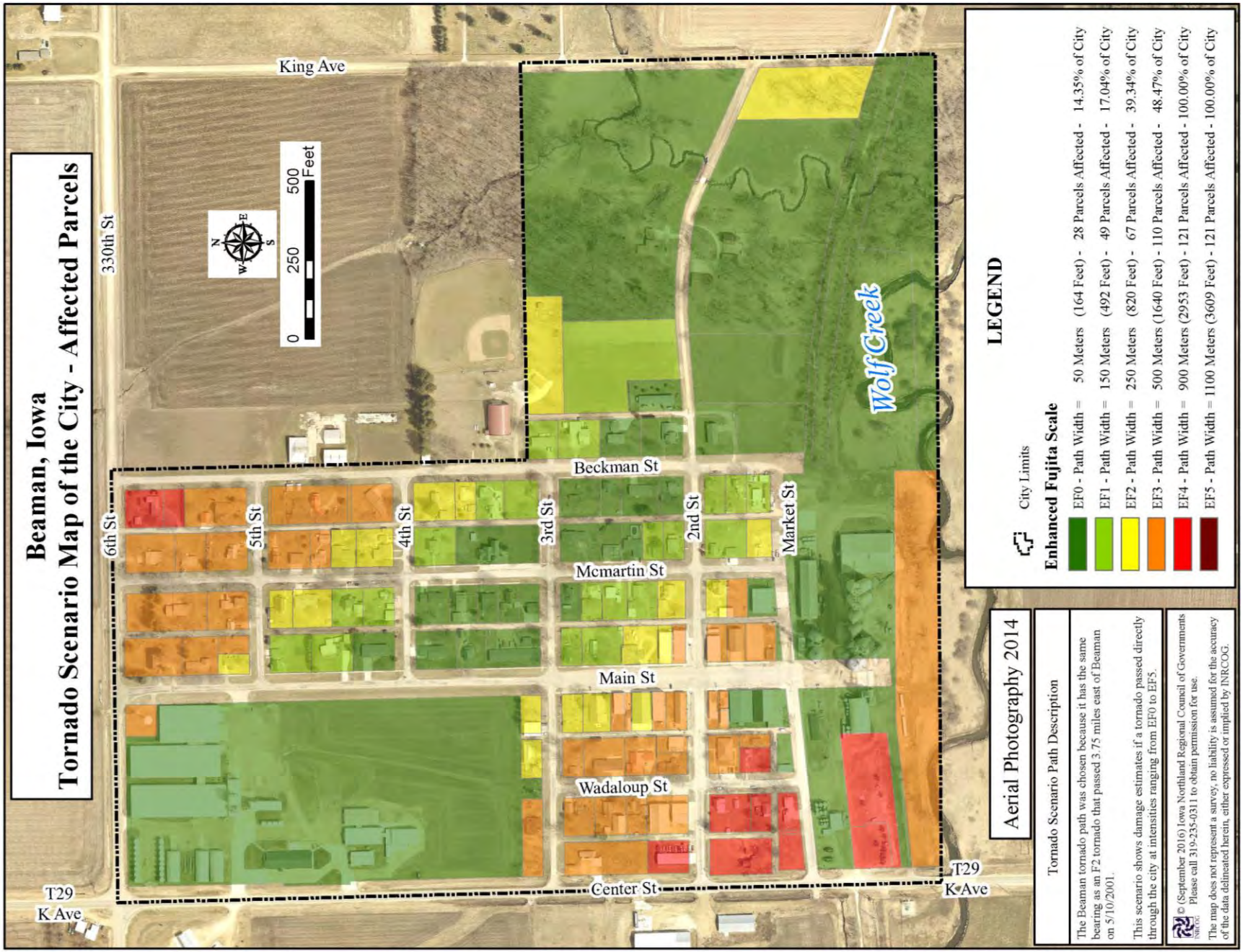
L80228

APPENDIX P: Tornado Scenario

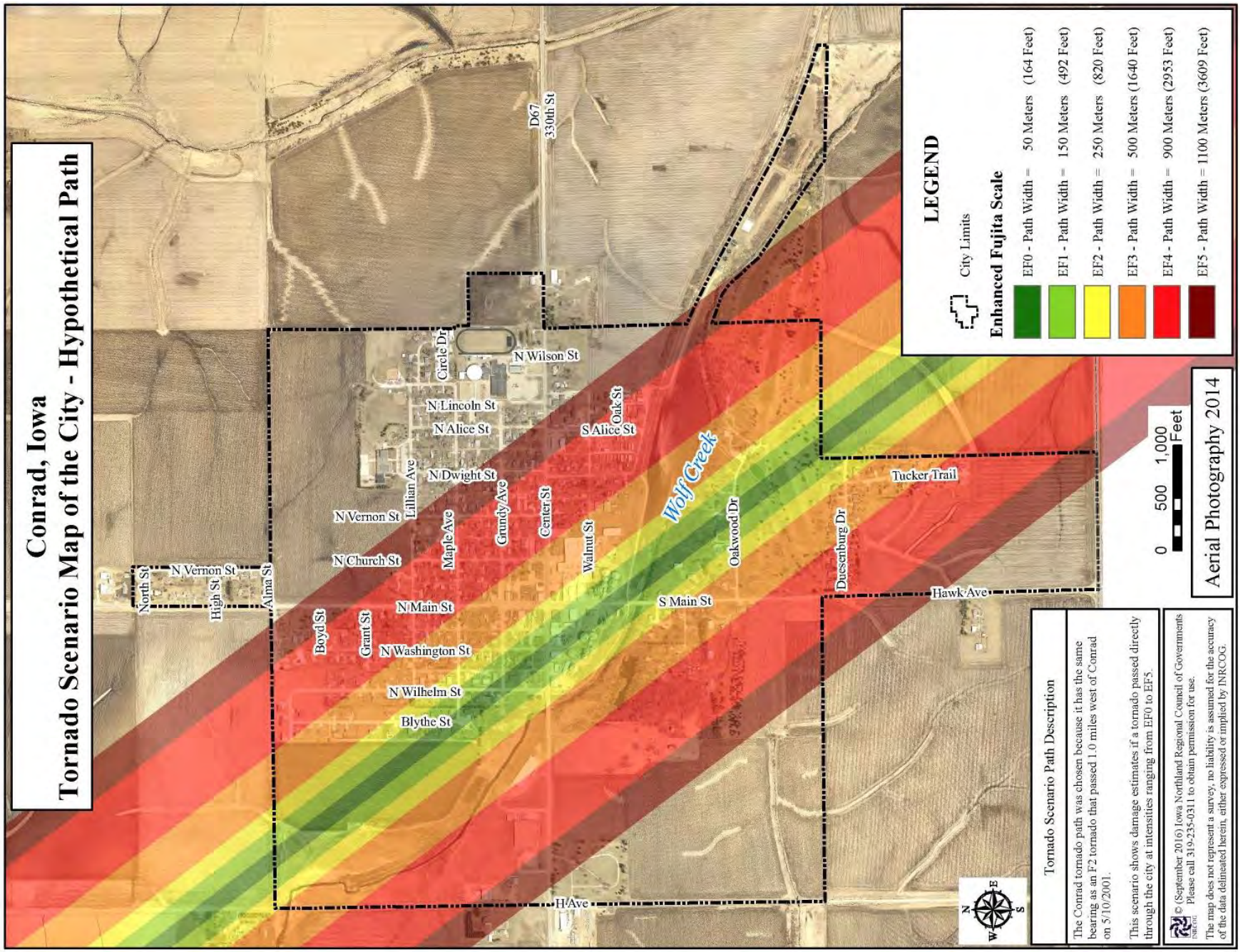


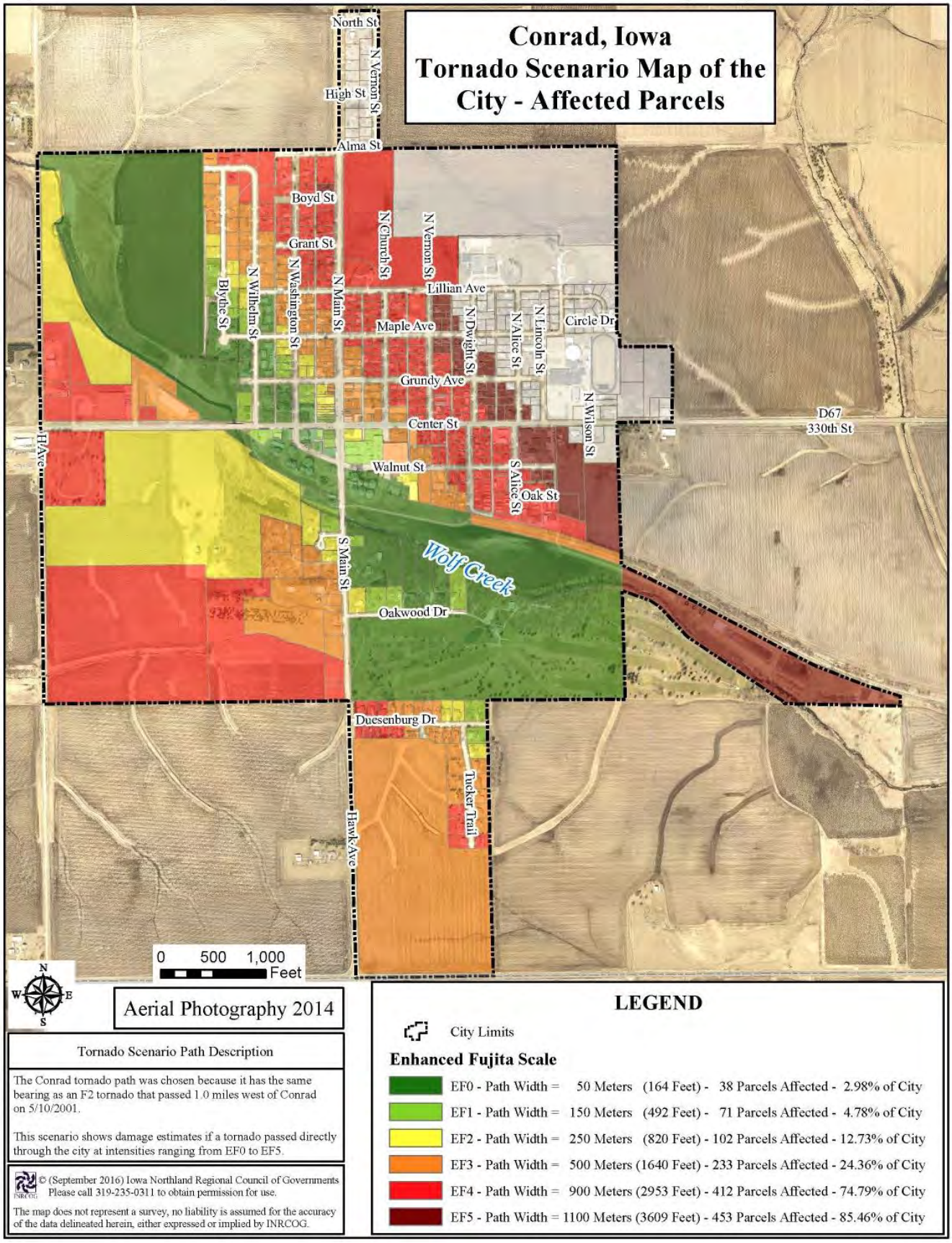
Map P-1: City of Beaman Tornado Scenario Map of the City – Hypothetical Path

Map P-2: City of Beaman Tornado Scenario Map of the City – Affected Parcels



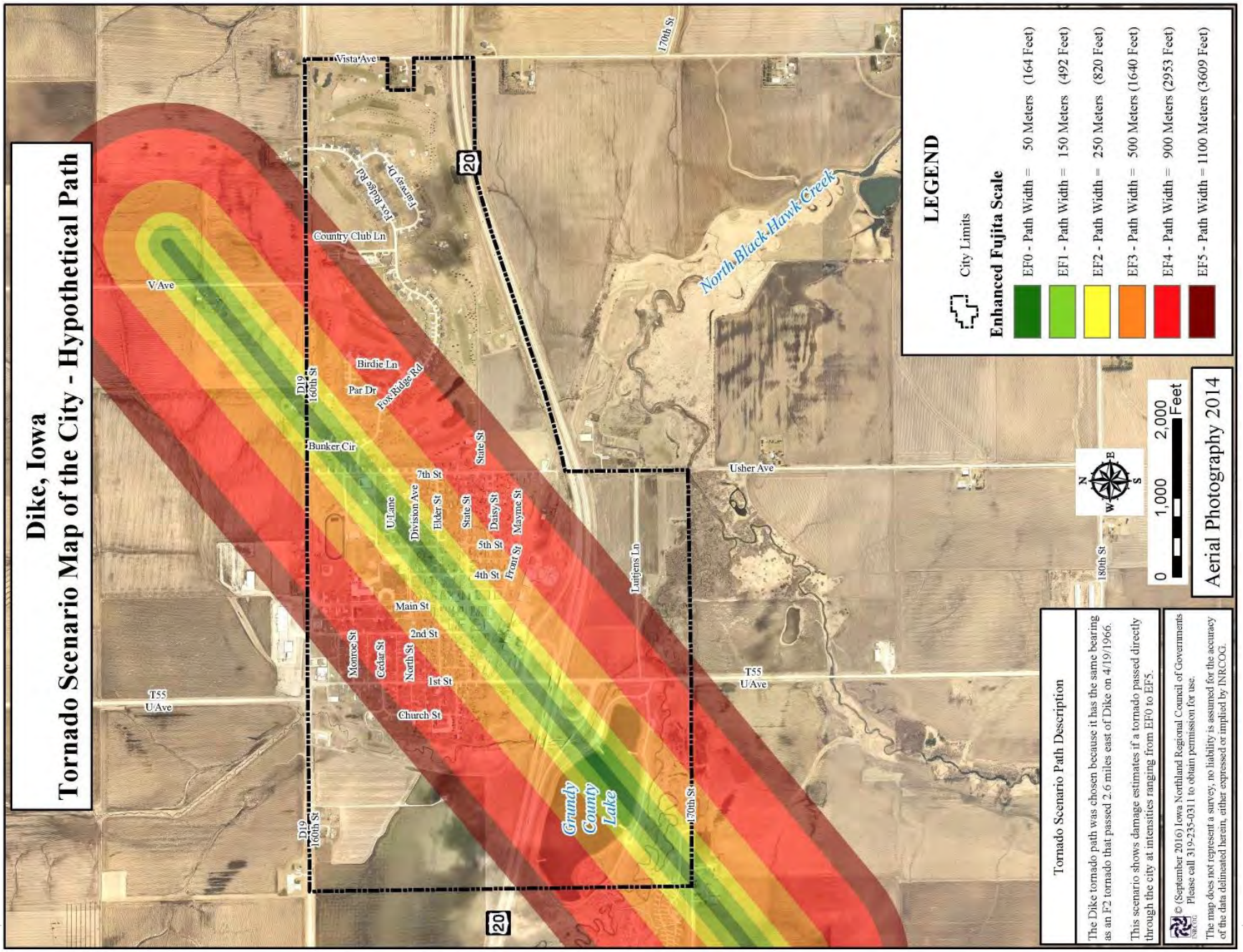
Map P-3: City of Conrad Tornado Scenario Map of the City – Hypothetical Path



