GREENE COUNTY

2026

MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Prepared By :

REGION XII
COUNCIL OF GOVERNMENTS

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Chapter 1: Introduction

Purpose

FEMA defines mitigation as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event. The goal of mitigation is to decrease the need for response as opposed to simply increasing the response capability. For the purpose of this plan, mitigation discussions focus on specific actions taken to reduce loss of life and property from hazards by modifying the built environment and undertaking other actions to reduce the risk and potential consequences of these hazards.

Section 322 of the Stafford Act, 42 U.S.C. 5165 as amended by DMA 2000 (Public Law 106-390), provides for states, tribes, and local governments to undertake a risk-based approach to reducing risks of natural hazards through mitigation planning. FEMA implemented hazard mitigation planning provisions through regulations at 44 CFR Part 201. This plan was prepared in accordance to the regulations set forth in 44 CFR §201.6. Under this regulation, local governments must have an approved plan to apply for and/or receive funding through the Hazard Mitigation Grant Program, Pre-Disaster Mitigation, Flood Mitigation Assistance, and Severe Repetitive Loss programs.

The purpose of the Greene County Hazard Mitigation Plan is to reduce the effects that hazards have on people and property in Greene County. Hazard mitigation planning is the process through which hazards that threaten jurisdictions are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are identified, prioritized, and implemented. This document will be used to plan and prioritize future mitigation projects in Greene County. This plan will comply with the appropriate Federal and State laws and planning requirements while making the county and communities eligible for certain federal disaster assistance, specifically the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program, Pre-Disaster Program, and the Flood Mitigation Assistance Program.

Two of the most important components of emergency management deals with disaster recovery and hazard mitigation. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage, reconstruction, and repeated damage.

This plan demonstrates Greene County's commitment to reduce risks due to hazards, and serves as a tool to help decision makers facilitate mitigation activities and resources.

Assurance to Compliance with FEMA Requirements

This multi-jurisdictional mitigation plan complies with Iowa Homeland Security and Emergency Management Division's and FEMA's planning guidance; FEMA regulations, rules, guidelines, and checklists; Code of Federal Regulations; existing Federal and State laws; and such other reasonable criterion as the President/Governor, Federal/State legislatures and IHSEMD/FEMA may establish in consultation with local governments while the plan is being developed. This plan also helps with the minimum planning requirements for all FEMA mitigation programs, such as the Flood Mitigation Assistance (FMA) Program, the Pre-Disaster Mitigation (PDM) Program, and the Hazard Mitigation Grant Program (HMGP), and where appropriate, other FEMA mitigation related programs such as the National Earthquake Hazards Reduction Program (NEHRP), the National Flood Insurance Program (NFIP), and the Community Rating System (CRS).

Planning Process

Meetings

Section 201.6 (c)(1): [The plan shall include] 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.

Region XII moderated the committee meetings. There was no set time limit for each meeting, but most lasted between one and two hours, depending on the committee's discussion. Each city held meetings to discuss and adopt the hazard mitigation plan.

The first meeting on June 9, 2026 of the planning committee was an introductory meeting as well as a productive one. This introductory meeting allowed Region XII staff to present an overview of the plan requirements as outlined in FEMA guidance, with particular note of multi-jurisdictional requirements. Previous critical facility maps were handed out along with the community profiles, and committee members were asked to add or remove facilities as necessary. To ensure accuracy, these maps were also sent to city staff. Discussion about which hazards should be included in the plan were held and the hazards identified in the 2023 State of Iowa Hazard Mitigation Plan were referenced. Committee members scored hazards based on probability, severity, warning time, and duration.

Meetings with the Greene County cities occurred over a span of a couple months. Discussions concerning Churdan and Scranton's sections and mitigation actions were held on June 9. On July 1, Region XII staff visited with Dana's residents about any potential changes to the document. On July 13, Staff met with Grand Junction's residents about potential changes to the document.

Staff attended a meeting in Rippey on August 3rd to discuss any changes to the document and mitigation actions. On August 10th, staff met with the City of Paton and on August 11th staff met with the City of Jefferson's staff to review changes in the plan. Staff met with the Greene County Board of Supervisors on September 8th. School boards and their representatives were invited to the city meetings to discuss their respective city's changes.

During city meetings, city staff and elected officials were given their respective community profiles, previous goals, and respective appendix. Goals from the previous plan were handed out and evaluated in order to determine plan goals. The evaluation led to adding new goals, and the determination of what goals the committee wanted to include was completed. Along with the discussion of the goals were the mitigation actions, as these ensure that the cities meet their goals. Each city's respective goals and mitigation actions can be found in their respective appendix. The County goals are located in Chapter 4.

Participation

To be a participating jurisdiction, certain guidelines needed to be met. These guidelines include:

- An official of the jurisdiction must attend the planning team meetings;
- Participate in surveys and data collection activities;
- Participate in a local planning session in the jurisdiction, as needed, to finalize local elements of the plan;
- Review the plan draft and provide applicable feedback;
- Adopt the final plan.

The jurisdictions that participated in the creation of this plan include Greene County, City of Churdan, City of Dana, City of Grand Junction, City of Jefferson, City of Paton, City of Rippey, City of Scranton, Greene County Community School District, Paton-Churdan Community School District. The following table lists the appointed committee members, the jurisdiction they represent, and the position they hold.

Greene County Planning Committee		
Jurisdiction	**Name**	**Position**
Greene County Emergency Management	Doug Hawn	County EMA
Greene County Supervisor	Dawn Rudolph	Board Chair
Greene County Supervisor	Joe Gannon	Board Member
Greene County Supervisor	Dan Benitz	Board Member
Greene County Supervisor	John Muir	Vice Chair
Greene County Supervisor	Pete Bardole	Board Member
Greene County Auditor	Billie Jo Hoskins	Auditor
City of Churdan	Curt Milton	Mayor
City of Dana	Many Sims	Mayor
City of Grand Junction	Jason McDowell	Mayor
City of Jefferson	Scott Peterson	City Administrator

City of Paton	Steve Burrell	Mayor
City of Rippey	Shannon Lawrence	Mayor
City of Scranton	Steve Scheffler	Mayor
Greene County Community School District		Superintendent
Paton-Churdan Community School District		Superintendent

Other organizations were invited to participate in the planning process and develop projects within one or more of the jurisdictions. The following table lists people who attended at least one meeting in addition to the committee members. The input from the following individuals helped fully develop the Hazard Mitigation Plan. Sign-in sheets listing the meeting date and participants from each meeting can be found in Appendix I.

Additional Plan Contributors		
Jurisdiction	**Name**	**Position**
City of Churdan	John McCormick	City Council Member
City of Churdan	Garrett Riedesel	City Council Member
City of Churdan	Nancy Janssen	Acting City Clerk
City of Churdan	Marcia Brooks	City Clerk
City of Churdan	Mary Vogel	City Council Member
City of Churdan	Dennis Smidt	City Council Member
City of Churdan	Joline Lorney	Resident of Churdan
City of Churdan	Bobbie Miller	Resident of Churdan
City of Churdan	Karen Fay	Resident of Churdan
City of Churdan	Marsha Subbert	Resident of Churdan
City of Churdan	John Lonergan	Churdan Lions Club President
City of Churdan	Rhetta Wright	Resident of Churdan
City of Churdan	Debbie Olson	Resident of Churdan
City of Churdan	Roger Olson	Resident of Churdan
City of Scranton	Ashley Squibb	City Council Member
City of Scranton	Brenna Vauble	City Council Member
City of Scranton	Annette Brown	City Council Member
City of Scranton	Gale Zelweger	City Council Member
City of Scranton	Molly Ritter	Scranton Public Library
City of Scranton	Dawn Rudolph	Community Center Manager
City of Scranton	Ben Obert	Account Executive Heritage Insurance
City of Dana	Chris Vargas	City Council Member
City of Dana	Jackie Ostrander	Deputy Assistant City Clerk
City of Dana	Emily Ostrander	City Clerk
City of Dana	Anthony Sims	City Council Member
City of Dana	Michael S. McClanahan	City Council Member
City of Grand Junction	John L Thompson	City Council Member
City of Grand Junction	Zachary Dearborn	City Council Member

City of Grand Junction	Spencer Kirk	City Council Member
City of Grand Junction	Tom Launderville	City Council Member
City of Grand Junction	Bryce Stevens	City Council Member
City of Grand Junction	Mary Millard	City Clerk
City of Rippey	Charlie Mundy	City Council Member
City of Rippey	Rick Pearson	City Council Member
City of Rippey	Bobbie Dollinger	City Council Member
City of Rippey	Ned Johnston	City Council Member
City of Rippey	Mary Millard	City Clerk
City of Rippey	Chelsi Lawrence	Resident of Rippey
City of Rippey	Cindy Devilbliss	Library Trustee President
City of Rippey	Kevin Hicks	Rippey Baseball Commission
City of Rippey	Ian Kiner	Resident of Rippey
City of Rippey	Mary Butler Abry	Rippey Librarian
City of Paton	Jake Bohnet	City Council Member
City of Paton	Diane Hanlon	City Council Member
City of Paton	Colby Keasey	City Council Member
City of Paton	Zach Schweers	City Council Member
City of Paton	Mary Robison	City Clerk
City of Jefferson	Jon Koch	Water Superintendent
City of Jefferson	Dave Morlan	Public Works Administrator
City of Jefferson	Jason Kroeger	Police Cpt.
City of Jefferson	Mark Clouse	Police Chief
City of Jefferson	Jack Williams	Fire Chief

Public Involvement

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

Committee and additional meetings were open to the public. Agendas were posted in the Courthouse or respective jurisdiction prior to each meeting. Public outreach was strongly sought after at the mitigation action meeting, as well as during the draft plan period. All meetings were conducted in compliance with Chapter 21 of the Code of Iowa.

The hazard mitigation plan was discussed during various city council, county supervisor, and school board meetings, which are all conducted in compliance with the Iowa Open Meeting Law-Iowa Code Chapter. All members of each community were reached using the same notification methods of regular meeting notifications, which include posting on social media, posting around the community, notice on a jurisdiction's website, and sometimes notification in the newspaper. When the plan reached draft stage, the public was encouraged to view it online and leave comments and criticisms. The plan was uploaded online for viewing as a draft, which was

regularly updated so the most recent revisions were viewable. The draft link was sent to each participating jurisdiction, floodplain administrators, non-profit organizations, service providers for vulnerable populations, and Greene County Extension. A SurveyMonkey survey was also distributed for viewers to give feedback. Appendix I lists those that the draft link and survey were sent to as well as feedback received.

Plan Content

This plan evaluates all aspects of hazard mitigation. The plan is split into six chapters, which serve as an overview for the plan. The first chapter is an introductory chapter which explains the planning process used in development of the plan. Greene County's general backgrounds, as well as profiles for each city, are given in chapter two. The planning process is put in motion by explaining the specific steps taken to generate each jurisdiction's risk assessment (chapter 3), vulnerability assessment and loss estimates (chapter 4), and mitigation strategies (chapter 5). The final chapter of the plan explains how the plan was adopted and how it will be maintained in the future.

Appendices A-H present the details of each jurisdiction's hazard mitigation plan outcomes. Each appendix includes the jurisdiction's critical infrastructure, risk assessment, vulnerability and loss estimates, mitigation strategies, flood maps (when applicable), and resolution adopting the plan.

Section 201.6 (c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan. For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Plan Content Updates/Changes

In all phases of the planning process, the planning team reviewed the existing sections of the plan and provided comments on necessary changes. Planning requirements from FEMA and other applicable bodies become increasingly stringent, requiring new and updated data.

Referenced Plans

Referenced plans throughout the planning process and within this document include:

- Iowa State Hazard Mitigation Plan, 2023
- Greene County Hazard Mitigation Plan, 2020
- FEMA State and Local Hazard Mitigation Planning How-to Guides

Many other plans that are jurisdiction specific were utilized in the development of each jurisdiction's appendix. These plans included, but are not limited to: comprehensive plans, city codes, zoning codes, strategic plans, capital improvement plans, housing needs assessments, and building codes. These plans were used to develop portions of each jurisdiction's appendix.

Chapter 2:

County Profile

Greene County

History

Greene County was established in 1851 from territory at one time belonging to Benton. The county was named for General Nathaniel Greene of the American Revolution and was first attached to Polk. Truman Davis was the first settler in the county in 1849 near the City of Rippey. Enos Buttrick also settled in Greene County in 1849 near the mouth of Buttrick's Creek and Richard Hardin, at Hardin's Creek.

The county seat is Jefferson, which was laid out in 1854 along the banks of the Raccoon River. The first courthouse was a log cabin constructed by Judge William Phillips. A new courthouse was built in 1856 and replaced in 1870. The present courthouse was constructed in 1917. In 1904, the first concrete span bridge was constructed in Greene County over Hardin Creek on the old Lincon Highway.

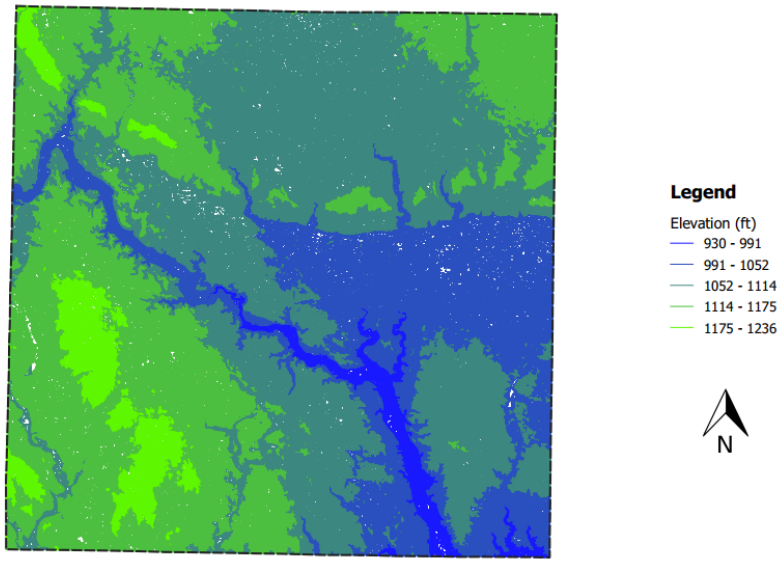
In 1909, a small group of men led by a Jefferson banker spent several days filling holes on 35 miles of county road. This work was done to prepare for an auto touring caravan. The tourists stopped for ten minutes or so and "sang the praises of Greene County roads which they pronounced the best-kept county roads they had struck in their journey."

Geography and Environment

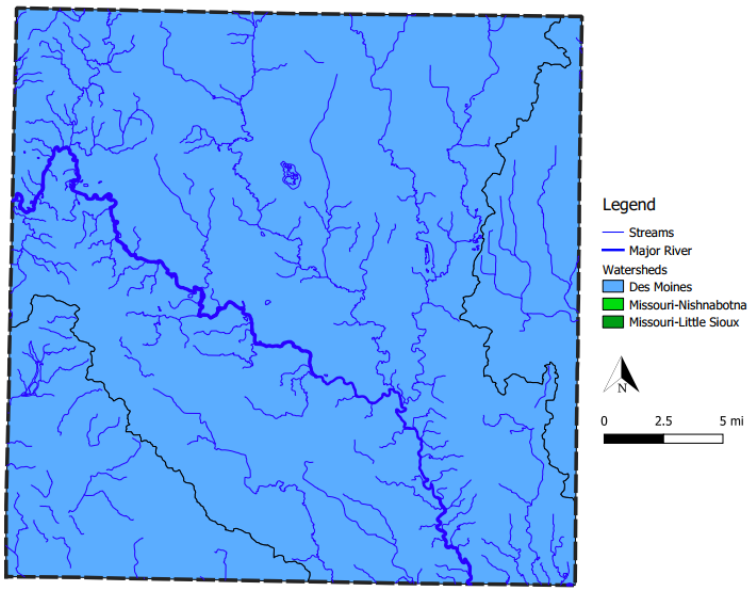
Greene County is located in the west central part of Iowa and is bordered by Boone, Webster, Carroll, Guthrie, Dallas, and Calhoun Counties. Major highways running through Greene County include U.S. Highway 30, which runs east west through the county, and Highway 4, which cuts through the county from north to south. Jefferson is the county seat and is located in the center of the county. The 571 square mile county has seven communities located within its borders: Churdan, Dana, Grand Junction, Jefferson, Paton, Rippey, and Scranton.

The highest elevation in Greene County can be found in both the northwest and southwest portions of the county on each side of the Raccoon River. Here the elevation can reach as much as 1,230 feet above sea level. As one moves east through the county, the elevation continues to decline to as little as 930 feet. Map 2.1 depicts Greene County Elevation and Map 2.2 depicts Greene County Watersheds. As shown on Map 2.2 Greene County lies exclusively in the Des Moines Watershed as opposed to surrounding watershed including the Missouri-Nishnabotna and Missouri-Little Sioux watersheds.

Map 2.1: Greene County Elevation



Map 2.2: Greene County Watersheds



Greene County has a variety of highly productive soils with the majority of the county being Clarion-Nicollet-Canisteo. Table 2.1 shows the soils of Greene County.

Table 2.1: Soils of Greene County

Soil Association	% of County	Description
Clarion-Nicollet-Webster	36%	These soils are found in relatively young till plain. They are nearly level to strongly sloping, well drained, somewhat poorly drained, and poorly drained, loamy soils that formed in glacial till and glacial sediments, found on uplands.
Canisteo-Webster-Nicollet	35%	These soils are found in relatively young till plain. They are nearly level and very gently sloping, poorly drained and somewhat poorly drained, loamy soils that formed in glacial sediments and glacial till, found on uplands.
Mayer-Biscay-Coland	4%	These soils are found in level area. They are nearly level, poorly drained, loamy and silty soils that formed in glacial outwash sediments and alluvium, found on outwash plains, terraces, and bottom land.
Clarion-Coland-Storden	7%	These soils are found along creek valleys. Theya re nearly level to very steep, well drained and poorly drained, loam and silty soils that formed in glacial till and alluvium, found on uplands and bottom land.
Lester-Fluvaquents-Wadena	12%	These soils are found along the valley of the Raccoon River and its adjoining tributaries. They are nearly level to very steep, well drained, somewhat poorly drained, and poorly drained, loamy or variably textured soils that formed in glacial till, alluvium, and outwash sediments, found on uplands, terraces, and bottom land.
Marna-Canisteo-Guckeen	3%	These soils are found in relatively young till plain. They are nearly level and very gently sloping, poorly drained and somewhat poorly drained, silty and loamy soils that formed in glacial or lacustrine sediments and glacial till, found on uplands.
Clarion-Calco-Wadena	3%	These soils are found in flood plains, terraces, and valley side slopes. They are nearly level to strongly sloping, well drained and poorly drained, loamy and silty soils that formed in glacial till, alluvium and outwash sediments, found on uplands, bottom land, and terraces.

Transportation

The principal highways in Greene County are listed in Table 2.2, along with the approximate mileage of farm-to-market and secondary roads in the county. Greene County contains one U.S.

Highways and three State Highways. Greene County's transportation network is shown on Map 2.3.

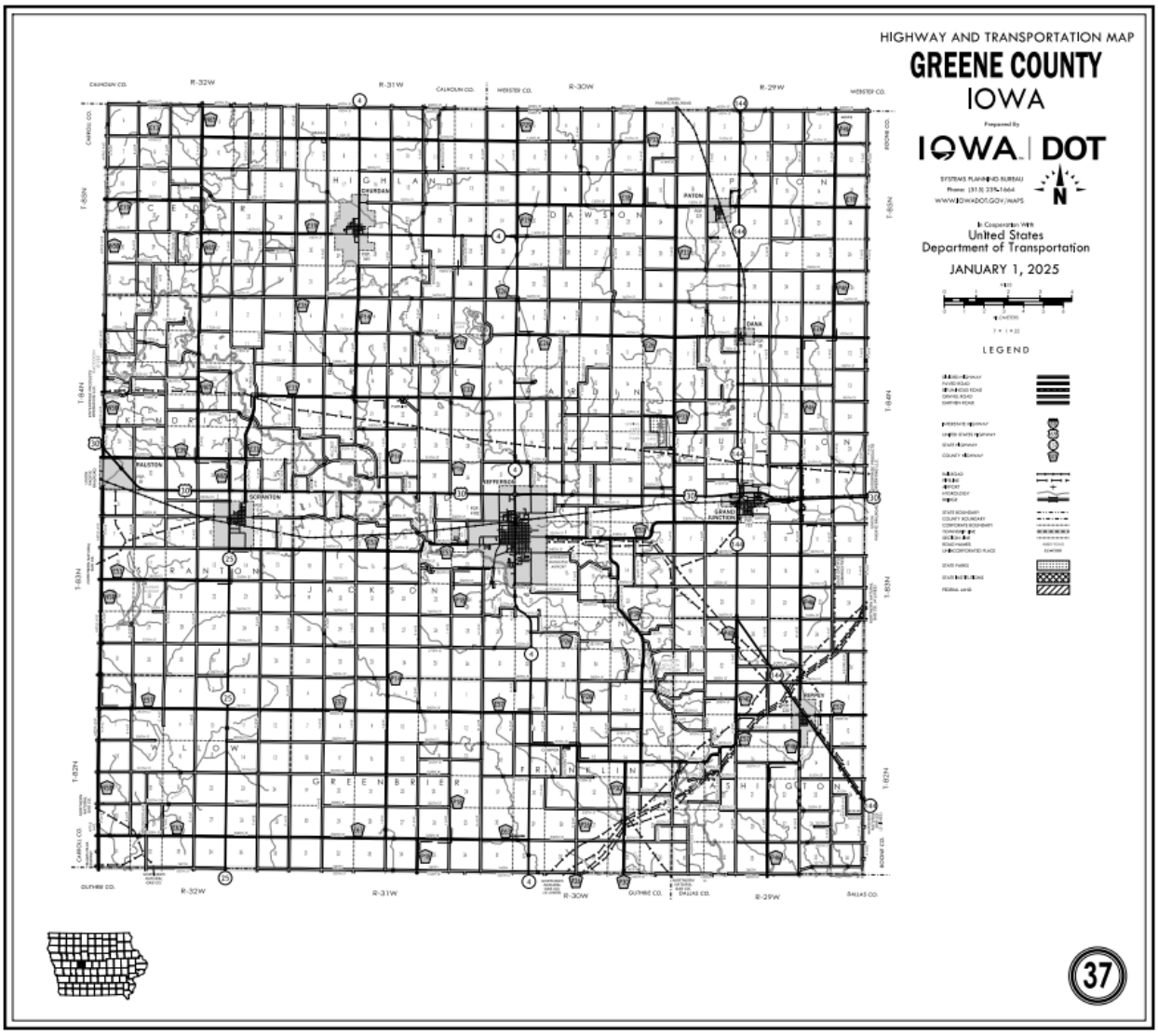
The incorporated communities in Greene County have roads to all developed areas. Most of the roads in these incorporated communities are seal coated or paved. Most communities have gravel roads as well. Western Iowa Transit provides public transit using and "on demand" service throughout the county.

The Jefferson Municipal Airport is the only airport located in Greene County. It is owned and operated by the City of Jefferson. According to the *Iowa Aviation System Plan, 2020,* the Jefferson Municipal Airport is a basic service airport . Basic Services Airports have runways 3,000 feet or greater in length with facilities and services customized to meet local aviation needs. The airport has 24 based aircraft, 20 single-engine, 2 multi-engine and 2 ultralights.

Table 2.2: Greene County Transportation Network

Roadway	**Mileage (approximate)**	**Communities Served**
U.S. Highway 30	24 miles	Scranton, Jefferson, Grand Junction
IA Highway 4	29 miles	Churdan, Jefferson
IA Highway 25	12 miles	Scranton
IA Highway 144	22 miles	Paton, Grand Junction, Rippey
Farm-to-Market	320 miles	All
Secondary Roads (area serviced)	962 miles	All

Map 2.3: Greene County Highway and Transportation Map



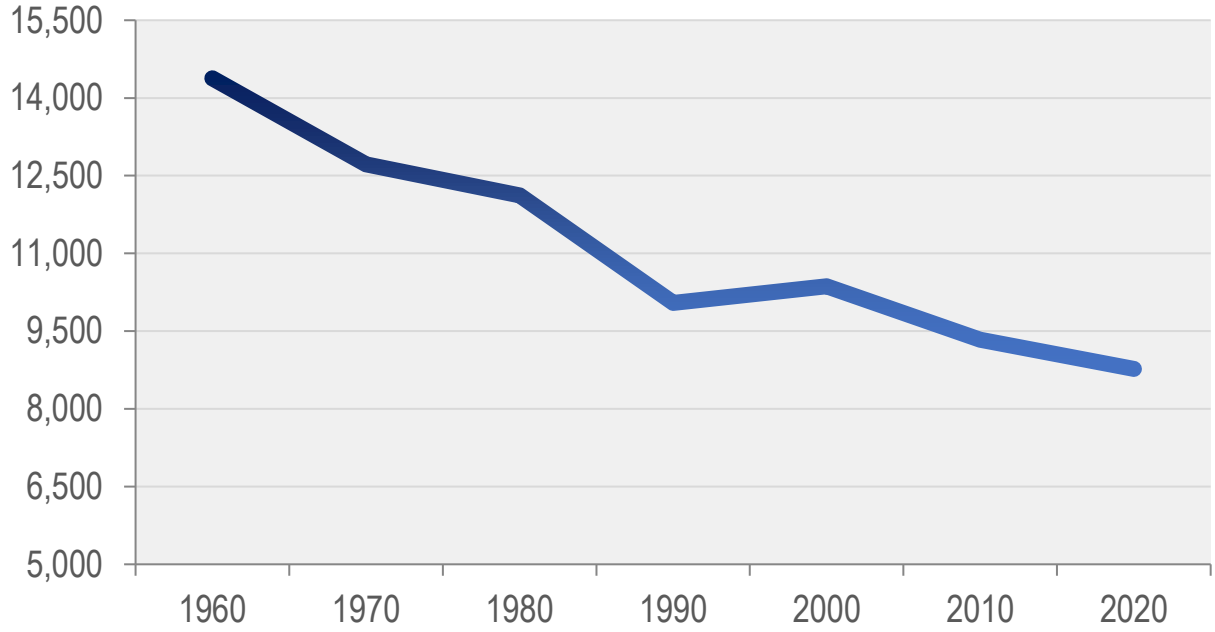
Demographics

The population of an area is one of the most important assets because without people, there is no labor force, entrepreneurs, taxpayers, or buyers of goods and services. Greene County's population has seen an overall decline since 1960. There have been some periods of small growth, but the overall trend has been downward, limiting the amount of influence the population can exert on development. Since 2010, Greene County has lost 6% of its total population. Since 2000, there has been a population loss of 15% in the county.

Population size, composition, and distribution influence the range of businesses a county can support, the pool of workers from which to draw, and the demand for and supply of services. Population trends give county leaders information on what kind of services need to be provided

and offers prospective employers an overview of the local labor force. Figure 2.1 displays Greene County's population from 1960 to 2020.

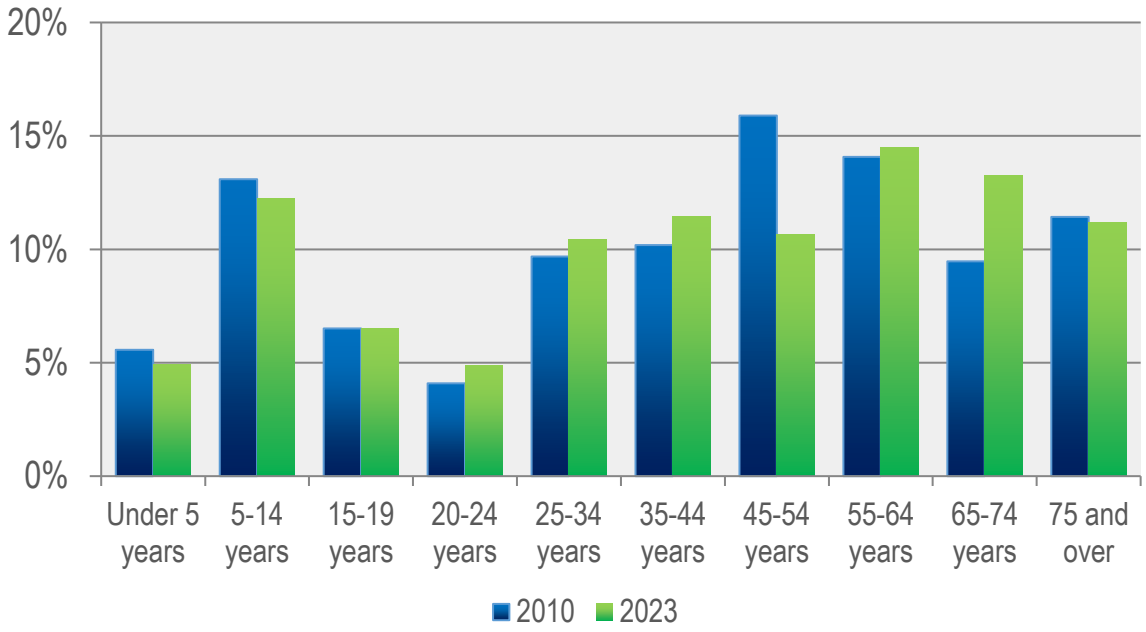
Figure 2.1: Greene County Historic Population, 1960-2020



Source: US Census Bureau

Figure 2.2 compares the age distribution throughout Boone County from 2010 to 2023. Overall, there has been a decline in the county's population since 2010, with the largest decreases occurring in the 45–54-year-old range. The largest population increases happened in the 65-74 age cohort. This is consistent with other rural Iowa communities. Greene County did also have increases in the 20-24 and 35-44 year-old age cohorts. This is likely due to available entry-level jobs and low cost of living.

Figure 2.2: Greene County Age Distribution, 2010 & 2023



Source: US Census Bureau

Housing

One of the most important aspects to attract new residents is housing, and attracting new residents is important to rural Iowa counties. The current housing stock, type of houses, and housing availability and affordability are determining factors for potential residents.

Between 2010 and 2023, Greene County lost a total of 230 housing units. During the same time frame, the number of vacant homes decreased by 162 units. These numbers are consistent with the population decrease the county has seen since 2010. The number of renter-occupied units increased by 21 units, while owner-occupied units decreased by 68 units. Table 2.3 shows the housing trends for Greene County from 2010 to 2023.

Table 2.3: Greene County Housing Units, 2010 & 2023

	2010		2023	
	Number	Percent	Number	Percent
Occupied Housing Units	3,996	87.9%	3,928	91.0%
Owner-Occupied	3,006	75.2%	2,917	74.3%
Renter-Occupied	990	24.8%	1011	25.7%
Vacant Housing Units	550	12.1%	388	9.0%
Total Housing Units	4,546	100.0%	4,316	100.0%

Source: US Census Bureau, American Community Survey

This breakdown is important during hazard events due to the populations that occupy these units. Homeowners who occupy their home may be more likely to want to rebuild, while vacant homes, if damaged, would either sit vacant with no activity, or may be torn down. Renters are unpredictable as some may choose to stay within the same location, or they may decide to move.

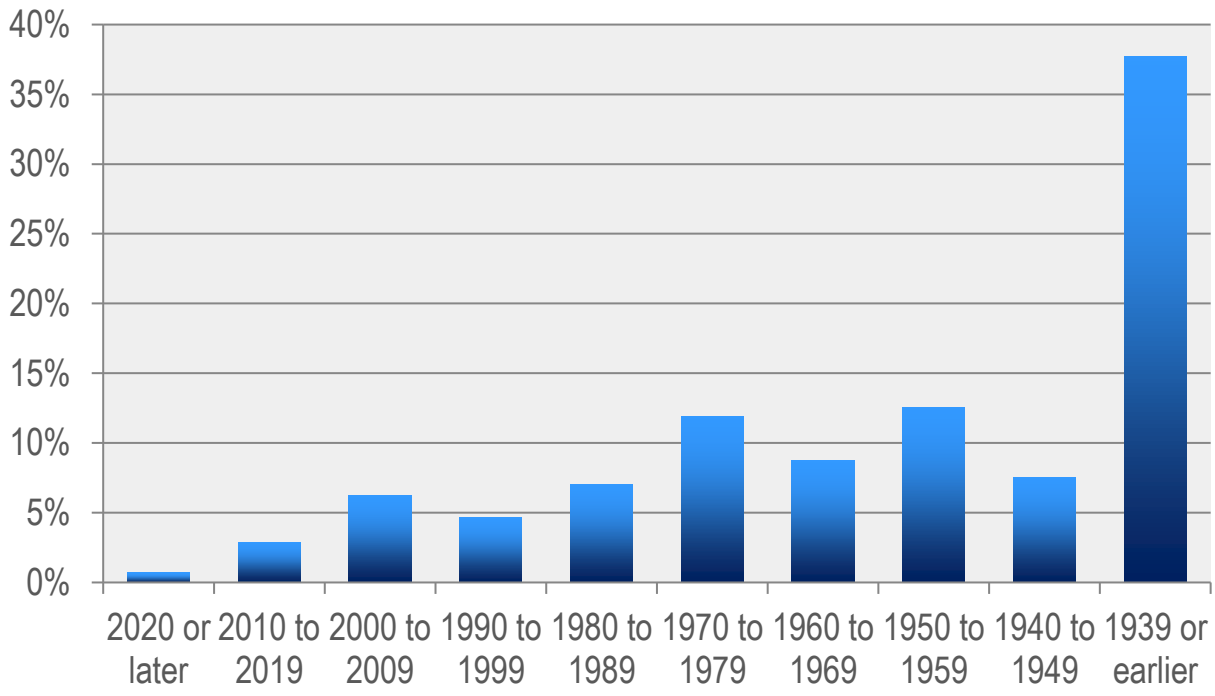
According to the 2023 American Community Survey Estimates (Table 2.4), the median housing value was $136,300. Over 50% of the homes in Greene County are valued under $150,000, and of those, 12.4% are valued less than $50,000. Since the population within the county continues to decline, it is unlikely that a large number of new homes will be built. Instead, the cities and county should invest in the rehabilitation of the existing structures. The rehabilitation of these homes will improve safety and reduce the susceptibility to numerous hazards.

Table 2.4: Greene County Value of Owner-Occupied Units, 2023

Value of Housing Unit	Percent of Homes
Less than $50,000	12.4%
$50,000 to $99,999	21.7%
$100,000 to $149,999	17.6%
$150,000 to $199,999	18.4%
$200,000 to $299,999	19.8%
$300,000 to $499,999	8.1%
$500,000 to $999,999	1.6%
$1,000,000 or more	0.4%
Median (dollars)	$140,500
Median (Iowa)	$213,300

Source: American Community Survey

Figure 2.3: Greene County Year Housing Units Constructed, 2023



Source: American Community Survey

Figure 2.3 shows that 37.7% of the housing units in Greene County were constructed before 1939. From 1940 to 1969, home construction was pretty steady, 28.87% of the county's homes being built in these decades. Older homes generally show deterioration in the structural aspect and in the overall general features. These homes were built to the standards of the time, and may not meet current building codes and standards, making them more susceptible to damage from hazards such as fires, severe storms, and other hazardous weather conditions.

Survey estimates show that there have been minimal builds since 2010, which is consistent with the county's building permits. There have been new builds in rural areas and limited within the county's cities. Virtually all homes within the county have adequate gas or other fuel heating systems and kitchen facilities. Most homes are connected to the public water and sewer, except in rural areas, where many homes are connected to individual septic tanks regulated by the Greene County Environmental Health Department, which is run through a contract with Carroll County.

Economics

Household income is one of the most important indicators of the economic base in Greene County. In 2023, Greene County's median household income was $59,159, 29% behind the State of Iowa's median of $83,966. Over 16.6% of the county's households make less than $25,000 per year, while 27% of the households make over $100,000. An area's economy relies heavily on

strong household income levels as higher incomes mean households have more spending power to purchase various goods and services. Higher income levels can be related to better employment opportunities, and changes to bring in workers from other counties. Table 2.5 shows the household income in 2023 inflation-adjusted dollars.

Table 2.5: Greene County Household Income, 2023

Income and Benefits (2023 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	185	4.7%
$10,000 to $14,999	134	3.4%
$15,000 to $24,999	334	8.5%
$25,000 to $34,999	322	8.2%
$35,000 to $49,999	640	16.3%
$50,000 to $74,999	790	20.1%
$75,000 to $99,999	456	11.6%
$100,000 to $149,999	621	15.8%
$150,000 to $199,999	240	6.1%
$200,000 or more	200	5.1%
Median Household Income	$59,159	--
Mean Household Income	$78,888	--

Source: American Community Survey

The county's small rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found throughout the county. Greene County's strongest employment sectors are educational services, and health care and social assistance (25.4%) followed by manufacturing (10.1%). A complete breakdown of the workforce aged 16 and over by industry is found in Table 2.6.

Greene County has an active labor force, with a large percentage of both men and women participating. In July of 2025, 4.9% of the County's labor force was estimated to be unemployed. Traditionally, the planning area's labor participation rate has been within the average or below average compared to Iowa, and much lower than the national average. Overall, Greene County has a fairly stable economy with diverse industry sectors represented. Few employers have closed and new ones have opened, changing the economy's outlook.