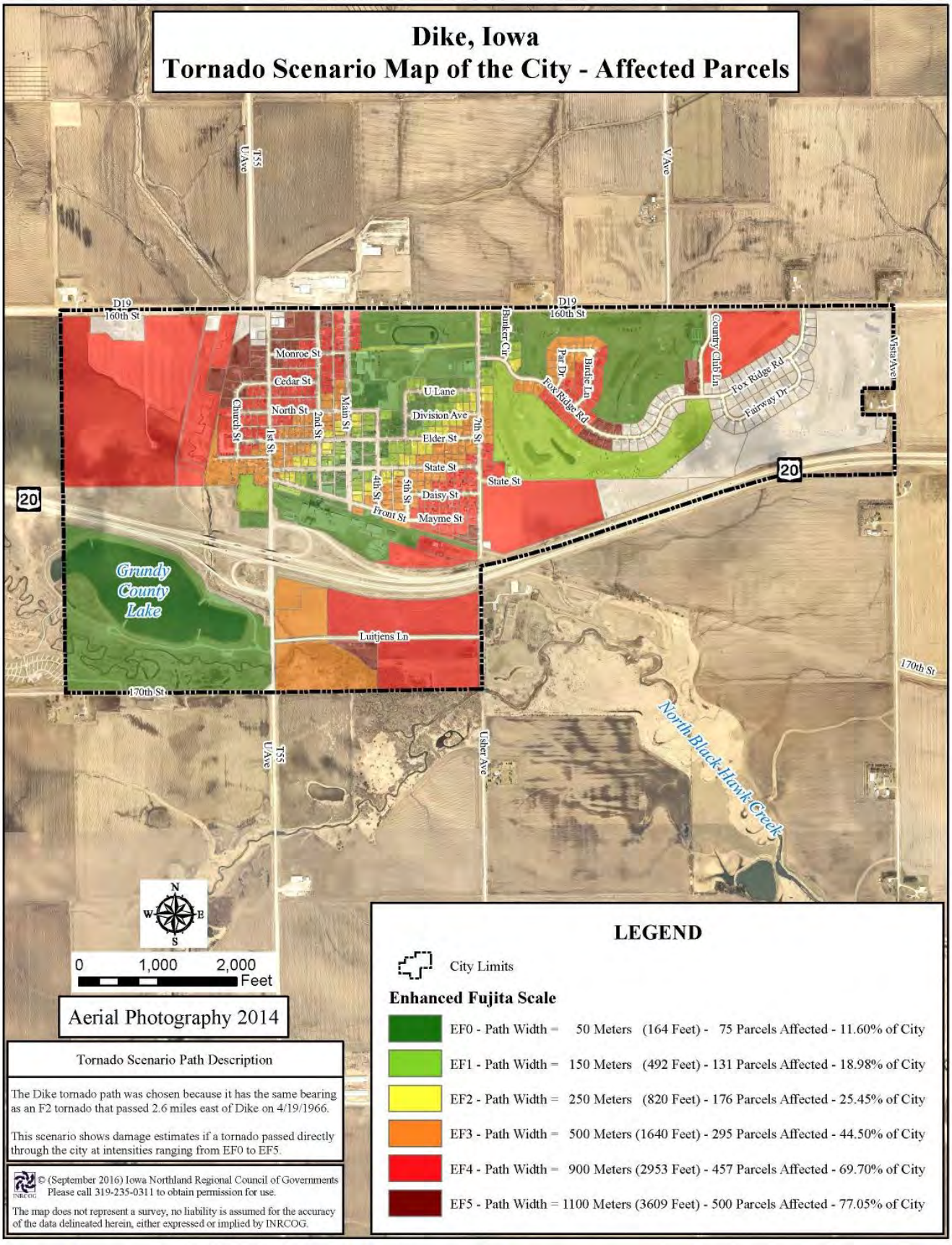


Map P-4: City of Conrad Tornado Scenario Map of the City – Affected Parcels

Map P-5: City of Dike Tornado Scenario Map of the City – Hypothetical Path



Dike, Iowa
Tornado Scenario Map of the City - Affected Parcels



LEGEND

City Limits

Enhanced Fujita Scale

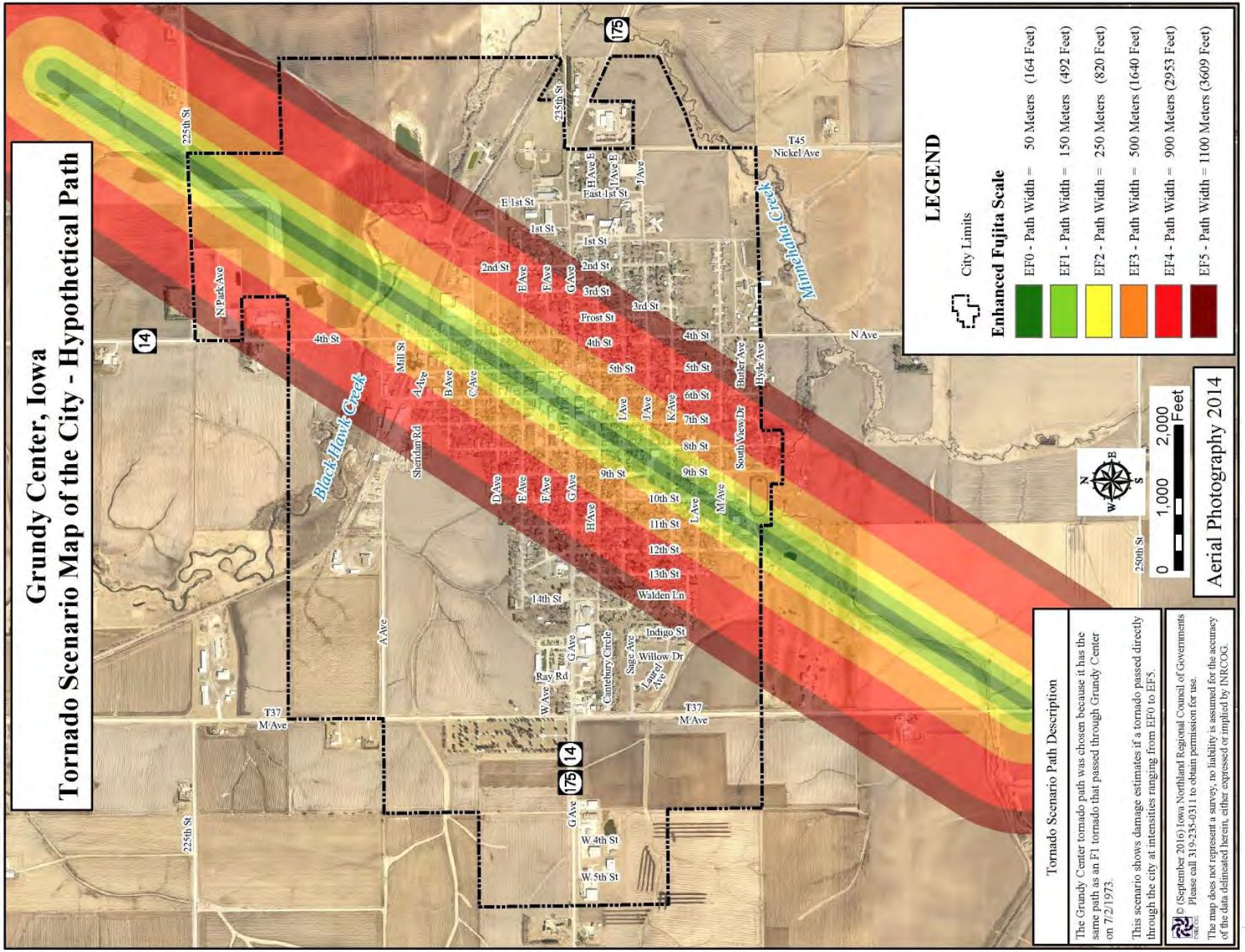
- EF0 - Path Width = 50 Meters (164 Feet) - 75 Parcels Affected - 11.60% of City
- EF1 - Path Width = 150 Meters (492 Feet) - 131 Parcels Affected - 18.98% of City
- EF2 - Path Width = 250 Meters (820 Feet) - 176 Parcels Affected - 25.45% of City
- EF3 - Path Width = 500 Meters (1640 Feet) - 295 Parcels Affected - 44.50% of City
- EF4 - Path Width = 900 Meters (2953 Feet) - 457 Parcels Affected - 69.70% of City
- EF5 - Path Width = 1100 Meters (3609 Feet) - 500 Parcels Affected - 77.05% of City

Tornado Scenario Path Description

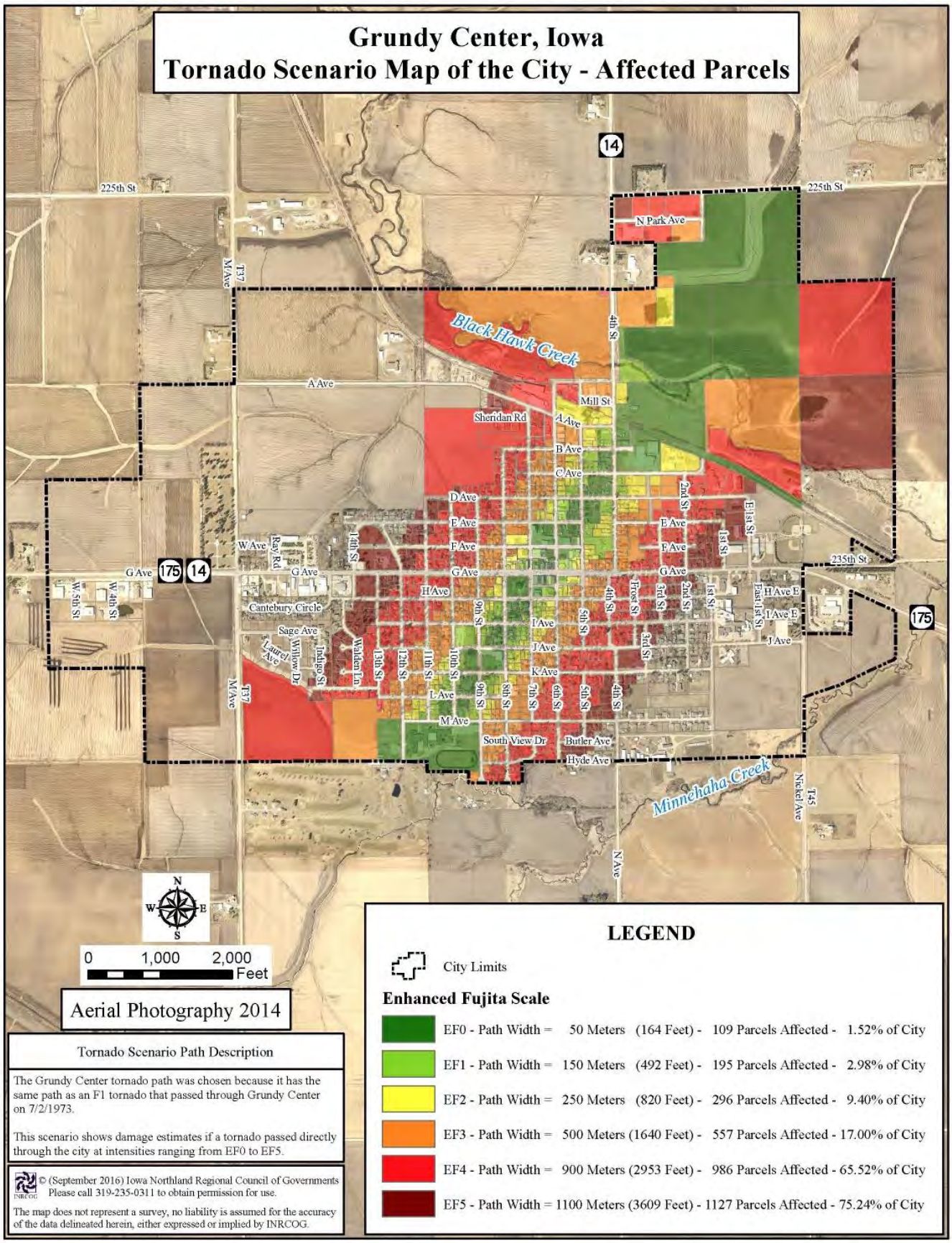
The Dike tornado path was chosen because it has the same bearing as an F2 tornado that passed 2.6 miles east of Dike on 4/19/1966.

This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.

Map P-7: City of Grundy Center Tornado Scenario Map of the City – Hypothetical Path



Grundy Center, Iowa
Tornado Scenario Map of the City - Affected Parcels



Aerial Photography 2014

LEGEND

City Limits

Enhanced Fujita Scale

EF0 - Path Width =	50 Meters	(164 Feet) -	109 Parcels Affected -	1.52% of City
EF1 - Path Width =	150 Meters	(492 Feet) -	195 Parcels Affected -	2.98% of City
EF2 - Path Width =	250 Meters	(820 Feet) -	296 Parcels Affected -	9.40% of City
EF3 - Path Width =	500 Meters	(1640 Feet) -	557 Parcels Affected -	17.00% of City
EF4 - Path Width =	900 Meters	(2953 Feet) -	986 Parcels Affected -	65.52% of City
EF5 - Path Width =	1100 Meters	(3609 Feet) -	1127 Parcels Affected -	75.24% of City

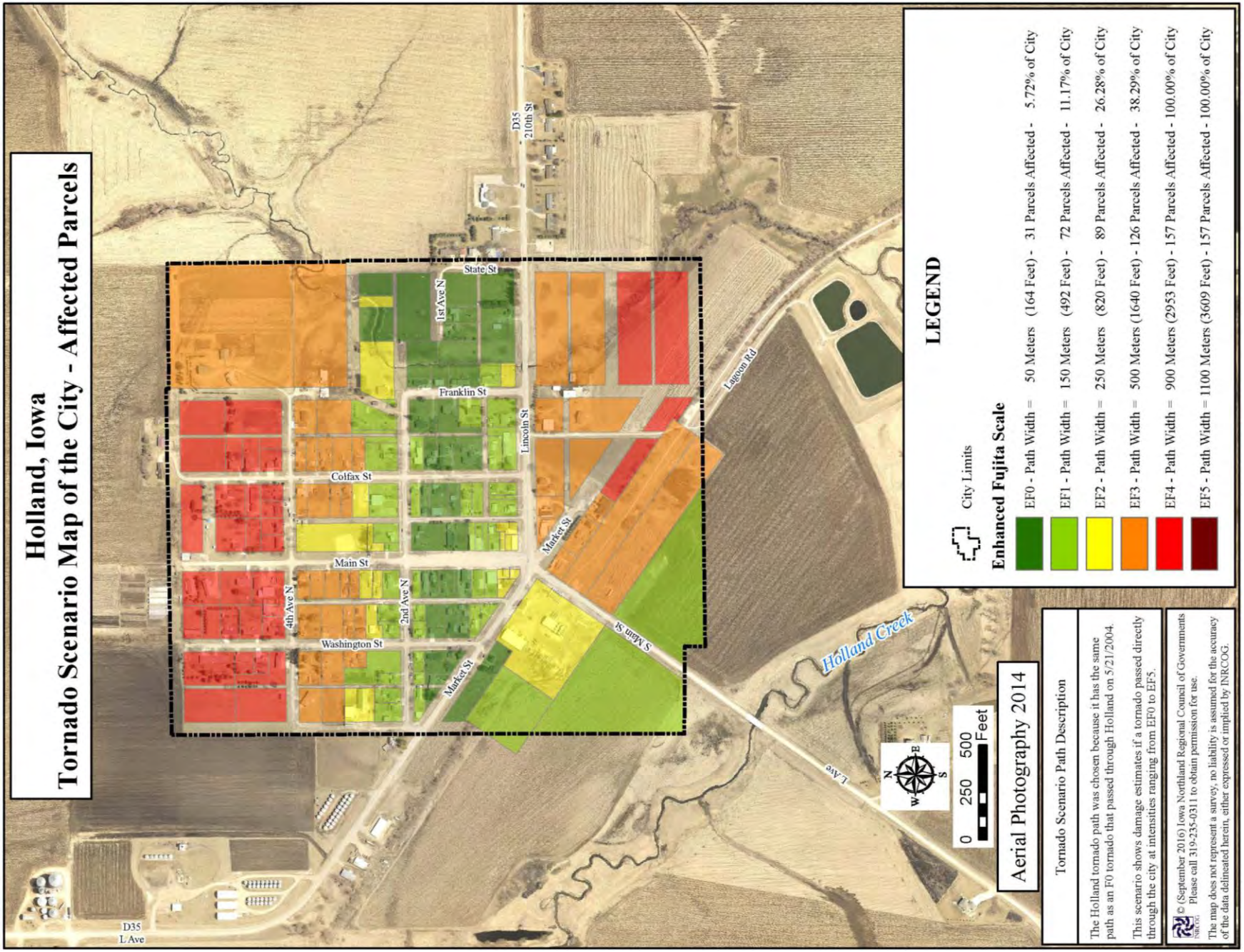
Tornado Scenario Path Description

The Grundy Center tornado path was chosen because it has the same path as an F1 tornado that passed through Grundy Center on 7/2/1973.

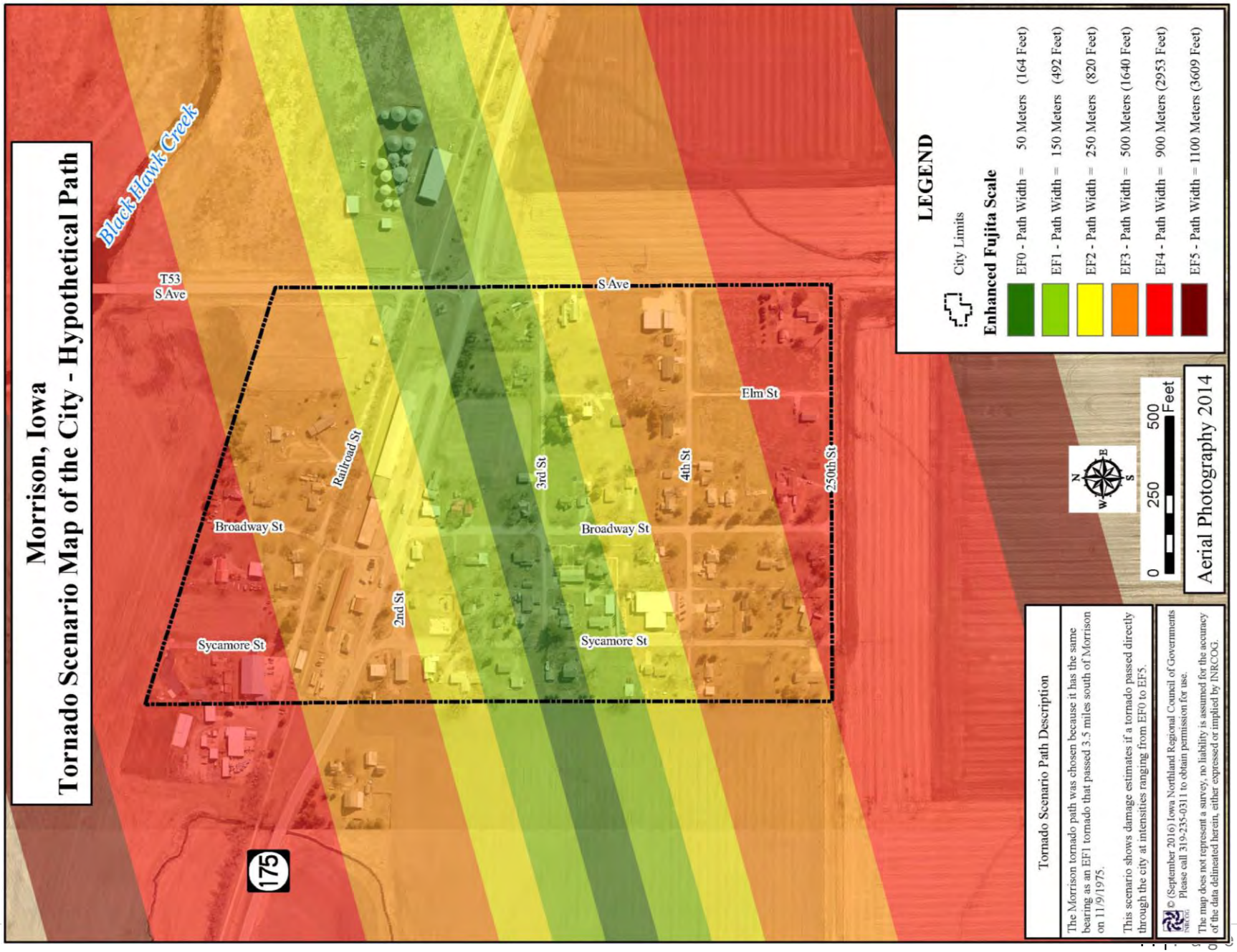
This scenario shows damage estimates if a tornado passed directly through the city at intensities ranging from EF0 to EF5.

Map P-9: City of Holland Tornado Scenario Map of the City – Hypothetical Path

Map P-10: City of Holland Tornado Scenario Map of the City – Affected Parcels

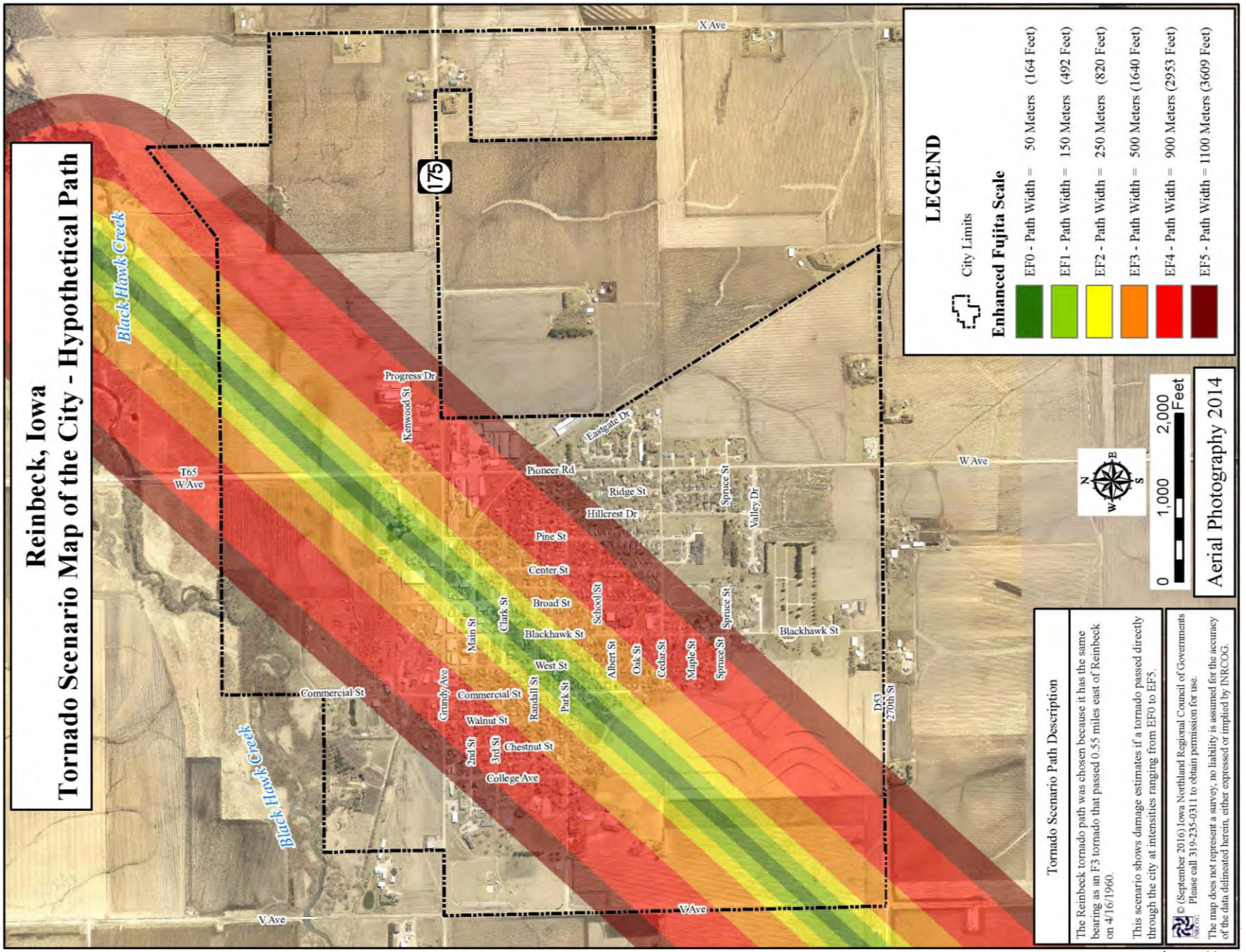


Map P-11: City of Morrison Tornado Scenario Map of the City – Hypothetical Path

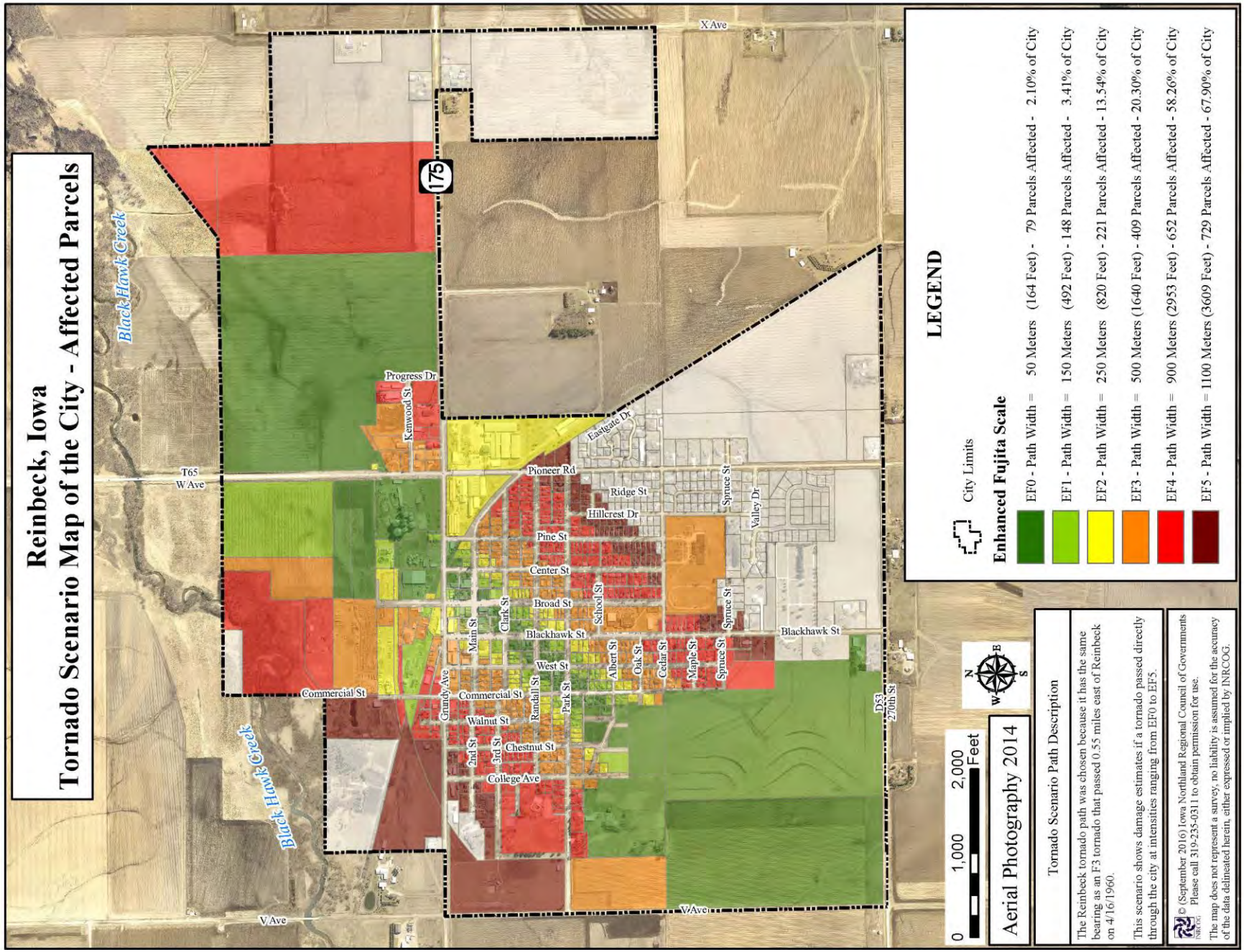


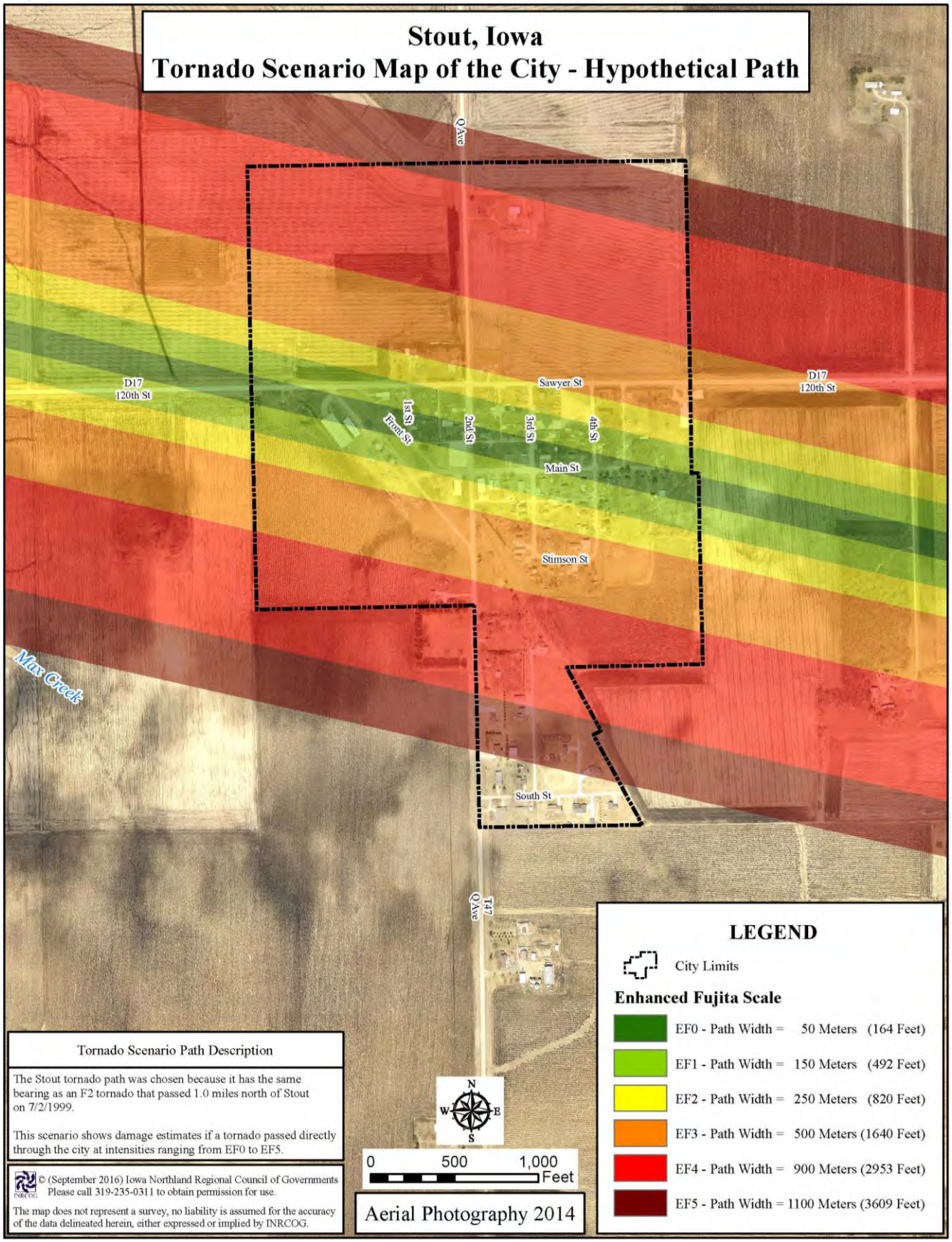
Map P-12: City of Morrison Tornado Scenario Map of the City – Affected Parcels