Table 2.6: Greene County Employment by Industry, 2023

2023	**Estimate**	**Percent**
Civilian employed population 16 years and over	4272	100.0%
Agriculture, forestry, fishing and hunting, and mining	395	9.2%
Construction	315	7.4%

Manufacturing	431	10.1%
Wholesale trade	199	4.7%
Retail trade	472	11.0%
Transportation and warehousing, and utilities	161	3.8%
Information	84	2.0%
Finance and insurance, and real estate and rental and leasing	276	6.5%
Professional, scientific, and management, and administrative and waste management services	374	8.8%
Educational services, and health care and social assistance	1083	25.4%
Arts, entertainment, and recreation, and accommodation and food services	144	3.4%
Other services, except public administration	163	3.8%
Public administration	175	4.1%

Source: American Community Survey

Existing Documents

Table 2.7 provides a compilation of the current planning and regulatory documents in place for Greene County. The table also shows the last update of each plan. These documents help the county mitigate the impacts of hazard events in the county. First and foremost, the previous hazard mitigation plan, as well as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The County updated their comprehensive plan in 2008 and evaluated the past and future growth. Between the comprehensive plan and the zoning ordinance, it was determined that farmland is to be converted on a conservative basis, and that development should be contained within previously developed areas of the county to not create additional hazard impacts. Floodplain regulations have been implemented to ensure that no construction happens within the floodplain, or if it is to happen within the floodplain to ensure that all necessary regulations are met.

Greene County is a county with a limited population. This limited population leads to a small tax base, which leads to a smaller overall county budget. While the County budget is smaller, it is still required to offer the same services to its residents as larger counties. This leaves a smaller budget left to do mitigation actions without outside assistance. The smaller budget has led to older infrastructure, limited planning, and reduced personnel. While the county itself is limited, it can be assisted by the local COG to assist with finding funding and additional planning opportunities. The county already is a part of numerous 28E agreements to examine the future health and safety of the county and expanding the number of these agreements would only continue to benefit the parties involved. Partnering with other counties and/or jurisdictions may be beneficial to completing necessary projects, of all types, and may create opportunities that previously may not have been possible.

Table 2.7: Greene County's Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	2008
Building Code	Yes	2008
Zoning Ordinance	Yes	2022
Strategic Plan	No	-
Housing Needs Assessment	Yes	2017
NFIP Participant	Yes	1977
Floodplain Regulations	Yes	2016

NFIP Participation

Greene County has participated in the NFIP since the initial FHBM was identified in 1977. The County's FIRMs were updated in 2016. In the past, there have been instances of flooding within Greene County. The County's FIRMS can be found in the Greene County appendix. Greene County's Flood Plain Administrator is also the Zoning and Environmental Health Coordinator for the county. Any development or demolition in the floodplain is required to obtain a permit which regulates the development/demolition and lays out the NFIP regulations that must be followed. Green County participates in NFIP and implements substantial improvement/substantial damage provisions in the following manner: Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD determinations and provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Outlook and Future Development

Since the last plan update, there has been limited development in the rural portions of Greene County. There have been some residential structures built outside of city limits, but these instances are limited and mostly concentrated around the City of Jefferson. There has also been some industrial development/expansion spread sporadically throughout the county.

Looking towards the life of this plan, the population of the rural part of the county is likely to continue to slowly decline, as has been the case in recent years, with growth likely within the City of Jefferson as residential infill. Most rural development will be residential, but some may be commercial, industrial, and recreational. Conversion of farmland on a very modest scale is likely, but development is not likely in potential flood hazard areas.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Examples of critical facilities include but are not limited to: hospitals and other medical facilities, police and fire stations, emergency operations centers, evacuation shelters, public works facilities, schools and colleges, transportation systems (airways, highways, railways, waterways), lifeline utility systems (potable water, wastewater, oil, natural gas, electricity, communication systems), high potential loss facilities (nuclear power plants, dams, military installations), and hazardous material facilities (corrosives, explosives, flammable materials, radioactive materials, toxins, etc.). The critical facilities for Greene County can be found on Map 2.4 and are listed in Table 2.9.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the county as a whole, and each individual community can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The County's essential infrastructure and services can be found in Table 2.8.

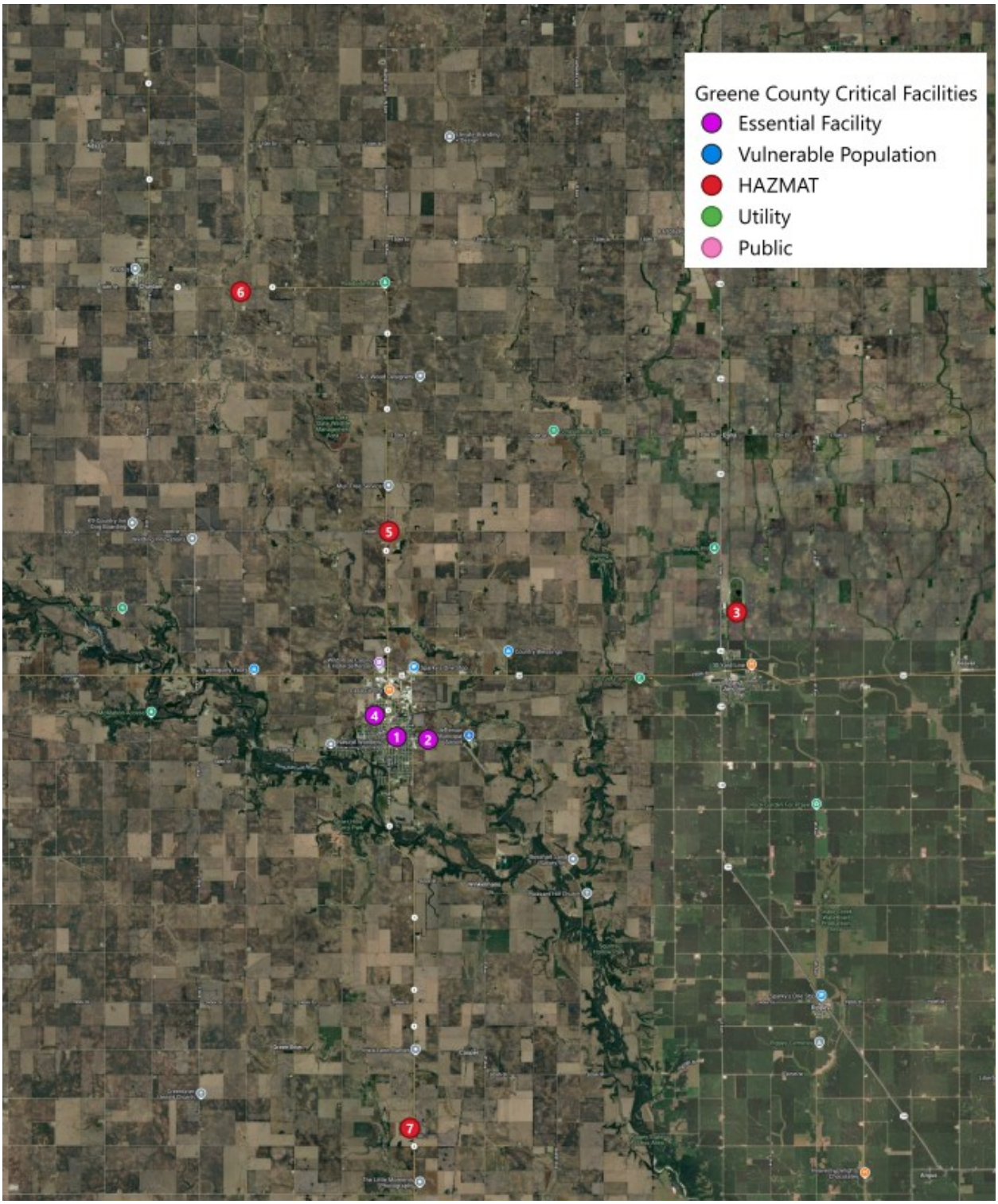
Table 2.8: Essential Infrastructure and Services

Major Arterials	U.S. Highways 30 IA Highways 4, 25 & 144	**Air Service**	Jefferson Municipal Airport
Water Service	Municipal, Wells, Xenia Rural Water, Grand Junction Municipal Utilities	**Sewer Service**	Private Septic, Municipal
Electric Service	Black Hills Energy, Midland Power Cooperative, Alliant Energy, Grand Junction Municipal Utilities	**Gas Service**	Alliant Energy, Black Hills Energy
Sanitation/Solid Waste	Local Haulers, City of Jefferson	**Landfill**	Boone County Landfill
Phone and Internet	Wireless, Scranton Telephone, Jefferson Telecom	**Law Enforcement**	Greene County Sheriff, City of Jefferson Police
Fire Service	5 City Departments	**Ambulance Service**	Greene County Ambulance

Table 2.9: Greene County Critical Facilities

Number on Map	Name	Address	Type
1	Greene County Courthouse	114 North Chestnut Street, Jefferson	Essential Facility
2	Greene County Law Enforcement Center	1105 E Lincoln Way, Jefferson	Essential Facility
3	Louis Dreyfus Company	1149 U Avenue, Grand Junction	HAZMAT
4	Greene County Secondary Roads Department	701 W Wall Street, Jefferson	Essential Facility
5	Landus	1407 190th Street, Jefferson	HAZMAT
6	NEW Coop	510 K Avenue, Churdan	HAZMAT
7	NEW Coop	2272 Neola Avenue, Jefferson	HAZMAT

Map 2.4: Greene County Critical Facilities



Chapter 3:

Hazard Analysis and Risk Assessment

The Hazard Analysis and Risk Assessment (HARA) is a process for determining the emergency management needs for a jurisdiction. The determination is possible when the knowledge of the hazards is combined with the knowledge of the impact it would have on citizens and property within the jurisdiction. The HARA process includes four steps and shows the jurisdictions how frequently damage from a particular event could occur; the extent of damage; and which portions of the jurisdiction could be impacted during an event.

Step 1: Identify Hazards – determine which hazards can affect the jurisdiction.
What kinds of hazards can affect the jurisdiction? What happened in the past that the jurisdiction should have known about?

Many people are only aware of the most obvious risks, usually as a result of a disaster that affected their community in recent years such as a tornado or flood. In many cases, a large majority of the population is not aware of certain hazards because they have not affected the jurisdiction during their lifetime.

Step 2: Community Profile – determine if and to what extent these hazards will affect the assets of the jurisdiction.
What will be affected by these hazards? Are there buildings, roads, utilities, or other facilities in the jurisdiction that will be damaged or destroyed by these hazards? Are there concentrations of certain populations in the hazard area that are especially vulnerable, such as elderly, children, or non-English speaking people? Are there unique or symbolic characteristics about the jurisdiction that will be impacted adversely by a hazard? How will the economy of the jurisdiction or region be impacted by the occurrence of the hazard?

An inventory will help identify the assets that can be damaged or affected by the hazard event. In many cases, jurisdictional assets may be vulnerable to more than one type of hazard, in which the jurisdiction may need to look at different characteristics of the same asset to understand its vulnerability to each type of hazard. For example, if a building is subject to both floods and tornadoes, the jurisdiction will be interested in the location and elevation of the building in order to determine how much of the structure and its contents will be damaged by flooding. The jurisdiction will also be interested in the construction of the building and its ability to resist physical damage caused by high winds and debris during a tornado.

Step 3: Profile Hazard Events – determine how impactful a hazard can be.
How "big" is each hazard's potential impact? Will it affect every area the same or will certain areas get hit harder than others? How often will each type of hazard impact the jurisdiction?

It is important to know the location and amount of land area that may be affected by certain hazard types. For example, there may be areas that can be affected repeatedly by a hazard in one part of the jurisdiction such as floodplains adjacent to streams and rivers or areas around chemical facilities, or there may be potential jurisdiction-wide impacts from events such as windstorms or winter storms.

Hazards can create direct damages, indirect effects, and secondary hazards to jurisdictions. Direct damages are caused immediately by the event itself, such as a bridge washing out during a flood. Indirect effects usually involve interruptions in asset operations and community functions. For example, when a bridge is washed out due to a flood, traffic is delayed or rerouted, which then impacts individuals, businesses, and public services that depend on the bridge for transportation. Secondary hazards are caused by the initial hazard event, such as when flooding causes a dam break. While this is a disaster in its own right, its consequent damages should be included in the damage calculations of the initial hazard event. Loss estimations will include a determination of the extent of direct damages to property and indirect effects on functional use.

Step 4: Prioritizing Hazards – determine which hazards need to be addressed through mitigation planning
Which hazards are priorities for planning? Which hazards are candidates for special attention for response planning? Which hazards should mitigation efforts be focused on? Which hazards require further planning for post-disaster recovery?

Through completion of steps 1, 2, and 3, the hazards can be sorted by their composite score. The hazards with a higher score represent a higher risk to the jurisdiction. At first glance, the top third can be taken as the first priority group, the following third as the second priority group, and the remaining third as the third priority group. Adjustments can be made to this preliminary ranking by the planning team.

Since the last plan update was approved by the jurisdiction in 2020, there has been one disaster declaration in Greene County, DR-4642 was declared on February 22, 2022 for severe storms, straight line winds, and tornadoes that occurred on December 15, 2021. More information about these declarations can be found in the applicable hazard section later in this chapter.

The hazard identification portion of the hazard analysis and risk assessment is an inventory of the hazards that could potentially affect the jurisdiction. Table 3.1 is a list from the State of Iowa's 2023 Hazard Mitigation Plan, and includes twenty hazards in two categories. Since 2013, due to the Covid-19 pandemic, the State's list of hazards was modified to include this type of event.

Table 3.1: State of Iowa Hazards

Natural	Non-natural
Drought	Animal/Crop/Plan Disease
Tornadoes and other High Wind Events (including derechos)	Pandemic Human Disease
Flooding - River	Hazardous Materials
Flooding - Flash	Infrastructure Failure
Severe Winter Storms	Radiological Incident
Hail and Lightning Storms	Terrorism
Excessive Heat	Transportation Incident
Dam and Levee Failure	
Landslides	
Earthquake	
Wildfire, including Grass Fire	
Sinkholes	
Expansive Soils	

Hazard Profiles

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

This plan's risk assessment was completed on a planning area wide basis, rather than analyzing each jurisdiction. Unique conditions within participating jurisdictions are noted in each hazard profile. School districts worked with their respective communities in determining the risk analysis scores, which gives them the same score as the community in which the district's assets are located.

The hazard analysis identified potential hazards that could affect Greene County for the purpose of mitigation planning. 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.

To identify the hazards that threaten the planning area, the Hazard Mitigation Committee reviewed hazard data from the National Climatic Data Center among other sources and discussed the impacts of each hazard required by FEMA, and natural and human-caused hazards that were included in the State of Iowa Hazard Mitigation Plan. Hazards that the committee determined could affect Greene County are shown in Table 3.2.

Table 3.2: Hazards Affecting Greene County

Natural Hazards		Combination Hazards
Drought	Grass/Wild Land Fire	Levee/Dam Failure
Earthquake	Human Disease	
Expansive Soils	River Flooding	
Extreme Heat	Severe Winter Storm	
Flash Flood	Thunderstorm/Lightning/Hail	
	Tornado/Windstorm	

Not all of the hazards were determined to affect Greene County. The hazards shown in Table 3.3 were eliminated.

Table 3.3: Natural Hazards Not Affecting Greene County

Hazard	Reason for Omission
Landslides	There is no known agency that documents historical data on landslides. The best available data was personal knowledge of the committee. The committee decided to eliminate landslides due to their limited occurrences and impacts.
Sinkholes	There is no history of sinkholes in the county. Source: IADNR, Iowa Geological Survey

Included in the assessment of each hazard is a statement recognizing the potential that the hazard will impact the jurisdiction over the life of the plan, and in some cases, breaks it down to within the next year. These statements rank the potential of the hazard impacting the jurisdiction into four categories which are shown and described below:

-Highly unlikely- less than 10% chance that this hazard will impact the jurisdiction within the noted timeframe.

-Unlikely- 10% to less than 50% chance this hazard will impact the jurisdiction within the noted timeframe.

-Likely- 50%-90% chance the jurisdiction will experience the hazard within the noted timeframe.

-Highly likely- Greater than 90% chance the jurisdiction will experience the hazard within the noted timeframe.

Natural Hazards

Drought

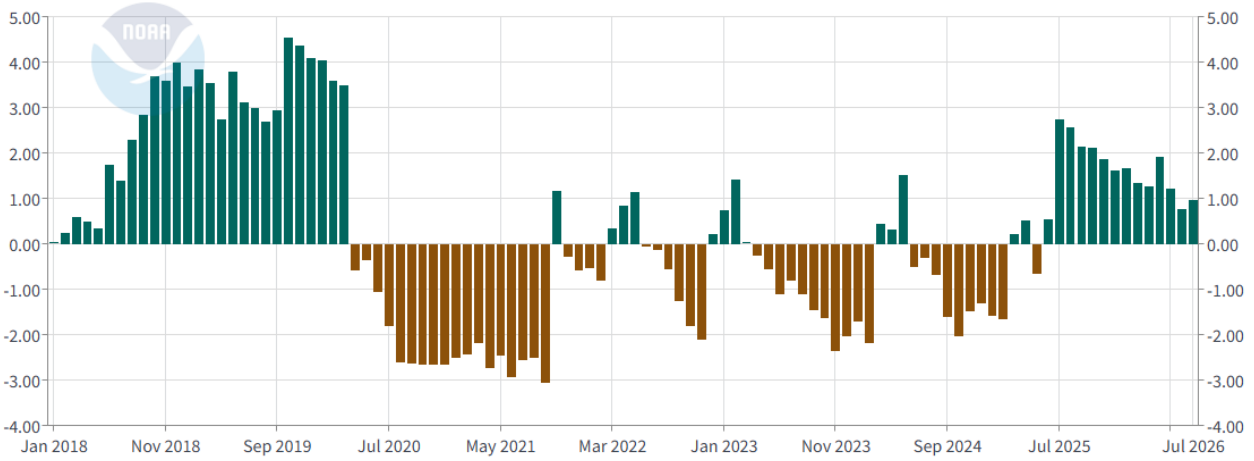
Droughts are defined as periods of prolonged dry weather that lasts long enough to cause serious problems such as crop damage and/or water supply shortages. The severity of the drought

depends upon the degree of moisture deficiency, the duration, and the size of the affected area. The four ways droughts can be defined are meteorological, hydrological, agricultural, and socioeconomic. A meteorological drought is a drought that refers to the precipitation deficiency, hydrological droughts pertain to the declining surface and groundwater supplies, agricultural droughts refer to soil moisture deficiencies, and socioeconomic droughts refer to physical water shortages affecting people.

In Iowa, the highest occurrence of drought conditions is associated with meteorological and agricultural as a result of either a decline in precipitation or low soil moisture. Droughts can have widespread adverse economic, environmental, and social impacts as rivers, reservoirs, groundwater levels, and soil moisture decrease. Droughts can be spotty or widespread and last from a few weeks to a number of years. During prolonged droughts, communities can notice serious impact on their water supply and economy, and increased demand for water and electricity may result in shortages of resources. If agricultural production is damaged or destroyed by a loss of crops or livestock, food shortages can occur. While droughts are generally associated with extreme heat, droughts can and do happen during cooler months.

The Palmer Drought Severity Index (PDSI) was developed by Wayne Palmer in the 1960s and uses temperature and rainfall information in a formula to determine dryness. The PDSI is most effective in determining long-term drought (several months) and is not as efficient with short-term forecasts. An advantage of the Palmer Index is that it is set to local climate, so it can be applied to any part of the country to demonstrate relative drought or rainfall conditions. The Palmer Index uses 0 as normal, with drought conditions shown as negative numbers and excess rainfall shown as positive numbers. Figure 3.1 displays the Palmer Drought Severity Index for the Greene County climate division from 2018-2026. The Palmer Drought Severity Index has seven categories of wet and dry conditions that are displayed in Table 3.1.

Figure 3.1 Palmer Drought Severity Index: 2018-2026



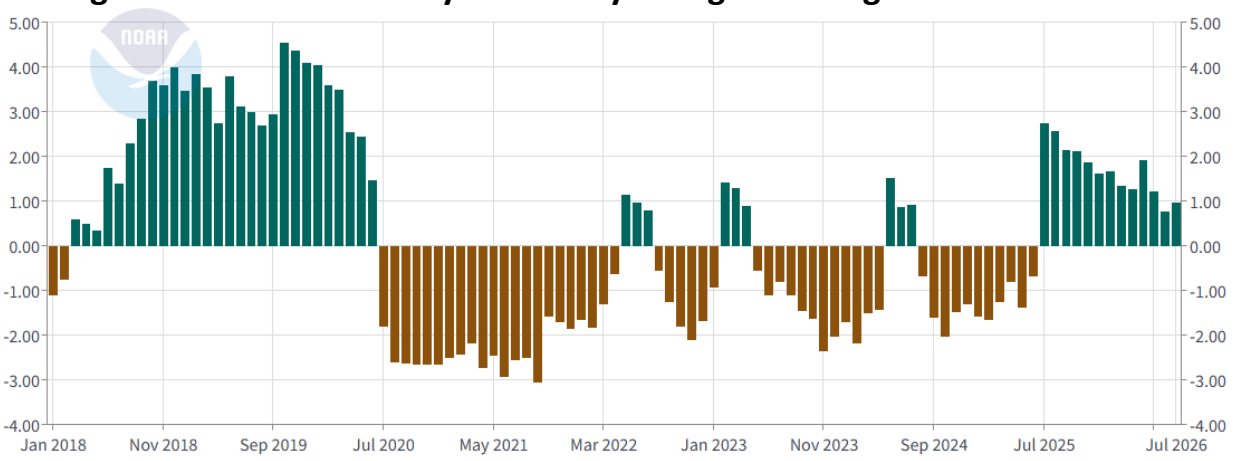
Source: NOAA

Table 3.4: Palmer Drought Severity Index

Numerical value	Condition
-4.0 or less	Extreme Drought
-3.0 to -3.9	Severe Drought
-2.0 to -2.9	Moderate Drought
-1.9 to 1.9	Near Normal
2.0 to 2.9	Unusual Wet Spell
3.0 to 3.9	Very Wet Spell
4.0 or more	Extremely Wet

The Palmer Hydrological Drought Index (PDHI) shows hydrological drought and wet conditions, which more accurately reflects groundwater conditions, reservoir levels, etc. The hydrological impacts of a drought take longer to develop and longer to recover, therefore PDHI responds more slowly to changing conditions than PDSI. Figure 3.2 shows the Palmer Hydrological Drought Index for Greene County from 2018-2026.

Figure 3.2 Greene County Palmer Hydrological Drought Index: 2018-2026



Source: NOAA

Since 2020, Greene County has experienced 21 droughts. The National Center for Environmental Information did not report any crop or property damage due to the droughts. These 21 droughts occurred from 2020-2024. According to the National Weather Service, the average drought in Greene County lasted 25 days.

When droughts occur, they tend to affect more than just one county or state. As the agriculture sector is reliant on precipitation and when droughts occur it tends to be the most impacted sector. During water shortages, water dependent manufacturers are also affected. Drinking water is drawn from surface and groundwater sources, so prolonged droughts may affect all citizens if there were to be a drop in the stream flow coupled with the drop in the water table.

Over the past century, studies have been conducted that show meteorological droughts are never the result of one single cause. Scientists are not able to predict a drought more than a month or so in advance, as predicting droughts depends on forecasting precipitation and temperature. Anomalies of precipitation and temperature may last weeks, to months, to even decades and is dependent on several unstable weather systems at the global level. Drought prediction improvements differ by region, season, and climate. The U.S. Drought Monitor map provides a weekly summary of drought conditions across the United States and combines a variety of data-based drought indices, indicators and local expert input. This map is the most widely used gauge of drought conditions throughout the country.

Droughts do not pose as much threat to physical structures as they do to humans and the environment. During the past five years, Greene County has experienced 21 drought events, but with none causing property or crop damage. These events also caused no deaths or injuries. With twenty-one drought events happening within the county during the past five years, it is anticipated that the county will continue to see periods of drought annually. From 2020 to 2024, at least three drought events occurred each year, with the exception of 2022. The previous reporting period did not experience any events. While the frequency of these events has increased, the amount of damage caused by them has not increased from the previous planning

period, when there no crop damage reported. Due the number of occurrences during the previous planning period, drought is likely to occur across the county during the planning period.

While there are no mitigation actions jurisdictions can take to stop drought instances, there are actions that can be undertaken to alleviate the effects of them.

➢ Create a response plan
➢ Have a plan in place for reduction of water usage
➢ Educate the public on the effects of a drought and how they can do their part
➢ Encourage communities to create additional redundancy in their water systems to reduce loss

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; and sometimes trigger landslides, flash floods, and fires. (Iowa Hazard Mitigation Plan 2023).

Greene County is located in the lowest risk Seismic Zone. Previously this zone was categorized as Seismic Zone 1, but the USGS map shown in Figure 3.3 recognizes this area as the lowest hazard zone. Most structures in Iowa are not built to earthquake standards, but because of the relatively low magnitude of a possible quake, property damage would likely be minor foundational damage. The most vulnerable structures are houses built on poorly consolidated substrate, especially floodplain materials.

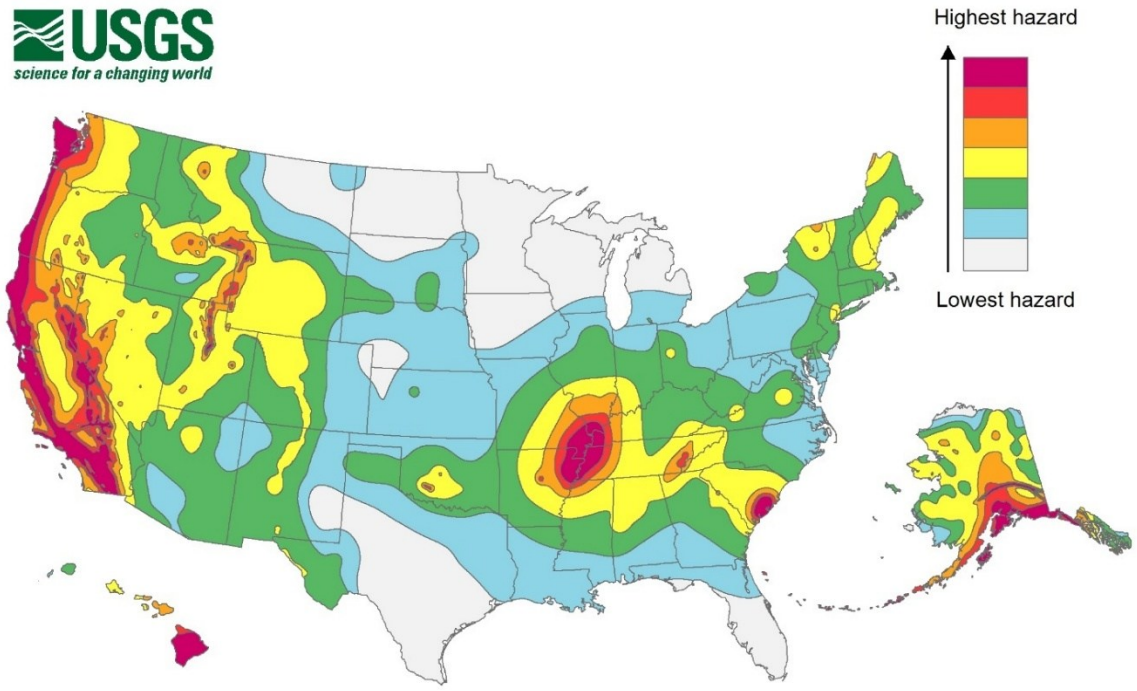
Iowa as a whole has experienced the effects of only a few earthquakes in the past 175 years. The epicenters of thirteen earthquakes have been located in the state, with the majority along the Mississippi River. While more than twenty earthquakes have occurred in or around Iowa over the past 175 years, they have not seriously impacted the state.

It is highly unlikely an earthquake will causing damage in Iowa- especially in Greene County, but that does not mean that one could not feel the effects of an earthquake. Iowans may feel earthquake shaking on occasion, but it may feel more like the vibrations similar to a passing large truck. Southeast Iowa has a greater risk of damage than the other portions of the state.

Table 3.5 Earthquake Intensity- Modified Mercalli Scale for Iowa

MMI	Intensity	Typical Effects
I	Not Felt	Not felt except under especially favorable conditions
II	Weak	Felt only by a few people at rest, particularly on upper floors of buildings
III	Weak	Noticeably felt indoors. Vibrations may resemble a passing truck/ Generally not recognized as an earthquake.
IV	Light	Felt indoors by many and outdoors by a few. Dishes, windows, and doors may rattle, Little or no damage.

Map 3.1: USGS 2018 Long-Term National Seismic Hazard Map



Source: USGS

Greene County is located in lowest earthquake hazard designation area. This designation comes from the United States Geological Survey, who ranks areas based on the past faults and earthquakes, behavior of seismic waves as they travel through different parts of the U.S. crust, and the near-surface site conditions at a specific location of interest (USGS). Greene County has not experienced an earthquake in the recorded past, and is unlikely to experience an earthquake in the future. The county does not rank within the top 10 most vulnerable counties in Iowa to earthquakes. Iowa as a whole anticipates $1,024,407 in expected annual loss due to earthquakes with the top ten counties anticipating $570,494 of that amount. The remaining 88 counties are anticipated to share the remaining $453,913 in expected annual loss (average of $5,158 per county). This information, coupled with the location of the planning area, have assisted in the determination that this particular hazard is unlikely to affect the planning area. If an earthquake were to occur, it is more likely that the planning area occur at a weak intensity.

Expansive Soils

Soils and soft rock that tend to swell or shrink excessively due to changes in moisture content are commonly known as expansive soils. 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 develops gradually and seldom presents a threat to life. The hazard occurs in many parts of the southern, central, and western United States. The availability of data on expansive soils varies greatly. For large areas of the United States, little information is reported other than field observations of the physical characteristics of clay.

The most extensive damage from expansive soils happens to highways and streets. Houses and one-story commercial buildings are most apt to be damaged by the expansion of soils than are multi-story buildings, which usually are heavy enough to counter swelling pressures. The warning time for expansive soils is consistent with other geological hazards that occur slowly over time.

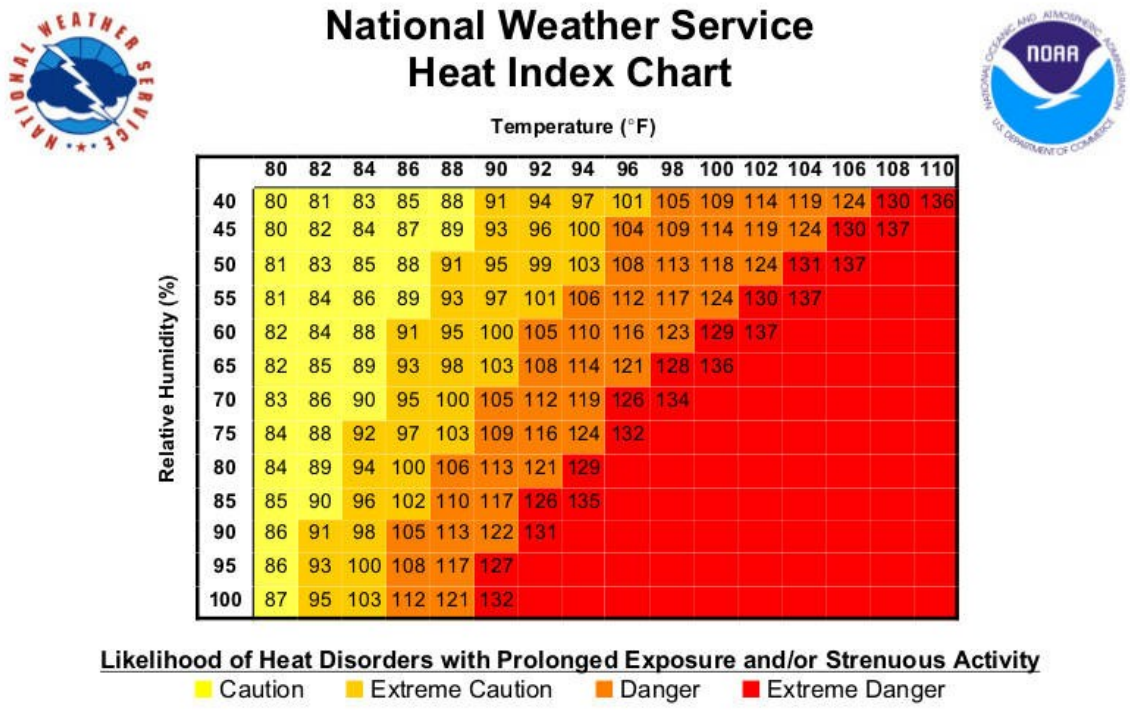
There have been no past instances of disasters associated specifically to expansive soils in Iowa (State of Iowa Hazard Mitigation Plan, 2023). Also, there is no comprehensive data available to compare losses throughout the region and State of Iowa. Based on the lack of historical impacts and identified losses, expansive soils are not considered a hazard within Greene County, and are not expected to present a risk during the life of this plan. Therefore, mitigation measures specific to expansive soils are not considered necessary at this time.

Extreme Heat

Extreme heat is the number one weather-related killer in the United States, and has the highest 30-year average compared to other weather events. The 30-year average for heat-related deaths is 130 per year, 49 more than flooding, which has the second highest average. Extreme heat conditions 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 or at least three consecutive days of 90 plus degree weather. Heat advisories are issued at 105 degrees and warnings are issued at 115 degrees. A heat index is a temperature that tells how hot it really feels when relative humidity is added to the actual air temperature. When exposed to full sunshine, the heat index can be increased by 15 degrees. Figure 3.4 displays heat index and likelihood of experiencing a heat disorder with rising temperatures and humidity.

The body's ability to cool itself is affected during extreme heat. When the body heats too rapidly, to cool itself properly or when too much fluid or salt is lost through dehydration or perspiration, the body temperature rises and heat-related illnesses may develop. These illnesses can include heat cramps, sunstroke, heat exhaustion, and heat stroke. As heat stroke can be deadly, immediate medical attention is necessary.

Figure 3.3: National Weather Service Heat Index Chart



Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Source: NOAA

Since 2020, Greene County has not experienced extreme heat events. The last extreme heat event happened during the last planning period, in July 2019. No deaths or property and crop damage were reported.

Many factors can determine how extreme heat affects all types of life. Older adults, young children, people with disabilities, and those who work outdoors are more susceptible to illnesses caused by heat. Households that do not have air-conditioning are also more at risk, as they cannot escape the heat. Livestock and other animals are also adversely affected by extreme heat and this event at the wrong time can inhibit crop production. Roadways and railroad tracks can also be distorted or even fail during extreme heat.

Greene County is likely to experience extreme heat events within the planning period. Extreme heat events can be predicted a few days in advance. When the heat index is expected to exceed 105 degrees for at least two consecutive days, the National Weather Service initiates alert procedures. Since extreme heat events have to have at least three days of 90-plus degree weather, these events are expected to last a minimum of three days, but no more than seven days. With proper precautions taken, there should be little to no harm done to humans or livestock.

While mitigation actions for jurisdictions are unable to stop excessive heat events, there are actions that can be taken to protect the populations from the effects of this hazard.

➢ Create a response plan
➢ Designate cooling shelters and equip shelters with necessary items
➢ Suspend utility shutoffs during excessive heat events
➢ Publicize information related to personal safety during heat events

Flash Flood

Flash flooding is one of the most dangerous weather events because there is little to no warning time. Flash floods occur when the water along a stream or low-lying area rises rapidly. These events happen within six hours of a significant rainfall. They are caused by heavy rainfall in a short amount of time from intense storms, slow-moving storms, or storms repeatedly moving over the same area. Other flash floods can be caused by dam or levee failures, or sudden releases of water held by an ice jam. Some flash floods are strong enough to roll boulders, tear out trees, destroy buildings or bridges, and scour out new channels.

Areas with dense populations are at a high risk of flash floods, as the construction of buildings, highways, driveways, and parking lots increases runoff. Streams through cities are sometimes routed underground into storm drains and during heavy rains, the storm drains can be overwhelmed and flood roads and buildings, particularly low spots such as underpasses, underground parking garages, and basements. Areas near rivers are at risk from flash floods. Levees are often built along rivers and used to prevent high water from flooding bordering land.

Nearly half of all flash flood deaths occur as vehicles are swept downstream after the driver drives onto the flooded highway. Six inches of fast-moving water can knock a person off their feet; water only twenty-four inches (two feet) deep can carry away most vehicles. The National Weather Service has the “Turn Around Don’t Drown” program to educate the public about the dangers of floods and fast-moving waters.

The National Weather Service has developed classes of flash flood warnings.