Map P-13: City of Reinbeck Tornado Scenario Map of the City – Hypothetical Path

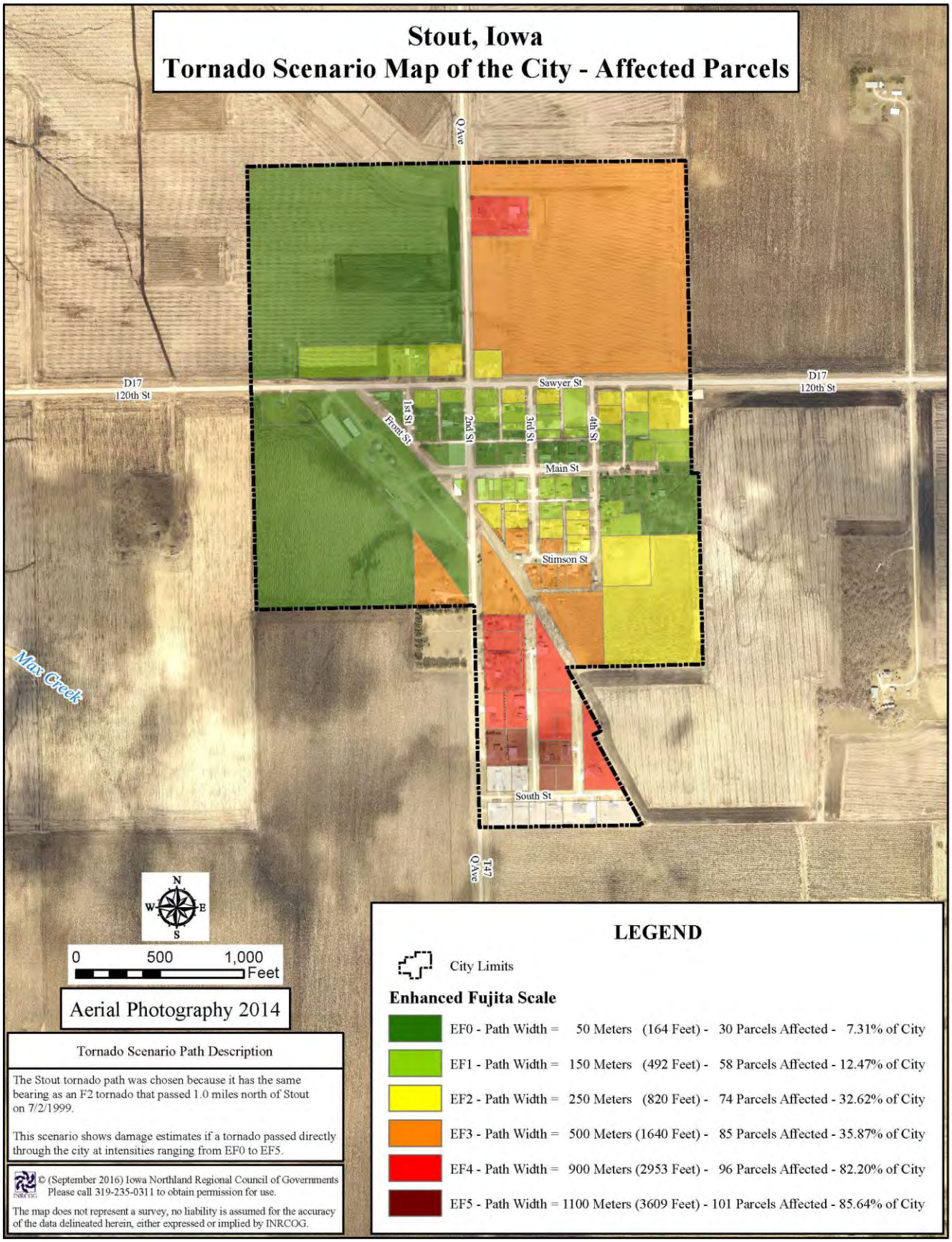


Map P-14: City of Reinbeck Tornado Scenario Map of the City – Affected Parcels

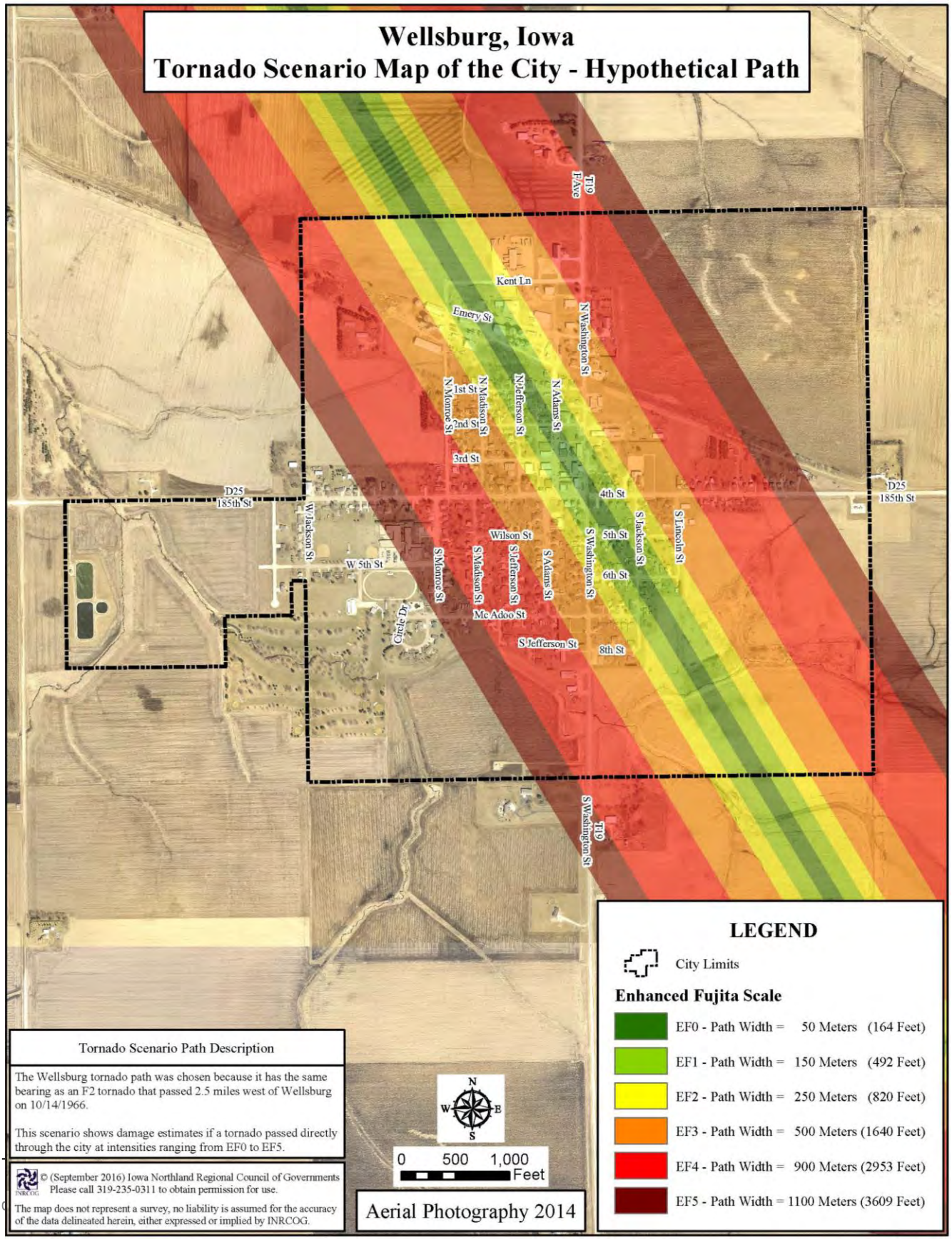




Map P-15: City of Stout Tornado Scenario Map of the City – Hypothetical Path

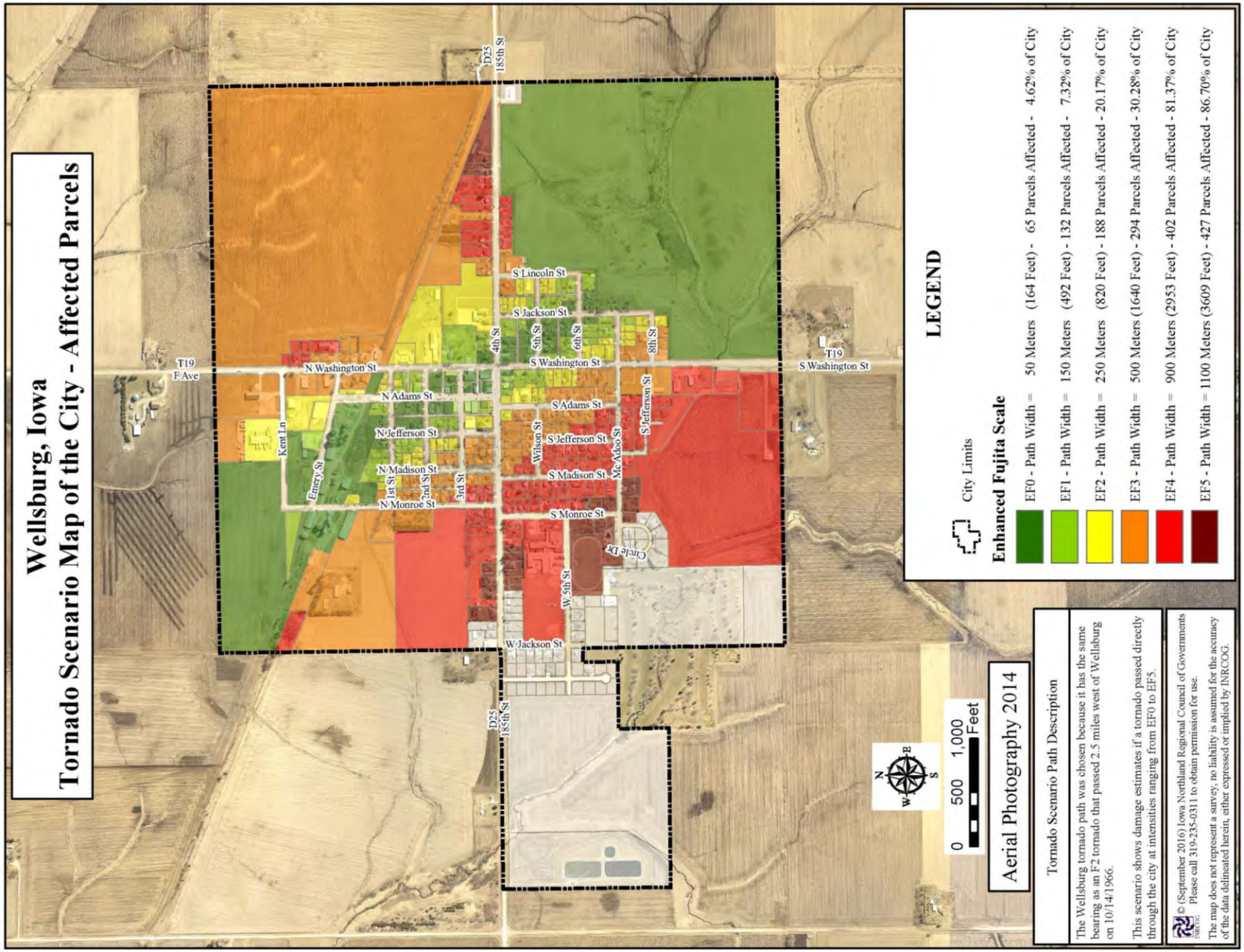


Map P-16: City of Stout Tornado Scenario Map of the City – Affected Parcels



Map P-13: City of Wellsburg Tornado Scenario Map of the City – Hypothetical Path

Map P-18: City of Wellsburg Tornado Scenario Map of the City – Affected Parcels



APPENDIX Q: Flood Scenario Maps

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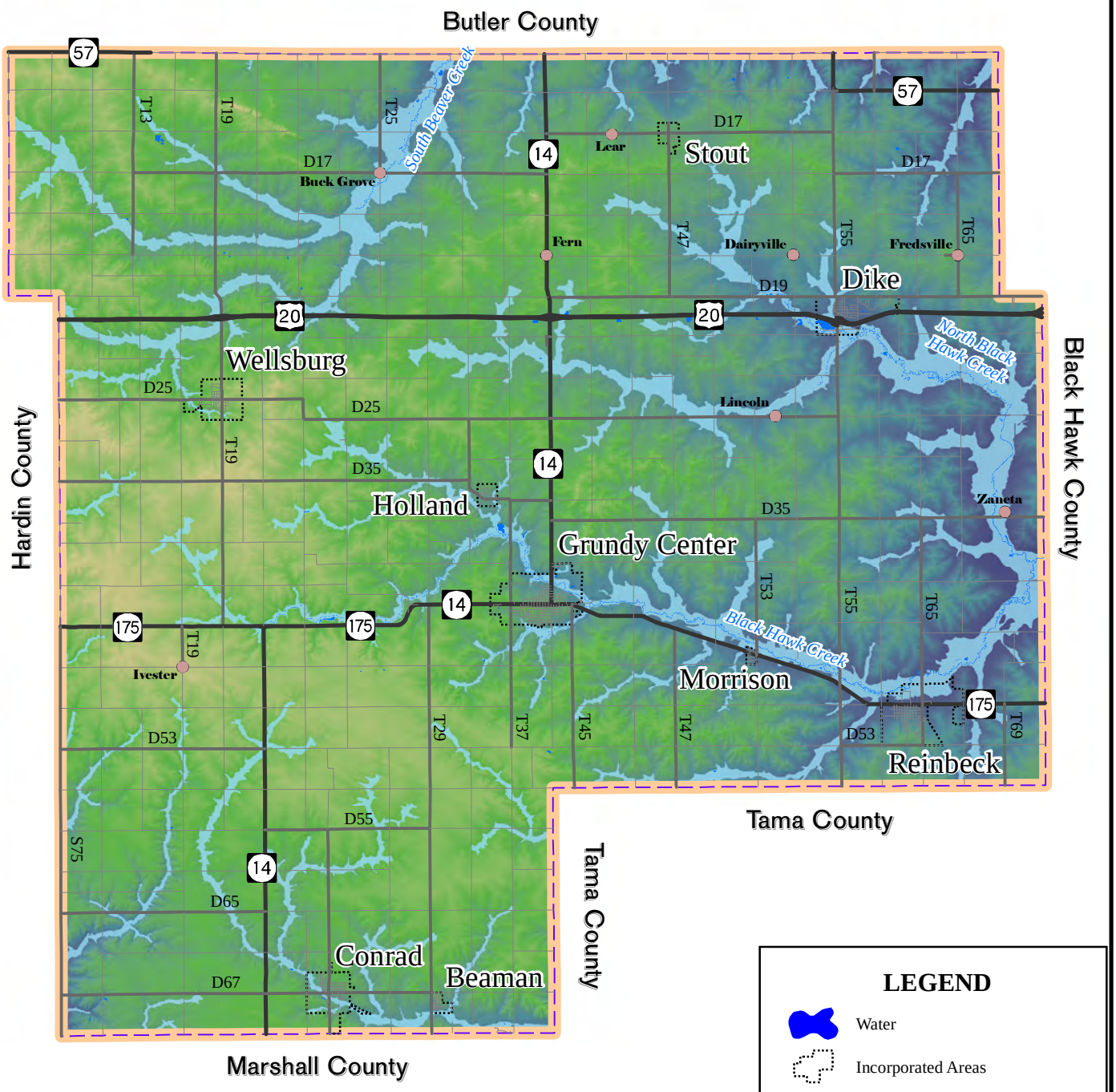
Grundy County, Iowa Flood Plain Map



DISCLAIMER

This flood overlay shows the current floodplain designations in the County. The digital flood layer was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Grundy County Effective 10/19/2005.

For actual determination if a location is within the floodplain please contact your local floodplain administrator.

N W E S

0 1 2 3 4 Miles

LEGEND

Water

Incorporated Areas

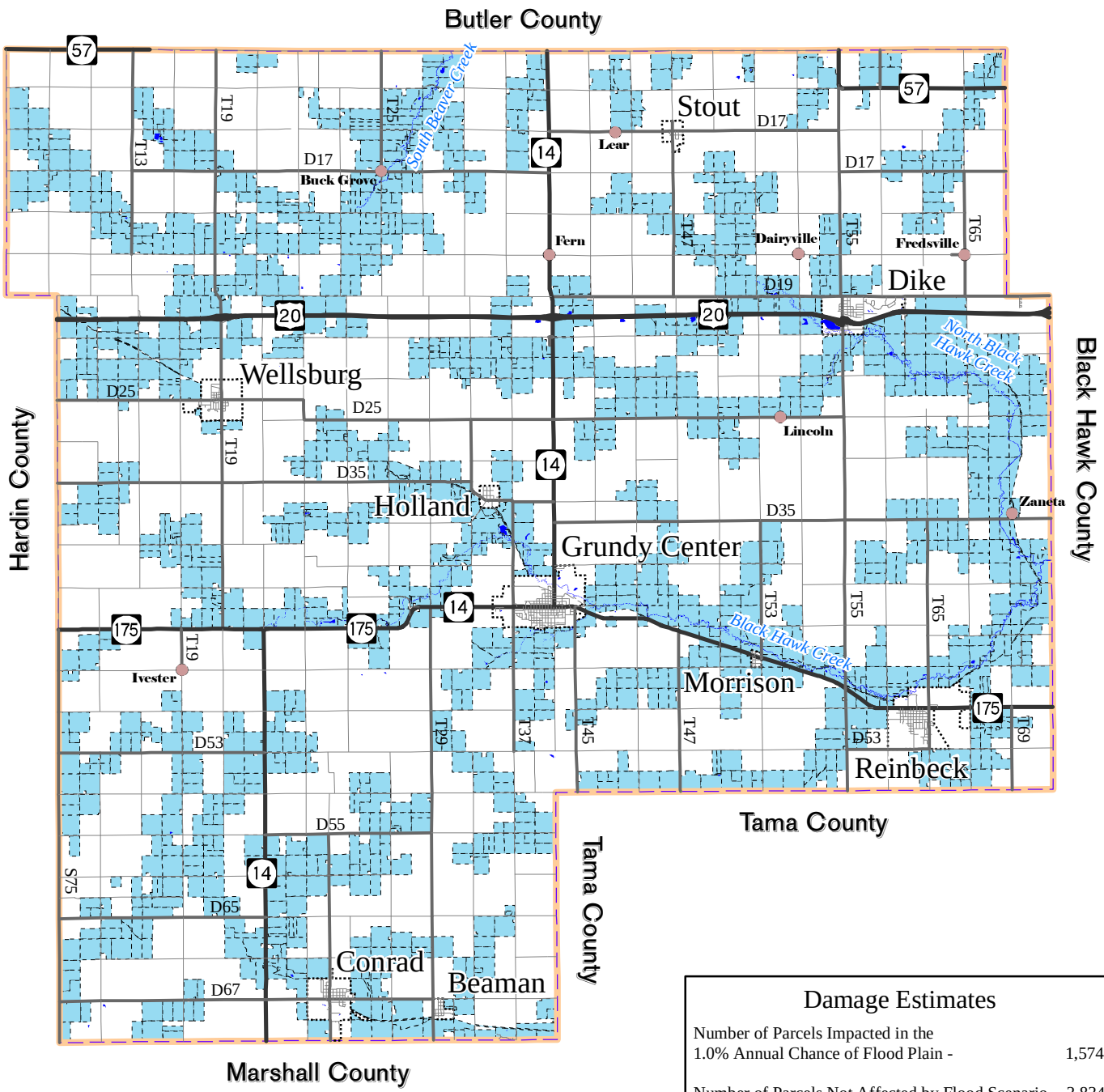
Flood Zone

1.0% Annual Chance of Flooding

Elevation Feet

1175
1070
970
860

Grundy County, Iowa
Flood Scenario Map (Unincorporated Areas Only)



Damage Estimates

Number of Parcels Impacted in the 1.0% Annual Chance of Flood Plain - 1,574

Number of Parcels Not Affected by Flood Scenario - 3,834

LEGEND

- Incorporated Areas
- Water

Flood Scenario

- Parcels Affected by 1.0% Annual Chance of Flooding
- Not in Flood Hazard Zone

DISCLAIMER

The digital flood layer used to calculate this scenario was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Grundy County. The effective date is 10/19/2005.

For actual determination if a location is within the floodplain please contact your local floodplain administrator.

N W E S

0 1 2 Miles

CIty of Beaman Flood Map

12/28/2023

1:8,226

USA Flood Hazard Areas

0.2% Annual Chance Flood Hazard

1% Annual Chance Flood Hazard

City

World Imagery

Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

Citations

2.4m Resolution Metadata

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

CONRAD

12/28/2023

USA Flood Hazard Areas

0.2% Annual Chance Flood Hazard

1% Annual Chance Flood Hazard

City

World Imagery

Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

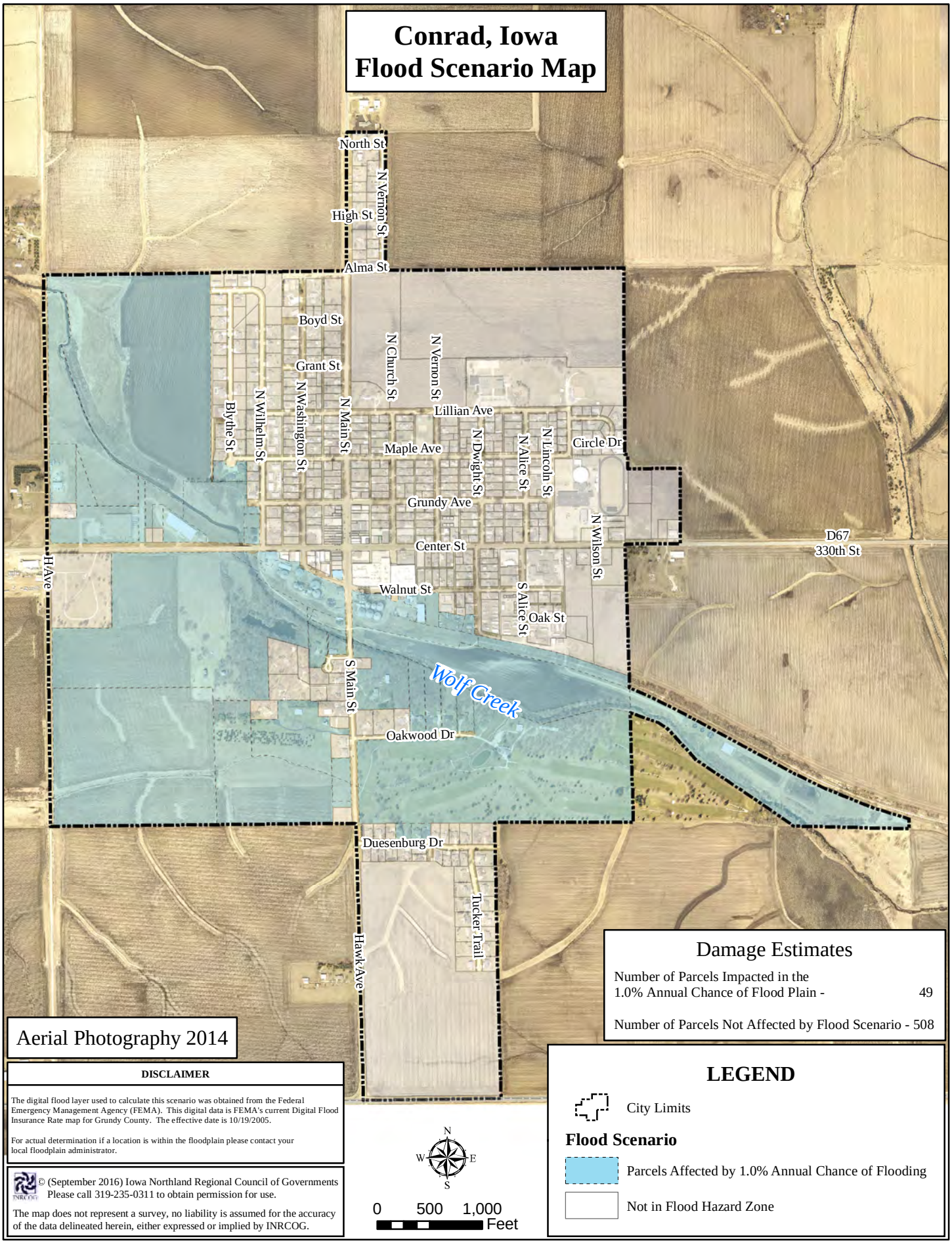
Citations

4.8m Resolution Metadata

1:16,451

0 0.1 0.2 0.4 mi

0 0.15 0.3 0.6 km


Conrad, Iowa
Flood Scenario Map
North St
N Vernon St
High St
Alma St
Boyd St
N Church St
N Vernon St
Grant St
N Washington St
N Wilhelm St
Blythe St
N Main St
Lillian Ave
Maple Ave
N Dwight St
N Alice St
N Lincoln St
Circle Dr
Grundy Ave
N Wilson St
D67
330th St
Center St
H Ave
Walnut St
S Alice St
Oak St
Wolf Creek
S Main St
Oakwood Dr
Duesenburg Dr
Tucker Trail
Hawk Ave
Damage Estimates
Number of Parcels Impacted in the
1.0% Annual Chance of Flood Plain - 49
Number of Parcels Not Affected by Flood Scenario - 508
Aerial Photography 2014
DISCLAIMER
The digital flood layer used to calculate this scenario was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Grundy County. The effective date is 10/19/2005.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
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Please call 319-235-0311 to obtain permission for use.
The map does not represent a survey, no liability is assumed for the accuracy of the data delineated herein, either expressed or implied by INRCOG.
N
W
E
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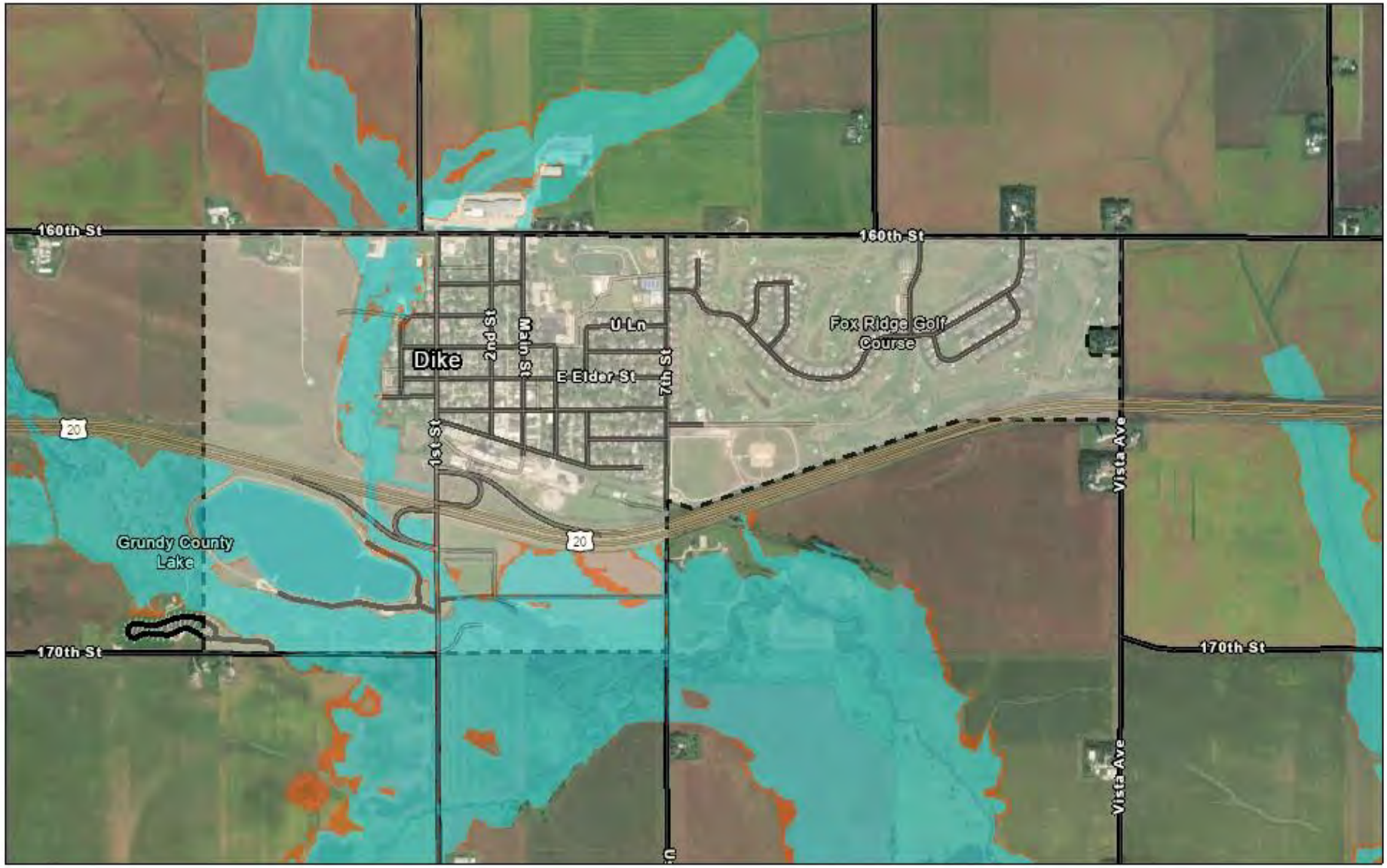
0 500 1,000
Feet
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone

City of Dike Flood Map



12/28/2023

USA Flood Hazard Areas

0.2% Annual Chance Flood Hazard

1% Annual Chance Flood Hazard

City

World Imagery

Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

Citations

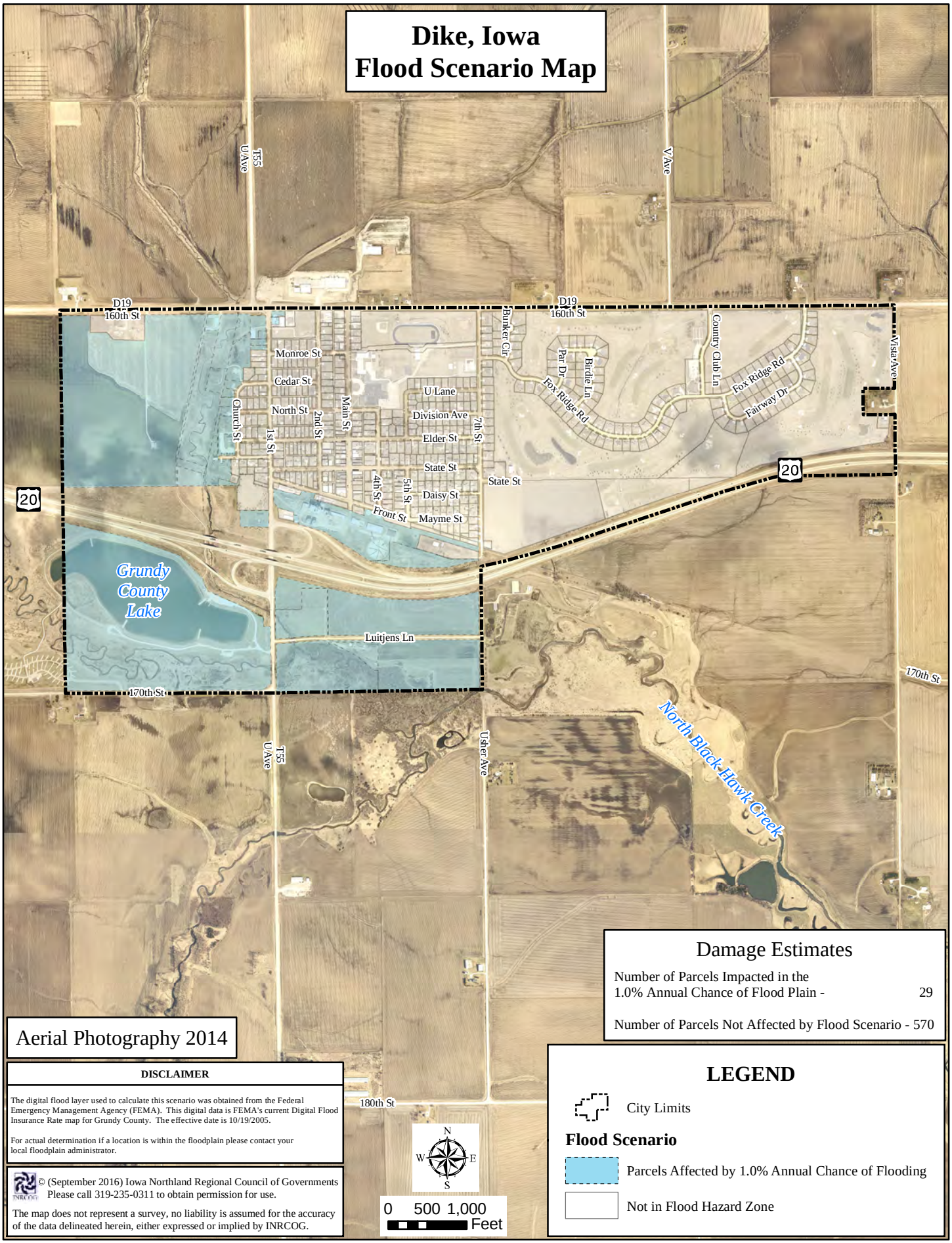
4.8m Resolution Metadata

1:25,971

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

Iowa DNR, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/ NASA, USGS, EPA, NPS, US Census Bureau, USDA, Maxar


Dike, Iowa
Flood Scenario Map
U Ave
T55
V Ave
D19
160th St
Monroe St
Cedar St
North St
Church St
1st St
2nd St
Main St
U Lane
Division Ave
Elder St
7th St
State St
4th St
5th St
Daisy St
Front St
Mayme St
Bunker Cir
Par Dr
Birdie Ln
Fox Ridge Rd
Country Club Ln
Fairway Dr
Vista Ave
20
Grundy County Lake
Luitjens Ln
170th St
Usher Ave
North Black Hawk Creek
180th St
N
W
E
S
0 500 1,000 Feet
Aerial Photography 2014
Damage Estimates
Number of Parcels Impacted in the 1.0% Annual Chance of Flood Plain - 29
Number of Parcels Not Affected by Flood Scenario - 570
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone
DISCLAIMER
The digital flood layer used to calculate this scenario was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Grundy County. The effective date is 10/19/2005.
For actual determination if a location is within the floodplain please contact your local floodplain administrator.
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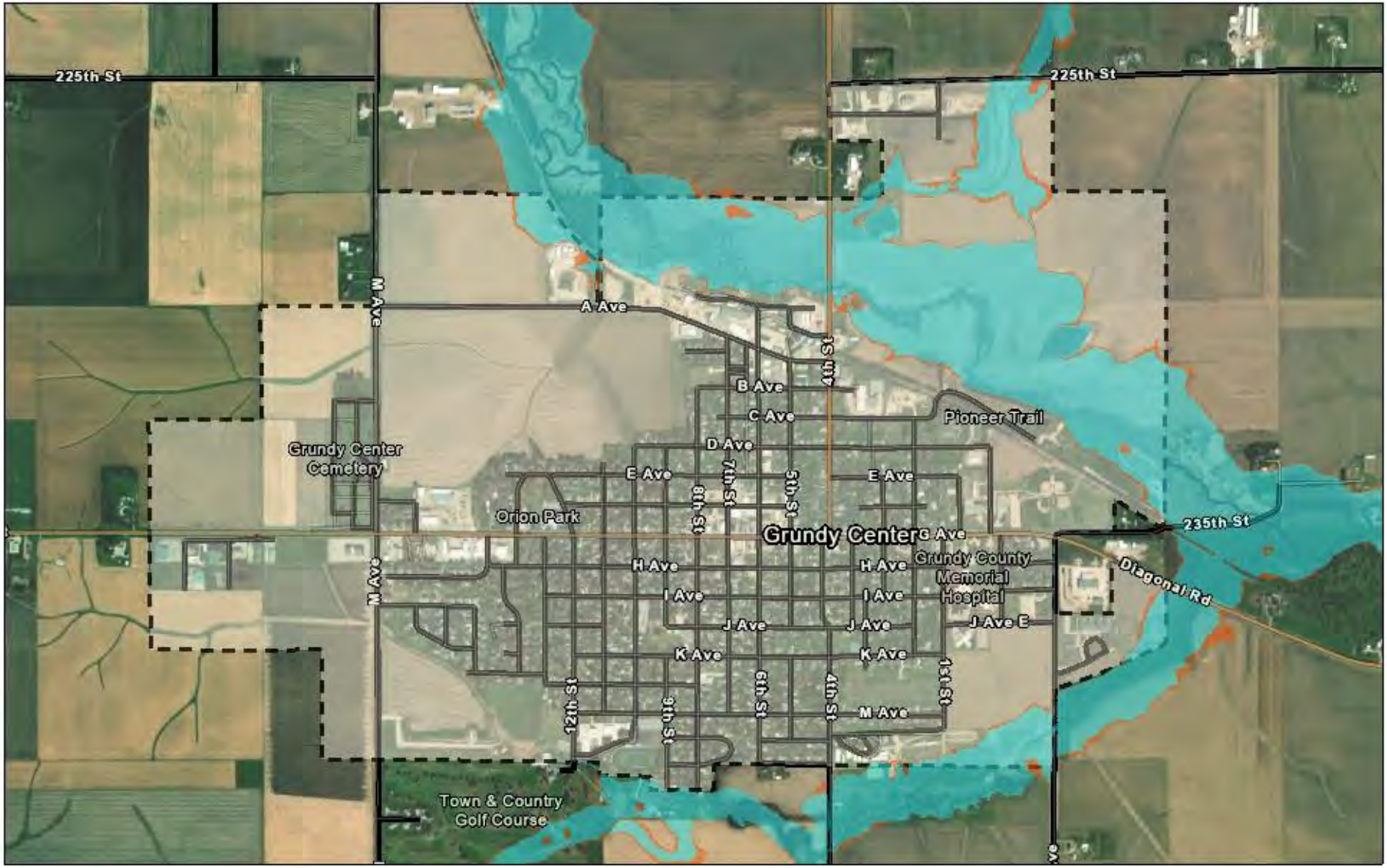
CIty of Grundy Center Flood Map



12/28/2023

USA Flood Hazard Areas

0.2% Annual Chance Flood Hazard

1% Annual Chance Flood Hazard

City

World Imagery

Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

Citations

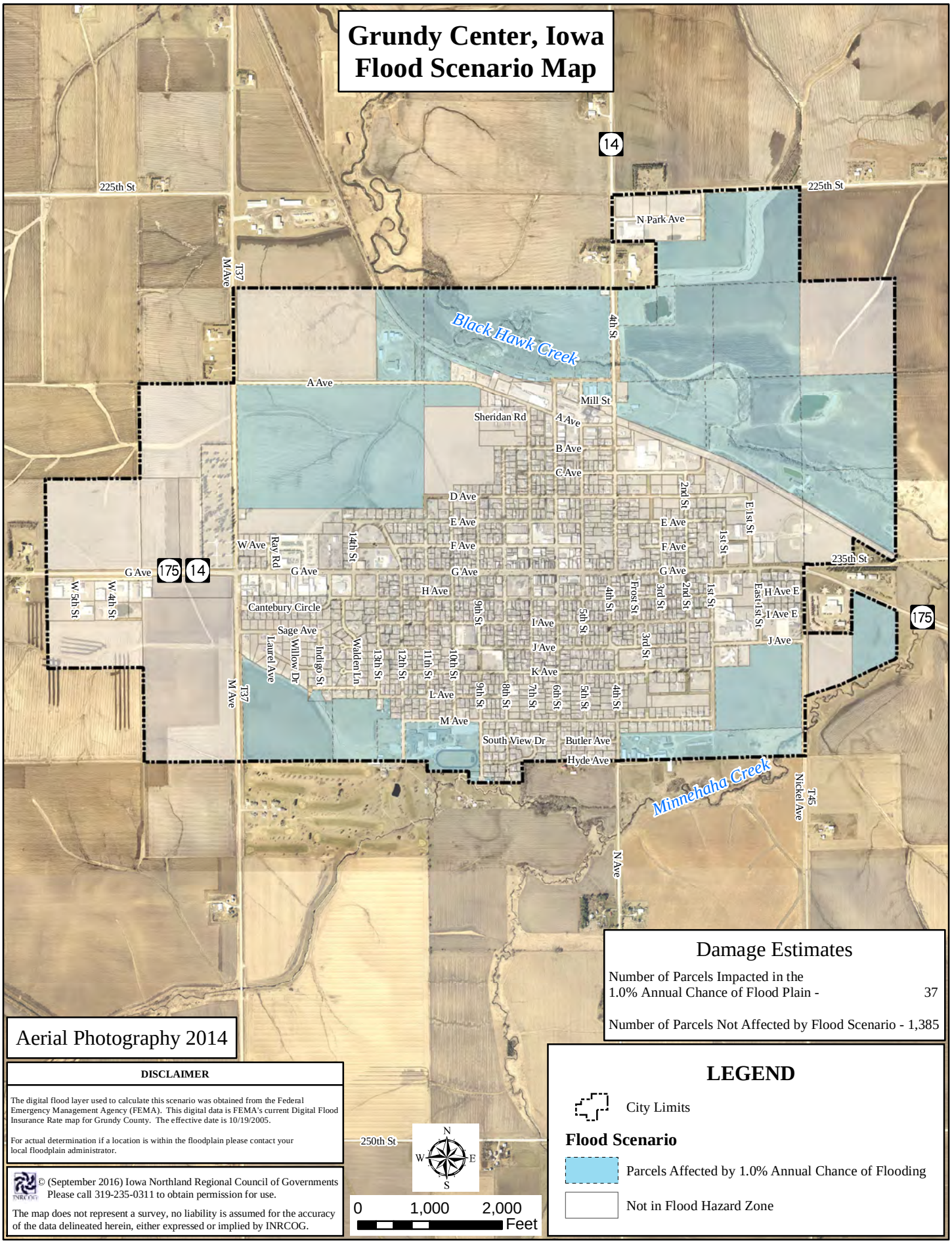
4.8m Resolution Metadata

1:25,971

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

Iowa DNR, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/ NASA, USGS, EPA, NPS, US Census Bureau, USDA, Maxar