Table 3.6 Flash Flood Warning Levels

Base	Used most of the time, when flash flood impact is possible.
Considerable	Used rarely, when there are indications flash flooding capable of unusual severity or impact is imminent or ongoing and urgent action is needed to protect lives and property.
Catastrophic	Used exceedingly rarely, when a flash flood threat to life and catastrophic damage is occurring or is imminent, and floodwaters have risen or will rise to levels rarely if ever seen.

Table 3.7 Flash Flood Intensity Scale

Intensity	Anticipated Conditions
Low	Localized ponding and minor drainage problems
Moderate	Localized flooding of roads, property, and agricultural land
High	Significant flooding of developed and rural areas
Extreme	Widespread or rapidly developing life threatening flooding

East-central Greene County is more susceptible to flash flooding due to the area's very flat terrain and limited natural relief. Water may accumulate in low-lying areas and overwhelm drainage systems, ditches, and culverts because runoff cannot move quickly from the area. Widespread flash flooding is not common in Greene County and since 2020, Greene County has not experienced flash flooding events. This is lower than the two events reported from 2014 to 2019. The last recorded flash flood occurred in Scranton and Ralston in September 2015, resulting in $100,000 in property damage. Due to the lack of flash flooding in the previous planning period, widespread flash flooding is unlikely to occur in the planning period. Localized flash flooding, particularly in east-central Greene County is likely to occur at a low to moderate intensity due to lack of drainage and low-lying areas.

Land that is located within a floodplain or in low-lying areas are at the most risk of experiencing flash floods. Properties that have aging sewer systems can also be at risk due to the design of the drains. Older systems were designed for what was necessary at the time, and current capacities could be significantly larger. When possible, the National Weather Service forecasts flash flood watches 12-36 hours in advance when conditions look favorable for a flash flood. Although a watch is issued 12-36 hours in advance, warnings, on average, are issued thirty minutes to an hour before the flood occurs.

While there is a good deal of information pertaining to river flooding for the state, data for flash floods is not readily available. Flash floods occur with little to no warning, and with no data being used to predict future instances, it is important that Greene County is prepared for these events. Even though the county has not experienced flash floods within last planning period, flash floods are unpredictable and the jurisdiction needs to be prepared for all results of this type of event. It is important that the jurisdiction is prepared to minimize the damage caused by these events by implementing mitigation items prior to their occurrences.

Climate change is anticipated to increase the number of flash floods that impact the planning area. Precipitation is expected to increase in intensity, but may not increase in frequency. Average annual precipitation is anticipated to increase 1" to 4" by 2050, but heavy precipitation events are likely to be more common.

There are some mitigation actions that can be implemented to alleviate the effects of flash floods.

➢ Restore rivers and drainage districts to prevent flooding

➢ Encourage the jurisdiction to participate in the NFIP
➢ Encourage permeable pavement installation
➢ Educate homeowners about on-site stormwater management practices

Grass/Wild Land Fires

A grass/wildland fire is an uncontrolled fire that threatens life and property in either rural or wooded areas. When conditions are favorable, such as periods of drought when natural vegetation is drier, fires are more likely to occur.

Wildland fires are a serious threat to life and property in the United States. Fire seasons have become progressively worse over the past fifty years due to the combination of drought, warmer temperatures, high winds, and an excess of dried vegetation in forests and grasslands. As the wildland threat grows, so does the cost of fighting the fires. Although lightning is a common ignition source of wildland fires, nine out of ten fires are started directly or indirectly by people through debris burning, campfires, arson, discarded smoking products, sparks from equipment in operation, arced power lines, or other means.

Weather is the most variable of the factors that affect fire behavior. The combination of wind, temperature, and humidity affects how fast wildland fires can spread. Strong winds can push the flames toward new fuel sources or pick up and transfer burning embers, sparks, and other materials that are capable of starting "spot fires". Temperature affects the spread of wildland fires because the temperature of the fuel affects how quickly or slowly they will reach their ignition point and burn. Humidity dampens the fuel, slowing the spread of flames.

Grass and Wild Land fires are the most common types of fires that occur in Greene County, and all jurisdictions can be affected by this hazard. Most jurisdictions have been affected by a grass or wild land fire in the past, but these types of fires tend to occur in the rural parts of the county most often. Consistent and accurate data is not readily available for the county, but in total, the area fire departments report multiple incidents per year.

Fire severity is a quantitative measure of the effects of a fire on the environment, typically considering both the damage to vegetation and the impacts on the soil. Fire severity is described along a spectrum, ranging from unburned/low severity to moderate severity, and high severity. Fire severity is driven by multiple factors that affect how a fire behaves. Those factors are often depicted in what's called a 'fire behavior triangle." The three major factors in the triangle are: the weather conditions during the fire (wind, temperature, humidity); the topography of the landscape (slope, aspect); and the amount, arrangement, and types of fuels that are present during the fire.

Table 3.8 Fire Severity

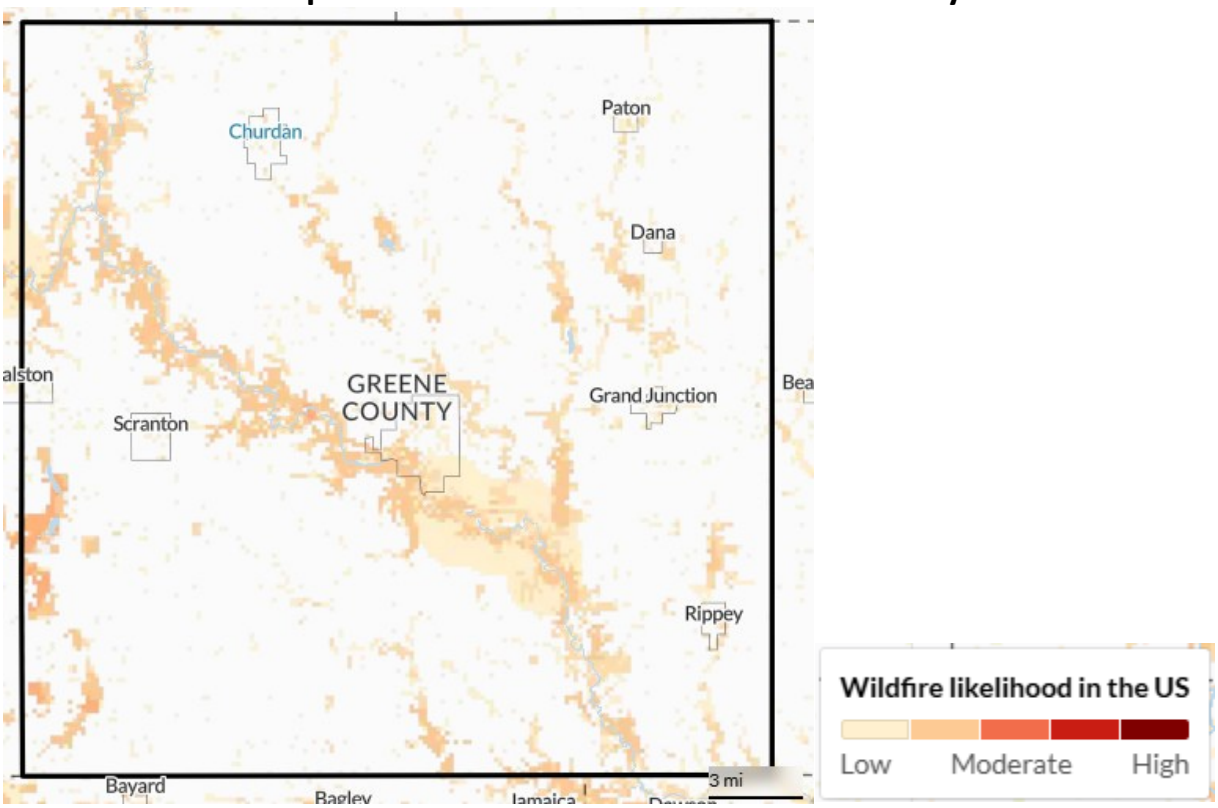
Low	A fire that has limited effect on overstory trees (<30% mortality), understory vegetation, and soils.

Moderate	A fire producing variable, moderate effects on overstory trees, averaging 30-80% of the vegetation killed, and /or moderate soil exposure.
High	A fire producing a high percent of overstory tree mortality (>80%) and/or extensive mineral soil exposure.

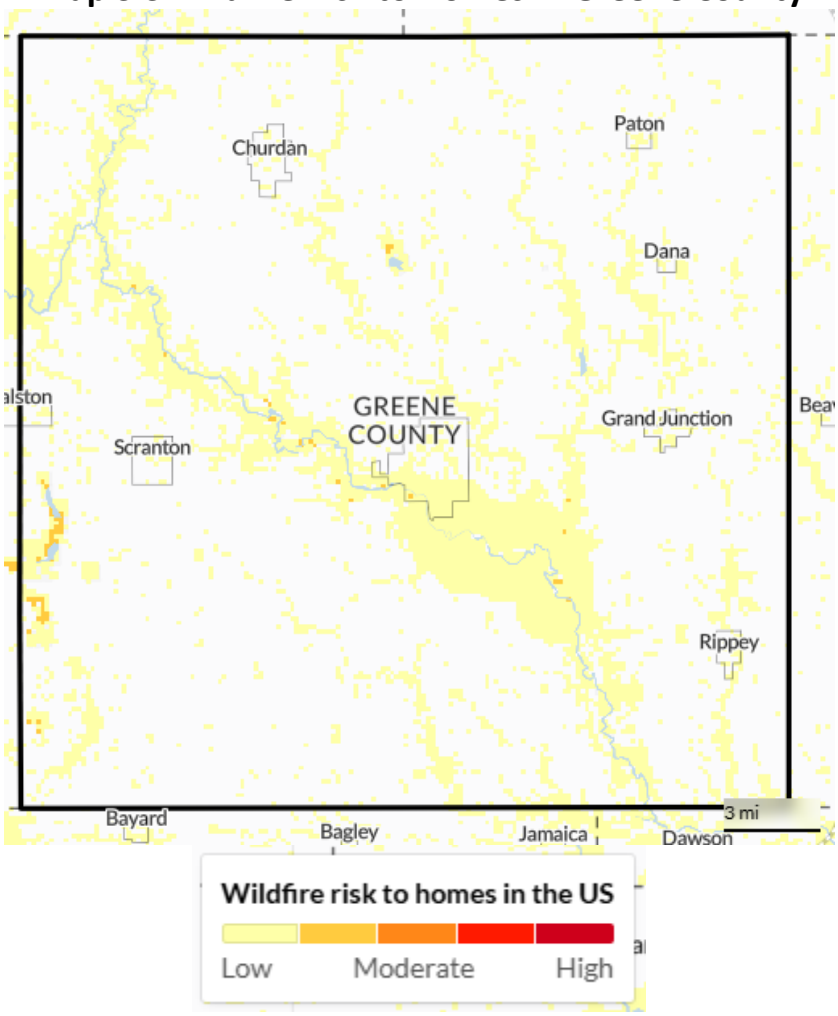
According to the National Interagency Fire Center (NIFC), the United States saw 56,580 fires resulting in 8,924,884 acres burned. Iowa reported no wildland fires in 2024. According to the NIFC, no fire in Iowa has been reported as a historically significant wildfire or a large wildfire (more than 100,000 acres). The NIFC puts out a monthly National Significant Wildland Fire Potential Outlook, warning areas where wildland fires have the potential to breakout.

Maps 3.3 and 3.4 show the likelihood of wildfires in Greene County and the risk these fires pose to homes within the county. Utilizing available data, the jurisdictions within the county are anticipated to fight at least one grass/wildland fire annually throughout the life of this plan. It is likely that Greene County will have a grass/wildland fire in the planning period at low to moderate intensity.

Map 3.2 Wildfire Likelihood in Greene County



Map 3.3 Wildfire Risk to Homes in Greene County



Map 3.4 Wildfire Hazard Potential

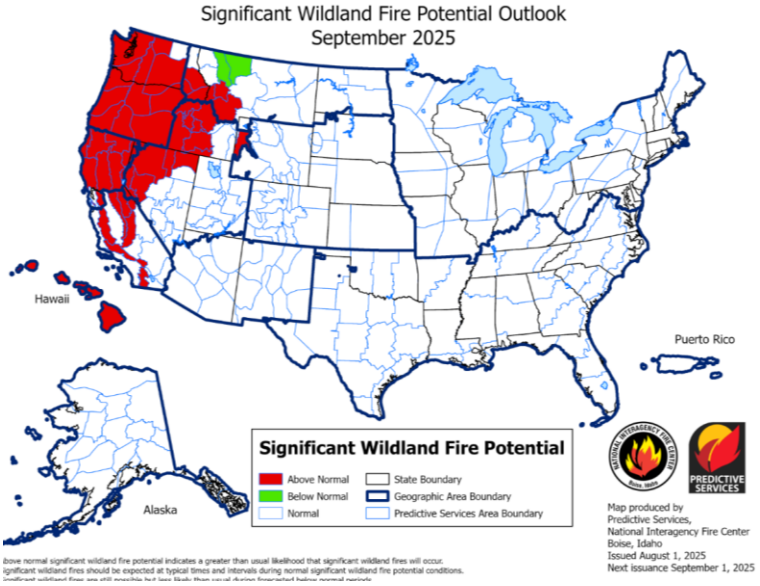


Table 3.9 Grass/Wildland Fire Intensity

Intensity	Fire Behavior
Low	Slow moving, low-intensity fire
Moderate	Active fire with increased rate of spread
High	Rapidly spreading fire with difficult suppression
Extreme	Very rapid, difficult-to-control fire

Most grass/wildland fires are contained to highway right-of-way and rail right-of-way ditches; however, high winds can turn a small fire into a multi-acre grass fire within a matter of minutes. The extent is dependent on weather conditions and topography. Grass/wildland fires occur without warning and can spread rapidly. The majority of Iowa wildfires are short in duration.

Grass and wildland fires are unpredictable and Greene County is susceptible to these hazard events. While the county and its jurisdictions are at risk of grass/wildland fires, recent data has shown that the risk to humans is reduced. These fires tend to primarily damage crops and other property (including farm machinery). Fires are not uncommon in Iowa; therefore, it is important that the jurisdictions are informed on the mitigation actions that can reduce the impact these fires have on the environment and population.

Mitigation actions to minimize the effect of grass and wildland fires can include:

- ➢ Proper training for first responders
- ➢ Ensure first responders have adequate equipment to fight fires
- ➢ Education of citizens on preparedness and reaction prior to and during a wildfire

River Flooding

A river flood occurs when water levels rise due to heavy rains, persistent thunderstorms over the same area for extended periods of time, snow melt, ice jams, or dam/levee breakage. Other factors that contribute to flooding include topography, soil conditions, and ground cover. Flooding may impact an area with only a few inches of water or cover entire houses, it could last a couple days or carry on for several weeks. As much as 90% of the damage related to all natural disasters (excluding droughts) is caused by flooding and associated debris flow. On average, flooding causes more than $2 billion in property damage each year.

Flooding is the most common of all natural hazards- it occurs in every U.S. state and territory and is a threat experienced anywhere in the world that receives rain. From 1983-2012, floods in the United States have killed more people than tornadoes, hurricanes, or lightning. Since 1900, flooding has caused more than 10,000 deaths, and though numbers can fluctuate from year to year, the thirty-year national average is 89. It is believed that many people underestimate the power and force of water; six inches of fast-moving water can knock a person off their feet, twenty-four inches can carry away most automobiles.

Between 2020 and 2024, Greene County has experienced only one reported flood between June 20-22, 2024. This flood occurred on the North Raccoon River but no reported crop damage or deaths. Table 3.10 depicts river flooding intensity in Greene County.

Table 3.10 River Flooding Intensity

Intensity	Flood Conditions
Low	Minor flooding near waterways
Moderate	Flooding extends into developed or transportation areas
High	Significant flooding of developed areas
Extreme	Widespread, severe flooding

The National Flood Insurance Program (NFIP) was created by Congress in 1968 to mitigate future flood loses. The NFIP is designed to provide an insurance alternative to disaster assistance to meet the escalating costs caused by floods. The flood insurance is offered to homeowners, renters, and business owners if their community participates in the NFIP. Participating communities must agree to adopt and enforce ordinances to reduce the risk of flooding. Participating communities must agree to adopt and enforce ordinances to reduce the risk of flooding. The Cities of Churdan, Jefferson, Paton, and Rippey, as well as Greene County participate in the NFIP. There are no repetitive loss or severe repetitive loss properties in Greene County.

The National Weather Service provides flood forecasts for the State of Iowa. Local National Weather Service forecast offices issue flood watches 12-36 hours in advance of a possible flood. Warnings are issued when river flooding is occurring or imminent.

The report Climate Change Impacts on Iowa 2010 ("Report") notes that there is a trend toward more frequent intense rainfall events. If this trend continues, flash flooding events and their associated impacts will likely occur more often in Iowa. As for riverine flooding, very heavy precipitation does not always result in flooding, but it can when the very heavy precipitation occurs frequently without enough time for the watershed to drain properly. The impact of these climate changes in Iowa may be impacting eastern Iowa more than the rest of the state. Greene County has regions that are susceptible to river flooding. Even though the county has not experienced flooding during the last planning period, this hazard still requires attention, with that attention focused on the flood prone areas. Reducing the impacts of flooding can reduce the impacts on the population, crops, and property. It is likely that Greene County will experience low to moderate intensity river flooding during the planning period.

Mitigation actions to minimize the effect of river flooding can include:

➢ Implement the "watershed approach" for flood reduction when appropriate
➢ Get all jurisdictions within the county to participate in NFIP
➢ Create plans which limit construction within floodplains
➢ Elevate or protect wastewater lift stations
➢ Put in impervious manholes, pumps, or backflow prevention, or similar small-scale flood protection projects
➢ Promote the implementation of green infrastructure
➢ Educate the public about flood preparation and response
➢ Reduce erosion and flooding through riverbank improvement projects

Severe Winter Storms

Every year, winter weather kills hundreds of people in the United States, primarily from automobile accidents, overexertion, or exposure. Severe winter storm events can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold. They are most common from the months of October to April.

The various types of severe winter weather can cause considerable damage. Heavy snow can immobilize transportation systems, take down trees and power lines, collapse buildings, and lead to the loss of livestock and wildlife. Loose snow begins to drift when wind speed reaches 9-10 mph under freezing conditions. The potential for drifting is substantially higher in open country than urban areas where buildings, trees, and other features obstruct the wind. Ice storms have resulted in fallen trees, broken tree limbs, downed power lines and utility poles, fallen communications towers, and impassable transportation routes. Severe ice storms have caused total electric power outages over large areas of Iowa and rendered assistance unavailable to those in need due to impassible roads. Extreme cold often accompanies a winter storm or is left

in its wake. Prolonged exposure to the cold can cause frostbite or hypothermia and become life threatening. Table 3.6 displays the definitions for severe winter storms.

Table 3.11: Severe Winter Storm Definitions

Blizzard	Sustained or frequent winds of 35 mph or greater; falling and/or blowing snow that frequently reduces visibility to ¼ of a mile or less; conditions are expected to last for a minimum of three hours
Frost/Freeze	Frost describes the formation of thin ice crystals on the ground or other surfaces in the form of scales, needles, feathers, or fans. Frost develops under conditions similar to dew, except the temperatures of the Earth's surface and earthbound objects falls below 32°F. A freeze is when the surface air temperature is expected to be 32°F or below over a widespread area for a climatologically significant period of time. Use of the term is usually restricted to advective situations or to occasions when wind or other conditions prevent frost. The National Oceanic and Atmospheric Administration groups these two events together when recording data.
Heavy Snow	4" or more of snow in 12 hours or less, 6" or more of snow in 24 hours or less
Ice Storm	Damaging accumulations of more than 1/4" of ice are expected during freezing rain
Sleet Storm	Pellets of ice composed of frozen or mostly frozen raindrops; these pellets cause slippery surfaces. Heavy sleet is a relatively rare occurrence defined as an accumulation of sleet covering the ground to a depth of 1/2" or more
Extreme Cold/Wind chill	Temperatures at or below 0 degrees Fahrenheit and wind chill temperatures at -25 degrees Fahrenheit for at least three hours is considered extreme cold. Wind chill is not the actual temperature, but rather how wind and cold feel on exposed skin.
Winter Storm Event	A combination of heavy snow, blowing snow, and/or dangerous wind chills that can lead to hazardous conditions and potential disruptions.

Between 2020 and 2026, Greene County experienced sixteen severe winter storm events: two blizzards, one cold/wind chill event, four extreme cold/wind chill events, five heavy snow events, and four winter storms, meaning that more than one significant hazard met or exceeded locally defined warning criteria.

Bridges and overpasses are particularly dangerous because they freeze before other structures. This, along with heavy snow, can cause hazardous conditions that can slow or stop the flow of supplies as well as disrupt emergency and medical services.

Greene County experiences several instances of severe winter storms each year and it is highly likely that these events will continue during the planning period. Some of these events cause reported damage, but the majority do not. The economic impact of winter weather each year is huge, with costs of snow removal, damage repairs, and loss of business in the millions. While the severe winter storm events in Greene County caused no reported damage, they cost the local jurisdictions money to remove the snow and ice these hazards caused. Each jurisdiction spends numerous hours planning for snow removal and emergency service response during these events. While there is little that can be done to prevent these events, jurisdictions continue to strive for a quick and efficient response that will reduce costs to taxpayers.

Mitigation actions to minimize the effect of severe winter storms can include:

➢ Electric utility retrofit/hardening
➢ Encourage the use of NOAA radios
➢ Purchase and installation of back-up electrical generation
➢ Educate the population about carbon monoxide and its dangers and ways to reduce the potential for carbon monoxide poisoning

Thunderstorm/Lightning/Hail

A thunderstorm is a rain shower during which thunder occurs. Since thunder comes from lightning, all thunderstorms have lightning. Most thunderstorms are 15 miles in diameter and last an average of 30 minutes. A thunderstorm is classified as "severe" when it contains one or more of the following:

➢ Hail three-quarter inch or greater
➢ Winds gusting in excess of 57.5 mph
➢ Tornado

There are about 100,000 thunderstorms each year in the United States and approximately 10% of those results in severe thunderstorms. Severe thunderstorms are found most often from Texas to Southern Minnesota. Thunderstorms are common in the spring and summer months, and during the afternoon and evening hours. However, thunderstorms can occur year-round and at all hours.

There are four types of thunderstorms: single cell, multi-cell cluster, multi-cell line, and supercell.

Single Cell

Single cell thunderstorms typically last less than 30 minutes and are not usually severe; however, it is possible for a single cell storm to produce a brief severe weather event with heavy rainfall and occasionally a week tornado.

Multi-Cell Cluster

Multi-cell cluster thunderstorms are the most common type of thunderstorm. The multi-cell cluster consists of multiple cells, moving along as one unit, with each cell in a different phase of the thunderstorm life cycle. It can produce moderate size hail, flash floods, and weak tornadoes. While to multi-cell cluster may last for several hours, each cell in a multi-cell cluster only lasts about 20 minutes.

Multi-Cell Line

Multi-cell line thunderstorms consist of a long line of storms with a continuous well-developed gust front at the leading edge of the line. The line of storms can be solid, or there can be gaps and breaks in the line. These thunderstorms can produce hail up to golf-ball size, heavy rainfall, and weak tornadoes, but they are best known to produce strong downdrafts.

Supercell

Supercell thunderstorms are rare, but highly organized and pose a high threat to life and property. A supercell thunderstorm is similar to a single-cell thunderstorm because they both have one main updraft. The difference is that the updraft of a supercell is extremely strong, reaching speeds of 150-175 mph. It is set apart from the other thunderstorm types due to the presence of rotation. The rotating updraft of a supercell thunderstorm helps it to produce extreme severe weather threats, such as giant hail (more than two inches in diameter), strong downbursts of 80 mph or more, and strong to violent tornadoes. The leading edge of a supercell is usually light rain as heavier rain tends to fall closer to the updraft with severe weather typically forming towards the rear of the storm.

Unlike other weather hazards that often involve sophisticated watches and warnings from the National Weather Service, lightning can occur anywhere there is a thunderstorm. It is one of the most underrated severe weather hazards, yet ranks as one of the top weather killers in the United States. According to the National Weather Service, from 2008-2017, lightening killed an average of thirty-one people each year, with hundreds of documented injuries. It is estimated that lightening causes more than one billion dollars in damage each year.

There are three types of lightening: ground flashes, cloud-to-ground, and cloud flashes

Ground Flashes

Natural ground flashes occur because of normal electrification in the environment while artificially initiated lightning occurs because of strikes to very tall structures, airplanes, and towers. Natural lightning travels from the cloud to the ground; artificially initiated lightning travels from the ground to the cloud.

Cloud-to-Ground

Cloud-to-ground lightning is the result of a step leader, a channel of negative charge, traveling downward through the cloud. As it nears the ground, the negatively charged step leader is attracted to a channel of positive charge, called a streamer, normally through something tall such as a tree, house, or telephone pole. When the leader and streamer connect, a powerful electrical current begins flowing, resulting in a flash of lightning.

Cloud Flashes

Cloud flashes sometimes have visible channels that extend out into the air and around the storm, but they do not strike the ground. A related term for cloud flashes is heat lightning.

The lightning rate peaks in the summer months, specifically July, with rapid increase during May and rapid decrease in September. Most lightning occurs during the afternoon or early evening. Besides causing injury and death, a lightning strike can result in extensive property damage by sparking a fire or surging through the electrical circulatory of a home or business. Damage to the emergency management center may affect warning systems, communications equipment, and computer systems.

Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. There is no clear distinction between storms that do and do not produce hailstorms. Nearly all severe thunderstorms produce hail, though it may melt before reaching the ground. Hailstorms can have layers like an onion if they travel up and down in an updraft, or they can have no layers if they are “balanced” in an updraft. One can tell how many times a hailstone traveled to the top of a storm by counting the layers. Drops of super-cooled water hit the ice and freeze on it, causing it to grow. Hail falls when it becomes heavy enough to overcome the strength of the updraft and is pulled by gravity towards earth.

Hail size is estimated by comparing it to a known object. Most hail storms are made up of a mix of sizes, and only the very largest hail stones pose serious risk to people caught in the open. Hail that is quarter size (one inch) or larger is considered severe. The stronger the thunderstorm updraft, the larger the hailstone can grow. The largest hailstone recovered in the United States fell in Vivian, South Dakota on June 23, 2010, with a diameter of 8 inches and a circumference of 18.62 inches. It weighed one pound and fifteen ounces.

Damage from hail approaches $1 billion in the United States annually and most of the damage is to crops. Crops are particularly vulnerable and even relatively small hail can destroy them in a matter of minutes. Vehicles, roofs, buildings, homes, and landscaping are other things that are most commonly damaged by hail. Hail only rarely results in loss of life directly, although injuries can occur.

Table 3.12 Thunderstorm/Lightning/Hail Intensity

Intensity	Characteristics
Low	Thunderstorms with wind gusts below 58 mph and hail of less than 1 inch in diameter
Moderate	Severe thunderstorms with wind gusts 58-74 mph and/or hail of 1-1.00 inches in diameter
High	Severe thunderstorms with wind gusts 75-99 mph and/or hail of 2-2.00 inches in diameter
Extreme	Thunderstorms with wind gusts 100 mph greater and/or hail of 3 inches or greater in diameter

Data collected from the National Climatic Data Center (NCDC) shows that Iowa experiences many thunderstorm and lightning events every year. Between 2020 and 2025, there were seven days with hail reported, and seven with thunderstorm wind reported. These storms resulted in no property or crop damages. Thunderstorms can bring other hazards that the jurisdiction may face such as heavy rain, flash flooding, river flooding, tornadoes, and high winds. Those in unprotected areas, mobile homes, or automobiles during a storm are most at risk.

Between 1997 and 2012, Iowa experienced, on average, 628,511 cloud-to-ground flashes per year. This ranks Iowa fifteenth nationally in terms of cloud-to-ground flash densities with 11.1 flashes per square mile. From 1959-2011, Iowa experienced 72 fatalities due to lightning (Vaisasla). Iowa's last reported lightning fatality was in 2008. Lightning injures more people than it kills and leaves some victims with life-long health problems.

Some thunderstorms can be seen approaching, while others hit without warning. The National Weather Service usually issues severe thunderstorm watches a few hours before the storm hits an area, but an area may only have minutes after a warning is issued. Most single-cell thunderstorms are 15 miles in diameter and last an average of 30 minutes. However, multi-cell cluster thunderstorms are the most common type of thunderstorm and can last several hours.

Based on information collected from FEMA for the Iowa Hazard Mitigation Plan, Greene County is categorized as experiencing relatively low hail expected annual loss and also relatively low lightning expected annual loss. While losses from lightning are very low, Greene County experiences an average of 49 days per year of thunder/lightning. Both people and property are vulnerable to this hazard and mitigation actions should be implemented to reduce the overall vulnerability of the county. It is likely that Greene County will continue to experience thunderstorms/lightning/hail at a low to moderate intensity across the planning area during the planning period.

Mitigation actions to minimize the effects of thunderstorms/lighting/hail may include:

➢ Encourage the use of NOAA weather radios

➢ Construct shelters or safe rooms at public locations where people gather

➢ Provide education on how to respond to thunderstorm events, especially if they are not at home

➢ Electric system hardening, including putting electric systems underground

Tornado

Tornadoes are the most violent of all atmospheric storms. A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. The funnel is made visible by dust and debris sucked up and condensation of water droplets in the center of the funnel.

There are two types of tornadoes: those that come from the supercell thunderstorm and those that do not. Tornadoes that form from a supercell thunderstorm are most common, and often are the most dangerous. In a supercell, the tornado is a very small extension of a larger rotation that can be as large as ten miles in diameter and up to 50,000 feet fall. Field studies show that as few as 20% of all supercell thunderstorms produce tornadoes. Non-supercell tornadoes are circulations that form without a rotating updraft. One type of non-supercell tornado is the gustnado. A gustnado tornado has a whirl of dust and/or debris at or near the ground with no condensation funnel. Another non-supercell tornado is a landspout. A landspout tornado is a narrow, rope-like condensation funnel that forms when the thunderstorm cloud is still growing and has no rotating updraft, instead the spinning motion originates near the ground. Waterspouts are similar to landspouts; except they occur over water. Damage from non-supercell tornadoes tends to be F2 or less.

The Enhanced Fujita Scale (EF-Scale) replaced the Fujita Scale on February 1, 2007. The EF Scale addresses some of the Fujita Scale limitations identified by meteorologists and engineers. The EF Scale is still a set of wind estimates, not measurements, based on damage. The original Fujita Scale lumped together homes, schools, mobile homes, vehicles, and trees in one short description of damage for each F-Scale category. In the EF-Scale, detailed descriptions are given for examples of damage to twenty-three types of buildings, taking into account types of buildings, construction quality and maintenance, and five additional objects like trees, towers, and poles. Wind speed estimates are then provided for each structure and type of damage (www.weather.com). Table 3.7 shows the estimated wind speed for the Enhanced Fujita Scale, as well as the expected damage associated with the tornado's intensity. Table 3.7 displays the relationship between tornado strength and associated damages.

Approximately 1,000 tornadoes hit the nation yearly, killing an average of 60 people per year—mostly from flying or falling debris. The peak tornado season for the northern plains and upper Midwest is in June or July. Most tornadoes occur between 3 pm and 9 pm; however, it is important to remember that they can happen at all hours of the day and any day of the year.

Table 3.7: Tornado Ratings and Expected Damage

EF Rating	Wind Speeds	Expected Damage		
EF-0	65-85 mph	'Minor' damage: shingles blown off or parts of a roof peeled off, damage to gutters/siding, branches broken off trees, shallow rooted trees toppled.		
EF-1	86-110 mph	'Moderate' damage: more significant roof damage, windows broken, exterior doors damaged or lost, mobile homes overturned or badly damaged.		
EF-2	111-135 mph	'Considerable' damage: roofs torn off well constructed homes, homes shifted off their foundation, mobile homes completely destroyed, large trees snapped or uprooted, cars can be tossed.		
EF-3	136-165 mph	'Severe' damage: entire stories of well constructed homes destroyed, significant damage done to large buildings, homes with weak foundations can be blown away, trees begin to lose their bark.		
EF-4	166-200 mph	'Extreme' damage: Well constructed homes are leveled, cars are thrown significant distances, top story exterior walls of masonry buildings would likely collapse.		
EF-5	> 200 mph	'Massive/incredible' damage: Well constructed homes are swept away, steel-reinforced concrete structures are critically damaged, high-rise buildings sustain severe structural damage, trees are usually completely debarked, stripped of branches and snapped.		

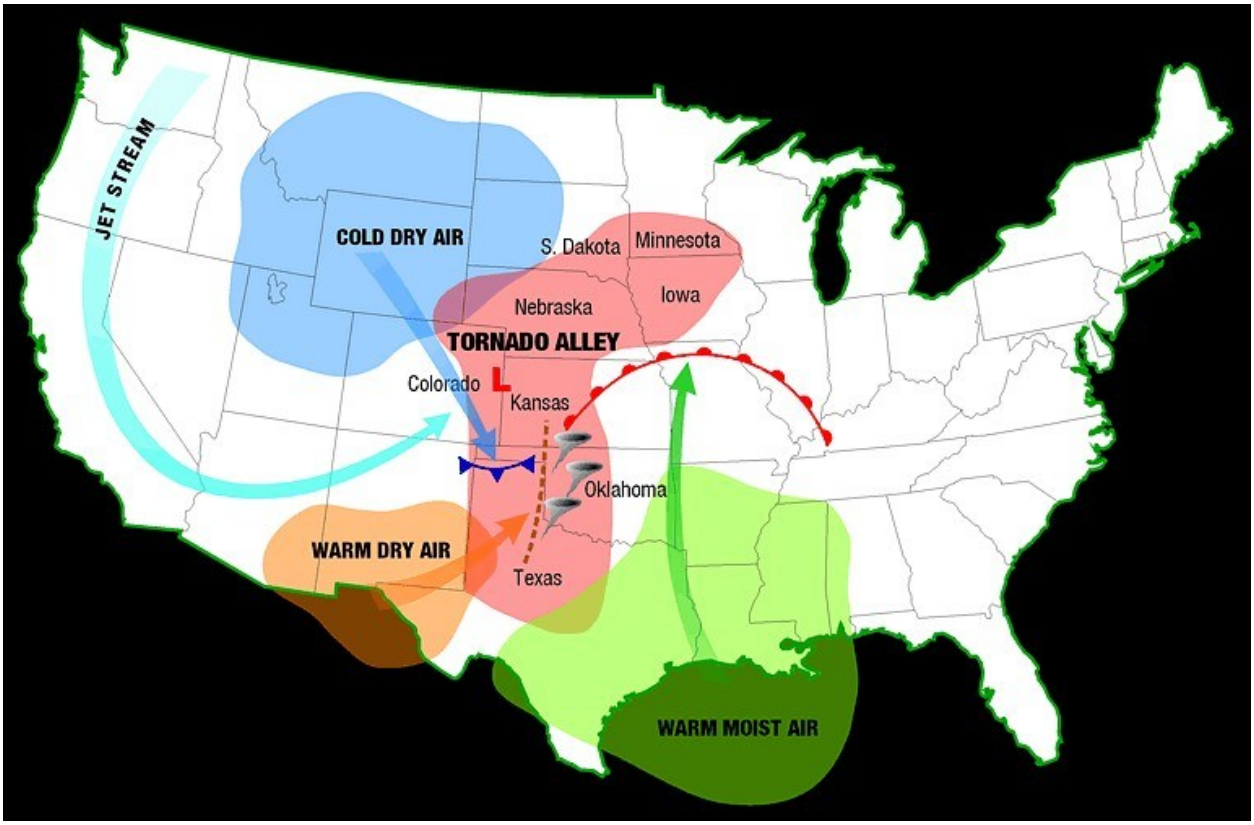
Source: NOAA

Table 3.13: Tornado Facts

Weak Tornadoes (EF0 and EF1)	Strong Tornadoes (EF2 and EF3)	Violent Tornadoes (EF4 and EF5)
88% of all tornadoes	11% of all tornadoes	1% of all tornadoes
Less than 5% of all tornado deaths	Nearly 30% of all tornado deaths	70% of all tornado deaths
Lasts 1-10+ minutes	May last 20 minutes or longer	Can exceed 1 hour
Light to Moderate damage	Considerable to Severe damage	Devastating to Incredible damage

Tornado Alley is a nickname given to the area of the United States that consistently experiences a high frequency of tornadoes each year. The relatively flat land in the Great Plains allows cold, dry, polar air from Canada to meet warm, moist, tropical air from the Gulf of Mexico. A large number of tornadoes form when these two air masses meet. Figure 3.4 depicts the warm and cold air masses, as well as Tornado Alley.