Grundy Center, Iowa
Flood Scenario Map
Black Hawk Creek
Minnehaha Creek
225th St
N Park Ave
M Ave
T37
4th St
A Ave
Mill St
Sheridan Rd
B Ave
C Ave
D Ave
E Ave
F Ave
G Ave
H Ave
I Ave
J Ave
K Ave
L Ave
M Ave
W Ave
Ray Rd
14th St
175
14
W 5th St
W 4th St
Cantebury Circle
Sage Ave
Laurel Ave
Willow Dr
Indigo St
Walden Ln
13th St
12th St
11th St
10th St
9th St
8th St
7th St
6th St
5th St
4th St
3rd St
2nd St
1st St
Frost St
East 1st St
E 1st St
H Ave E
I Ave E
235th St
South View Dr
Butler Ave
Hyde Ave
Nickel Ave
T45
N Ave
250th St
N
S
E
W
0
1,000
2,000
Feet
Damage Estimates
Number of Parcels Impacted in the 1.0% Annual Chance of Flood Plain - 37
Number of Parcels Not Affected by Flood Scenario - 1,385
Aerial Photography 2014
DISCLAIMER
The digital flood layer used to calculate this scenario was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Grundy County. The effective date is 10/19/2005.
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LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone

City of Holland Flood Map

12/28/2023

USA Flood Hazard Areas

0.2% Annual Chance Flood Hazard

1% Annual Chance Flood Hazard

City

World Imagery

Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

Citations

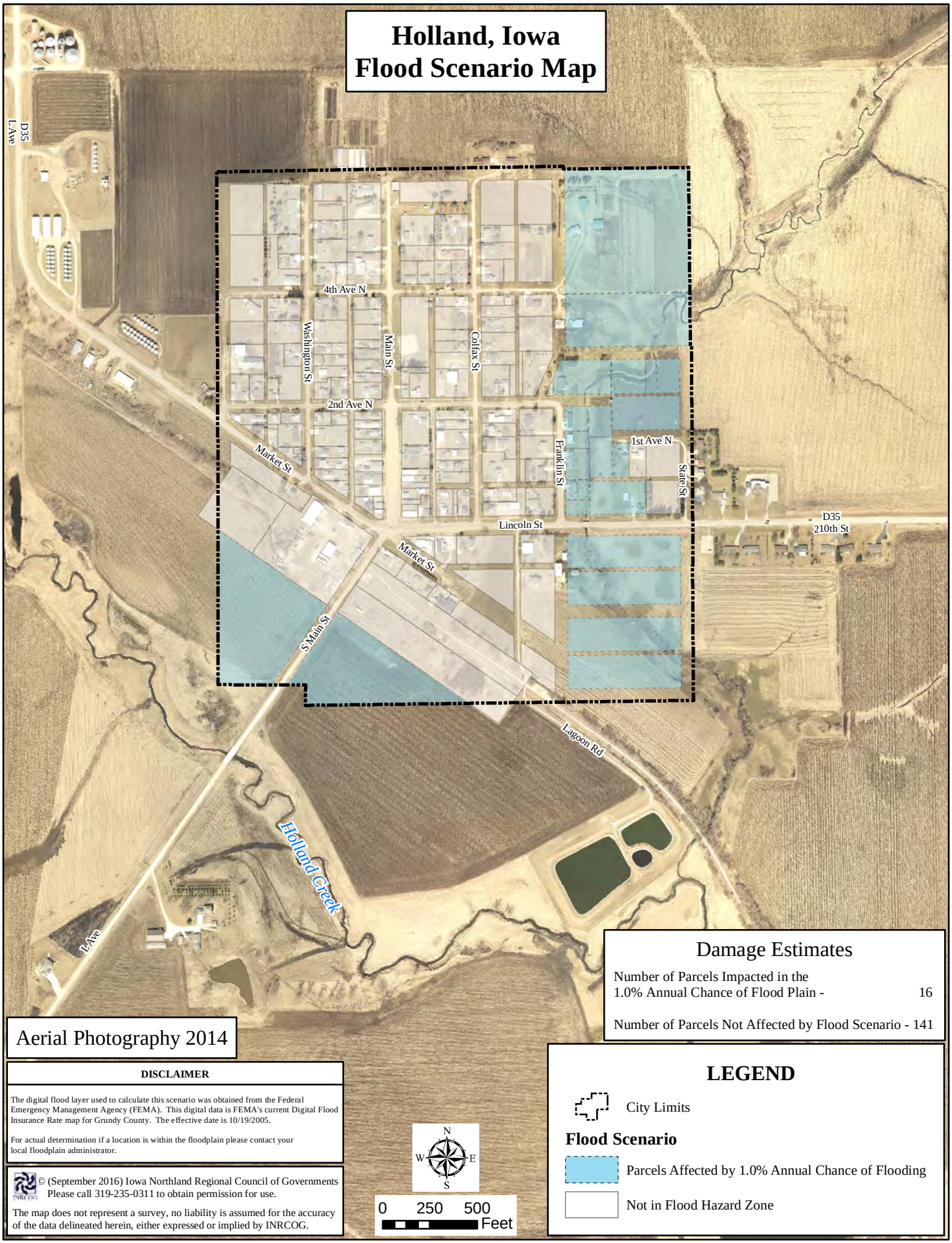
2.4m Resolution Metadata

1:12,985

0 0.07 0.15 0.3 mi

0 0.13 0.25 0.5 km

Maxar, Esri Community Maps Contributors, Iowa DNR, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US


Holland, Iowa
Flood Scenario Map
D35
L Ave
4th Ave N
Washington St
Main St
Colfax St
2nd Ave N
Market St
Franklin St
1st Ave N
State St
Lincoln St
D35
210th St
Market St
S Main St
Lagoon Rd
Holland Creek
L Ave
Damage Estimates
Number of Parcels Impacted in the
1.0% Annual Chance of Flood Plain - 16
Number of Parcels Not Affected by Flood Scenario - 141
Aerial Photography 2014
DISCLAIMER
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N
W
E
S
0 250 500
Feet
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone

City of Morrison Flood Map

12/28/2023

USA Flood Hazard Areas

- 0.2% Annual Chance Flood Hazard
- 1% Annual Chance Flood Hazard
- City

World Imagery

Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

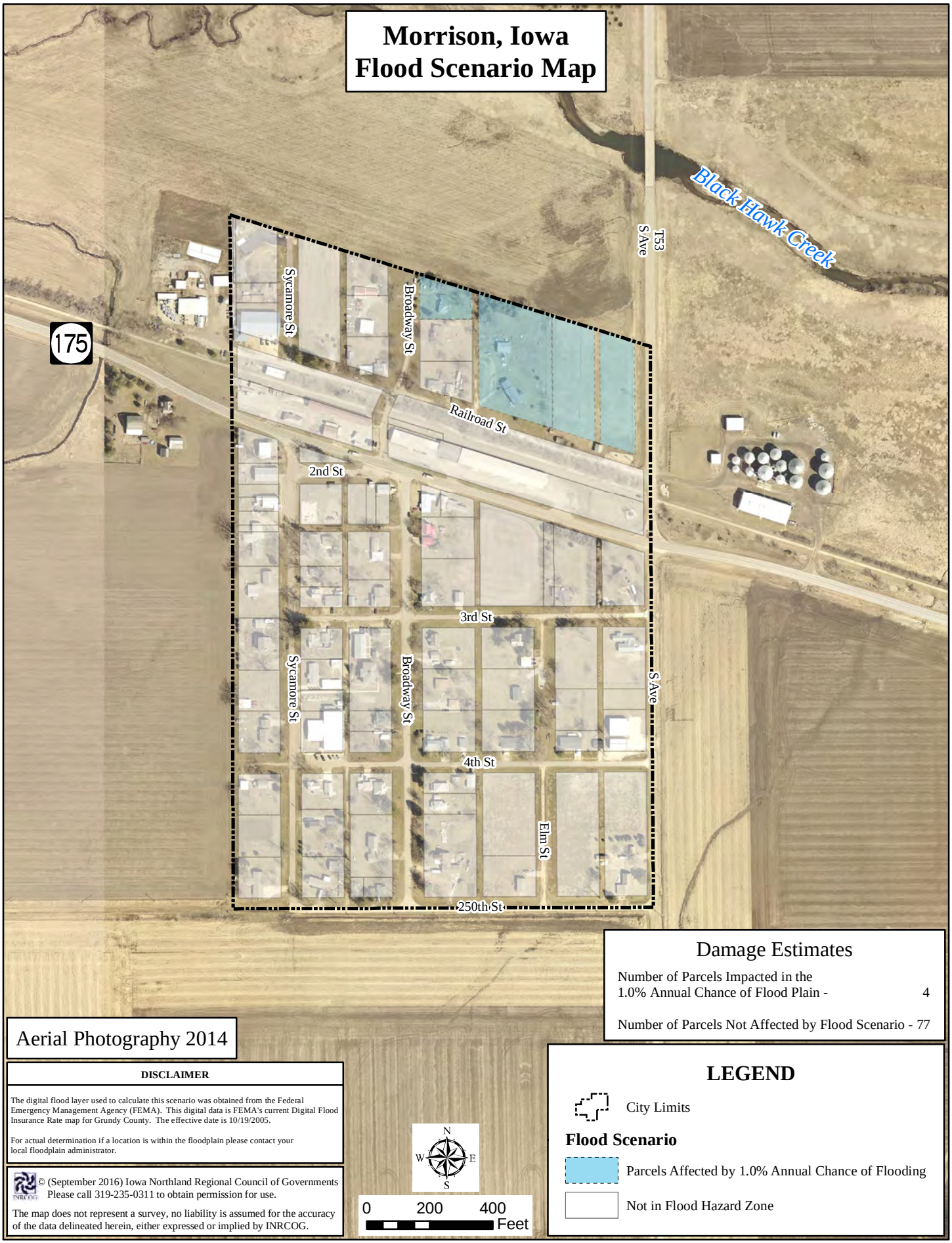
Citations

1.2m Resolution Metadata

1:6,493

0 0.04 0.08 0.16 mi

0 0.05 0.1 0.2 km


Morrison, Iowa
Flood Scenario Map
Black Hawk Creek
T53
S Ave
175
Sycamore St
Broadway St
Railroad St
2nd St
3rd St
4th St
Elm St
250th St
S Ave
Damage Estimates
Number of Parcels Impacted in the
1.0% Annual Chance of Flood Plain - 4
Number of Parcels Not Affected by Flood Scenario - 77
Aerial Photography 2014
DISCLAIMER
The digital flood layer used to calculate this scenario was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Grundy County. The effective date is 10/19/2005.
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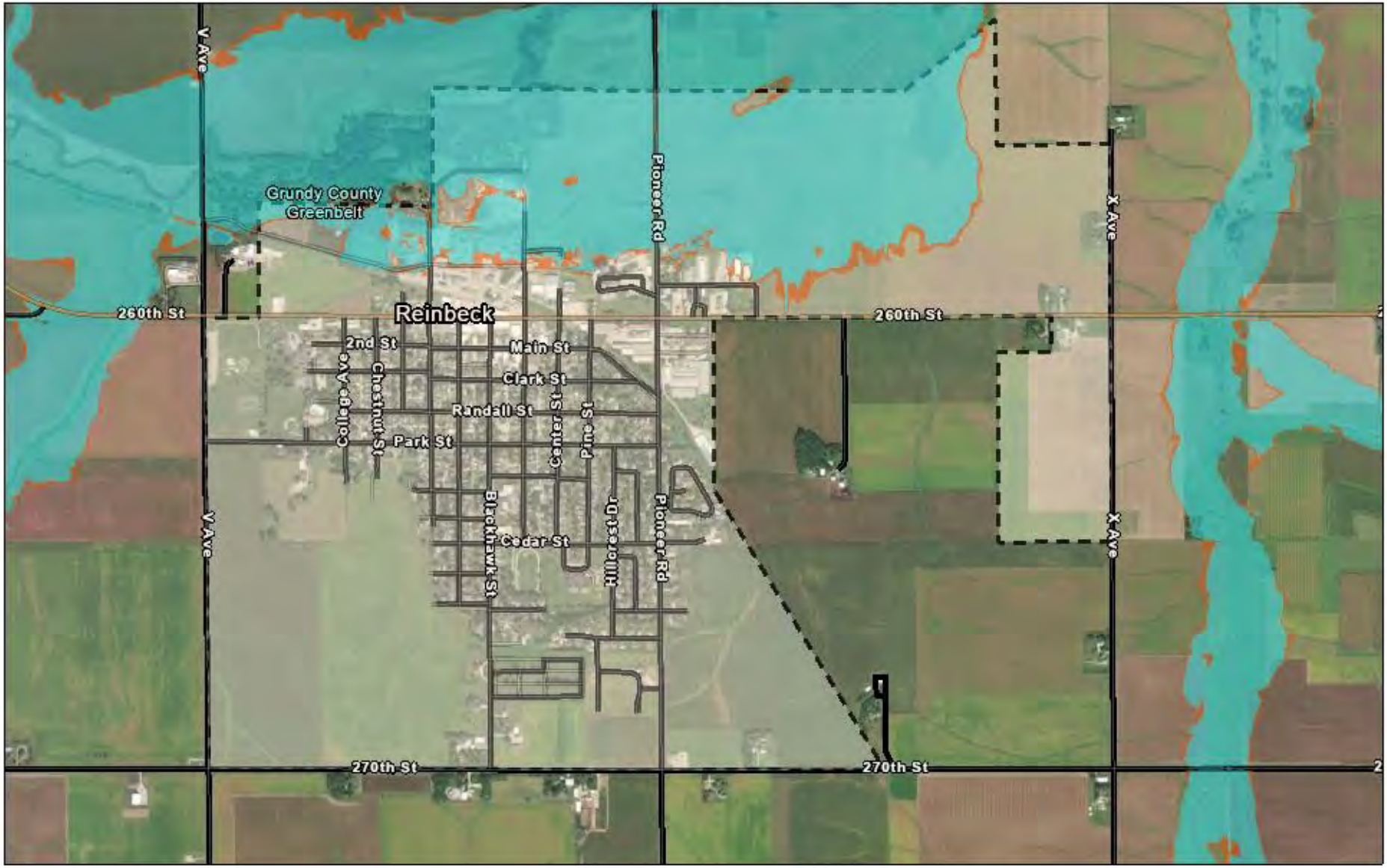
N
W
E
S
0 200 400
Feet
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone

City of Reinbeck Flood Map



12/28/2023

USA Flood Hazard Areas

- 0.2% Annual Chance Flood Hazard
- 1% Annual Chance Flood Hazard
- City

World Imagery

Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

Citations

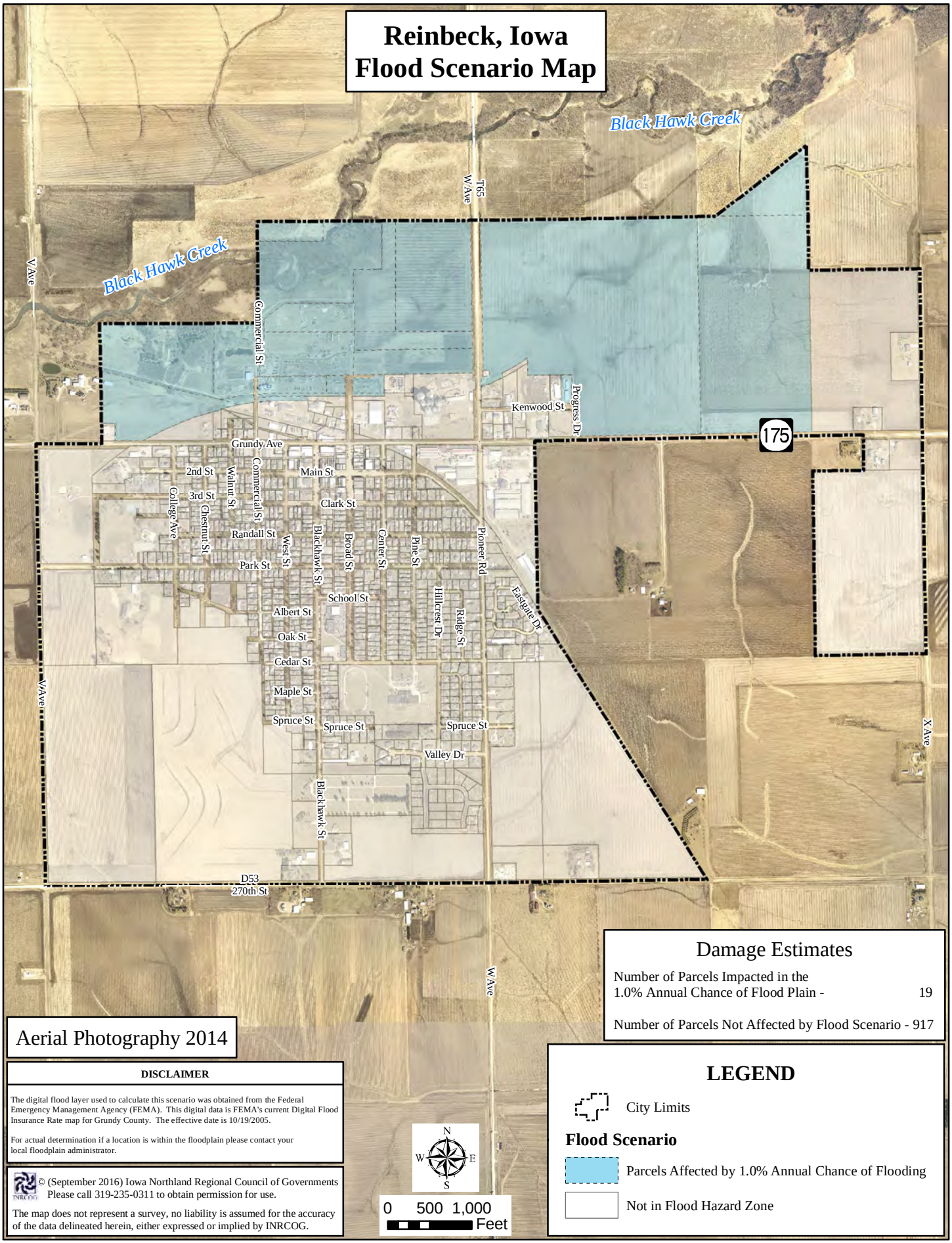
4.8m Resolution Metadata

1:25,971

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

Iowa DNR, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Maxar


Reinbeck, Iowa
Flood Scenario Map
Black Hawk Creek
Black Hawk Creek
W Ave
T65
V Ave
Commercial St
Kenwood St
Progress Dr
175
Grundy Ave
2nd St
Walnut St
Commercial St
Main St
3rd St
College Ave
Chestnut St
Clark St
Randall St
West St
Blackhawk St
Broad St
Center St
Pine St
Pioneer Rd
Park St
School St
Hillcrest Dr
Ridge St
Eastgate Dr
Albert St
Oak St
Cedar St
Maple St
Spruce St
Spruce St
Spruce St
Valley Dr
Blackhawk St
V Ave
X Ave
D53
270th St
W Ave
Damage Estimates
Number of Parcels Impacted in the
1.0% Annual Chance of Flood Plain - 19
Number of Parcels Not Affected by Flood Scenario - 917
Aerial Photography 2014
DISCLAIMER
The digital flood layer used to calculate this scenario was obtained from the Federal Emergency Management Agency (FEMA). This digital data is FEMA's current Digital Flood Insurance Rate map for Grundy County. The effective date is 10/19/2005.
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N
W
E
S
0 500 1,000
Feet
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone

City of Stout Flood Map

12/28/2023

USA Flood Hazard Areas

0.2% Annual Chance Flood Hazard

1% Annual Chance Flood Hazard

City

World Imagery

Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

Citations

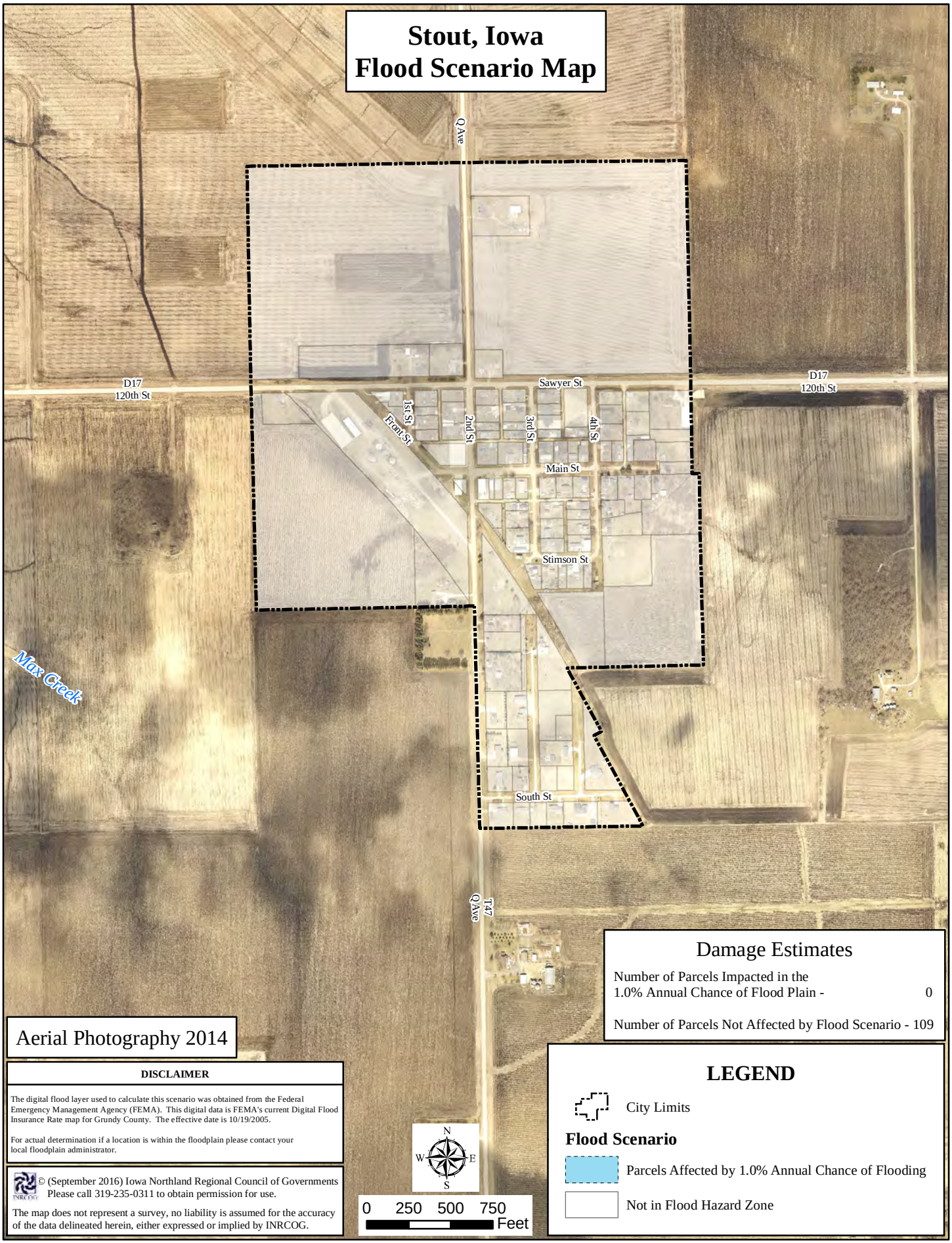
2.4m Resolution Metadata

1:12,985

0 0.07 0.15 0.3 mi

0 0.13 0.25 0.5 km

Maxar, Esri Community Maps Contributors, Iowa DNR, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US


Stout, Iowa
Flood Scenario Map
Q Ave
D17
120th St
Sawyer St
1st St
From St
2nd St
3rd St
4th St
Main St
Stimson St
South St
Max Creek
T47
Aerial Photography 2014
DISCLAIMER
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N
W
E
S
0 250 500 750
Feet
Damage Estimates
Number of Parcels Impacted in the 1.0% Annual Chance of Flood Plain - 0
Number of Parcels Not Affected by Flood Scenario - 109
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone

City of Wellsburg Flood Map

12/28/2023

USA Flood Hazard Areas

- 0.2% Annual Chance Flood Hazard
- 1% Annual Chance Flood Hazard
- City

World Imagery

Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

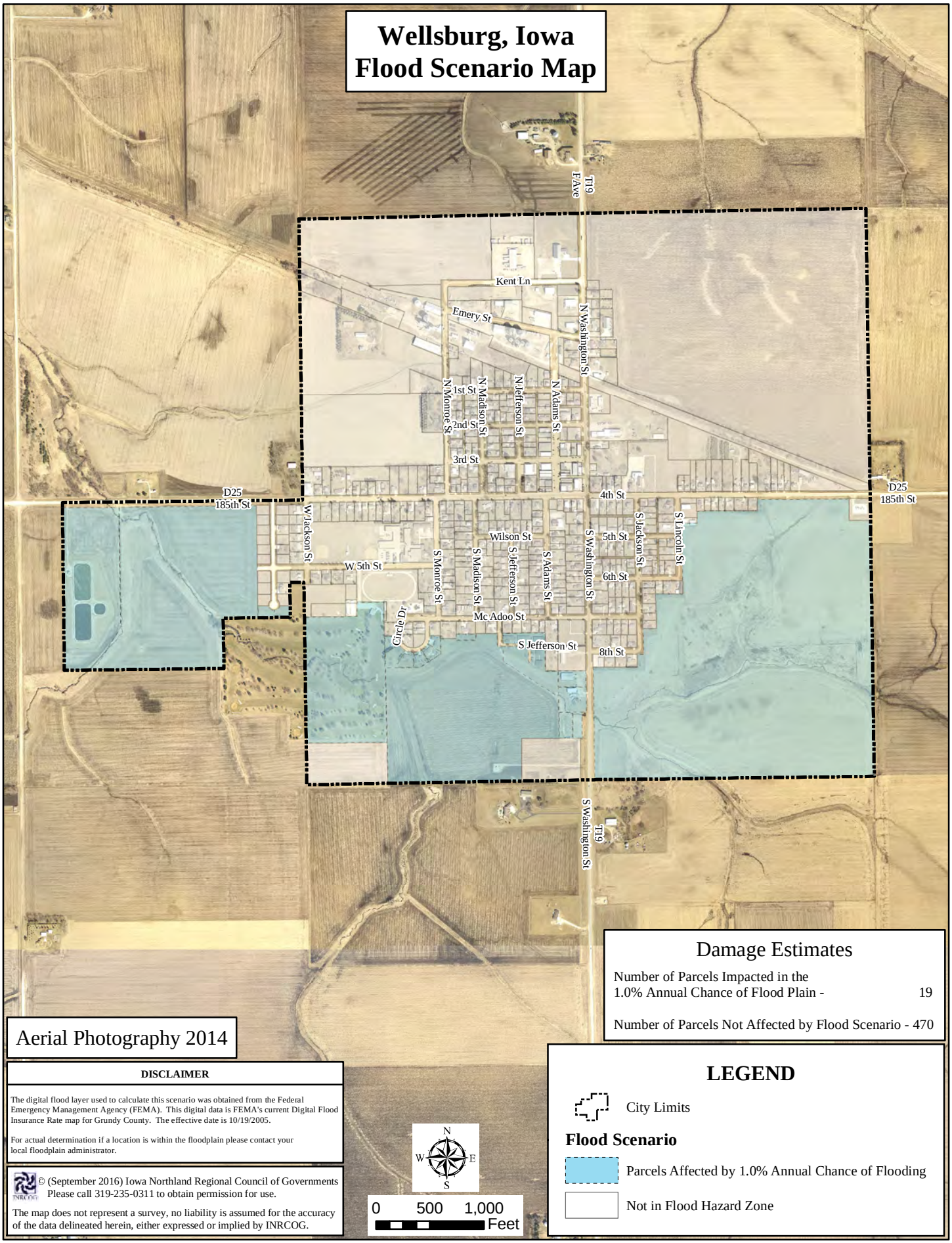
Citations

4.8m Resolution Metadata

1:25,971

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km


Wellsburg, Iowa
Flood Scenario Map
F Ave
T19
Kent Ln
Emery St
N Washington St
N Monroe St
1st St
N Madison St
N Jefferson St
N Adams St
2nd St
3rd St
4th St
D25
185th St
W Jackson St
Wilson St
5th St
S Jackson St
S Lincoln St
W 5th St
S Monroe St
S Madison St
S Jefferson St
S Adams St
S Washington St
6th St
Mc Adoo St
Circle Dr
S Jefferson St
8th St
Damage Estimates
Number of Parcels Impacted in the 1.0% Annual Chance of Flood Plain - 19
Number of Parcels Not Affected by Flood Scenario - 470
Aerial Photography 2014
DISCLAIMER
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N
W
E
S
0 500 1,000
Feet
LEGEND
City Limits
Flood Scenario
Parcels Affected by 1.0% Annual Chance of Flooding
Not in Flood Hazard Zone

APPENDIX R: Plan Evaluation Tool

\

2023 GRUNDY COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
APPENDIX R: PLAN EVALUATION TOOL
PROGRESS REPORT

Progress Report Period: _____ to _____
(Date) (Date)

Project Title: _____

Responsible Agency: _____

Address: _____

City/County: _____

Contact Person: _____ Title: _____

Phone #(s): _____ e-mail address: _____

List Supporting Agencies and Contacts: _____

_____

Total Project Cost: $_____ Anticipated Cost Overrun/Under run: _____

Date of Project Approval: _____ Start date of the project: _____

Anticipated completion date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase).

_____

_____

_____

_____

_____

PLAN EVALUATION TOOL

Milestones	Complete	Projected Date of Completion

Plan Goal(s)/Objective(s) Addressed:

Goal: _____

Objective: _____

Indicator of Success (e.g., losses avoided as a result of the acquisition program):
In most cases, you will list losses avoided as the indicator. In cases where it is difficult to quantify the benefits in dollar amounts, you will use other indicators, such as the number of people who now know about mitigation or who are taking mitigation actions to reduce their vulnerability to hazards.

_____

_____

_____

PLAN EVALUATION TOOL

Status *(Please checks pertinent information and provide explanations for items with an asterisk. For completed or canceled projects, see Worksheet #2 — to complete a project evaluation):*

Project Status	Project Cost Status
(1) ☐ Project on schedule	(1) ☐ Cost unchanged
(2) ☐ Project completed	(2) ☐ Cost overrun* *explain: _____
(3) ☐ Project delayed* *explain: _____	(3) ☐ Cost under run* *explain: _____

_____

(4) ☐ Project canceled

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

B. What obstacles, problems, or delays did you encounter, if any?

C. How was each problem resolved?

PLAN EVALUATION TOOL

Next Steps: What is/are the next step(s) to be accomplished over the next reporting period?

Other comments:

PLAN EVALUATION TOOL

WORKSHEET #2: EVALUATING YOUR PLANNING TEAM

When gearing up for the plan evaluation, the planning team should reassess its composition and ask the following questions:

	YES	NO
Have there been local staffing changes that would warrant inviting different members to the planning team? **Comments/Proposed Action:**		
Are there organizations that have been invaluable to the planning process or to project implementation that should be represented on the planning team? **Comments/Proposed Action:**		
Are there any representatives of essential organizations who have not fully participated in the planning and implementation of actions? If so, can someone else from this organization commit to the planning team? **Comments/Proposed Action:**		
Are there procedures (e.g., signing of MOAs, commenting on submitted progress reports, distributing meeting minutes, etc.) that can be done more efficiently? **Comments/Proposed Action:**		
Are there ways to gain more diverse and widespread cooperation? **Comments/Proposed Action:**		
Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning? **Comments/Proposed Action:**		

If the planning team determines the answer to any of these questions is “yes,” some changes may be necessary.

PLAN EVALUATION TOOL

WORKSHEET #3: EVALUATE YOUR PROJECT RESULTS

Project Name and Number:		***Insert location map*** ***include before and after photos if appropriate***
Project Budget:		
Project Description:		
Associated Goal and Objective (s):		
Indicator of Success (e.g., losses avoided):		

Was the action implemented?

IF YES ↓

What were the results of the implemented action?

IF NO ↓

Why not?

Was there political support for the action?	**YES**	**NO**
Were enough funds available?	**YES**	**NO**
Were workloads equitably or realistically distributed?	**YES**	**NO**
Was new information discovered about the risks or community that made implementation difficult or no longer sensible?	**YES**	**NO**

↓

PLAN EVALUATION TOOL

Was the estimated time of implementation reasonable?	**YES**	**NO**
Were sufficient resources (for example staff and technical assistance) available?	**YES**	**NO**

Were the outcomes as expected? **If No, please explain:**	**YES**	**NO**	**Additional comments or other outcomes:**
Did the results achieve the goal and objective (s)? **Explain how:**	**YES**	**NO**	
Was the action cost-effective? **Explain how or how not:**	**YES**	**NO**	
What were the losses avoided after having completed the project?			

PLAN EVALUATION TOOL

If it was a structural project, how did it change the hazard profile?	Date:
	Prepared by:

PLAN EVALUATION TOOL

WORKSHEET #4: REVISIT YOUR RISK ASSESSMENT

If you answered "Yes" to any of the above questions, review your data and update your risk assessment information accordingly

Risk Assessment Steps	Questions	YES	NO	COMMENTS
Identify hazards	Are there new hazards that can affect your community?			
Profile hazard events	Are new historical records available?			
	Are additional maps or new hazard studies available?			
	Have chances of future events (along with their magnitude, extent, etc.) changed?			
	Have recent and future development in the community been checked for their effect on hazard areas?			
Inventory assets	Have inventories of existing structures in hazard areas been updated?			
	Are future developments foreseen and accounted for in the inventories?			
	Are there any new special high-risk populations?			
Estimate losses	Have loss estimates been updated to account for recent changes?			