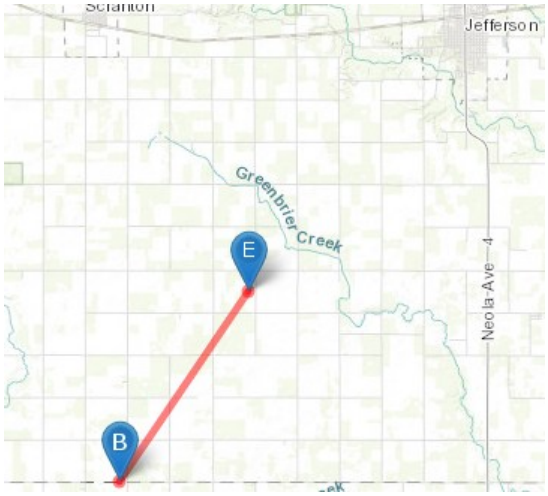
Figure 3.5: Air Masses and Tornado Alley



Source: Farmer's Almanac

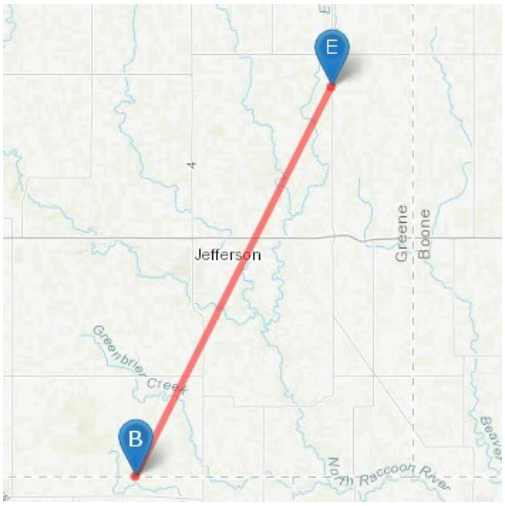
According to the National Climatic Data Center, there have been nine tornadoes in Greene County from 2020 to 2025. All nine of the tornados occurred on December 15, 2021. Seven of the tornadoes were EF2 and the remaining two were EFU. Total damages to property were $2,995,000. Among the nine tornadoes, no fatalities or injuries were reported.

Map 3.6: Greene County EF2 Tornado 12/15/2021



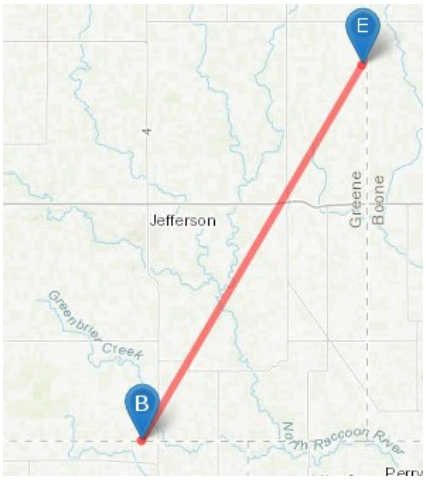
Starting location: 10.34 WSW Cooper
12/15/2021 17:24 CST-6
Ending location: 6.56 W Cooper
12/15/2021 17:28 CST-6
Scale: EF2, Width: 100 yards, Length: 5.43 Miles
Property Damage: $100,000 Crop Damage: $0

Map 3.7: Greene County EF2 Tornado 12/15/2021



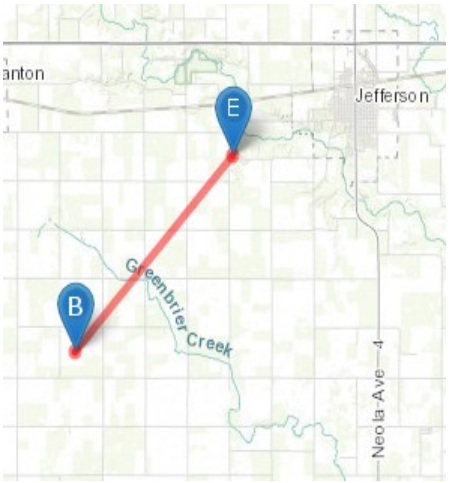
Starting location: 5.79 SW Cooper
12/15/2021 17:27 CST-6
Ending location: 1.64 NNE Dana
12/15/2021 17:42 CST-6
Scale: EF1, Width: 300 yards, Length: 21.65 Miles
Property Damage: $350,000 Crop Damage: $0

Map 3.8: Greene County EF2 Tornado 12/15/2021



Starting location: 4.29 SSW Cooper
12/15/2021 17:29 CST-6
Ending location: 4.23 ENE Dana
12/15/2021 17:45 CST-6
Scale: EFU, Width: 150 yards, Length: 21.73 Miles
Property Damage: $800,000 Crop Damage: $0

Map 3.9: Greene County EF2 Tornado 12/15/2021



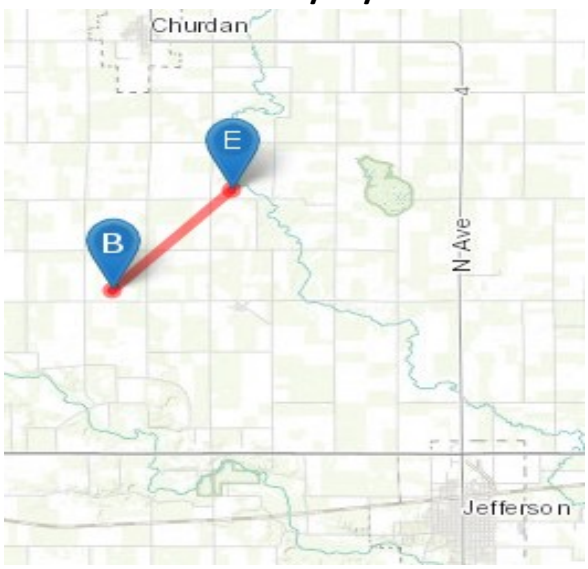
Starting location: 6.43 SSE Scranton
12/15/2021 17:29 CST-6
Ending location: 3.03 WSW Jefferson
12/15/2021 17:33 CST-6
Scale: EFU, Width: 100 yards, Length: 5.49 Miles
Property Damage: $1,200,000 Crop Damage: $0

Map 3.10: Greene County EF2 Tornado 12/15/2021



Starting location: 44.71 SE Scranton
12/15/2021 17:32 CST-6
Ending location: 1.91 NNW Jefferson
12/15/2021 17:36 CST-6
Scale: EFU, Width: 100 yards, Length: 5.83 Miles
Property Damage: $500,000 Crop Damage: $0

Map 3.11: Greene County EF2 Tornado 12/15/2021



Starting location: 1.88 W Farlin
12/15/2021 17:34 CST-6
Ending location: 2.02 N Farlin
12/15/2021 17:36 CST-6
Scale: EFU, Width: 70 yards, Length: 2.74 Miles
Property Damage: $20,000 Crop Damage: $0

Map 3.12: Greene County EFU Tornado 12/15/2021



Starting location: 1.61 ENE Grand Junction
12/15/2021 17:39 CST-6
Ending location: 4.88 ESE Dana
12/15/2021 17:42 CST-6
Scale: EFU, Width: 50 yards, Length: 3.83 Miles
Property Damage: $0 Crop Damage: $0

Map 3.13: Greene County EF2 Tornado 12/15/2021



Starting location: 1.59 SSW Paton
12/15/2021 17:42 CST-6
Ending location: 2.36 WNW Hope
12/15/2021 17:46 CST-6
Scale: EFU, Width: 90 yards, Length: 4.64 Miles
Property Damage: $25,000 Crop Damage: $0

Map 3.14: Greene County EFU Tornado 12/15/2021



Starting location: 1.72 SE Scranton
5/13/2023 16:18 CST-6
Ending location: 1.53 ESE Scranton
12/15/2021 16:20 CST-6
Scale: EFU, Width: 40 yards, Length: 0.42 Miles
Property Damage: $0 Crop Damage: $0

Advancement in weather forecasting has allowed tornado watches to be delivered up to hours in advance. However, the best lead-time for a specific severe storm and tornado is about thirty minutes. Tornadoes can develop and change paths rapidly, limiting the warning time. They can last from several seconds to over an hour, though most tornadoes last about five minutes. The aforementioned tornadoes were not the cause for any disaster declarations. From 2020 to 2026, tornadoes in Greene County lasted an average of 5 minutes.

It is likely that Greene County will experience tornado events within the five-year planning period of this plan with an intensity of EF2 or lower. This hazard can occur across the entire planning area. Although there have been advancements in the predictability of the events, the warning time is still limited, putting people and property at a high risk of damage. Damage to the economy can continue to happen even after the weather event has ended. Damage caused by tornadoes can cause counties, cities, and the public large amounts to clean up the damage, get streets opened back up, and utilities back up and running. Educating the public about tornados and what to do in the event of one occurring can be a mitigation effort that can save lives.

Climate change's impact on tornadoes is uncertain. The intensity and frequency do not appear to be changing, although evidence suggests that "tornado alley" is shifting east. The likelihood of a tornado in Iowa has not significantly shifted, but as temperatures rise, the length of tornado season may increase.

Mitigation actions to minimize the effects of tornadoes may include:

➢ Encourage the use of NOAA weather radios
➢ Construct shelters or safe rooms
➢ Installation of storm sirens
➢ Electric system hardening, including putting electric systems underground
➢ Adoption and enforcement of higher building standards with the jurisdictions

Windstorm

Damaging winds are classified as those exceeding 50-60 mph. Damage from severe thunderstorm winds account for half of all severe reports in the lower forty-eight states and are more common than damage from tornadoes. According to the majority of Storm Prediction Center forecasts, severe wind is the most difficult threat to forecast because they come from a wider range of environments than just supercells, tornadoes, or large hail. Damaging wind events can develop with little advanced warning as they can occur on their own, with severe winter storms, or with severe thunderstorms.

There are several types of damaging winds: straight-line, downdrafts, downbursts, microbursts, gust front, derecho, and bow echo.

Straight-Line

Straight-line winds are any thunderstorm wind that is not associated with rotation and is used mainly to differentiate from tornadic winds. Most thunderstorms produce some straight-line winds as a result of outflow generated by the thunderstorm downdraft.

Downdrafts

Downdrafts are a small-scale column of air that rapidly sinks towards the ground.

Downbursts

Downbursts are strong downdrafts with horizontal dimensions larger than 2.5 miles, resulting in an outward burst of wind on or near the ground. Although usually associated with thunderstorms, downbursts can occur with showers too weak to produce thunder.

Microbursts

Microbursts are small, concentrated downbursts that produce an outward burst of damaging winds at the surface. Microbursts are generally small (less than 2.5 miles) and short-lived, lasting only five to ten minutes.

Gust Front

A gust front wind is the leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. Gust fronts are characterized by a wind shift, temperature drop, and gusty winds out ahead of a thunderstorm.

Derecho

A derecho wind is a widespread thunderstorm wind event caused when new thunderstorms form along the leading edge of an outflow boundary. The thunderstorms feed on this boundary and continue to reproduce themselves. Derechos typically occur in the summer months when complexes of thunderstorms form over the plains and northern plains states. Usually, these thunderstorms produce heavy rain and severe wind, as they can last a long time and cover such large areas.

Bow Echo

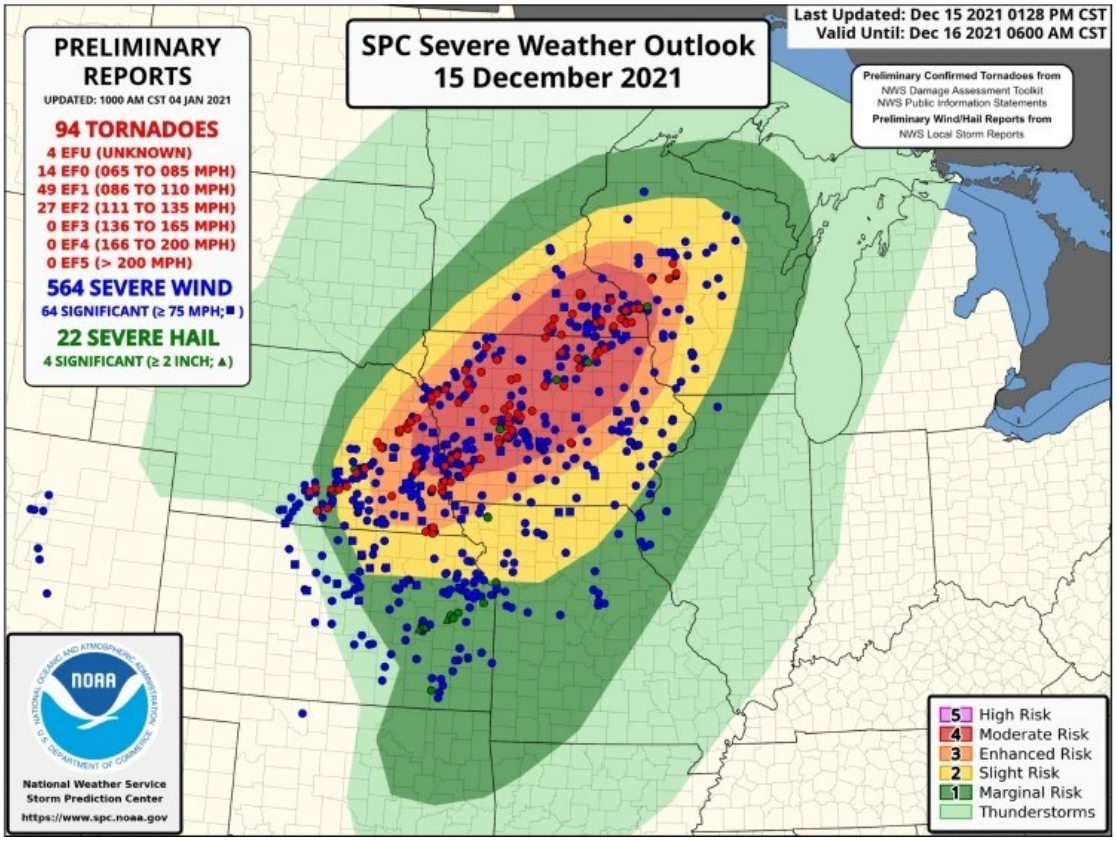
A bow echo wind is a radar echo which is linear but bent outward in a bow shape. Damaging straight-line winds often occur near the “crest” or center of a bow echo. Bow echo winds can be over 186 miles in length, last for several hours, and produce extensive wind damage at the ground.

Microbursts and downbursts are very dangerous to aviation. They are known for their ability to produce wind shears which can slow airspeed and cause aircrafts to lose altitude at a very critical time for flight near the ground. A plane will encounter strong headwinds followed by strong tailwinds as it enters and flies through a microburst. Great strides have been made in understanding and avoiding the risk from low altitude wind shears. Major airports routinely use Terminal Doppler Weather Radars, developed during the 1990s. These radars pay particular attention to weather conditions occurring within a few miles of the airport, especially conditions that might cause deadly microbursts.

From 2020 to 2025, Greene County experienced four high wind events. On December 15, 2021, another high wind event was a derecho coupled with thunderstorms and tornadoes, being the first-ever December derecho in the United States. This event could be observed throughout the whole state of Iowa, causing 63 tornadoes statewide and thunderstorm winds that could exceed 80 mph. During the event, gusts were recorded at over 70 miles per hour throughout most of the affected area, and in some areas, wind gusts were recorded at over 80 miles per hour. Although no property or crop damage were reported for this specific event, its occurrence can be associated with disaster declaration DR-4642-IA, to be declared on February 23, 2022. The declaration obligated $252,342 for emergency work and $5,656,144 in permanent work. It also obligated $1,173,187 in hazard mitigation assistance.

The next high wind episode in Greene County occurred in on 4/14/2022, where wind gusts of 40 to over 60 mph were recorded. No property or crop damage were reported. This was followed by an event on March 5, 2025 with wind gusts of up to 68 mph and an additional event on March 19, 2025, a similar high wind event with northwest winds gusting to 609-65 mph.

Figure 3.15: December 15, 2021 Weather Events



Source: NOAA

Damaging winds can develop with little advanced warning. The National Weather Service has developed a windstorm warning system similar to other events such as tornadoes, winter storms, and thunderstorms, and watches are issued when conditions are favorable. Advisories are issued when sustained winds of 31 to 39 mph are expected to last for three hours or longer, or when there are wind gusts of 46 to 57 mph. Windstorm warnings are issued when there are sustained winds of 40 mph or greater for one hour or more, or when there are wind gusts of 58 mph or greater for one hour or more. Windstorm watches are generally delivered hours in advance, but the best warning lead-time for a specific storm is about 30 minutes.

Greene County is likely to experience windstorms over this planning period uniformly across the planning area. Those most at risk during windstorms include people in mobile homes, at campgrounds, or at other dwellings without secure foundations. Windstorms may have a destructive path that is tens of miles wide and the duration could range from hours to days.

Damages can include broken tree branches, roof damage, broken windows, or crop damage. There are a number of projects each jurisdiction can undertake to improve the safety for the residents and protection of property during a windstorm.

Climate change's impact on windstorms in Greene County and Iowa is uncertain. The intensity and frequency do not appear to be changing. The likelihood of a windstorm impacting the planning area has not significantly shifted, but as temperatures rise, the length of the severe weather season may increase.

Some of the mitigation actions that jurisdictions can implement to reduce the impact of a windstorm include:

- ➢ Encourage the use of NOAA weather radios
- ➢ Construct shelters or safe rooms
- ➢ Installation of storm sirens
- ➢ Electricity hardening/under grounding
- ➢ Purchase and installation of backup generators for critical facilities
- ➢ Develop and enforce building codes

Combination Hazards

Levee/Dam Failure

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 occurs when there is an uncontrolled release of impounded water, resulting in downstream flooding, which can affect life and property. FEMA states that dams can fail for one or a combination of the following reasons:

- ➢ Overtopping caused by floods that exceed the capacity of the dam
- ➢ Deliberate acts of sabotage
- ➢ Structure 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
- ➢ Inadequate maintenance and upkeep

In Iowa, dams are classified according to the downstream damages that would occur if that dam were to fail. The higher the risk, the higher the standards that have to be met during dam construction and modification. There are three dam classifications: High Hazard, Significant Hazard, and Low Hazard. High Hazard dams have to meet the state's highest level of criteria and are inspected on a two-year cycle. Dam hazard potential classifications have nothing to do with the condition of a dam, only the potential for death and/or destruction due to the size of the dam, the size of the impoundment, and the characteristics of the area downstream of the dam.

A dam is classified as a High Hazard when it is located in an area where dam failure may create a serious threat of loss of human life. A Significant Hazard Dam is where failure may damage isolated homes or cabins, industrial or commercial buildings, moderately traveled roads, interrupt major utility services, but are without substantial risk of loss of human life. Dams are also classified as Significant Hazard when the dam and its impoundment are themselves of public importance, such as dams associated with public water supply systems, industrial water supply or public recreation, or which are an integral feature of a private development complex. Low Hazard dams are classified as such where damages from a failure would be limited to loss of the dam, livestock, farm outbuildings, agricultural lands and lesser used roads, and where loss of human life is considered unlikely.

Levees differ from dams in that they are constructed alongside the edge of a stream or river channel to manage or prevent water flow into the adjacent land. They were first built in the United States more than 150 years ago and were traditionally used by farmers to protect agricultural areas form frequent flooding, but since then levees have been built to protect urban areas. Artificial levees are typically needed to control the flow of rivers meandering through broad, flat floodplains. Levees are usually constructed from dirt, clay, or artificial material such as concrete or steel and are built wide enough so that they will not collapse or be eroded when saturated with moisture from rivers running at unusually high levels. Grass or some other dense vegetation can be planted on top of the levee's bank to minimize erosion.
It is important to note that levees reduce the risk of flooding, but no not eliminate it. The failure of a levee can be attributed to overtopping or breaching. Overtopping occurs when the river rises higher than a levee's crown. Breaching can result from the loss of structural integrity of a wall, dike, berm or elevated soil by erosion, piping, saturation, under seepage, and even animal burrows. Levees can and do deteriorate over time, so regular maintenance and periodic upgrades are necessary to ensure a levee performs as designed.

Nearly 85% of levees are locally owned and maintained. It is the responsibility of the levee's owner to provide evidence that the levee meets or exceeds minimum federal requirements. A levee is certified if evidence has been presented showing that the system meets current design, construction, maintenance, and operation standards to provide risk reduction from the one-percent-annual-chance-flood.

According to the National Inventory of Dams, Greene County has nineteen dams as of August 2024. The dams that are included in the inventory meet at least one of the following criteria:

➢ High hazard classification—loss of human life is likely if the dam fails

➢ Significant hazard classification – possible loss of human life and likely significant property or environmental destruction

➢ Equal or exceed 25 feet in height and exceed 15 acre-feet in storage

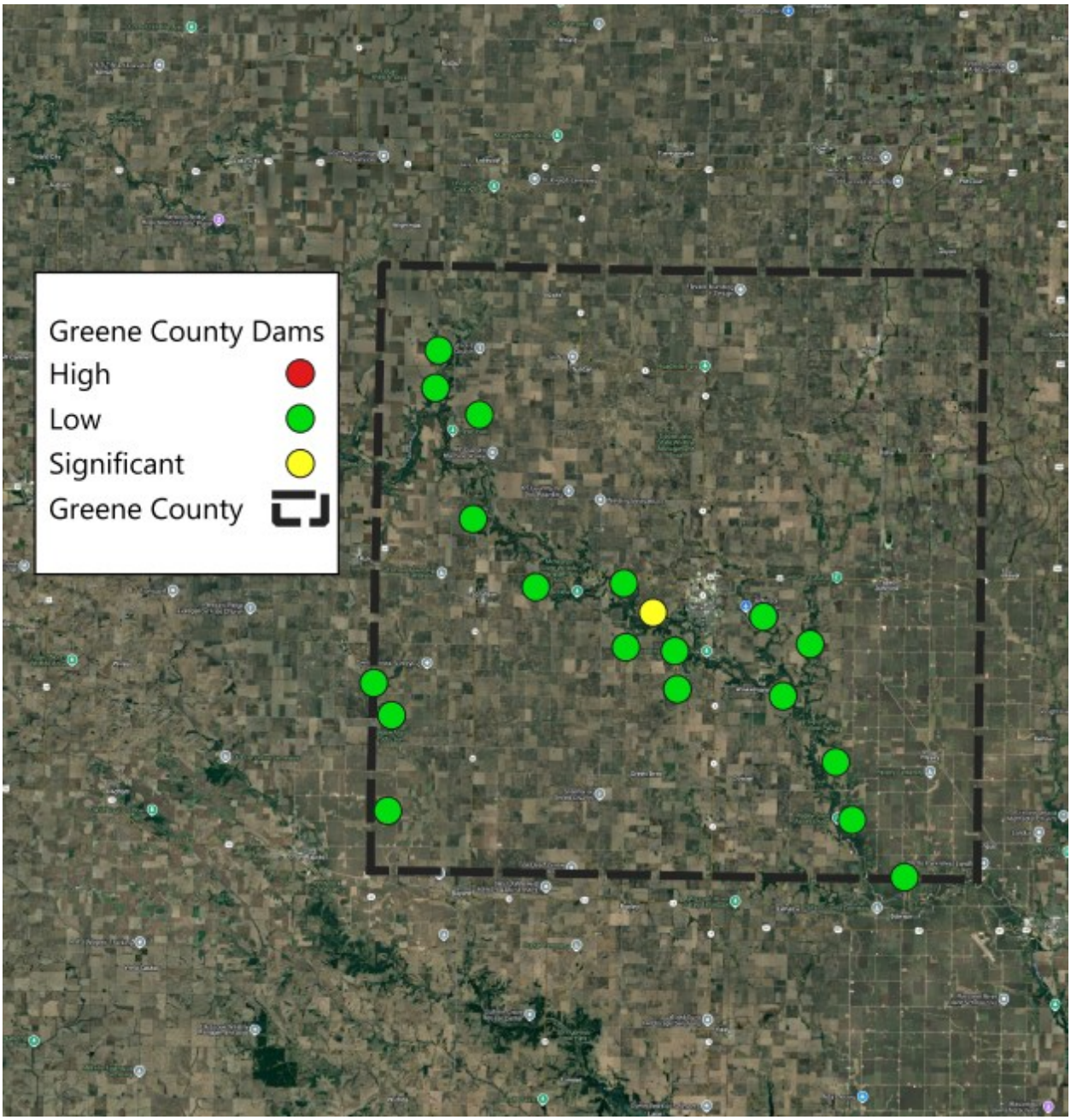
➢ Equal or exceed 50 acre-feet storage and 6 feet in height

Table 3.14 Dam/Levee Failure Intensity

Intensity	Failure/Inundation Characteristics	Typical Conditions/Impacts
Low	Limited release or localized inundation	Flooding confined to areas immediately downstream or adjacent to the dam/levee
Moderate	Inundation extends beyond the immediate downstream area	Floodwater may affect agricultural land, local roads, bridges, utilities, or isolated structures. Temporary road closures or localized service disruptions may occur.
High	Significant downstream inundation	Floodwater may affect multiple structures, transportation routes, utilities, or other infrastructure. Rapidly moving or deeper water may create life-safety concerns. Evacuations, significant property damage, and extended service disruptions may occur.
Extreme	Widespread or severe downstream inundation	Deep and/or rapidly moving water may affect developed areas and critical infrastructure. Significant structural damage, transportation and utility disruption, evacuations, injuries or fatalities, and substantial economic losses may occur.

Of the nineteen Greene County dams in the inventory, one is considered to be a significant hazard dam and the remaining eighteen are considered low hazard dams. There have been no known occurrences of dam failure in Greene County. Sound design, quality construction, and continued inspections and repairs reduce the probability of dam failure. Greene County's dams and their hazard ranking can be found in Map 3.11.

Map 3.16: Greene County Dams and Hazard Ranking



The Iowa DNR is responsible for the state's dam safety program. The program involves the review and approval for the construction of new dams, maintaining an inventory of existing dams that meet minimum size criteria, and the periodic inspection of certain dams. The inventory excludes all dams less than six feet in height regardless of storage capacity and dams less than fifteen-acre feet of storage regardless of height. Currently, there are approximately 3,800 dams in the state's inventory.

A majority of Iowa's dams on major rivers are well past their design life cycles. The average life span of a dam is fifty years. The average age of dams in Greene County is 37 years, with the average completion year of 1989. This means that within the next thirteen years, these dams will reach the end of their design life. With the majority of these dams being at the end of their design life, it is important that they are routinely inspected and maintained to ensure that the dams continue to function properly. The proper maintenance of these dams is important as there are people and properties located in the area which a dam failure would greatly impact. A dam failure could result in everything from minor property damage to significant property damage and potentially death.

Although Greene County has not had a dam failure in the reporting period, a dam failure can occur without warning, leaving little or no time for those downstream to escape. Some weak areas and possible failure points can be identified shortly ahead of a failure, allowing some time for evacuation and possible repair of the dam. Similar to dam failures, levee failures are difficult to predict and can occur without warning. High water levels that may result in the overtopping of a levee can sometimes be predicted hours in advance; however, if a levee is breached, there may not be any warning time. While it is unlikely that Greene County will experience a dam/levee failure in the planning period- if one occurs it is expected to be of low to moderate intensity with flooding occurring directly downstream or adjacent to the failed dam/levee. Mitigation actions that the jurisdictions may decide to implement could include both prevention and response actions to alleviate the impacts.

Mitigation actions that may be implemented to reduce the impacts of a dam failure may include:

➢ Consider the creation of a dam failure emergency action plan

➢ Budget for the demolition and reconstruction of old higher hazard dams to reduce potential for failure

A number of resources were used in gathering the information used in this chapter. They are as follows: Iowa Hazard Mitigation Plan 2023; Association of State Dam Safety Officials; Iowa DNR; National Inventory of Dams; FEMA; National Weather Service; NOAA; National Climatic Data Center; National Drought Mitigation Center; National Wildfire Coordinating Group; National Fire Protection Association; National Severe Storms Laboratory; Vaisala Inc.; Storm Prediction Center; The Weather Channel; Iowa Department of Agriculture; Iowa State University Extension; American Association of Equine Practitioners; Iowa Department of Public Health; The Center for Food Security and Public Health; U.S. Nuclear Regulatory Commission; Iowa Department of Transportation; and Audubon County Home Health, Hospice and Public Health.

Chapter 4:

Vulnerability Assessment and Loss Estimates

The final step in the risk assessment is to identify the likely level of loss for each type of hazard determined to affect the jurisdiction. The vulnerability assessment and loss estimates assess the County's total exposure to identified hazards. The vulnerability assessment consists of a vulnerability overview for each profiled hazard, an evaluation of potential losses to existing development, a description of the methodology used to estimate losses, and data limitations/corrective actions.

Risk assessment information was gathered from all jurisdictions through discussions held at jurisdiction meetings. Information provided was compared to reported data and compiled. The information provided and discussions identified if a hazard had occurred in the jurisdiction previously, if the hazard was likely to occur in the future, the probability of the hazard occurring in a given year, the magnitude/severity the hazard would have on the jurisdiction, the amount of warning time before a hazard occurred, and the estimated duration that the hazard would last. The final risk assessments were written after further discussion with the Hazard Mitigation Committee, public responses, and further detailed research on past hazard occurrences. The risk assessment information, as provided by Greene County and individual jurisdictions in Appendices A through H, varies slightly due to geographical area and jurisdictional representative's personal opinions on the identified hazards and their associated risks. For example, a transportation incident may impact each jurisdiction differently depending on the location of highways, railways, and airports in relation to the jurisdiction.

County-wide calculations have been determined for each hazard that could affect a large portion of the county. These calculations are represented in the Greene County Appendix. Each individual city has ranked these individual hazards differently based upon history and experience.

Structural Inventory

A structural inventory was completed for the corporate limits of each jurisdiction in Greene County. Structural inventories were completed to determine the type, number and value of structures within each jurisdiction. This information is critical to help determine vulnerability and potential losses in each jurisdiction. Structures were classified into the following categories:

➢ Residential – structures which are primarily used or intended for human habitation.

➢ Commercial – structures primarily used or intended as a place business where goods, wares, services,
or merchandise is stored or offered for sale. Commercial also includes hotels, motels, rest homes, structures consisting of three or more separate living quarters and any other buildings for human habitation that are used as a commercial venture.

➢ Industrial – structures used primarily as a manufacturing establishment.

➢ Agricultural – Structures located on all tracts of land which are used primarily for agricultural purposes,
except buildings which are primarily used or intended for human habitation.

Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. It is beyond the scope of this plan to complete an inventory of structures and critical facilities located within the 100-year floodplain. The Iowa Department of Natural Resources, along with the Iowa Flood Center, created new, comprehensive, accurate floodplain maps for Iowa cities and counties. The maps show the boundaries of flooded areas for the 1% annual chance (100-year) and 0.2% annual chance (500-year) floods. According to the Iowa Department of Homeland Security and the Iowa Department of Natural Resources, there are no repetitive loss properties within Greene County. The results from the structural inventories are discussed in more detail for each jurisdiction in Appendices A through H.

To determine the extent of an area that is susceptible to damages from each hazard, the committee estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries, fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from chapter 3. Table 4.1 shows the percentages used.

Table 4.1: Loss Estimate Magnitude and Severity Impacts

Description		Percentage Used in Loss Estimates
Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths	100%
Critical	25% to 50% of property severely damaged Shutdown of facilities and services for at least 2 weeks Injuries/illnesses that result in permanent disability	50%
Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week	25%

	Injuries/illnesses that do not result in permanent disability	
Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid	9%

The committee determined that Greene County is vulnerable to the following hazards:

- Drought
- Extreme Heat
- Flash Flood
- Grass or Wild Land Fire
- Dam/Levee Failure
- Hailstorm
- River Flooding
- Severe Winter Storms
- Thunderstorm and Lightning
- Tornado
- Windstorm

Based on the potential impacts of each hazard that is listed above, the vulnerability and loss estimates for each jurisdiction in Greene County were calculated. All structural data in Table 4.2 is based on 2024 parcel data provided by the County Assessor and population data came from the 2020 U.S. Census.

The parcel data was manipulated to eliminate missing or incomplete information. Parcel data was not used if it did not have a designated land use or if it has a dwelling or building value of $0. The calculations for "Number of Vulnerable Structures" are based on those structures that are exposed to each hazard. While 100% of the jurisdiction may be vulnerable to a hazard, not 100% of it will necessarily experience damages due to the hazard. The "Number of People Vulnerable" for each hazard was based on the total population. By multiplying the total population for the county by the percentage of exposure, the number of residents at risk could be calculated.

It is unlikely that a jurisdiction can determine the impact any hazard will have. If a hazard were to impact the entire county, the numbers in Table 4.2 show the number of people who would be affected and the maximum number of structures and their value. If this type of event were to occur, a shutdown of some facilities and services could last for at least two weeks and some injuries/illnesses would result in permanent disability to even death.

Table 4.2: Greene County Maximum Exposure

Type of Structure	Value of Structures	Number of People
Residential	$518,594,423	8,771
Commercial	$69,115,113	
Industrial	$84,808,908	
Agricultural Structures	$30,770,300	

Potential impacts vary significantly by hazard. Table 4.3 evaluates anticipated physical damage, service disruption, economic and social consequences, impacts to vulnerable populations, and potential losses to identified assets for each hazard.

Table 4.3: Greene County's Hazard Impact and Vulnerability Summary

Hazard	Anticipated Impacts and Potential Losses
Drought	Drought may affect the entire county through reduced water availability and increased demand on municipal water systems and well levels, however, significant structural damage is not anticipated. Prolonged drought may increase operating demands on the water system, affect vegetation, and increase grass/wildland fire risk. Economic impacts may occur indirectly through impacts to the surrounding agricultural community. Older adults, households with limited financial resources, and residents dependent on reliable municipal water service may be more vulnerable to prolonged drought conditions. Agricultural losses could include damage to crops and livestock.
Extreme Heat	Significant direct damage to buildings is not anticipated. Extreme heat may affect the entire population and increase demand on the electrical system and cooling equipment. Power outages could interrupt municipal services and leave residents without adequate cooling. Older adults, young children, individuals with medical conditions, outdoor workers, and residents without adequate air conditioning are particularly vulnerable. Potential losses are primarily associated with increased utility costs, lost productivity, medical impacts, and service interruptions rather than structural damage. Agricultural losses could include damage to crops and livestock.
Flash Flood	Greene County has reported no flash flooding since 2020; however, intense rainfall could produce localized street, yard, basement, or property flooding where drainage is limited. Streets, culverts, utilities, and structures in low-lying or poorly drained areas would be most vulnerable. Temporary road closures could affect access and emergency response. Because there have been no recent flash-flood losses, widespread structural losses are not anticipated. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.
Grass/Wildland Fire	Agricultural land and open vegetation in Greene County presents potential for grass or field fires. Homes, businesses, farms, utility infrastructure, and other structures are most vulnerable. Smoke could affect the majority of the community and particularly individuals with respiratory conditions. A fire could also temporarily close roads or interrupt utilities. Structural losses would depend on the location, wind conditions, and ability of responders to contain

	the fire. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.
Levee/Dam Failure	Vulnerability to levee/dam failure is localized and dependent on the location of the dam, the area that could be inundated, and development located downstream. Because none of the 18 inventoried dams are classified as high hazard and only one is classified as significant hazard, widespread impacts to developed areas are not anticipated. A failure could, however, result in localized flooding and damage to downstream roads, bridges, agricultural land, utilities, structures, and other infrastructure. Flooded or damaged roadways could temporarily disrupt transportation, emergency responses, and access to affected properties. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure. People located within the potential inundation area at the time of a failure would be the most vulnerable, particularly those with limited mobility or transportation who may require assistance evacuating. The extent of physical damage, service interruption, displacement, and economic loss would vary considerably depending upon the dam involved, water levels at the time of failure, and downstream development. Given the hazard classification of the dams within Greene County, potential losses are expected to be concentrated within the area immediately downstream of a failed structure rather than a more widespread area.
River Flooding	The 2016 FIRM identifies flood hazard areas within Greene County; therefore, structures, streets, utilities, and other assets located within or adjacent to those mapped areas have greater vulnerability than assets elsewhere in the county. Flooding could damage buildings and contents, temporarily restrict transportation, interrupt utilities or municipal services, and displace affected residents. Residents with limited mobility, transportation, or financial resources may have greater difficulty evacuating or recovering. Potential property losses are concentrated within the identified flood hazard areas rather than distributed evenly throughout the city. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.
Severe Winter Storm	Severe Winter Storms may affect the entire community but generally do not cause uniform structural damage. Heavy snow, ice, wind, and extreme cold can damage trees, roofs, overhead utilities, water infrastructure, and transportation systems. Power outages and blocked roads could interrupt municipal services and emergency response. Older adults, individuals with medical needs and/or limited mobility, and households without alternative heat sources are particularly vulnerable during extended outages or extreme cold. Economic losses may include snow removal, infrastructure repairs, business interruption, and increased heating costs. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.

Thunderstorm/Lightning/Hail	All of Greene County is exposed to severe thunderstorms, lightning, and hail. Future storms could damage roofs, siding, windows, vehicles, trees, utility infrastructure, and public facilities. Lightning and wind may cause power outages and fires in localized areas of the city. Potential economic losses include building and vehicle repairs, utility restoration, debris removal, and temporary business interruption. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.
Tornado	All structures and residents of Greene County are potentially exposed to tornadoes, although actual damage would generally be concentrated along the path of the tornado rather than affecting a fixed percentage of the community. A direct strike could cause severe or complete damage to homes, farms, businesses, public buildings, utilities, and other critical facilities; block streets or roads with debris; interrupt utilities, communications, and emergency services; and result in displacement, injuries, or fatalities. Residents without access to adequate shelter and those requiring assistance to shelter quickly would be particularly vulnerable. Potential structural losses could be substantial in the area directly affected. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.
Windstorm	All of Greene County is exposed to high winds and derecho events. Recent events have demonstrated the potential to damage roofs, siding, trees, crops, vehicles, and overhead electrical and communications infrastructure. Downed trees and utility lines may block streets, cause extended power outages, and interfere with emergency response and municipal services. Older structures and buildings with large roof areas may experience greater damage. Economic losses may include structural repairs, utility restoration, debris removal, business interruption, and agricultural losses. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.

Each individual jurisdiction and rural county loss estimate and vulnerability summary can be found in their respective appendix.

Chapter 5:

Mitigation Strategies

Section 201.6 (c)(3)(i): The plan must contain a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section must include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Section 201.6 (c)(3)(ii): [The mitigation strategy shall include] A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

The hazard mitigation goals, objectives, and actions are directly connected to the hazard analysis and risk assessment. After the hazard risk analysis was completed for each jurisdiction, broad-based county-wide goals were developed to address hazards and their impact on jurisdictions. The committee used a top-down approach where the overall goals were determined, then worked down to establish more specific objectives and even more specific mitigation actions. As a starting point, each jurisdiction was provided with the goals from their previous hazard mitigation plan. If a jurisdiction did not have a previous hazard mitigation plan, they were given the county's previous goals. This hazard mitigation plan's goals are identified as follows:

- ➢ Maintain and protect public infrastructure
- ➢ Minimize deaths, injuries, property loss, and vulnerability due to natural hazards
- ➢ Improve coordination, public communication, education, and awareness of hazards
- ➢ Enhance community protection
- ➢ Maintain and support public safety facilities, including equipment and training

Using the plan goals as a platform, each jurisdiction decided upon mitigation objectives and actions to help reduce or eliminate the impacts of hazards. Objectives were defined as strategies or steps to achieve the goals that have been set. They are more specific and narrower in scope than goals. It is important that the objectives be measurable in order to determine if the action was successfully implemented. Actions were defined as specific activities to reduce hazard risks. Actions can be classified into six mitigation categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects.

Each committee member was supplied with a supplement to provide help in picking mitigation actions. The supplement was titled *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards.* The booklet contained a list of possible hazard mitigation measures for communities compiled from FEMA. The list gives mitigation ideas for natural hazard types, such as flood, tornadoes, and drought. A worksheet was also distributed to committee members with examples of mitigation objectives and actions from several approved mitigation plans. In addition, committee members were given copies of their jurisdiction's previous objectives and actions from past hazard mitigation plans. As extensive as the three resources were, they did not prohibit other local ideas for actions to save lives and prevent or reduce damages.

This plan's mitigation goals and objectives fall under the state's three main goals to provide complete protection to the citizens of the county. Each of the county's goals falls under the umbrella of the state's three main goals, which include:

- ➢ Protect the health, safety, and quality of life for Iowa citizens while reducing or eliminating property losses, economic costs, and damage to the natural environment caused by a disaster.
- ➢ Ensure government operations, response, and recovery are not significantly disrupted by disasters.
- ➢ Expand public awareness and encourage intergovernmental cooperation, coordination, and communication to build a more resilient community against all hazards.

Action Plan

The Action Plan is a combination of the hazards addressed by each action, the prioritization of actions, the responsible department for the action, the estimated cost of the action, the potential funding source for the action, the mitigation measure category, and the target completion date of the action. All of these categories are explained in the following sections. The county-wide action plans can be found later in this chapter, while the city and school district's Action Plans can be found in their respective appendix.

Priority

Priority for each action is determined as High, Moderate, or Low.

- ➢ High - Completing this action item is vital to the jurisdiction's efforts towards either mitigating hazards or responding to them. The benefit of completing this project is greater than the cost. These projects tend to need to be completed within a short timeframe.
- ➢ Moderate - Completing this action would benefit the city's efforts towards mitigating hazards or responding to them, but if these projects are not completed, the jurisdiction can still further their efforts. The cost of these projects equals the benefit on the jurisdiction. These projects need to be completed in the mid timeframe.

➢ Low - If this action were to be completed, the jurisdiction would benefit, but if it is not completed, it will not be detrimental to the city's hazard mitigation efforts or response. The cost of the project outweighs the benefit the project will have on the jurisdiction. These projects tend to be completed long-term.

Estimated Cost

Estimated costs for each action are determined as: minimal, low, moderate or high based on the following:

- ➢ Minimal – cost estimate is $9,999 or less
- ➢ Low – cost estimate ranges from $10,000 to $99,999
- ➢ Moderate – cost estimate ranges from $100,000 to $299,999
- ➢ High – cost estimate is $300,000 or greater

Mitigation Measure Categories

Prevention Actions

Prevention actions are intended to address future development. These actions influence the way land and buildings are developed and built. These actions ensure that future development does not increase hazard losses, and guides future development away from hazards. Examples of these actions include:

- ➢ Planning and zoning codes that limit development in a floodplain
- ➢ Building codes
- ➢ Capital improvement programs that prevent extension of public infrastructure into hazard areas
- ➢ Open space preservation and development of parks and recreational areas in hazard prone areas
- ➢ Storm water management regulations.

Property Protection Actions

Property protection actions modify existing structures or their surroundings to protect them from a hazard. These actions directly protect people and property at risk. Protecting a building does not necessarily affect the building's appearance and is therefore a popular mitigation action for historic and cultural sites. Examples of these actions include:

- ➢ Acquisition of lands that are vulnerable to damage
- ➢ Elevation
- ➢ Relocation of hazard-prone structures to safer areas
- ➢ Structural retrofits to reduce damage by future hazards
- ➢ Storm shutters

➢ Flood-proofing

Public Education and Awareness Actions

Actions to inform and educate citizens, elected officials, and property owners about hazards and the actions they can take to avoid potential damage and injury. These actions are directed toward property owners, business owners, and visitors to the community. Examples include:

➢ Outreach projects that provide hazard information to the public, business and property owners

➢ Real estate disclosure so that potential property owners are informed of the risk before purchase

➢ Hazard information centers

➢ School-age and adult education programs

Natural Resource Protection Actions

Actions that reduce the intensity of hazard effects and preserves or improves the quality of the environment and wildlife habitats. The actions are usually implemented by parks, recreation, or conservation agencies and organizations. These actions can include:

➢ Sediment and erosion control

➢ Stream corridor restoration

➢ Watershed management

➢ Forest and vegetation management

➢ Wetland restoration and preservation

➢ Expanding public open space

Emergency Services Actions

Actions that protect people and property before, during, and immediately after a disaster or hazard event. Examples of these actions are:

➢ Warning systems

➢ Emergency response services

➢ Protection of critical facilities and infrastructure

Structural Project Actions

Actions are called “structural” because they involve the construction of structures or devices to reduce the impact of hazards. Actions in this category directly protect people at risk. These actions can include:

➢ Dams

➢ Levees

➢ Floodwalls

➢ Retaining walls

➢ Safe rooms

➢ Reservoirs to store drinking water
➢ Diversion of storm water

Target Completion Date

The target completion date is the estimated amount of time that the jurisdiction feels the action can be completed in. It is broken into four categories:

➢ Short – 0 to 2 years
➢ Mid – 3 to 6 years
➢ Long – 7+ years
➢ Ongoing

Rural Greene County Status of Previous Mitigation Actions

Status

The status of the previous actions is broken down into five categories:

➢ Complete – the project has been implemented since the last Hazard Mitigation Plan
➢ Underway – the action has been started and progress is being made. The project has a clear end.
➢ Ongoing – the action is continuing
➢ Future – the action is planned to have a start date in the future
➢ Not implemented – the action has not been implemented due to changes in priority or funding since the last plan update

Table 5.1: Rural Greene County Status of Previous Mitigation Actions

	Status				
Previous Actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not Implemented**
Use retention ponds with bridge and culvert replacement, where appropriate			**X**		
Continue to encourage development of water flow issues			**X**		
Constantly monitor and initiate repairs and improvements in drainage districts			**X**		
Coordinate with cities to increase awareness of value of weather radios			**X**		
Install weather radios in county facilities				**X**	
Look into warning sirens for county parks including Spring Lake	**X**				
Purchase new ambulance equipment including vehicles		**X**			

Coordinate with local law enforcement, Emergency Management and Secondary Roads Department for design of response and responsibilities			X		
Coordinate with hospital and clinic to determine responses and responsibilities of personnel involved			X		
Update and improve equipment and training			X		
Continued participation in and compliance of NFIP			X		
Security enhancement for all county facilities			X		
Build new jail	X				
Purchase/upgrade secondary road equipment			X		
Install ISICS tower	X				
Purchase new/upgraded communication equipment including radios	X				
Purchase new/upgrade emergency management radios including the hand helds and portables	X				

Rural Greene County Action Plan

Section 201.6 (c)(3)(iii): [The mitigation strategy shall include] 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.

Section 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.

Table 5.2: Rural Greene County Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructures, and other community assets from the effects of hazards**
Objective 1	Mitigate damage from rain/flooding
Goal 2	**Minimize injuries and loss of life due to the impacts of hazards**
Objective 1	Improve Warning System

Goal 3	**Improve coordination and communication with other relevant organizations and build support for hazard mitigation**
Objective 1	Protect health and safety
Goal 4	**Maintain and support public safety facilities, including equipment and training**
Objective 1	Improve First Responder resources and capabilities

Table 5.3: Rural Greene County Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Use retention ponds with bridge and culvert replacement, where appropriate	River flooding	Low	Secondary Roads	Moderate	County Board of Supervisors, Secondary Roads Budget	Structural Project	Short
Continue to encourage development of water flow issues	Flash Flood, River Flooding	Low	County Conservation Board	Minimal	County Board of Supervisors	Property Protection	Mid
Constantly monitor and initiate repairs and improvements in drainage districts	River Flooding	High	County Board of Supervisors	Minimal-High	County Board of Supervisors	Property Protection	Ongoing
Coordinate with cities to increase awareness of value of weather radios	Flash Flood, River Flooding, Tornado, Windstorm, Extreme Heat, Severe Winter Storms, Thunderstorm Lightning/Hail	Low	Emergency Services	Minimal	County EMA Budget, County Board of Supervisors	Emergency Services	Ongoing
Install weather radios in county facilities	Flash Flood, River Flooding, Tornado, Windstorm, Extreme Heat, Severe Winter Storms, Thunderstorm Lightning/Hail	Mod	Emergency Services	Minimal	County EMA Budget, County Board of Supervisors, Grow Greene County	Emergency Services	Short

Purchase new ambulance equipment including vehicles	Flash Flood, River Flooding, Tornado, Windstorm, Extreme Heat, Severe Winter Storms, Thunderstorm Lightning/Hail, Grass/Wild Land Fire	High	Emergency Services, County	High	County EMS Budget, Grow Greene County	Emergency Services	Short
Coordinate with local law enforcement, Emergency Management and Secondary Roads Department for design of response and responsibilities	Flash Flood, River Flooding, Tornado, Windstorm, Extreme Heat, Severe Winter Storms, Thunderstorm Lightning/Hail, Grass/Wild Land Fire	High	Emergency Services, Fire Department, Police Department, Secondary Roads, County Board of Supervisors	Minimal	County Public Safety Funds	Emergency Services	Short
Coordinate with Hospital and Clinic to determine responses and responsibilities of personnel involved	Flash Flood, River Flooding, Tornado, Windstorm, Extreme Heat, Severe Winter Storms, Thunderstorm Lightning/Hail, Grass/Wild Land Fire	High	Emergency Services, Fire Department, Police Department, Secondary Roads, County Board of Supervisors	Moderate	County Public Safety Funds	Emergency Services	Ongoing
Update and improve equipment and training	Flash Flood, River Flooding, Tornado, Windstorm, Extreme Heat, Severe Winter Storms, Thunderstorm Lightning/Hail, Grass/Wild Land Fire	High	Emergency Services, Fire Department, Police Department, Secondary Roads, County	Moderate	County Public Safety Funds, County EMS Budget, Grow Greene County, FEMA AFG, Fire	Emergency Services	Ongoing

			Board of Supervisors		Departments, Police/Sheriff Budgets		
Continued participation in and compliance of NFIP	River Flooding	Mod	County Drainage	Minimal	County General Funds	Property Protection	Ongoing
Security enhancement for all county facilities	Flash Flood, River Flooding, Tornado, Windstorm, Severe Winter Storms, Thunderstorm Lightning/Hail, Grass/Wild Land Fire	High	Emergency Services, Board of Supervisors	Moderate	County Public Safety Fund, Grow Greene County	Property Protection	Short
Purchase/upgrade secondary road equipment	Flash Flood, River Flooding, Tornado, Windstorm, Severe Winter Storms, Thunderstorm Lightning/Hail, Grass/Wild Land Fire	Mod	Secondary Roads, County Board of Supervisors, Engineer	High	County Roads Fund,	Property Protection	Ongoing
Purchase and install warning sirens for county parks and campgrounds	Tornado, Windstorm, Thunderstorm/Lightning/Hail	Mod	Emergency Services	Moderate	County Public Safety Fund, County Conservation Funds, HMGP with State Match, FEMA BRIC with State Match, Grow Greene County, USDA Community Facilities Grant		

Develop a contingency plan if water supply is diminished	Drought	Mod	Cities, County	Low	City General Funds, County Public Safety Fund	Natural Resource Protection	Short
Monitor Levee/Dam Failure Risk	Levee/Dam Failure	Low	County Board of Supervisors	Low	County Roads Fund	Emergency Services	Ongoing
Initiate a fire prevention program	Drought, Extreme Heat	Low	Fire Departments	Minimal	Fire Department Budgets	Emergency Services	Short

Chapter 6:

Plan Maintenance and Adoption

Section 201.6 (c)(4)(i): [The maintenance process shall include] A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Monitoring, Evaluating, and Updating the Plan

With the adoption of this plan, the Emergency Management Commission will be tasked with initiating the review, evaluation, and maintenance of the plan. The Emergency Management Commission will be in charge of making it a priority to update the Greene County Multi-Jurisdictional Hazard Mitigation Plan. The Greene County Multi-Jurisdictional Hazard Mitigation Plan will be evaluated once a year for potential changes, and to maintain compliance with FEMA rules and regulations. If Greene County, or any individual city, decides to update the plan, the Emergency Management Commission will be responsible to initiate the update. If there is not an update within four years of the plan being adopted, then the process will begin to update the plan. The Emergency Management Commission will coordinate the meeting time and place and will notify the other members of the committee. If a new committee needs to be formed, it should be comprised of representatives of the city government, businesses, citizens, emergency staff, school board, etc. The members of the Emergency Management Commission agree to:

- ➢ Meet annually to monitor and evaluate the implementation of the hazard mitigation plan
- ➢ Act as a forum for hazard mitigation issues
- ➢ Disseminate hazard mitigation ideas and activities to all members of the committee
- ➢ Pursue the implementation of hazard mitigation actions that are included in the plan
- ➢ Monitor any sources of possible funding to help the jurisdictions implement the plan's recommended actions
- ➢ Monitor and assist in implementation and update of this plan
- ➢ Inform and gather input from the public

The primary duty of the Greene County Emergency Management Commission, in relation to maintaining and updating this plan, is to see that the plan is successfully carried out and report to the Board of Supervisors, and to make information available to the public regarding the status of the plan and the progress of hazard mitigation actions.

Implementation Policies and Issues

The hazard mitigation planning team was created to develop the mitigation plan and guide the plan preparer. The planning team should not formally end with the approval of the plan. The planning team should become a watchdog to help local officials move the plan's goals forward and should take a key role in implementing projects. Members can help remind public officials of that particular year's mitigation strategy and possible funding options and can volunteer in the implementation process for certain actions. The team and local governments may participate in the process and engage regional organizations, state agencies, colleges, schools, NGOs, and churches via memoranda of agreement.

Throughout the mitigation plan, there are gaps in data that are outlined in the plan. In addition to specific mitigation actions in this chapter, it is important that Greene County's jurisdictions review this plan periodically as the County prepares for the next five-year update of this Plan. This process would help satisfy FEMA Region VII requirements. Missing data should be found and included by the next major update.

This hazard mitigation plan is a guide for future policy planning for participating jurisdictions in the county. The plan considers demographic trends and projections, community background information, current and future political decisions, and overall important goals and objectives for the county's jurisdictions. The goals and objectives have been developed to reflect the general consensus of the county's Hazard Mitigation Planning team, the broad range of elected officials, and the citizenry of the county. These recommendations have been developed to look five-plus years into the future with the expectation that periodic updates will occur in order to reflect changes within the county.

The success of this plan will require the support of the emergency management commission/agency, elected officials, department heads, and volunteers (including civic groups, academia, and general citizens). Cooperation from the public and private sectors will allow implementation of the recommendations that will provide long-term benefits for the entire county and each jurisdiction. By implementing these recommendations, the jurisdictions will be furthering other civic goals also.

Simply listing a project or discussing an issue does not cause anything to be done about it. It is vital that the jurisdictions make a sustained effort to implement projects, actions, and policies as outlined in this plan. Reviewing the text intermingled among the tables and lists also provides ideas on how to carry out the plan and meet mitigation goals. This chapter also provides more details about the regular activities involved in carrying out this plan and preparing for future planning efforts.

The following ideas should be kept in mind when considering how the plan should be implemented.

➢ Funding and resources are very limited due to the small population size, modest land value and tax base, and other funding obligations that make it impossible to save for long-term emergency needs.

➢ Greene County has a limited number of volunteers and support agencies to handle either mitigation projects or response needs. Funding is too limited to provide proper training and equipment, and volunteers do not have the time to undertake the necessary training. Many volunteers and staff wear multiple "hats" and cannot meet all the demands when hazards occur.

➢ Many members of the public are apathetic to hazards and particularly to the sustained efforts necessary to mitigate them. Some citizens and public officials do not properly respect the need for mitigation planning, the risks the county faces, and the roles they have in the process. Few members of the general public have attended planning meetings.

➢ Information and data to bring about detailed hazard analysis and the analysis of possible mitigation actions is often lacking on a local level.

➢ Local jurisdictions have limited legal authority to implement some possible mitigation actions.

➢ Because prioritization is needed in order to effectively use limited resources, it is important that the jurisdictions perform studies on community infrastructure and services provided.

➢ Because of the risk of failure of investments in key hazard areas where the area is defined, the jurisdictions should consider a policy to prohibit or limit public expenditures for capital improvements in such areas.

➢ Small towns should use mitigation before hazards occur as a means to be prepared for the fact that, in a widespread hazard, resources are not likely to be available to them until larger jurisdictions are served.

Annual Review and Plan Maintenance Process

The DMA of 2000 suggests that each local jurisdiction review the plan annually. Principally, each jurisdiction's government body and key staff should review the actual implementation plan for that jurisdiction. A review of capabilities, goals/objectives, and proposed actions is particularly warranted. It is important that the review notes and suggested changes be made at a public meeting and records are kept. If any of the changes relate to a project that is being submitted to FEMA, such as through a PDM, FMA, or HMGP application, the jurisdiction must adopt the changes at a council or supervisor meeting to make the changes officially part of the plan and thus eligible for mitigation funding. The local jurisdictional body, such as city council, board of supervisors, or school board, is responsible for ensuring reviews are completed.

The public school should be invited to all formal meetings where the plan is discussed and possible changes can be made. Local media should be used to alert the public. Each jurisdiction is responsible for reviewing the parts of the plan relevant to the said jurisdiction.

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- ➢ Decreased vulnerability as a result of implementing recommended actions
- ➢ Increased vulnerability as a result of failed or ineffective mitigation actions, and/or
- ➢ Increased vulnerability as a result of new development (and/or annexation)

The annual reviews and updates to this plan will:

- ➢ Consider changes in vulnerability due to action implementation
- ➢ Document success stories where mitigation efforts have proven effective
- ➢ Document areas where mitigation actions were not effective
- ➢ Document any new hazards that may arise or were previously overlooked
- ➢ Incorporate new data or studies on hazards and risks
- ➢ Incorporate new capabilities or changes in capabilities
- ➢ Incorporate growth and development-related changes to inventories, and
- ➢ Incorporate new action recommendations or changes in action prioritization

In order to best evaluate the mitigation strategy during plan review ad update, the participating jurisdictions will follow the following process:

- ➢ A representative from the responsible office identified in each mitigation action will be responsible for tracking and reporting the action status on an annual basis to the jurisdictional HMPC member and providing input on any completion details or whether the action still meets the defined objectives and is likely to be successful in reducing vulnerabilities.
- ➢ If the action does not meet identified objectives, the jurisdictional HMPC member will determine what additional measures may be implemented, and an assigned individual will be responsible for defining action scope, implementing the action, monitoring success of the action, and making any required modifications to the plan.
- ➢ As part of the annual review process, the Greene County Emergency Management Coordinator will provide the updated mitigation strategy with current status of each mitigation action to local elected officials of various jurisdictions requesting that the mitigation strategy be incorporated, where appropriate in other planning mechanisms.

Changes will be made to the plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes or submissions, as the planning team deems appropriate and necessary, and as approved by the Greene County Board of Supervisors and the governing boards of the other participating jurisdictions.

Opportunities for Publicity

Section 201.6 (c)(4)(iii): [The maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Several times the local media can make comments about the effort and successes that may arise:

- ➢ Adoption of the mitigation plan
- ➢ Receipt of approval by FEMA
- ➢ Initiation and completion of tangible mitigation actions or projects
- ➢ Update and evaluation meetings and results

Annually, each jurisdiction is to hold at least one public meeting or hearing so that the public can comment on the status of the mitigation actions' implementation and changes that are needed to the plan.

Incorporation into Other Planning Mechanisms

Section 201.6 (c)(4)(ii): [The plan shall include] A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

The planning team is partly responsible to ensure that the public officials are incorporating mitigation actions into relevant plans and planning mechanisms, such as zoning, annexation plans, and bonding proposals. Communities should also include mitigation initiatives as regular line items in community capital or operational budgets to ensure ongoing funding for hazard mitigation initiatives.

Some of the local jurisdictions did not formally incorporate any of the mitigation actions into existing plans since the previous plan was adopted. However, mitigation ideas were incorporated informally in budget decisions, such as to fund a mitigation action. The jurisdictions commit to improving formal planning efforts in the next five years. Ways each jurisdiction will incorporate this plan can be found in their respective appendix.

Where possible, Greene County and all other jurisdictions will consider the findings from this document when updating or creating new planning and operating documents. Examples of planning documents that would benefit from information provided in this plan include, but are not limited to:

- ➢ Incorporated City Codes
- ➢ Greene County Comprehensive Plan
- ➢ Greene County Code of Ordinances
- ➢ Greene County Zoning Codes
- ➢ Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans

As of the writing of this plan, some jurisdictions have documents currently in place, but if the document is to be updated, the hazard mitigation plan should be referenced in the update.

Appendix A:

Rural Greene County

Table A.1: Rural Greene County Risk Assessment

Hazard	Comments
Drought	Drought occurrences have increased across the state, and Greene County has not been exempted from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the county and its residents.
Earthquake	There have been no instances of earthquake in Greene County, and the committee feels there will be no instances during the life of this plan.
Expansive Soils	Expansive soils are not uncommon in portions of Greene County, due to high clay content and dramatic changes in soil moisture and temperature. This hazard has the greatest impact on individual properties, especially those not engineered to withstand the hazard. This is a very localized hazard (e.g., individual home) and not a major priority for public response. Greene County has no knowledge of problems affecting major infrastructure, county facilities, or personal homes and property.
Extreme Heat	Extreme heat events continue to impact Greene County. Education may be one of the best action tools to combat the effects of extreme heat as individuals need to know the effects of extreme heat and how it can affect the body.
Flash Flood	Since 2020, there have been no instances of flash flooding. While flash floods have little to no warning time, the committee does not consider this a high hazard priority, but will continue to consider mitigation actions to prepare the community for response to an event. Historically, flash flooding in Greene County has been caused by rapid snowmelt and heavy rainfall causing overland flooding, river flooding, and ice jam issues. As the County replaces bridges, they are being built to mitigate river flooding and ice jams.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand. This hazard can pose a large threat to the county, as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
Levee/Dam Failure	Of the 18 Greene County dams in the inventory, none are considered to be a high hazard dam, and only one is considered to be a significant hazard dam. There have been no known occurrences of dam failure in Greene County. Sound design, quality construction, and continued inspections and repairs reduce the probability of dam

	failure. While there have been no instances of failure in the past, with the age and classification of the dams in the county, continued maintenance, inspection, and repair are important to prevent deterioration and reduce future risk.
River Flooding	Large portions of Greene County are located within flood zones. While there have been limited instances of river flooding in the last planning period, it is important that the County stay vigilant and plan for river flooding instances. As the county replaces bridges, they are being reconstructed to mitigate river flooding issues.
Severe Winter Storm	Severe Winter Storms continue to impact Greene County. These storms, while historically have caused little damage, continue to build in strength, threatening property and lives within Greene County. The warning period of this hazard continues to grow with meteorological advances but can still pose great risks to the county.
Thunderstorm/ Lightning/Hail	Thunderstorm/lightning/hail instances are frequent within the county. While they are frequent, most storms pose no threat to life, crops, or property. This hazard is prevalent in the county but is normally not severe in nature.
Tornado	Greene County experienced nine separate tornados on December 15, 2021. It is important for the county to continue to plan for the response to tornadoes as storms within Iowa continue to grow in strength. Preparing the public and county is vital to ensuring there is no loss of life.
Windstorm	Windstorms frequently impact the county. Even though none of the occurrences during the last planning period caused damage to property or life, these hazard events continue to build in magnitude. The recent derecho affected Greene County prompting the community to prepare more effectively for these hazards.

Table A.2: Rural Greene County Maximum Building and Population Exposure

Type of Structure	Value of Structures	Number of People
Agricultural	$30,181,800	2,509
Commercial	$11,741,100	
Industrial	$62,584,725	
Residential	$195,965,100	

The extent of future losses cannot be precisely predicted because the location, magnitude, and duration of future hazard events are uncertain. Table A.2 represents Greene County's maximum community-wide exposure and should not be interpreted as the anticipated loss from any individual hazard. Potential impacts vary significantly by hazard. Table A.3 evaluates anticipated physical damage, service disruption, economic and social consequences, impacts to vulnerable populations, and potential losses to identified assets for each hazard.

Table A.3: Greene County's Hazard Impact and Vulnerability Summary

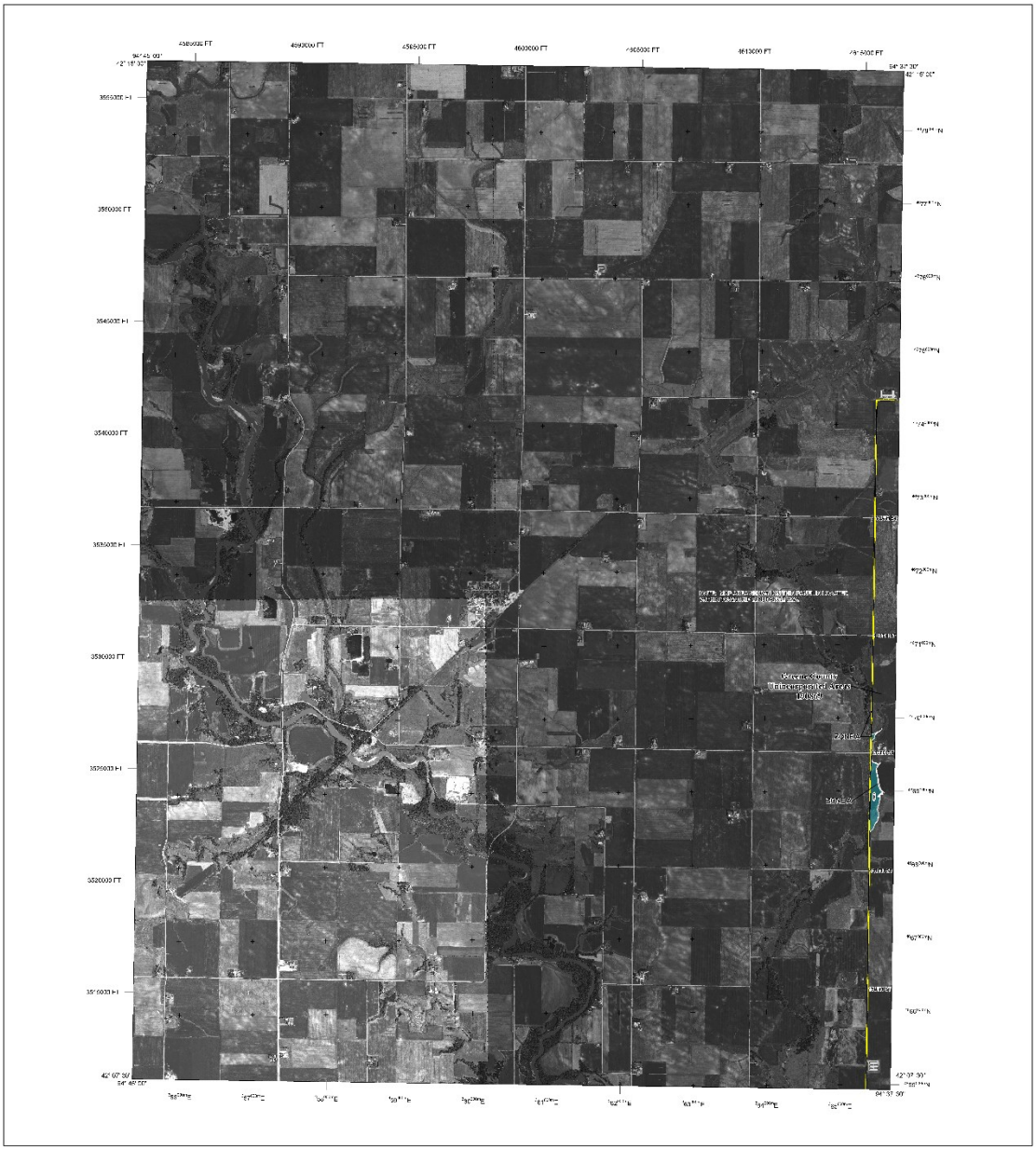
Hazard	Anticipated Impacts and Potential Losses

Drought	Drought may affect the entire county through reduced water availability and increased demand on municipal water systems and well levels, however, significant structural damage is not anticipated. Prolonged drought may increase operating demands on the water system, affect vegetation, and increase grass/wildland fire risk. Economic impacts may occur indirectly through impacts to the surrounding agricultural community. Older adults, households with limited financial resources, and residents dependent on reliable municipal water service may be more vulnerable to prolonged drought conditions. Agricultural losses could include damage to crops and livestock.
Extreme Heat	Significant direct damage to buildings is not anticipated. Extreme heat may affect the entire population and increase demand on the electrical system and cooling equipment. Power outages could interrupt municipal services and leave residents without adequate cooling. Older adults, young children, individuals with medical conditions, outdoor workers, and residents without adequate air conditioning are particularly vulnerable. Potential losses are primarily associated with increased utility costs, lost productivity, medical impacts, and service interruptions rather than structural damage. Agricultural losses could include damage to crops and livestock.
Flash Flood	Greene County has reported no flash flooding since 2020; however, intense rainfall could produce localized street, yard, basement, or property flooding where drainage is limited. Streets, culverts, utilities, and structures in low-lying or poorly drained areas would be most vulnerable. Temporary road closures could affect access and emergency response. Because there have been no recent flash-flood losses, widespread structural losses are not anticipated. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.
Grass/Wildland Fire	Agricultural land and open vegetation in Greene County presents potential for grass or field fires. Homes, businesses, farms, utility infrastructure, and other structures are most vulnerable. Smoke could affect the majority of the community and particularly individuals with respiratory conditions. A fire could also temporarily close roads or interrupt utilities. Structural losses would depend on the location, wind conditions, and ability of responders to contain the fire. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.
Levee/Dam Failure	Vulnerability to levee/dam failure is localized and dependent on the location of the dam, the area that could be inundated, and development located downstream. Because none of the 18 inventoried dams are classified as high hazard and only one is classified as significant hazard, widespread impacts to developed areas are not anticipated. A failure could, however, result in localized flooding and damage to downstream roads, bridges, agricultural land, utilities, structures, and other infrastructure.

	Flooded or damaged roadways could temporarily disrupt transportation, emergency responses, and access to affected properties. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure. People located within the potential inundation area at the time of a failure would be the most vulnerable, particularly those with limited mobility or transportation who may require assistance evacuating. The extent of physical damage, service interruption, displacement, and economic loss would vary considerably depending upon the dam involved, water levels at the time of failure, and downstream development. Given the hazard classification of the dams within Greene County, potential losses are expected to be concentrated within the area immediately downstream of a failed structure rather than a more widespread area.
River Flooding	The 2016 FIRM identifies flood hazard areas within Greene County; therefore, structures, streets, utilities, and other assets located within or adjacent to those mapped areas have greater vulnerability than assets elsewhere in the county. Flooding could damage buildings and contents, temporarily restrict transportation, interrupt utilities or municipal services, and displace affected residents. Residents with limited mobility, transportation, or financial resources may have greater difficulty evacuating or recovering. Potential property losses are concentrated within the identified flood hazard areas rather than distributed evenly throughout the city. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.
Severe Winter Storm	Severe Winter Storms may affect the entire community but generally do not cause uniform structural damage. Heavy snow, ice, wind, and extreme cold can damage trees, roofs, overhead utilities, water infrastructure, and transportation systems. Power outages and blocked roads could interrupt municipal services and emergency response. Older adults, individuals with medical needs and/or limited mobility, and households without alternative heat sources are particularly vulnerable during extended outages or extreme cold. Economic losses may include snow removal, infrastructure repairs, business interruption, and increased heating costs. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.
Thunderstorm/Lightning/Hail	All of Greene County is exposed to severe thunderstorms, lightning, and hail. Future storms could damage roofs, siding, windows, vehicles, trees, utility infrastructure, and public facilities. Lightning and wind may cause power outages and fires in localized areas of the city. Potential economic losses include building and vehicle repairs, utility restoration, debris removal, and temporary business interruption. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.
Tornado	All structures and residents of Greene County are potentially exposed to tornadoes, although actual damage would generally be

	concentrated along the path of the tornado rather than affecting a fixed percentage of the community. A direct strike could cause severe or complete damage to homes, farms, businesses, public buildings, utilities, and other critical facilities; block streets or roads with debris; interrupt utilities, communications, and emergency services; and result in displacement, injuries, or fatalities. Residents without access to adequate shelter and those requiring assistance to shelter quickly would be particularly vulnerable. Potential structural losses could be substantial in the area directly affected. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.
Windstorm	All of Greene County is exposed to high winds and derecho events. Recent events have demonstrated the potential to damage roofs, siding, trees, crops, vehicles, and overhead electrical and communications infrastructure. Downed trees and utility lines may block streets, cause extended power outages, and interfere with emergency response and municipal services. Older structures and buildings with large roof areas may experience greater damage. Economic losses may include structural repairs, utility restoration, debris removal, business interruption, and agricultural losses. Agricultural losses could include damages to crops, livestock, fencing, and other farm infrastructure.