PLAN EVALUATION TOOL

WORKSHEET #5: REVISE THE PLAN

Prepare to update the plan.

When preparing to update the plan:	**Check the box when addressed ✓**
1. Gather information, including project evaluation worksheets, progress reports, studies, related plans, etc.	
Comments:	
2. Reconvene the planning team, making changes to the team composition as necessary (see results from *Worksheet #2*).	
Comments:	

Consider the results of the evaluation and new strategies for the future.

When examining the community consider:	**Check the box when addressed ✓**
1. The results of the planning and outreach efforts.	
Comments:	
2. The results of the mitigation efforts.	
Comments:	
3. Shifts in development trends.	
Comments:	

4. Areas affected by recent disasters.	
Comments:	
5. The recent magnitude, location, and type of the most recent hazard or disaster.	
Comments:	
6. New studies or technologies.	
Comments:	
7. Changes in local, state, or federal laws, policies, plans, priorities, or funding.	
Comments:	
8. Changes in the socioeconomic fabric of the community.	
Comments:	
9. Other changing conditions.	
Comments:	

PLAN EVALUATION TOOL

Incorporate your findings into the plan.

When examining the plan:	**Check the box when addressed ✓**
1. Revisit the risk assessment.	
Comments:	
2. Update your goals and strategies.	
Comments:	
3. Recalculate benefit-cost analyses of projects to prioritize action items.	
Comments:	

Use the following criteria to evaluate the plan:

Criteria	**YES**	**NO**	**Solution**
Are the goals still applicable?			
Have any changes in the state or community made the goals obsolete or irrelevant?			
Do existing actions need to be reprioritized for implementation?			
Do the plan's priorities correspond with state priorities?			
Can actions be implemented with available resources?			

Comments:

APPENDIX S: Hazard Mitigation Plan Review

Local Mitigation Plan Review Tool

Cover Page

The Local Mitigation Plan Review Tool (PRT) demonstrates how the local mitigation plan meets the regulation in 44 CFR § 201.6 and offers states and FEMA Mitigation Planners an opportunity to provide feedback to the local governments, including special districts.

1. The Multi-Jurisdictional Summary Sheet is a worksheet that is used to document how each jurisdiction met the requirements of the plan elements (Planning Process; Risk Assessment; Mitigation Strategy; Plan Maintenance; Plan Update; and Plan Adoption).
2. The Plan Review Checklist summarizes FEMA's evaluation of whether the plan has addressed all requirements.

For greater clarification of the elements in the Plan Review Checklist, please see Section 4 of this guide. Definitions of the terms and phrases used in the PRT can be found in Appendix E of this guide.

Plan Information	
Jurisdiction(s)	Click or tap here to enter text.
Title of Plan	Click or tap here to enter text.
New Plan or Update	Click or tap here to enter text.
Single- or Multi-Jurisdiction	Choose an item.
Date of Plan	Click or tap to enter a date.
Local Point of Contact	
Title	Click or tap here to enter text.
Agency	Click or tap here to enter text.
Address	Click or tap here to enter text.
Phone Number	Click or tap here to enter text.
Email	Click or tap here to enter text.

Additional Point of Contact	
Title	Click or tap here to enter text.
Agency	Click or tap here to enter text.
Address	Click or tap here to enter text.
Phone Number	Click or tap here to enter text.
Email	Click or tap here to enter text.

Review Information	
State Review	
State Reviewer(s) and Title	Click or tap here to enter text.
State Review Date	Click or tap to enter a date.
FEMA Review	
FEMA Reviewer(s) and Title	Click or tap here to enter text.
Date Received in FEMA Region	Click or tap to enter a date.
Plan Not Approved	Click or tap to enter a date.
Plan Approvable Pending Adoption	Click or tap to enter a date.
Plan Approved	Click or tap to enter a date.

Multi-Jurisdictional Summary Sheet

#	Jurisdiction Name	Requirements Met (Y/N)						
		A. Planning Process	B. Risk Assessment	C. Mitigation Strategy	D. Plan Maintenance	E. Plan Update	F. Plan Adoption	G. State Requirements
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Plan Review Checklist

The Plan Review Checklist is completed by FEMA. States and local governments are encouraged, but not required, to use the PRT as a checklist to ensure all requirements have been met prior to submitting the plan for review and approval. The purpose of the checklist is to identify the location of relevant or applicable content in the plan by element/sub-element and to determine if each requirement has been "met" or "not met." FEMA completes the "required revisions" summary at the bottom of each element to clearly explain the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is "not met." Sub-elements in each summary should be referenced using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each element and sub-element are described in detail in Section 4: Local Plan Requirements of this guide.

Plan updates must include information from the current planning process.

If some elements of the plan do not require an update, due to minimal or no changes between updates, the plan must document the reasons for that.

Multi-jurisdictional elements must cover information unique to all participating jurisdictions.

Element A: Planning Process

Element A Requirements	Location in Plan (section and/or page number)	Met / Not Met
A1. Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))		
A1-a. Does the plan document how the plan was prepared, including the schedule or time frame and activities that made up the plan's development, as well as who was involved?	Click or tap here to enter text.	Choose an item.
A1-b. Does the plan list the jurisdiction(s) participating in the plan that seek approval, and describe how they participated in the planning process?	Click or tap here to enter text.	Choose an item.
A2. Does the plan document 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? (Requirement 44 CFR § 201.6(b)(2))		
A2-a. Does the plan identify all stakeholders involved or given an opportunity to be involved in the planning process, and how each stakeholder was presented with this opportunity?	Click or tap here to enter text.	Choose an item.

Element A Requirements	Location in Plan (section and/or page number)	Met / Not Met
A3. Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval? (Requirement 44 CFR § 201.6(b)(1))		
A3-a. Does the plan document how the public was given the opportunity to be involved in the planning process and how their feedback was included in the plan?	Click or tap here to enter text.	Choose an item.
A4. Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement 44 CFR § 201.6(b)(3))		
A4-a. Does the plan document what existing plans, studies, reports and technical information were reviewed for the development of the plan, as well as how they were incorporated into the document?	Click or tap here to enter text.	Choose an item.
ELEMENT A REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element B: Risk Assessment

Element B Requirements	Location in Plan (section and/or page number)	Met / Not Met
B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on previous occurrences of hazard events and on the probability of future hazard events? (Requirement 44 CFR § 201.6(c)(2)(i))		
B1-a. Does the plan describe all natural hazards that can affect the jurisdiction(s) in the planning area, and does it provide the rationale if omitting any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area?	Click or tap here to enter text.	Choose an item.
B1-b. Does the plan include information on the location of each identified hazard?	Click or tap here to enter text.	Choose an item.
B1-c. Does the plan describe the extent for each identified hazard?	Click or tap here to enter text.	Choose an item.

Element B Requirements	Location in Plan (section and/or page number)	Met / Not Met
B1-d. Does the plan include the history of previous hazard events for each identified hazard?	Click or tap here to enter text.	Choose an item.
B1-e. Does the plan include the probability of future events for each identified hazard? Does the plan describe the effects of future conditions, including climate change (e.g., long-term weather patterns, average temperature and sea levels), on the type, location and range of anticipated intensities of identified hazards?	Click or tap here to enter text.	Choose an item.
B1-f. For participating jurisdictions in a multi-jurisdictional plan, does the plan describe any hazards that are unique to and/or vary from those affecting the overall planning area?	Click or tap here to enter text.	Choose an item.
B2. Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP-insured structures that have been repetitively damaged by floods? (Requirement 44 CFR § 201.6(c)(2)(ii))		
B2-a. Does the plan provide an overall summary of each jurisdiction's vulnerability to the identified hazards?	Click or tap here to enter text.	Choose an item.
B2-b. For each participating jurisdiction, does the plan describe the potential impacts of each of the identified hazards on each participating jurisdiction?	Click or tap here to enter text.	Choose an item.
B2-c. Does the plan address NFIP-insured structures within each jurisdiction that have been repetitively damaged by floods?	Click or tap here to enter text.	Choose an item.
ELEMENT B REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element C: Mitigation Strategy

Element C Requirements	Location in Plan (section and/or page number)	Met / Not Met
C1. Does the plan document each participant's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement 44 CFR § 201.6(c)(3))		
C1-a. Does the plan describe how the existing capabilities of each participant are available to support the mitigation strategy? Does this include a discussion of the existing building codes and land use and development ordinances or regulations?	Click or tap here to enter text.	Choose an item.
C1-b. Does the plan describe each participant's ability to expand and improve the identified capabilities to achieve mitigation?	Click or tap here to enter text.	Choose an item.
C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))		
C2-a. Does the plan contain a narrative description or a table/list of their participation activities?	Click or tap here to enter text.	Choose an item.
C3. Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement 44 CFR § 201.6(c)(3)(i))		
C3-a. Does the plan include goals to reduce the risk from the hazards identified in the plan?	Click or tap here to enter text.	Choose an item.
C4. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement 44 CFR § 201.6(c)(3)(ii))		
C4-a. Does the plan include an analysis of a comprehensive range of actions/projects that each jurisdiction considered to reduce the impacts of hazards identified in the risk assessment?	Click or tap here to enter text.	Choose an item.
C4-b. Does the plan include one or more action(s) per jurisdiction for each of the hazards as identified within the plan's risk assessment?	Click or tap here to enter text.	Choose an item.

Element C Requirements	Location in Plan (section and/or page number)	Met / Not Met
C5. Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction? (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))		
C5-a. Does the plan describe the criteria used for prioritizing actions?	Click or tap here to enter text.	Choose an item.
C5-b. Does the plan provide the position, office, department or agency responsible for implementing/administrating the identified mitigation actions, as well as potential funding sources and expected time frame?	Click or tap here to enter text.	Choose an item.
ELEMENT C REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element D: Plan Maintenance

Element D Requirements	Location in Plan (section and/or page number)	Met / Not Met
D1. Is there discussion of how each community will continue public participation in the plan maintenance process? (Requirement 44 CFR § 201.6(c)(4)(iii))		
D1-a. Does the plan describe how communities will continue to seek future public participation after the plan has been approved?	Click or tap here to enter text.	Choose an item.
D2. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a five-year cycle)? (Requirement 44 CFR § 201.6(c)(4)(i))		
D2-a. Does the plan describe the process that will be followed to track the progress/status of the mitigation actions identified within the Mitigation Strategy, along with when this process will occur and who will be responsible for the process?	Click or tap here to enter text.	Choose an item.
D2-b. Does the plan describe the process that will be followed to evaluate the plan for effectiveness? This process must identify the criteria that will be used to evaluate the information in the plan, along with when this process will occur and who will be responsible.	Click or tap here to enter text.	Choose an item.

Element D Requirements	Location in Plan (section and/or page number)	Met / Not Met
D2-c. Does the plan describe the process that will be followed to update the plan, along with when this process will occur and who will be responsible for the process?	Click or tap here to enter text.	Choose an item.
D3. Does the plan describe a process by which each community will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement 44 CFR § 201.6(c)(4)(ii))		
D3-a. Does the plan describe the process the community will follow to integrate the ideas, information and strategy of the mitigation plan into other planning mechanisms?	Click or tap here to enter text.	Choose an item.
D3-b. Does the plan identify the planning mechanisms for each plan participant into which the ideas, information and strategy from the mitigation plan may be integrated?	Click or tap here to enter text.	Choose an item.
D3-c. For multi-jurisdictional plans, does the plan describe each participant's individual process for integrating information from the mitigation strategy into their identified planning mechanisms?	Click or tap here to enter text.	Choose an item.
ELEMENT D REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element E: Plan Update

Element E Requirements	Location in Plan (section and/or page number)	Met / Not Met
E1. Was the plan revised to reflect changes in development? (Requirement 44 CFR § 201.6(d)(3))		
E1-a. Does the plan describe the changes in development that have occurred in hazard-prone areas that have increased or decreased each community's vulnerability since the previous plan was approved?	Click or tap here to enter text.	Choose an item.
E2. Was the plan revised to reflect changes in priorities and progress in local mitigation efforts? (Requirement 44 CFR § 201.6(d)(3))		
E2-a. Does the plan describe how it was revised due to changes in community priorities?	Click or tap here to enter text.	Choose an item.

Element E Requirements	Location in Plan (section and/or page number)	Met / Not Met
E2-b. Does the plan include a status update for all mitigation actions identified in the previous mitigation plan?	Click or tap here to enter text.	Choose an item.
E2-c. Does the plan describe how jurisdictions integrated the mitigation plan, when appropriate, into other planning mechanisms?	Click or tap here to enter text.	Choose an item.
ELEMENT E REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element F: Plan Adoption

Element F Requirements	Location in Plan (section and/or page number)	Met / Not Met
F1. For single-jurisdictional plans, has the governing body of the jurisdiction formally adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))		
F1-a. Does the participant include documentation of adoption?	Click or tap here to enter text.	Choose an item.
F2. For multi-jurisdictional plans, has the governing body of each jurisdiction officially adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))		
F2-a. Did each participant adopt the plan and provide documentation of that adoption?	Click or tap here to enter text.	Choose an item.
ELEMENT F REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element G: High Hazard Potential Dams (Optional)

HHPD Requirements	Location in Plan (section and/or page number)	Met / Not Met
HHPD1. Did the plan describe the incorporation of existing plans, studies, reports and technical information for HHPDs?		
HHPD1-a. Does the plan describe how the local government worked with local dam owners and/or the state dam safety agency?	Click or tap here to enter text.	Choose an item.
HHPD1-b. Does the plan incorporate information shared by the state and/or local dam owners?	Click or tap here to enter text.	Choose an item.
HHPD2. Did the plan address HHPDs in the risk assessment?		
HHPD2-a. Does the plan describe the risks and vulnerabilities to and from HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD2-b. Does the plan document the limitations and describe how to address deficiencies?	Click or tap here to enter text.	Choose an item.
HHPD3. Did the plan include mitigation goals to reduce long-term vulnerabilities from HHPDs?		
HHPD3-a. Does the plan address how to reduce vulnerabilities to and from HHPDs as part of its own goals or with other long-term strategies?	Click or tap here to enter text.	Choose an item.
HHPD3-b. Does the plan link proposed actions to reducing long-term vulnerabilities that are consistent with its goals?	Click or tap here to enter text.	Choose an item.
HHPD4-a. Did the plan include actions that address HHPDs and prioritize mitigation actions to reduce vulnerabilities from HHPDs?		
HHPD4-a. Does the plan describe specific actions to address HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD4-b. Does the plan describe the criteria used to prioritize actions related to HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD4-c. Does the plan identify the position, office, department or agency responsible for implementing and administering the action to mitigate hazards to or from HHPDs?	Click or tap here to enter text.	Choose an item.

HHPD Requirements	Location in Plan (section and/or page number)	Met / Not Met
HHPD Required Revisions		
Required Revision: Click or tap here to enter text.		

Element H: Additional State Requirements (Optional)

Element H Requirements	Location in Plan (section and/or page number)	Met / Not Met
H1. Do jurisdictions identify critical facilities, assess vulnerabilities and ensure protection to a 0.02% chance event or worst-case scenario?		
H1-a. Does the plan document the name of facility, type of facility, jurisdictional location, and exposure to a 1% (100-year) and 0.02% chance event?	Click or tap here to enter text.	Choose an item.
H1-b. Does the plan document those critical facilities are protected to a 0.02% flood event, or previous worst case flood event?	Click or tap here to enter text.	Choose an item.
H1-c. For those that do not meet this level of protection (0.02%), the plan must include an action to meet or go beyond this criterion or explain why it is not feasible to do so.	Click or tap here to enter text.	Choose an item.
H2. Does the plan include an annex for every jurisdiction within the County's boundaries, including the County?		
H2-a. Is there an annex for each jurisdiction seeking FEMA approval within County's boundaries, including the County?	Click or tap here to enter text.	Choose an item.
H2-b. Does the plan include a table in the introduction section clearly identifying all jurisdictions which are seeking FEMA approval?	Click or tap here to enter text.	Choose an item.

Element H Requirements	Location in Plan (section and/or page number)	Met / Not Met
H3. Within each jurisdictional annex, are projects developed in accordance with the NYS DHSES Proposed Projects Table?		
H3-a. Does the plan include a minimum of two (2) new or carryover (not started) proposed mitigation actions that include all information requested in the NYS DHSES LHMP Proposed Action spreadsheet?	Click or tap here to enter text.	Choose an item.
H3-b. For jurisdictions containing an SFHA, one (1) of these actions must be for a project that addresses flooding.	Click or tap here to enter text.	Choose an item.
H4. Was the draft plan posted for public comment?		
H4-a. Was the draft plan posted in full (except for discretionary sensitive information) for 30 days for public comment or the time prescribed by local law, whichever is greater.	Click or tap here to enter text.	Choose an item.
H4-b. Is a description included of the efforts to gain feedback from underserved areas where residents may not have computer or internet access?	Click or tap here to enter text.	Choose an item.
H4-c. Does the website clearly identify how the public can comment on the plan and include either specific contact information to send comments or a user-friendly form or survey?	Click or tap here to enter text.	Choose an item.
Element H Required Revisions		
Required Revision: Click or tap here to enter text.		

Plan Assessment

These comments can be used to help guide your annual/regularly scheduled updates and the next plan update.

Element A. Planning Process

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element B. Risk Assessment

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element C. Mitigation Strategy

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element D. Plan Maintenance

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element E. Plan Update

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element G. HHPD Requirements (Optional)

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element H. Additional State Requirements (Optional)

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]