Flood maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, A99 With BFE or Depth Zone AE, AO, AH, VE, AR Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee See Notes. Zone X
OTHER AREAS	NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Accredited or Provisionally Accredited Levee, Dike, or Floodwall Non-accredited Levee, Dike, or Floodwall Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 2,000 feet 1:24,000

0 2,000 4,000 8,000 Feet

0 500 1,000 2,000 Meters

PANEL LOCATOR

0025 0050 0150 0175

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas

PANEL 25 OF 500

FEMA

Panel Contains:

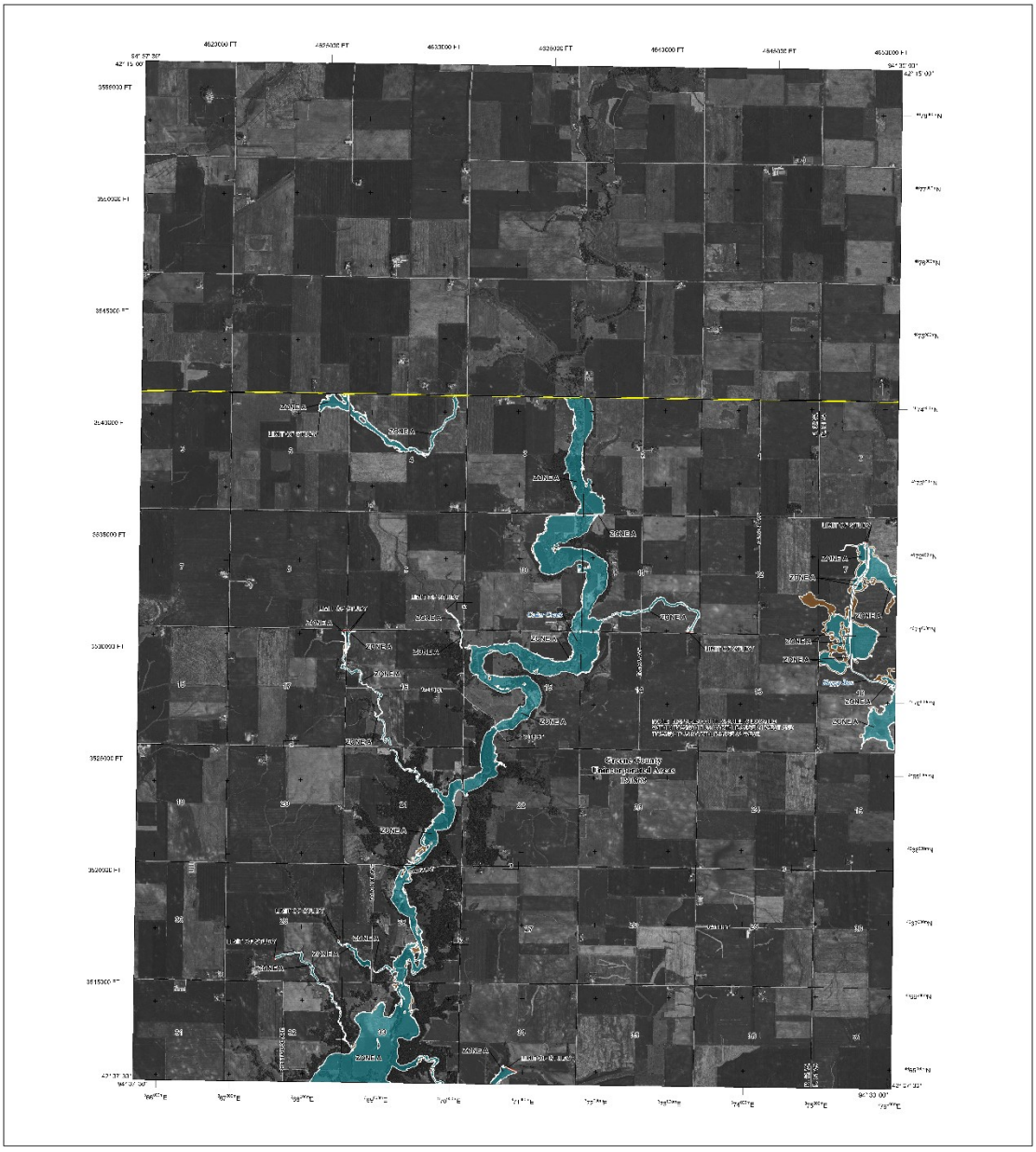
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GREENE COUNTY	190680	0025	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0025C

EFFECTIVE DATE
APRIL 19, 2016

Greene County Hazard Mitigation Plan Appendix A- Rural Greene County



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
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- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
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- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 2,000 feet 1:24,000
0 2,000 4,000 8,000 Feet
0 500 1,000 2,000 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

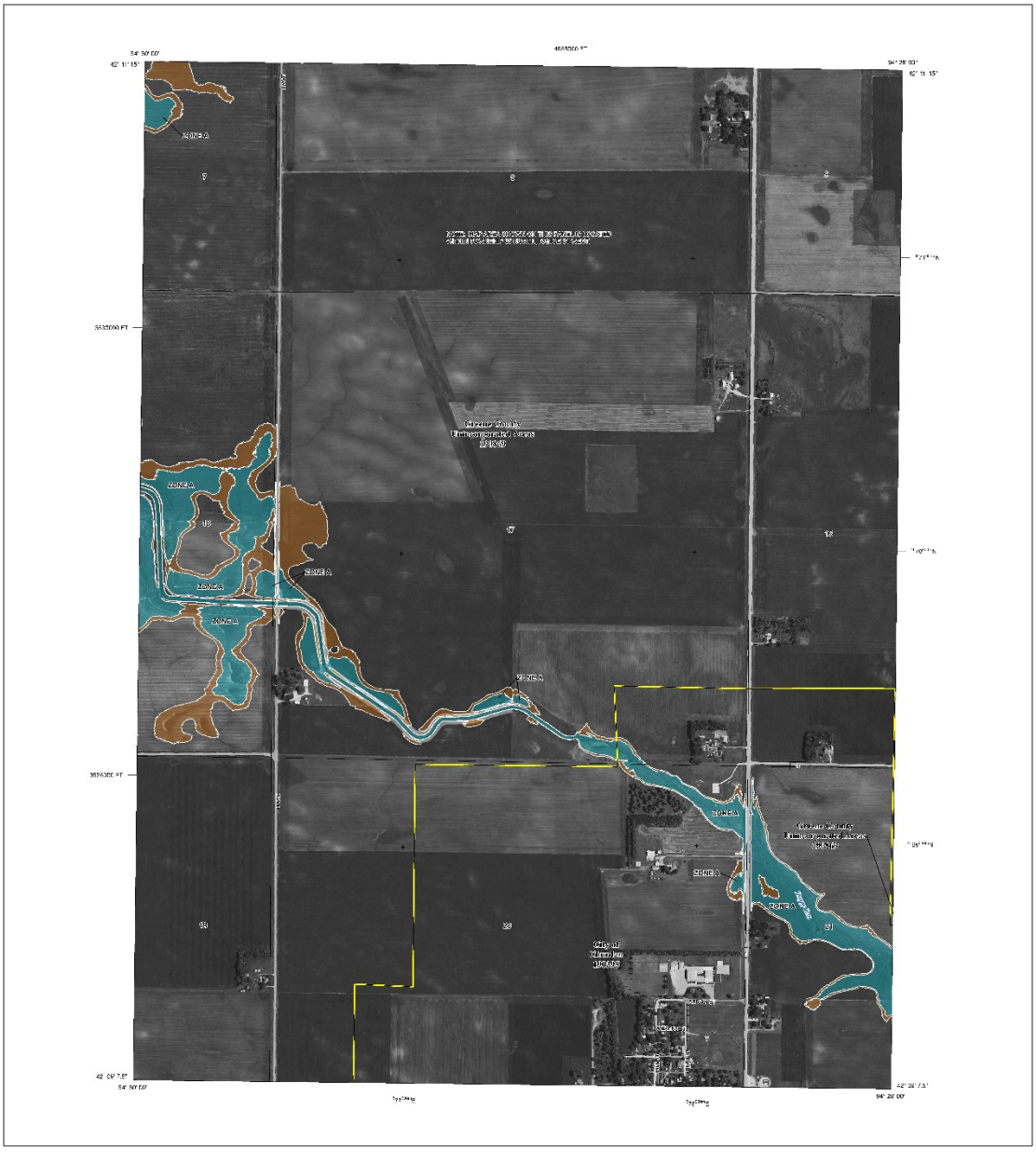
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
PANEL 50 OF 500

FEMA

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190680	0050	C

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0050C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
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- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 500 feet 1:6,000
0 500 1,000 2,000 Feet
0 125 250 500 Meters

PANEL LOCATOR

0060 0001 0065 0083

* PANEL NOT PRINTED

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas

PANEL 61 OF 500

FEMA

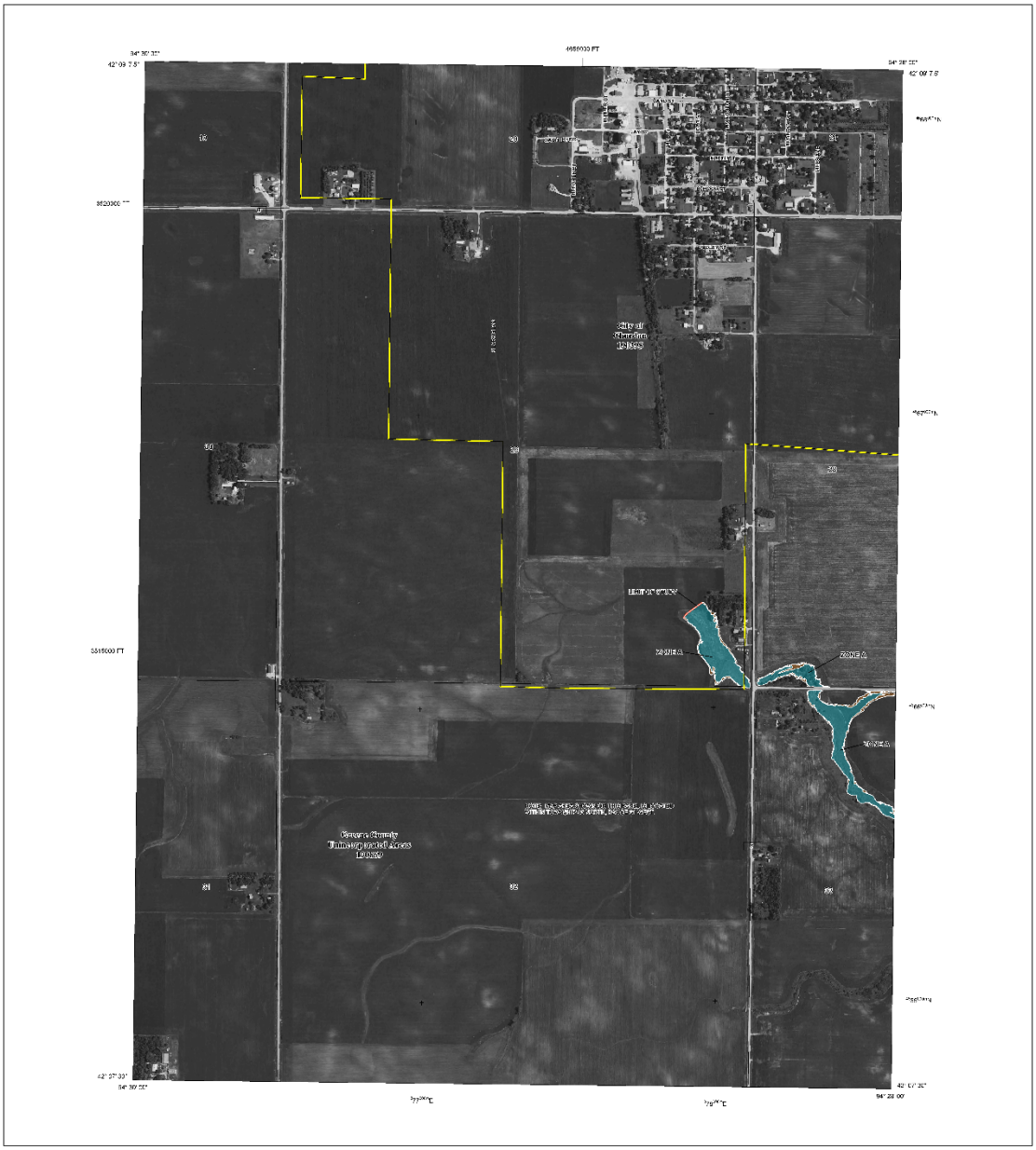
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VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0061C

EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

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- Non-accredited Levee, Dike, or Floodwall
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- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 500 feet 1:6,000
0 500 1,000 2,000 Feet
0 125 250 500 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

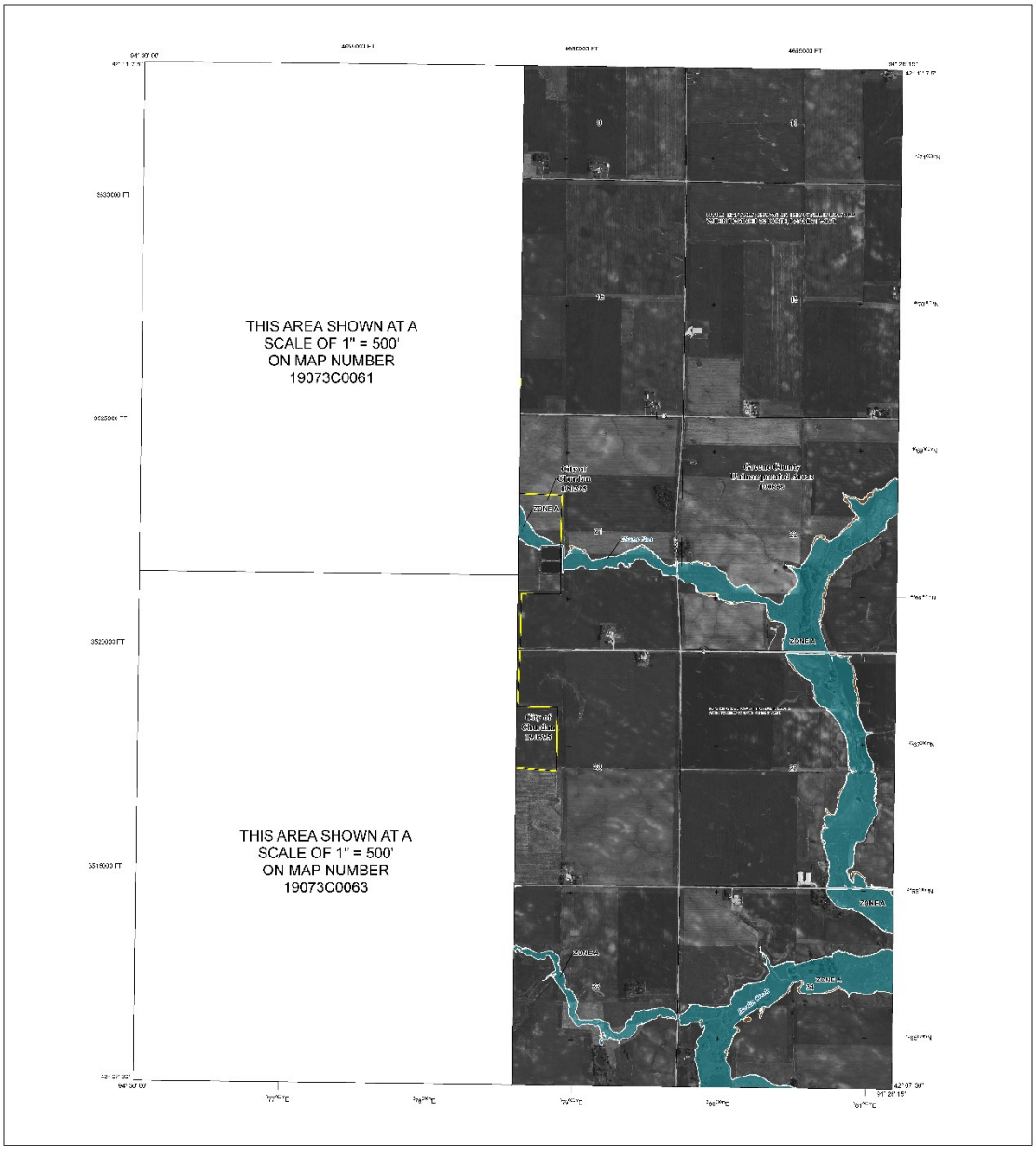
FEMA National Flood Insurance Program

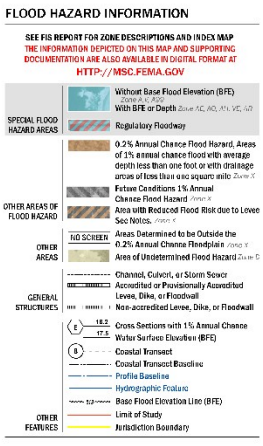
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

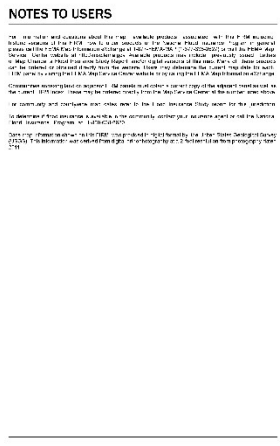
Greene County, Iowa
PANEL 63 OF 500

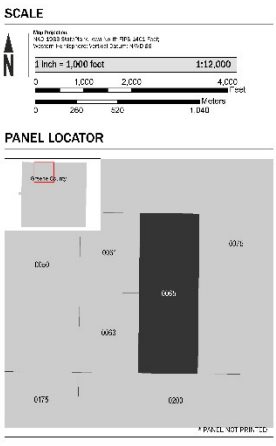
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CHURDAN, CITY OF	190336	0063	C

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0063C
EFFECTIVE DATE
APRIL 19, 2016

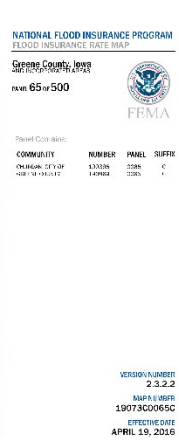

THIS AREA SHOWN AT A
SCALE OF 1" = 500'
ON MAP NUMBER
19073C0061
THIS AREA SHOWN AT A
SCALE OF 1" = 500'
ON MAP NUMBER
19073C0063
ZONE A
Beaver Creek
Bells Creek

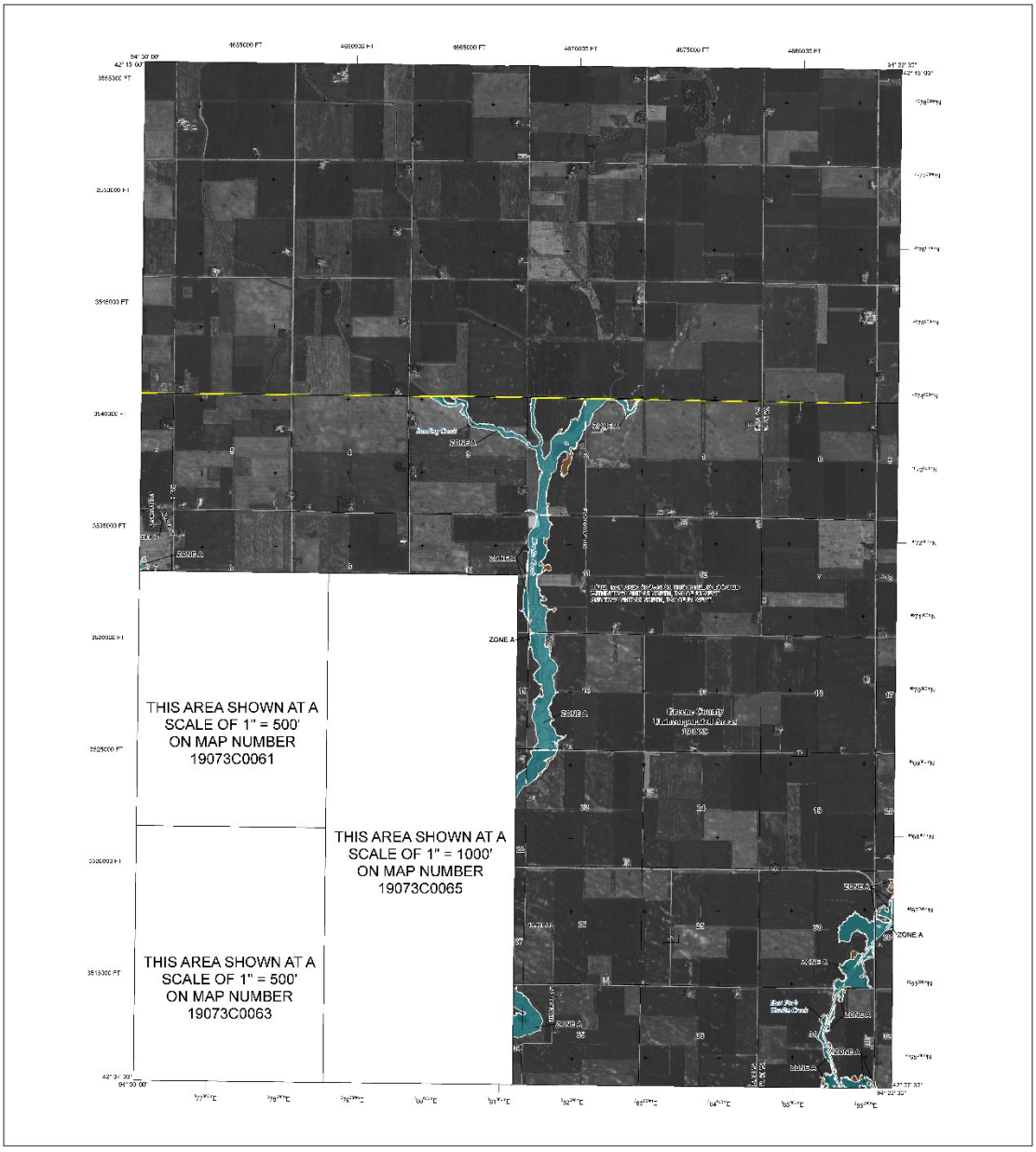

FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Flood Risk due to Levee
OTHER AREAS
NO SCREEN
Areas Determined to be Outside the 0.2% Annual Chance Floodplain
Area of Undetermined Flood Hazard
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Accredited or Provisionally Accredited Levee, Dike, or Floodwall
Non-accredited Levee, Dike, or Floodwall
Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
Coastal Transect
Coastal Transect Baseline
OTHER FEATURES
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
Limit of Study
Jurisdiction Boundary

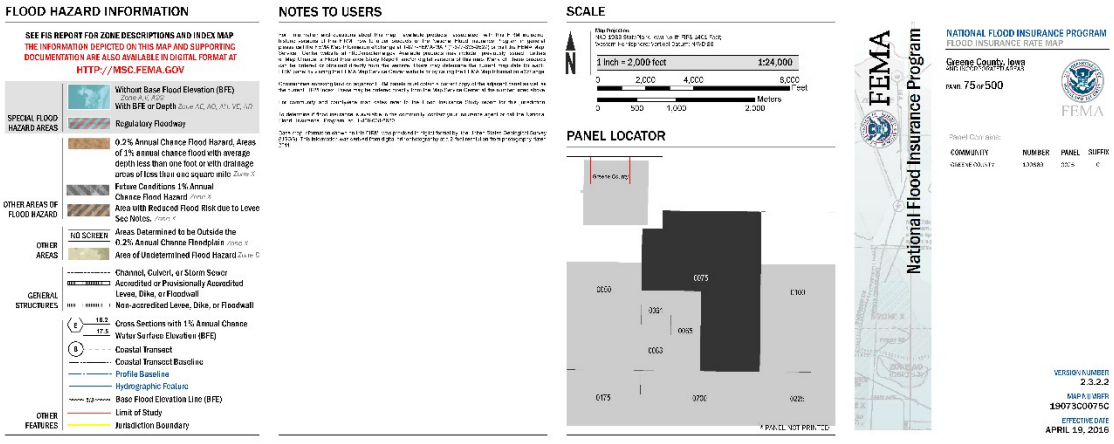

NOTES TO USERS

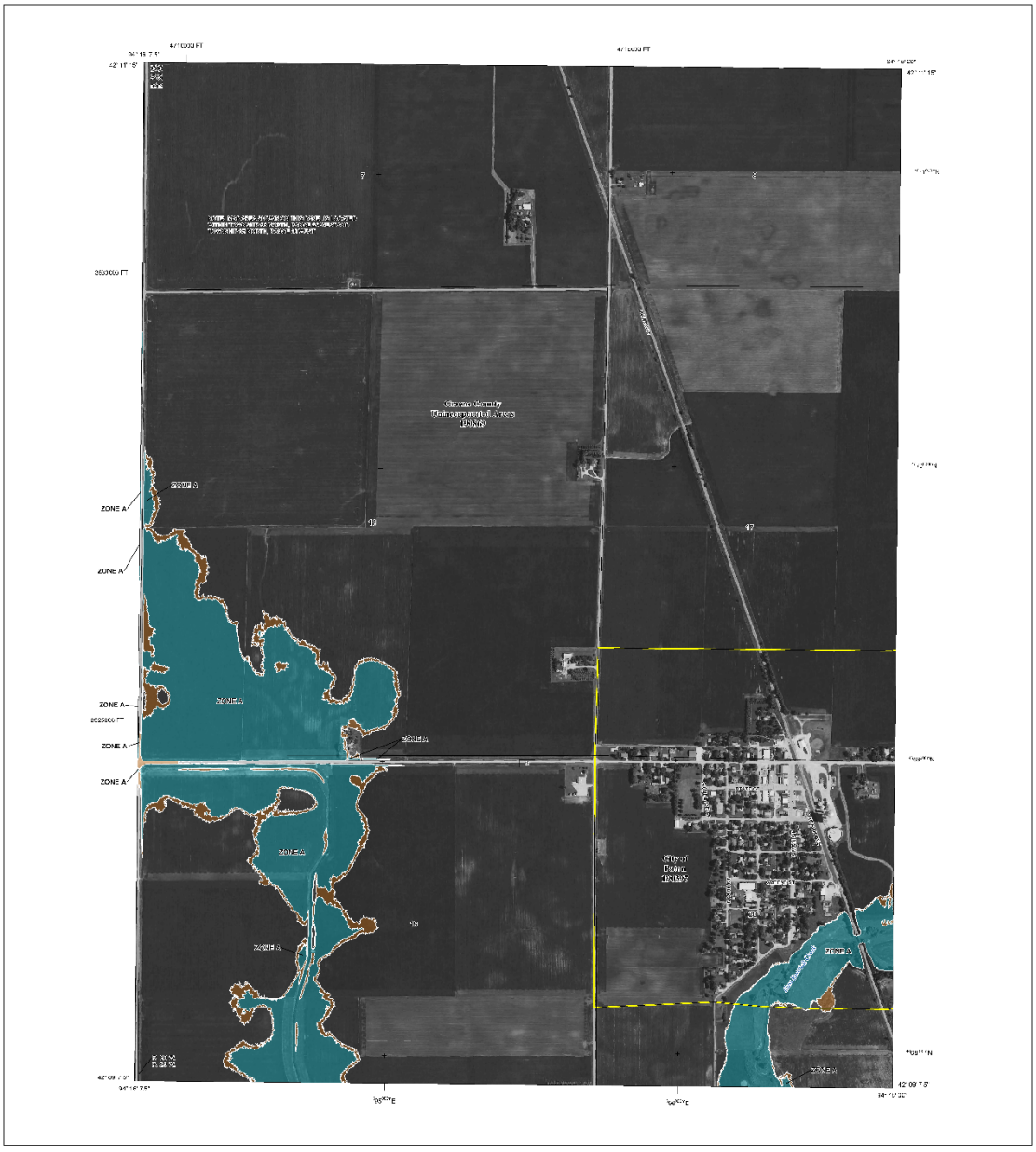

SCALE
1 inch = 1,000 feet
1:12,000
PANEL LOCATOR


FEMA
National Flood Insurance Program


NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
Greene County, Iowa
PANEL 65 OF 500
FEMA
COMMUNITY
NUMBER
PANEL
SUFFIX
VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0065C
EFFECTIVE DATE
APRIL 19, 2016


THIS AREA SHOWN AT A SCALE OF 1" = 500' ON MAP NUMBER 19073C0061
THIS AREA SHOWN AT A SCALE OF 1" = 1000' ON MAP NUMBER 19073C0065
THIS AREA SHOWN AT A SCALE OF 1" = 500' ON MAP NUMBER 19073C0063
ZONE A
Greene County Unincorporated Areas 190535


FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
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SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
Regulatory Floodway
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Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary
NOTES TO USERS
SCALE
1 inch = 2,000 feet
1:24,000
Meters
PANEL LOCATOR
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
Greene County, Iowa
PANEL 75 OF 500
FEMA
COMMUNITY
NUMBER
PANEL
SUFFIX
VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0075C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

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HTTP://MSC.FEMA.GOV

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- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

0002

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa

PANEL 92 OF 500

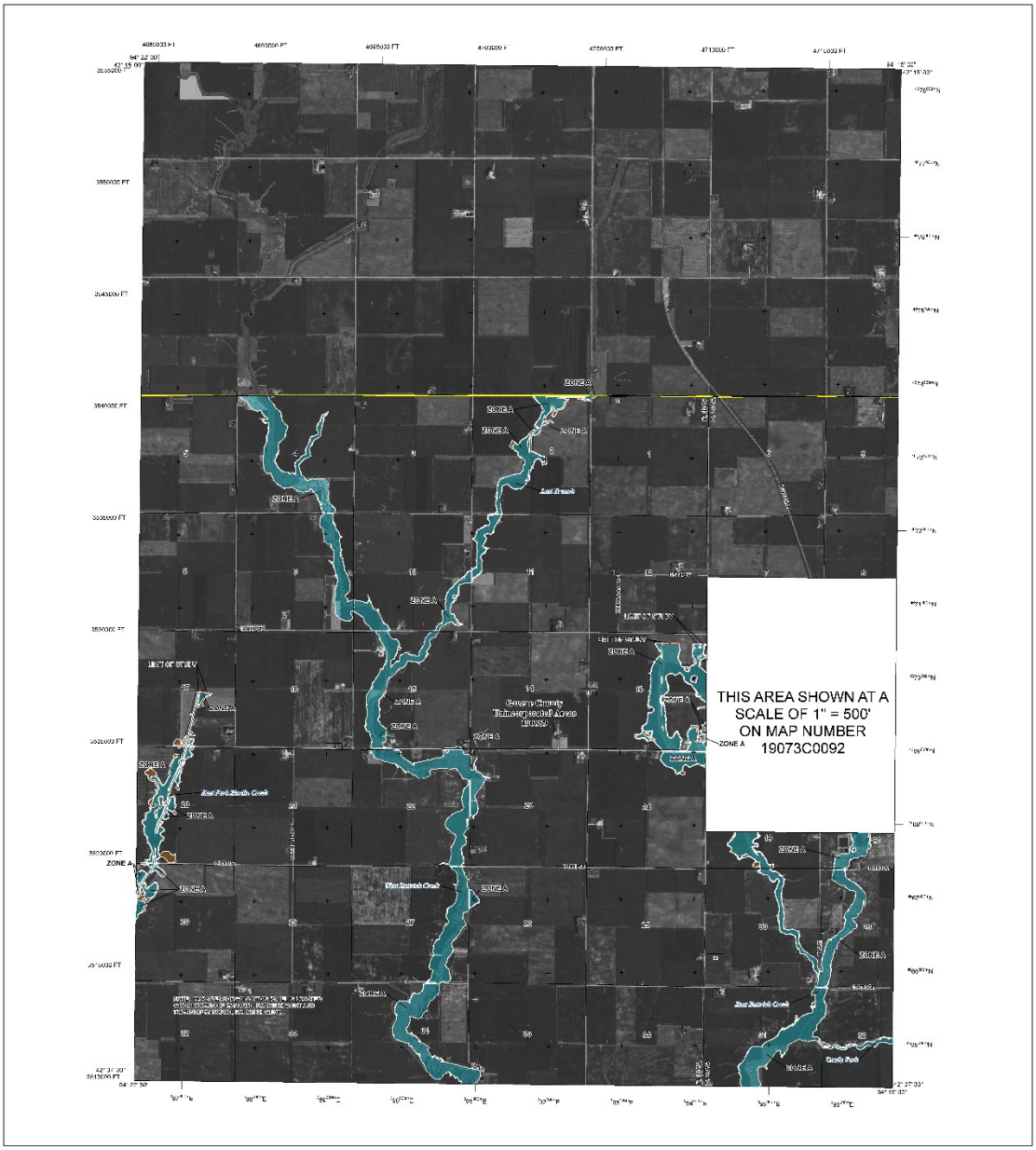
FEMA

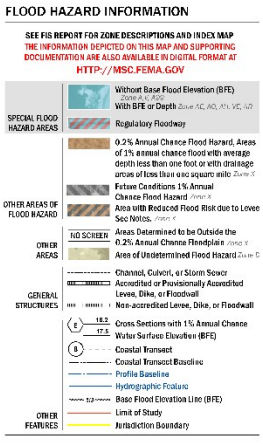
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GREENE COUNTY	190580	0092	C
DANA, CITY OF	190782	0092	C

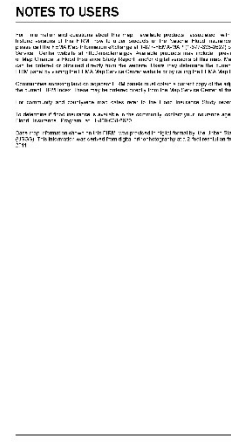
VERSION NUMBER
2.3.2.2

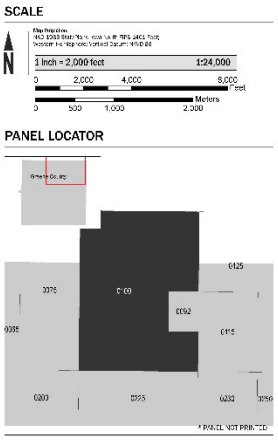
MAP NUMBER
19073C0092C

EFFECTIVE DATE
APRIL 19, 2016


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ZONE A
East Branch
East Fork Buttrick Creek
Buttrick Creek
Creek Park

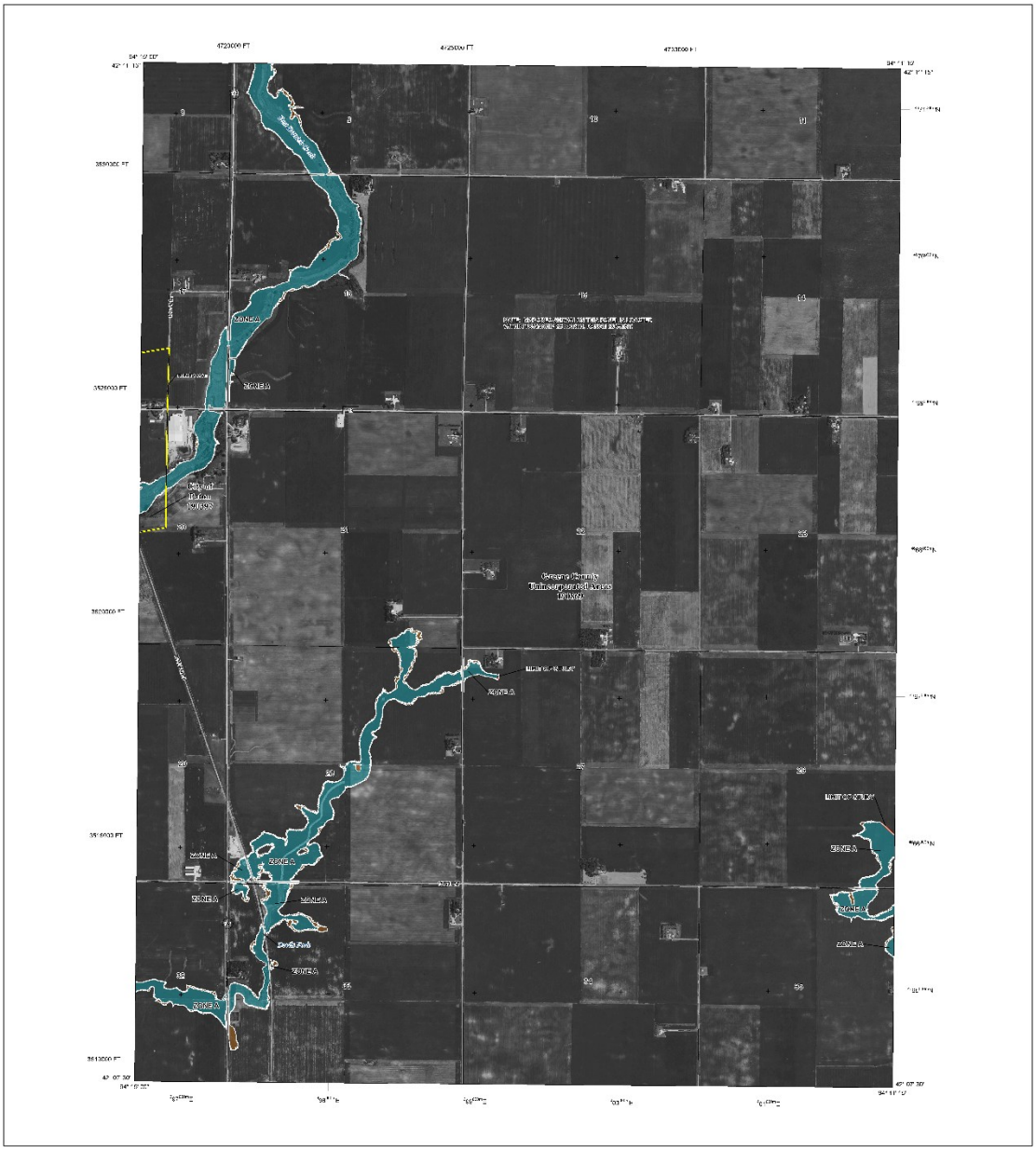

FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
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SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
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Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary


NOTES TO USERS


SCALE
1 inch = 2,000 feet
1:24,000
Meters
PANEL LOCATOR


FEMA
National Flood Insurance Program


NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
Greene County, Iowa
PANEL 100 OF 500
FEMA
COMMUNITY
NUMBER
PANEL
SUFFIX
VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0100C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

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- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 1,000 feet 1:12,000
0 1,000 2,000 4,000 Feet
0 260 520 1,040 Meters

PANEL LOCATOR

0062 0125 0075 0025 0050 0100

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas

PANEL 115 OF 500

FEMA

Panel Contains:

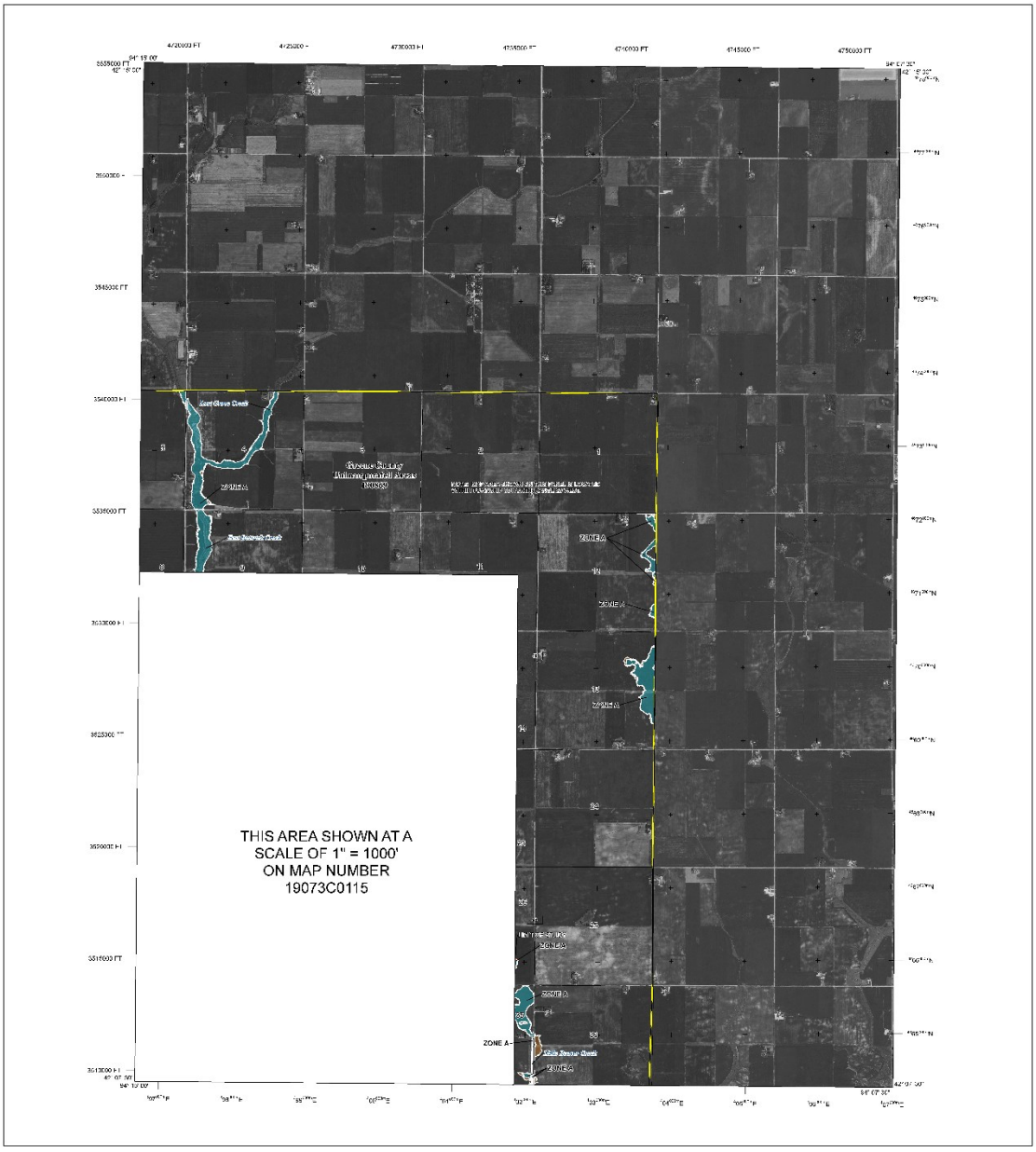
COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190080	0115	C
JEFFERSON, CITY OF	190081	0115	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0115C

EFFECTIVE DATE
APRIL 19, 2016

Greene County Hazard Mitigation Plan Appendix A- Rural Greene County



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 2,000 feet 1:24,000
0 2,000 4,000 8,000 Feet
0 500 1,000 2,000 Meters

PANEL LOCATOR

NOT PRINTED

FEMA National Flood Insurance Program

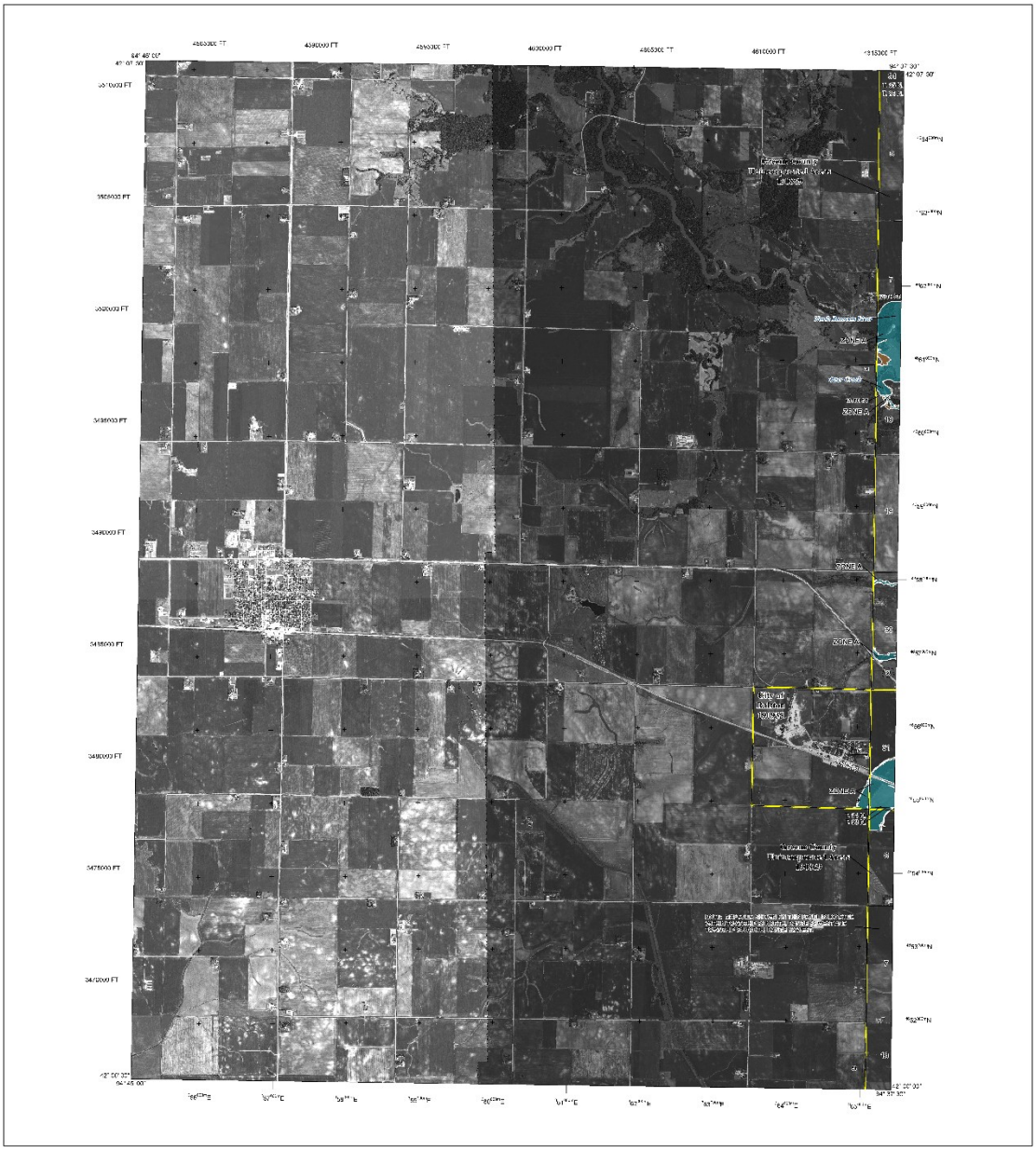
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

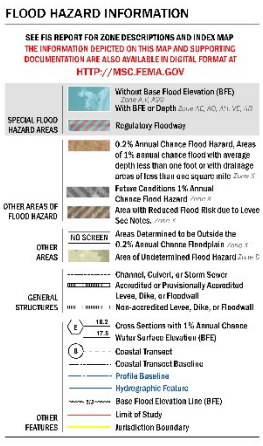
Greene County, Iowa
PANEL 125 OF 500

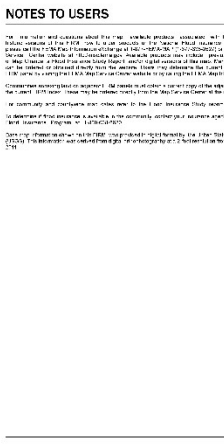
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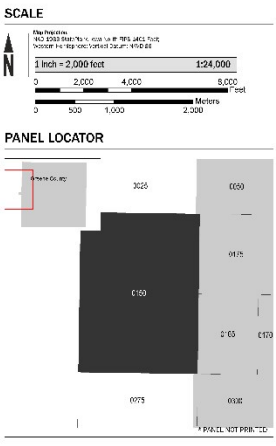
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GREENE COUNTY	190580	0125	C

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0125C
EFFECTIVE DATE
APRIL 19, 2016

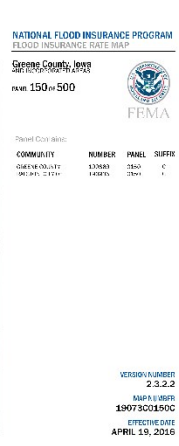


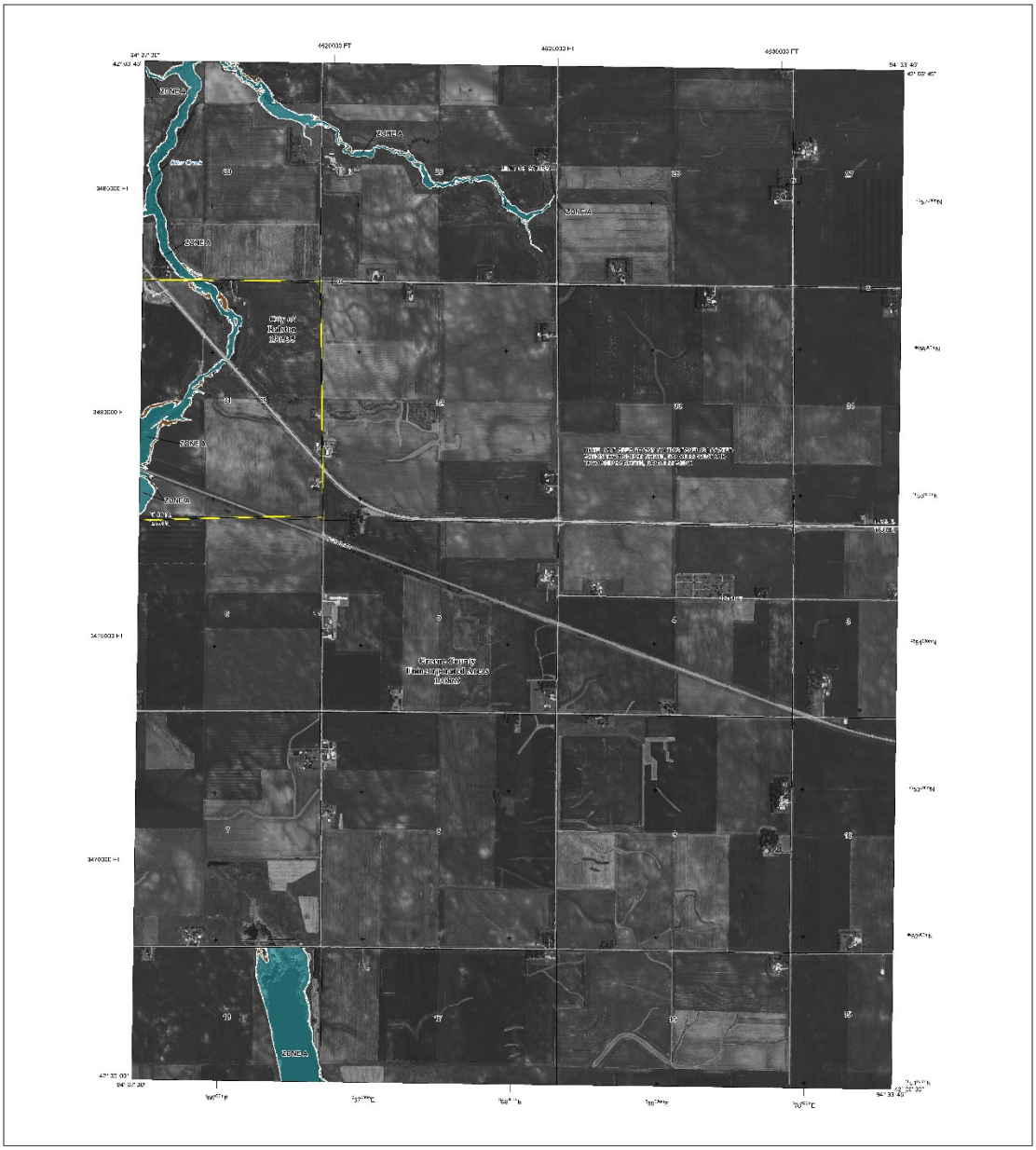

FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Flood Risk due to Levee
OTHER AREAS
NO SCREEN
Areas Determined to be Outside the 0.2% Annual Chance Floodplain
Area of Undetermined Flood Hazard
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Accredited or Provisionally Accredited Levee, Dike, or Floodwall
Non-accredited Levee, Dike, or Floodwall
Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary


NOTES TO USERS


SCALE
1 inch = 2,000 feet
1:24,000
Meters
PANEL LOCATOR


FEMA
National Flood Insurance Program


NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
Greene County, Iowa
PANEL 150 OF 500
FEMA
COMMUNITY
NUMBER
PANEL
SUFFIX
VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0150C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

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- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 1,000 feet 1:12,000
0 1,000 2,000 4,000 Feet
0 260 520 1,040 Meters

PANEL LOCATOR

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas
PANEL 165 OF 500

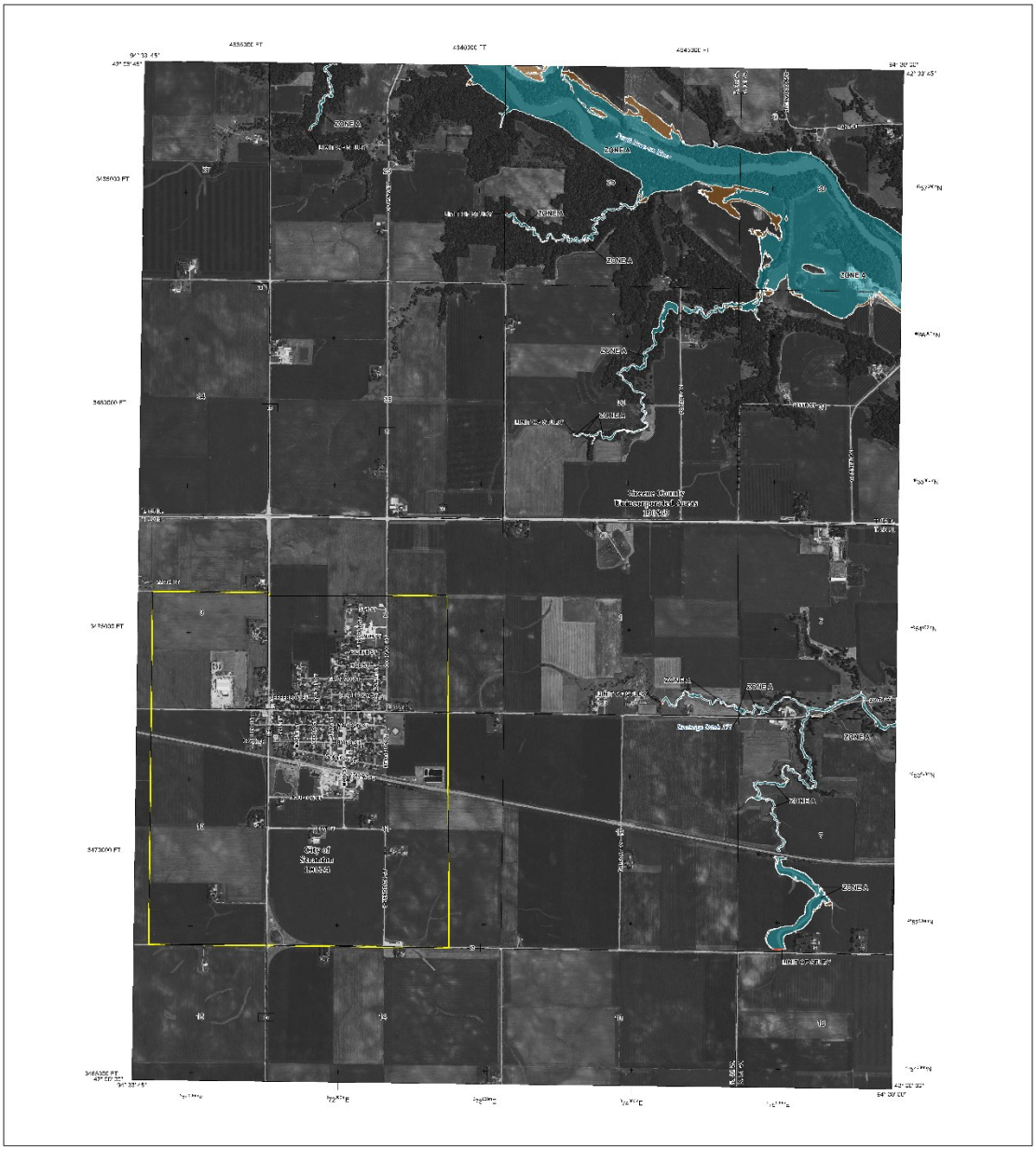
FEMA

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190680	0165	C
HAMLIN, CITY OF	190681	0165	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0165C

EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
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HTTP://MSC.FEMA.GOV

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- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 1,000 feet 1:12,000
0 1,000 2,000 4,000 Feet
0 260 520 1,040 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

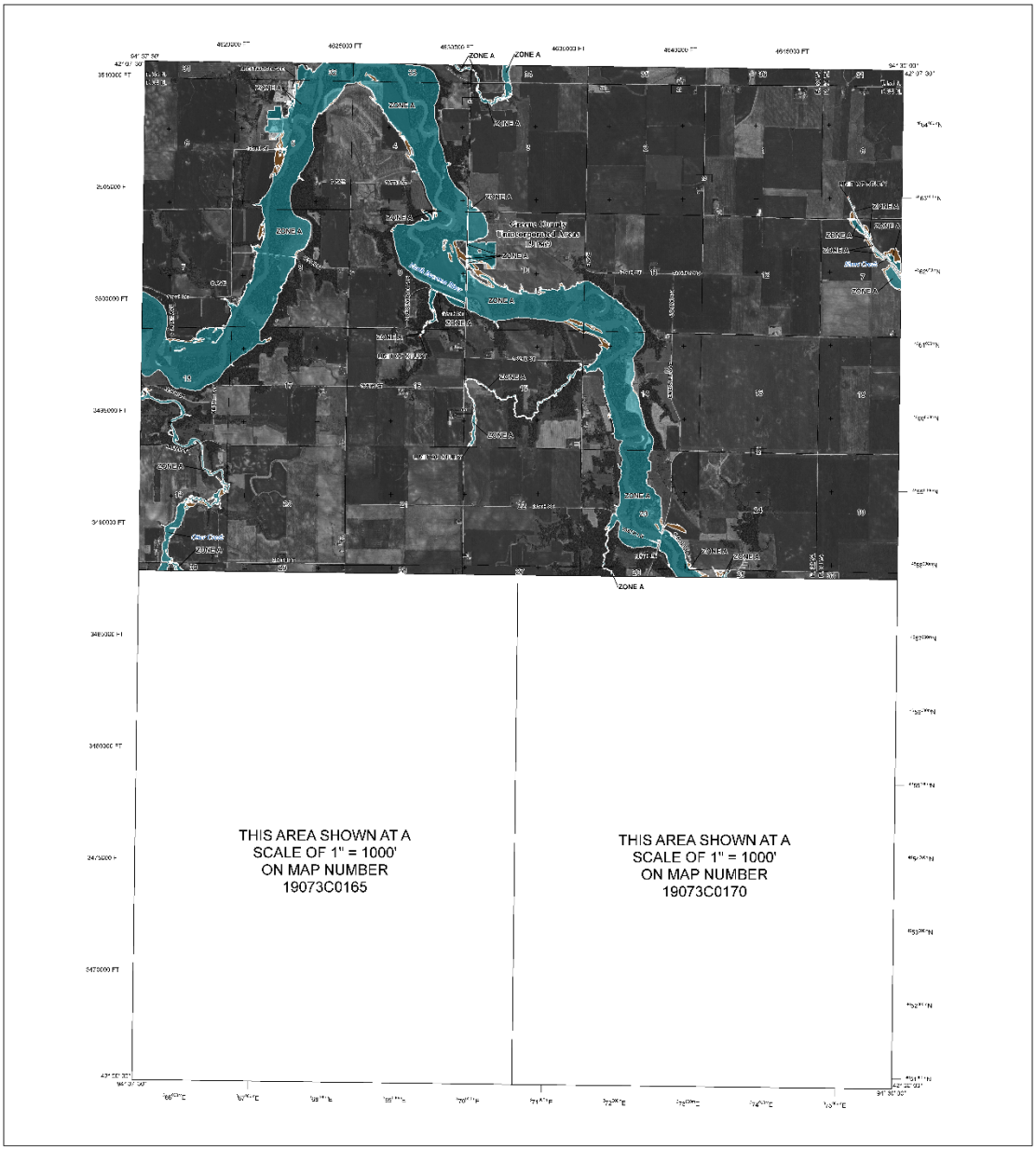
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
PANEL 170 OF 500

FEMA

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190683	0170	C
SCRANTON, CITY OF	190687	0170	C

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0170C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
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- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

N

1 inch = 2,000 feet 1:24,000

0 2,000 4,000 8,000 Feet

0 500 1,000 2,000 Meters

PANEL LOCATOR

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa

PANEL 175 OF 500

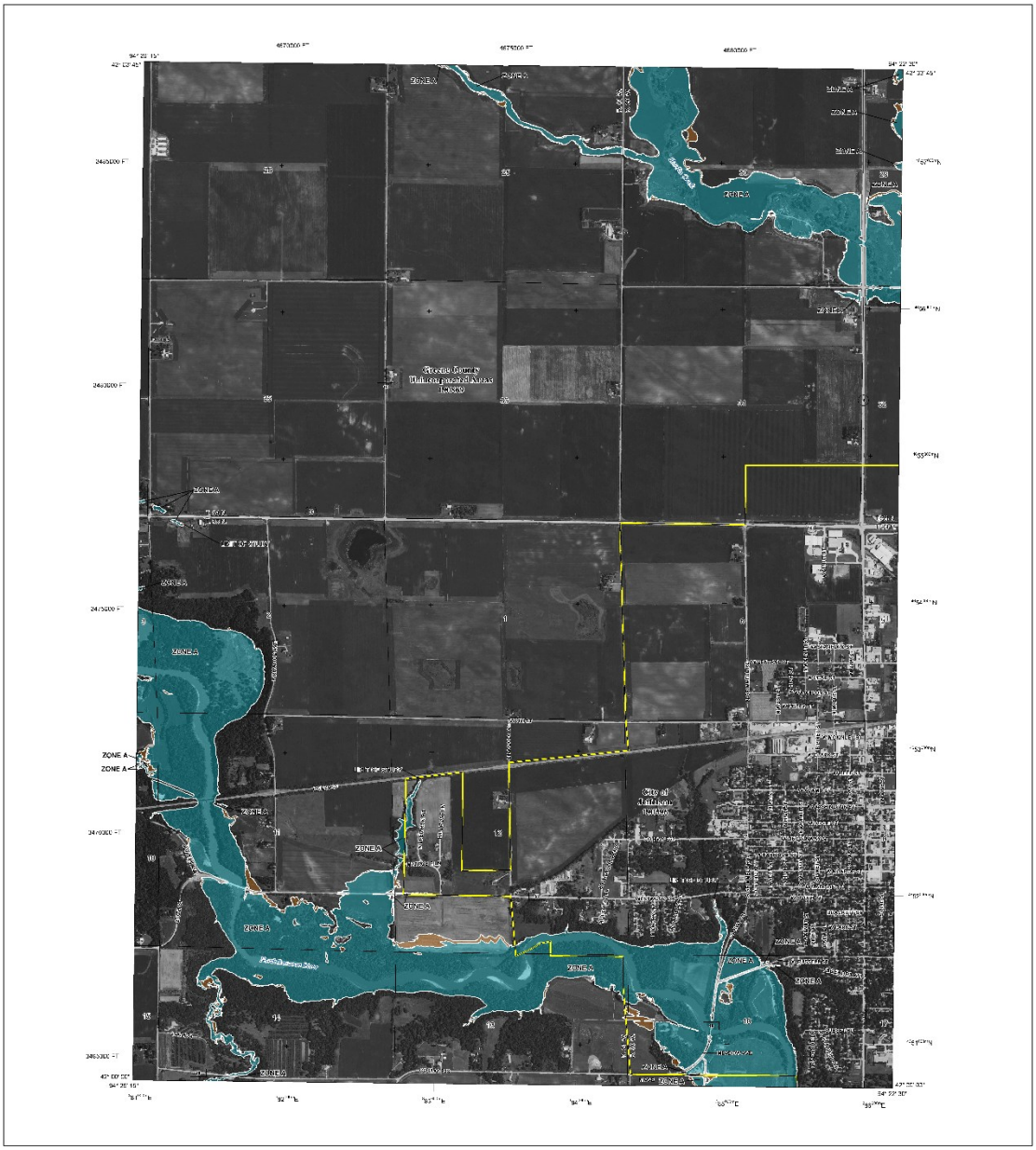
FEMA

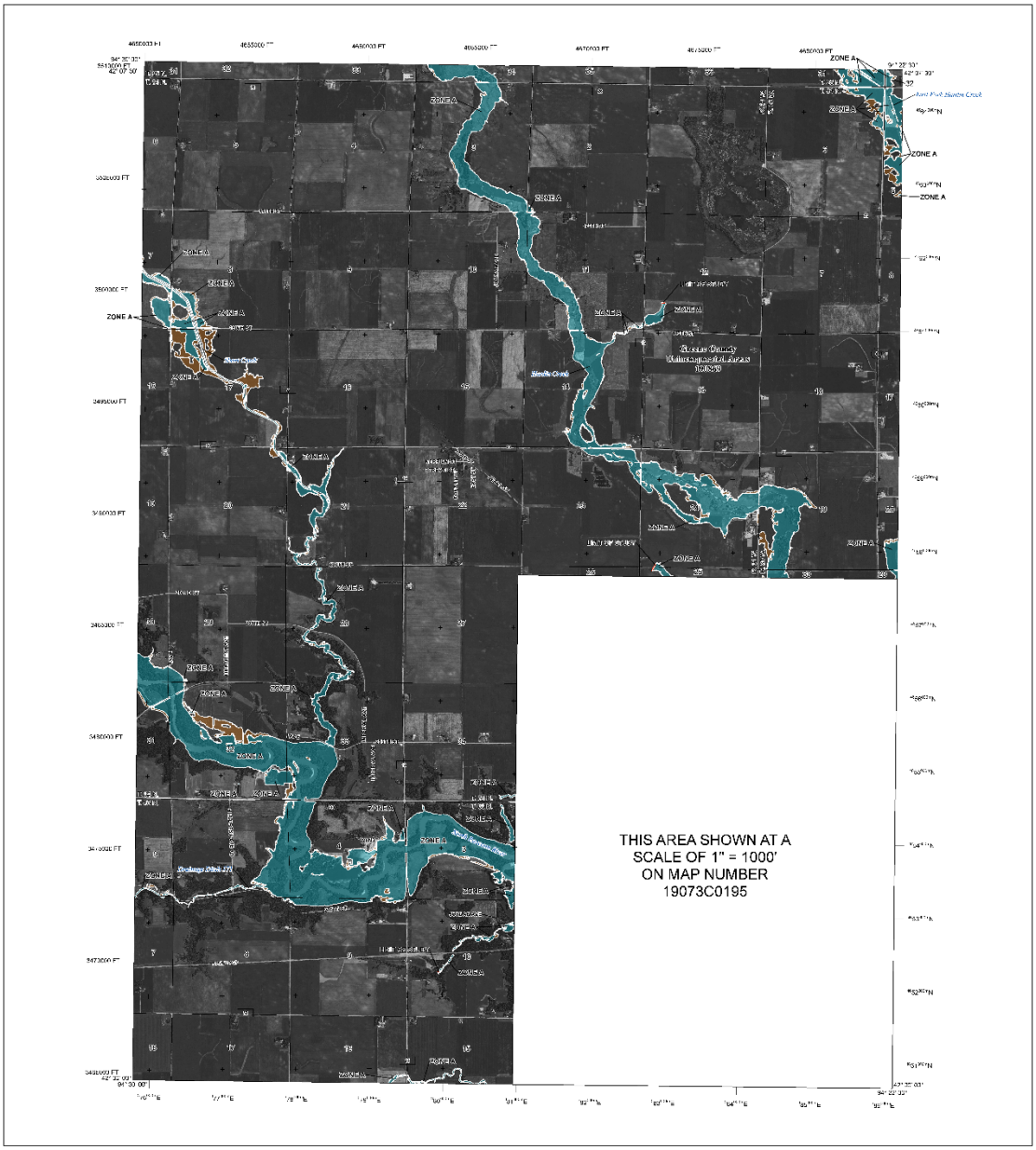
COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190680	0175	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0175C

EFFECTIVE DATE
APRIL 19, 2016


ZONE A
Greene County Unincorporated Areas
Iowa
City of Jefferson
Iowa
Floyd River
FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
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With BFE or Depth
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Areas Determined to be Outside the 0.2% Annual Chance Floodplain
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Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary
NOTES TO USERS
SCALE
1 inch = 1,000 feet
1:12,000
PANEL LOCATOR
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
Greene County, Iowa
PANEL 195 OF 500
FEMA
COMMUNITY
NUMBER
PANEL
SUFFIX
VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0195C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
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- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 2,000 feet 1:24,000
0 2,000 4,000 8,000 Feet
0 500 1,000 2,000 Meters

PANEL LOCATOR

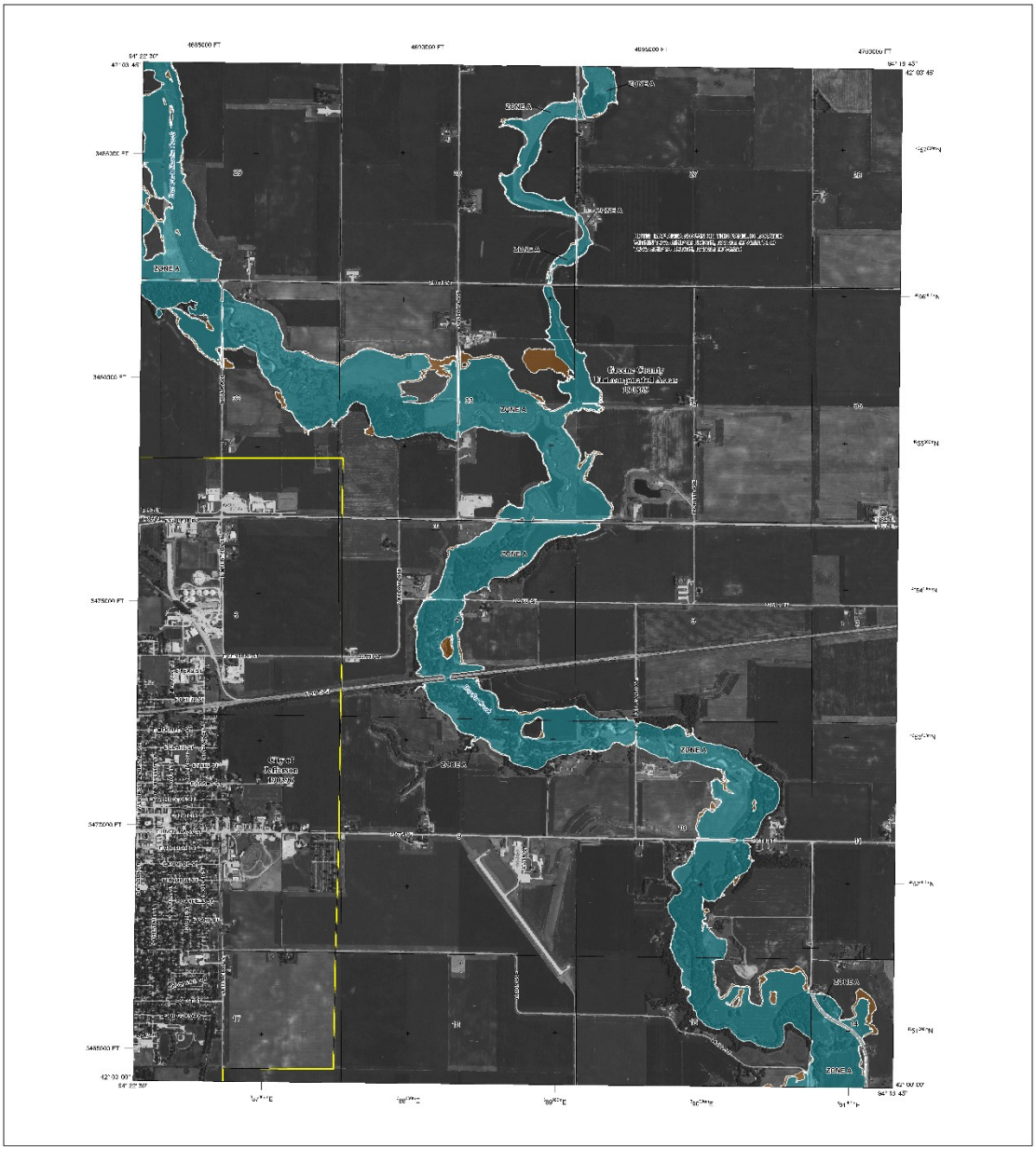
FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
PANEL 200 OF 500

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190580	0200	C

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0200C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

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OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 1,000 feet 1:12,000
0 1,000 2,000 4,000 Feet
0 260 520 1,040 Meters

PANEL LOCATOR

0225
0215
0220
0625
0650

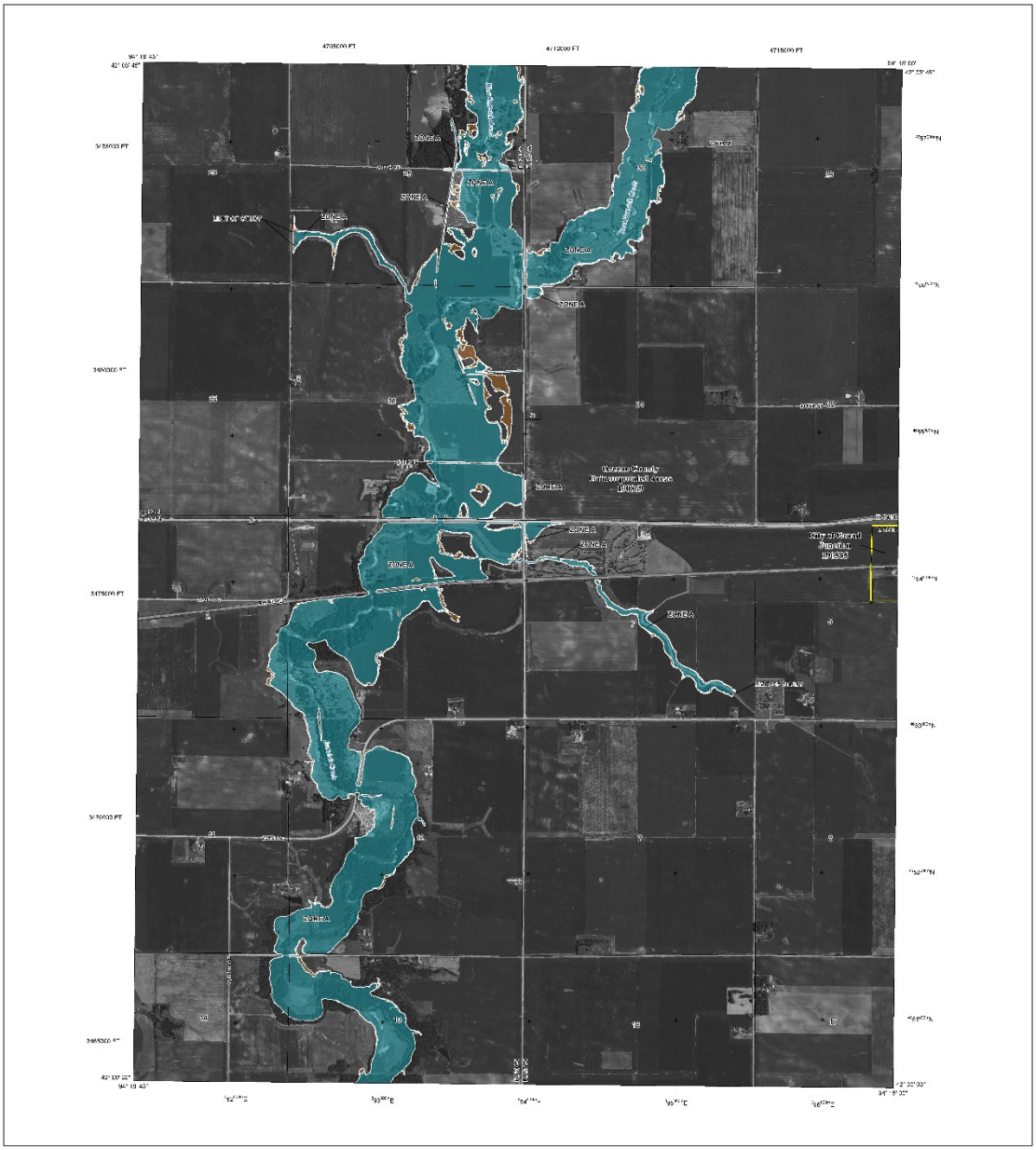
FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
PANEL 215 OF 500

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190580	0215	C
CITY OF JEFFERSON	190581	0215	C

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0215C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

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SPECIAL FLOOD HAZARD AREAS
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- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 1,000 feet 1:12,000
0 1,000 2,000 4,000 Feet
0 260 520 1,040 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

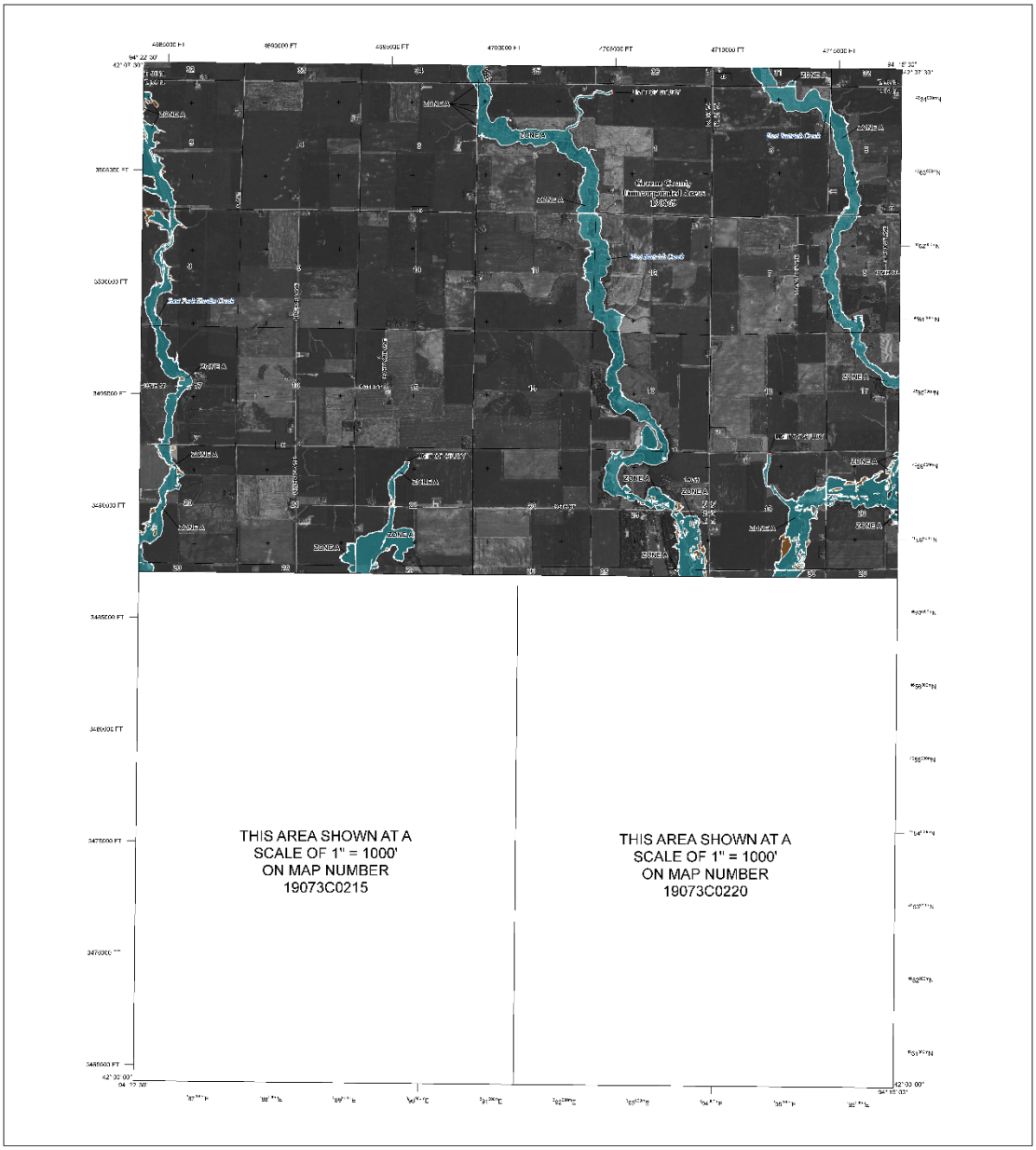
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

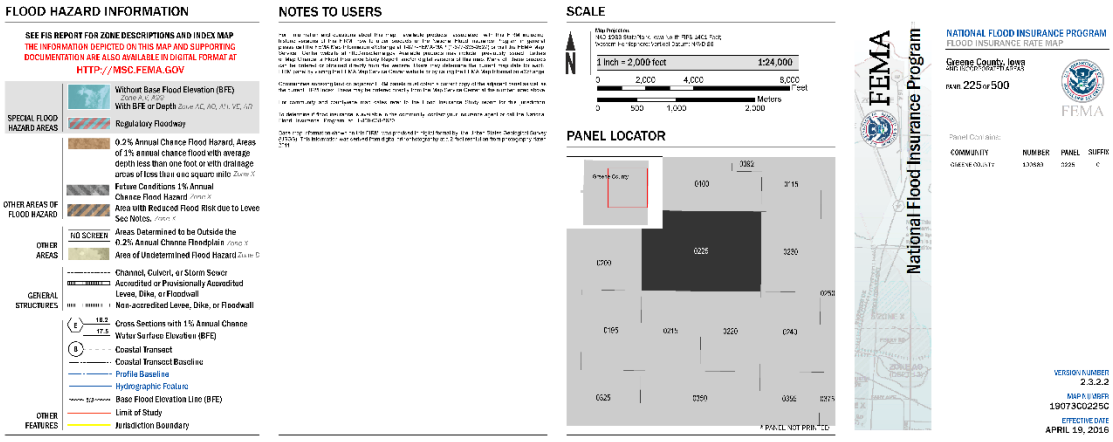
Greene County, Iowa
PANEL 220 OF 500

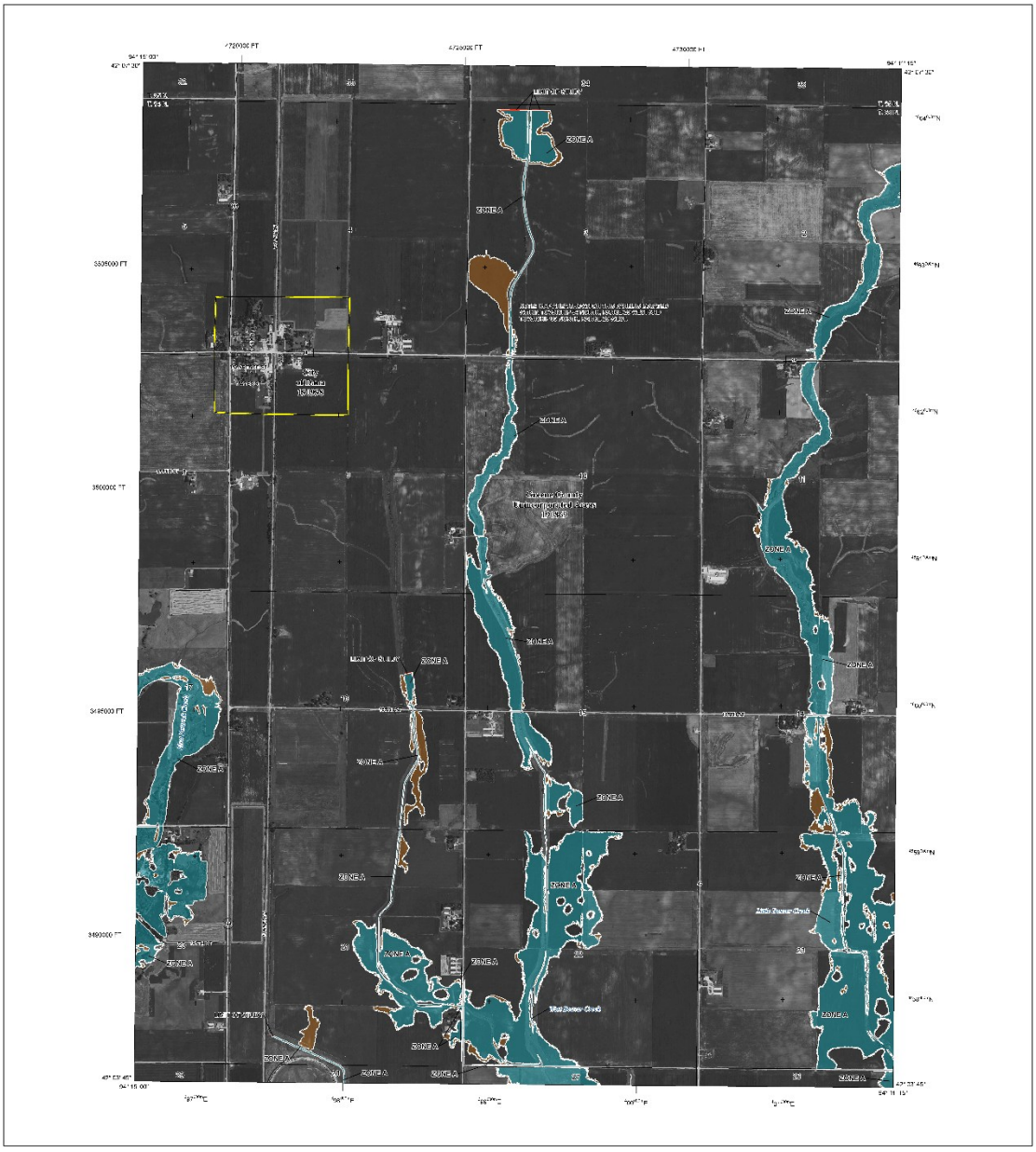
FEMA

COMMUNITY	NUMBER	PANEL	SUFFIX
[illegible]	190668	0220	C

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0220C
EFFECTIVE DATE
APRIL 19, 2016


THIS AREA SHOWN AT A
SCALE OF 1" = 1000'
ON MAP NUMBER
19073C0215
THIS AREA SHOWN AT A
SCALE OF 1" = 1000'
ON MAP NUMBER
19073C0220


FLOOD HAZARD INFORMATION
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SPECIAL FLOOD HAZARD AREAS
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Jurisdiction Boundary
NOTES TO USERS
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1 inch = 2,000 feet
1:24,000
Meters
PANEL LOCATOR
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
Greene County, Iowa
PANEL 225 OF 500
FIRMA
COMMUNITY
NUMBER
PANEL
SUFFIX
VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0225C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
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SCALE

1 inch = 1,000 feet 1:12,000
0 1,000 2,000 4,000 Feet
0 260 520 1,040 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

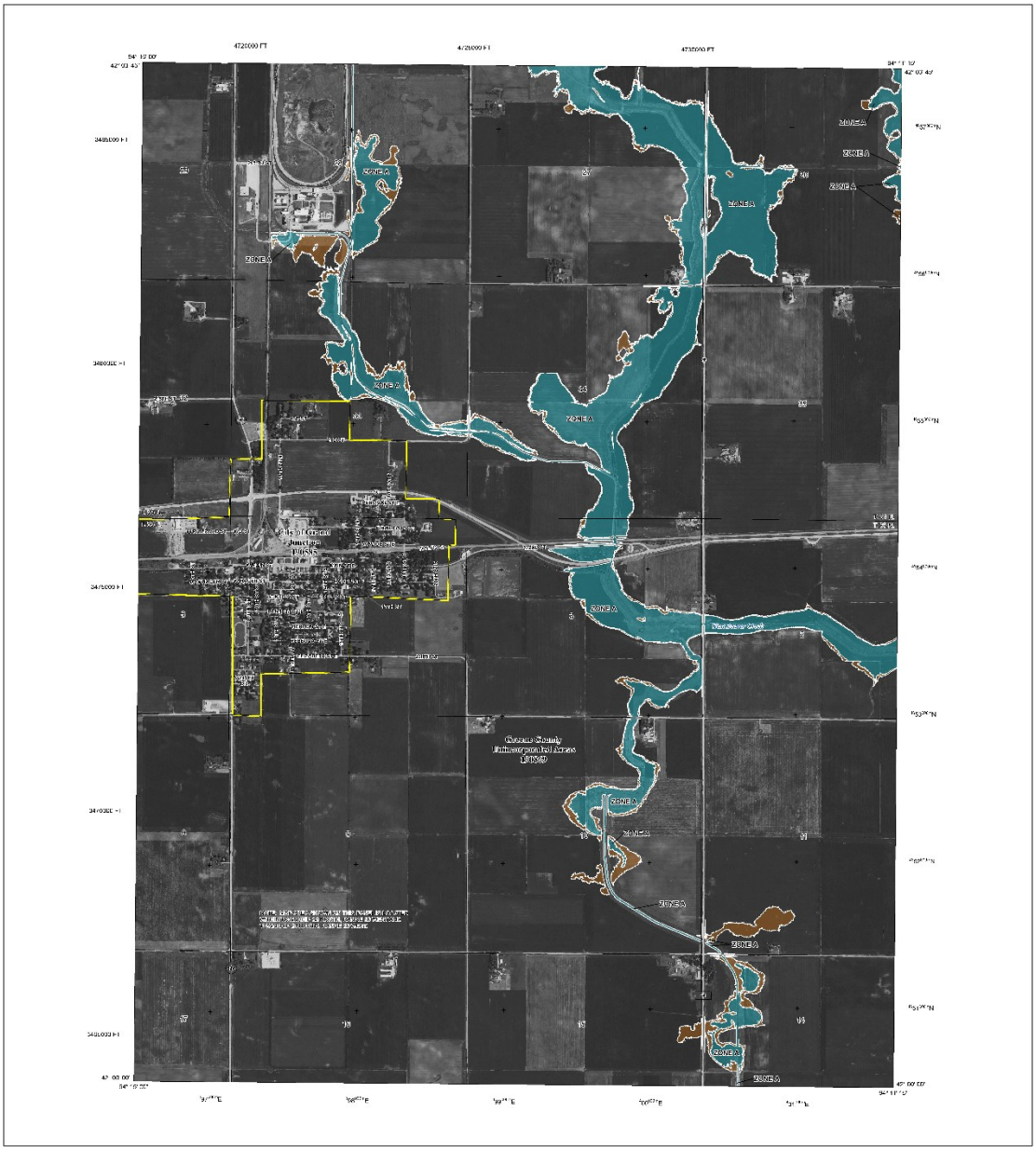
Greene County, Iowa
PANEL 230 OF 500

FEMA

COMMUNITY	NUMBER	PANEL	SUFFIX
[illegible]	[illegible]	[illegible]	[illegible]

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0230C
EFFECTIVE DATE
APRIL 19, 2016

Greene County Hazard Mitigation Plan Appendix A- Rural Greene County



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 1,000 feet 1:12,000
0 1,000 2,000 4,000 Feet
0 260 520 1,040 Meters

PANEL LOCATOR

C250 C240 C255

* PANEL NOT PRINTED

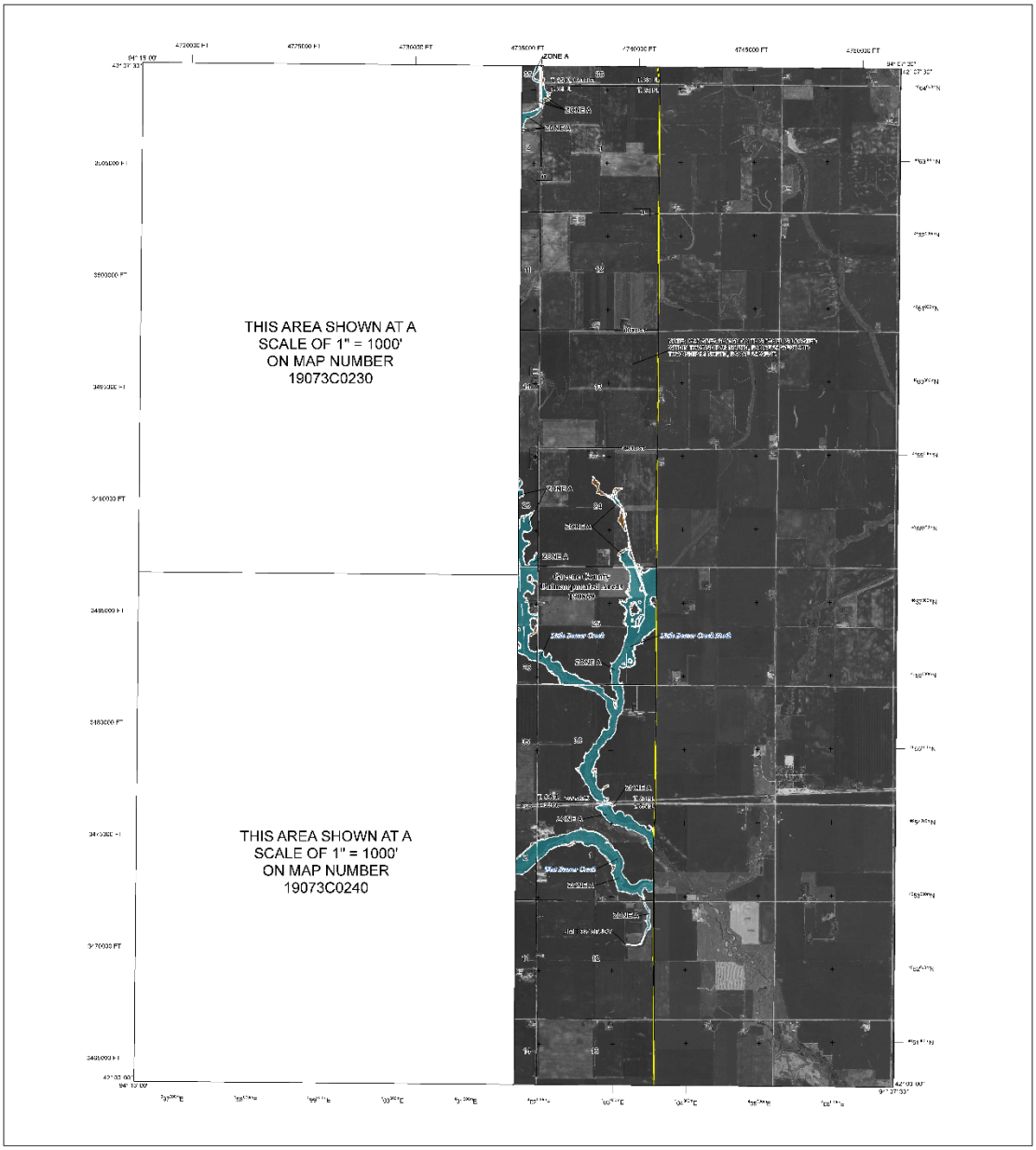
FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
PANEL 240 OF 500

COMMUNITY	NUMBER	PANEL	SUFFIX
[illegible]	190868	0240	C
[illegible]	190868	0255	C

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0240C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
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- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

N

1 inch = 2,000 feet 1:24,000

0 2,000 4,000 8,000 Feet

0 500 1,000 2,000 Meters

PANEL LOCATOR

0115 0125 0225 0250 0215 0220 0260 0050 0075

NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas

PANEL 250 OF 500

FEMA

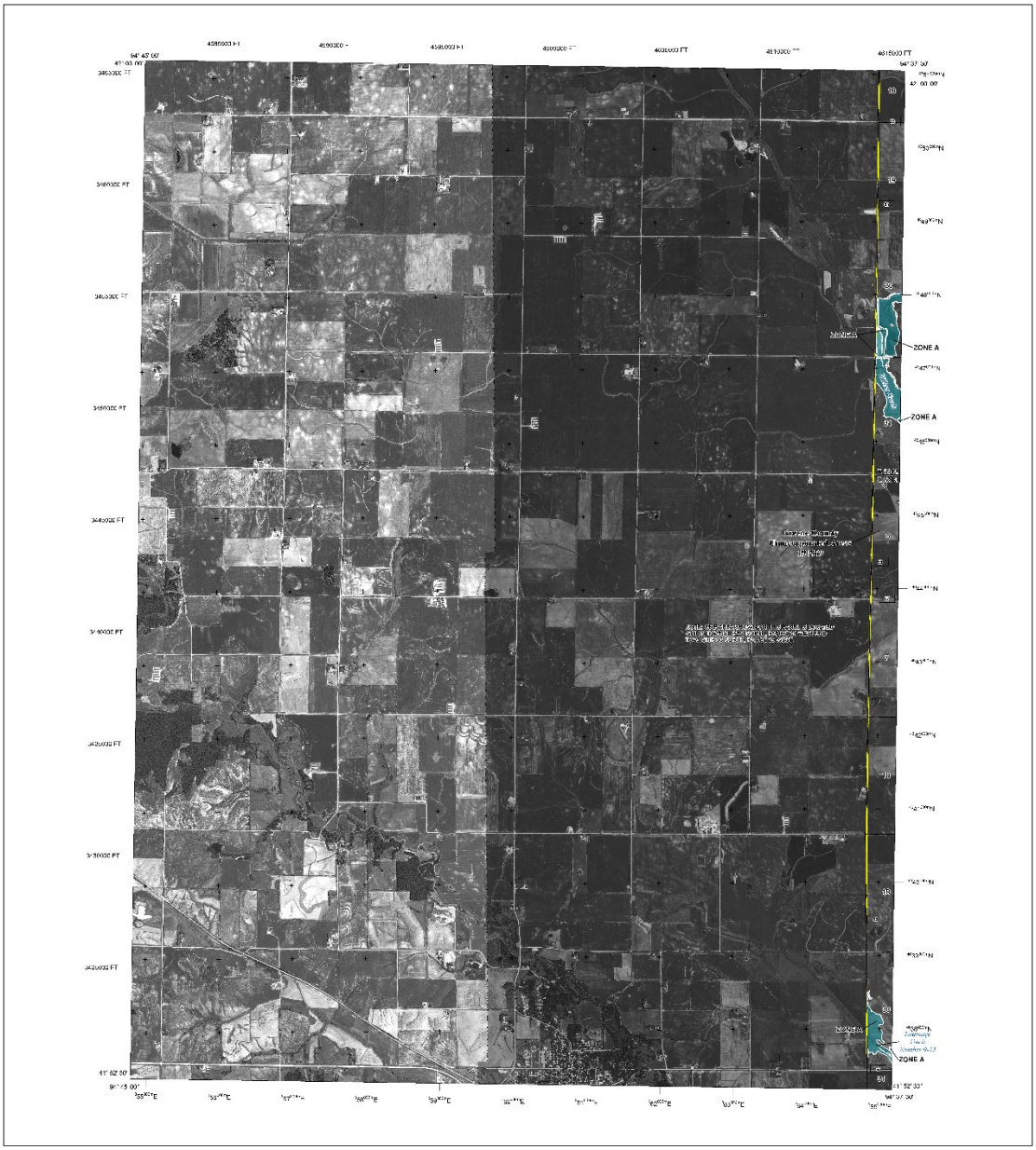
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GREENE COUNTY	190580	0250	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0250C

EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
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- Non-accredited Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 2,000 feet 1:24,000
0 2,000 4,000 8,000 Feet
0 500 1,000 2,000 Meters

PANEL LOCATOR

0150 0165 0275 0300 0400 0475

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas

PANEL 275 OF 500

FEMA

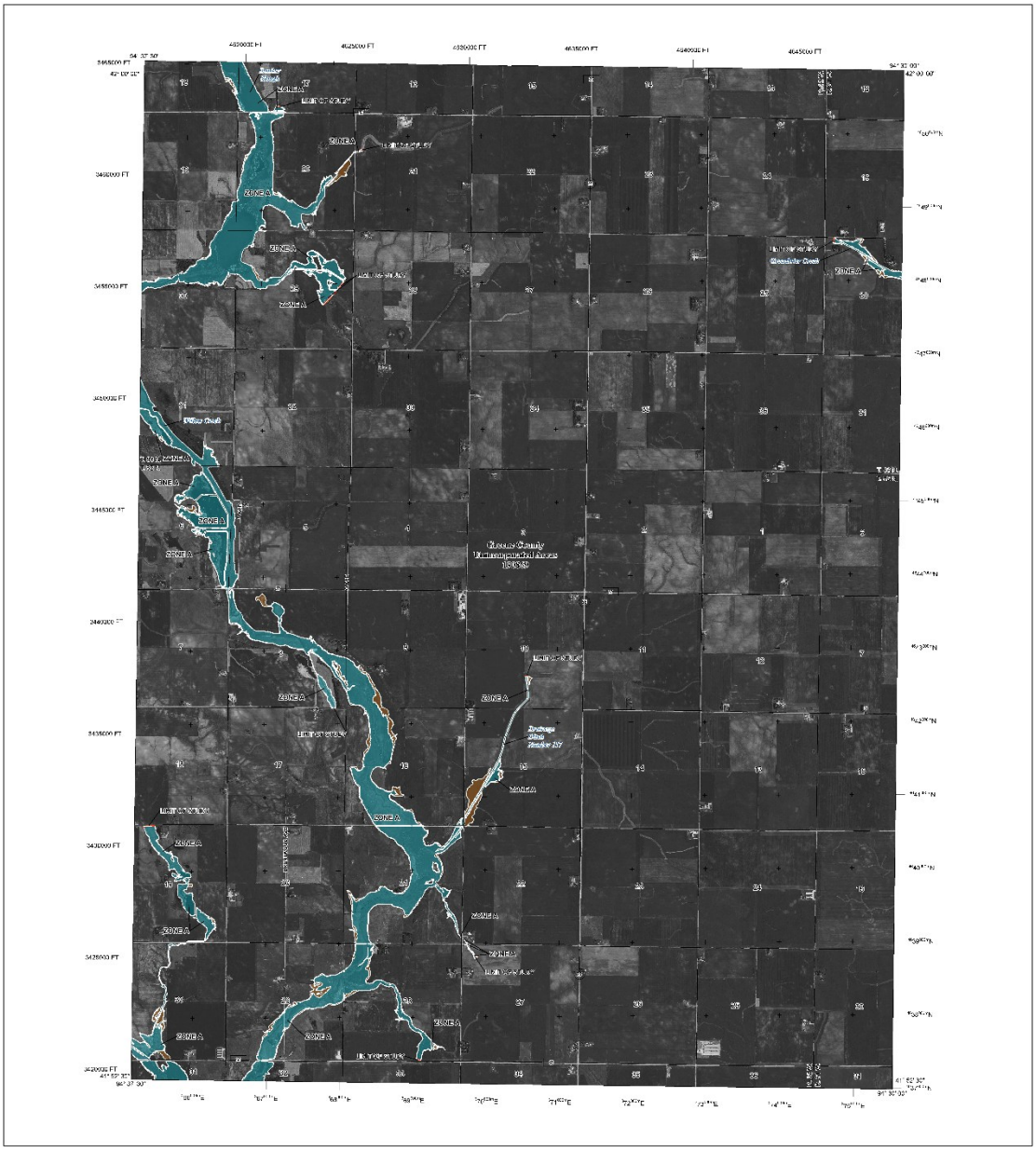
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GREENE COUNTY	190680	0275	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0275C

EFFECTIVE DATE
APRIL 19, 2016

Greene County Hazard Mitigation Plan Appendix A- Rural Greene County



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
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- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

N

1 inch = 2,000 feet 1:24,000
0 2,000 4,000 8,000 Feet
0 500 1,000 2,000 Meters

PANEL LOCATOR

0175 0300 0325

A PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas

PANEL 300 OF 500

FEMA

Panel Contains:

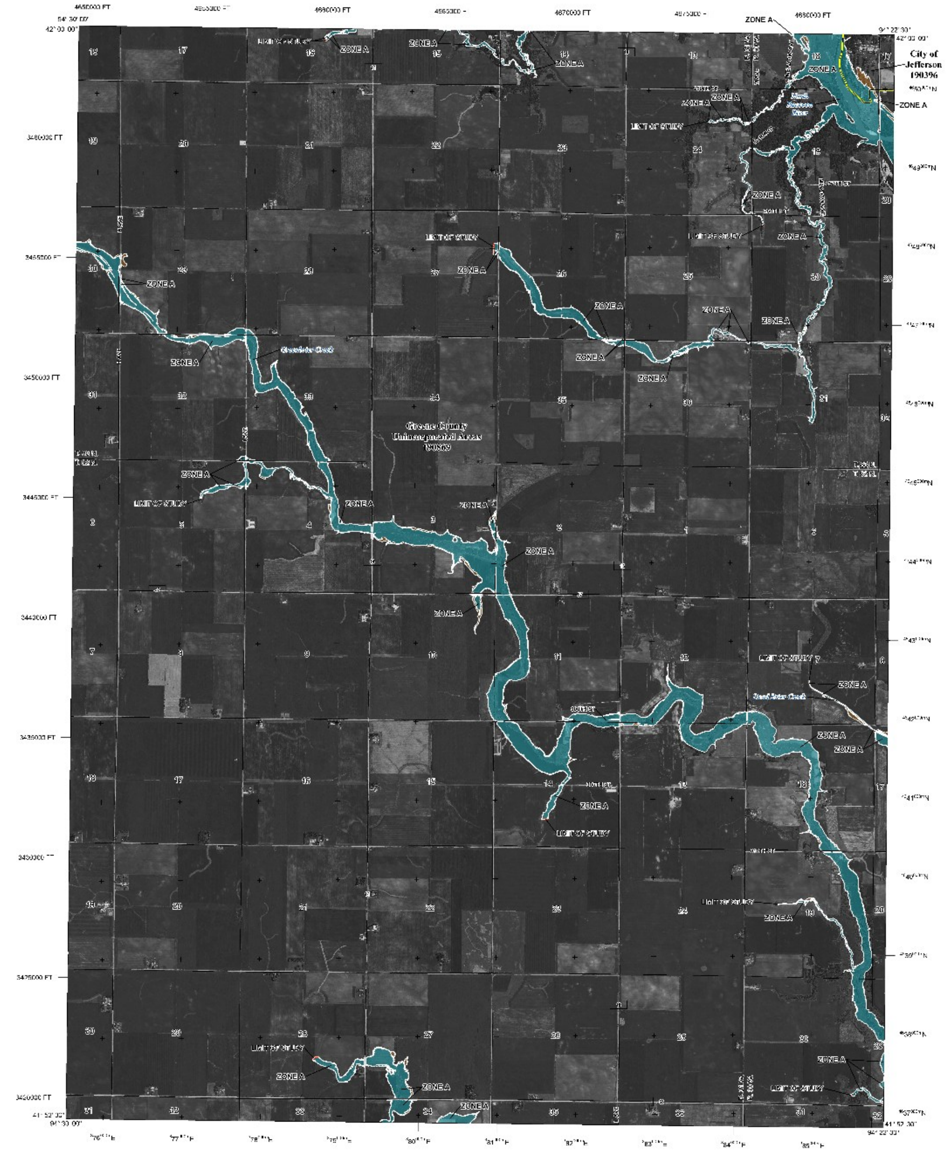
COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190830	0300	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0300C

EFFECTIVE DATE
APRIL 19, 2016

Greene County Hazard Mitigation Plan Appendix A- Rural Greene County



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) *Zone A, V, A99* With BFE or Depth *Zone AE, AO, AH, VE, AR*
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
		Future Conditions 1% Annual Chance Flood Hazard *Zone X*
		Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
OTHER AREAS	NO SCREEN	Areas Determined to be Outside the 0.2% Annual Chance Floodplain *Zone X*
		Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Accredited or Provisionally Accredited Levee, Dike, or Floodwall
		Non-accredited Levee, Dike, or Floodwall
OTHER FEATURES	E 18.2 17.5	Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	B	Coastal Transect
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
	513	Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary

NOTES TO USERS

SCALE

Map Projection:
NAD 1983 StatePlane Iowa North FIPS 1401 Feet;
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 2,000 feet 1:24,000

0 2,000 4,000 8,000 Feet

0 500 1,000 2,000 Meters

PANEL LOCATOR



* PANEL NOT PRINTED

FEMA
National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
AND INCORPORATED AREAS

PANEL 325 OF 500

FEMA

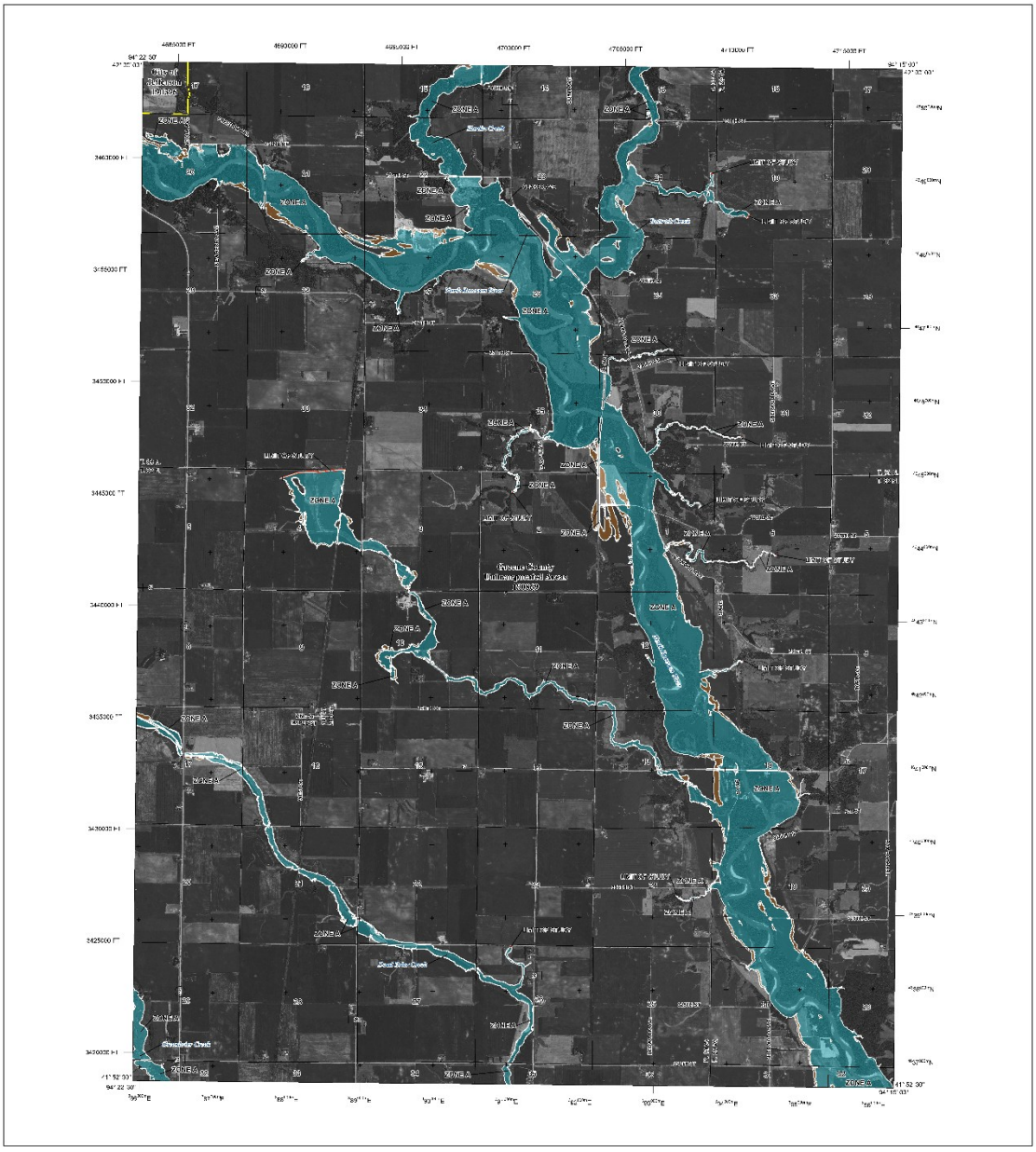
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GREENE COUNTY	190880	0325	C
JEFFERSON, CITY OF	190396	0325	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0325C

EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
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- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
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- Non-accredited Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

N

1 inch = 2,000 feet 1:24,000
0 2,000 4,000 8,000 Feet
0 500 1,000 2,000 Meters

PANEL LOCATOR

0215 0220 0340
0305
0360
0325
0345
0365
0450 0475 0500

A PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas

PANEL 350 OF 500

FEMA

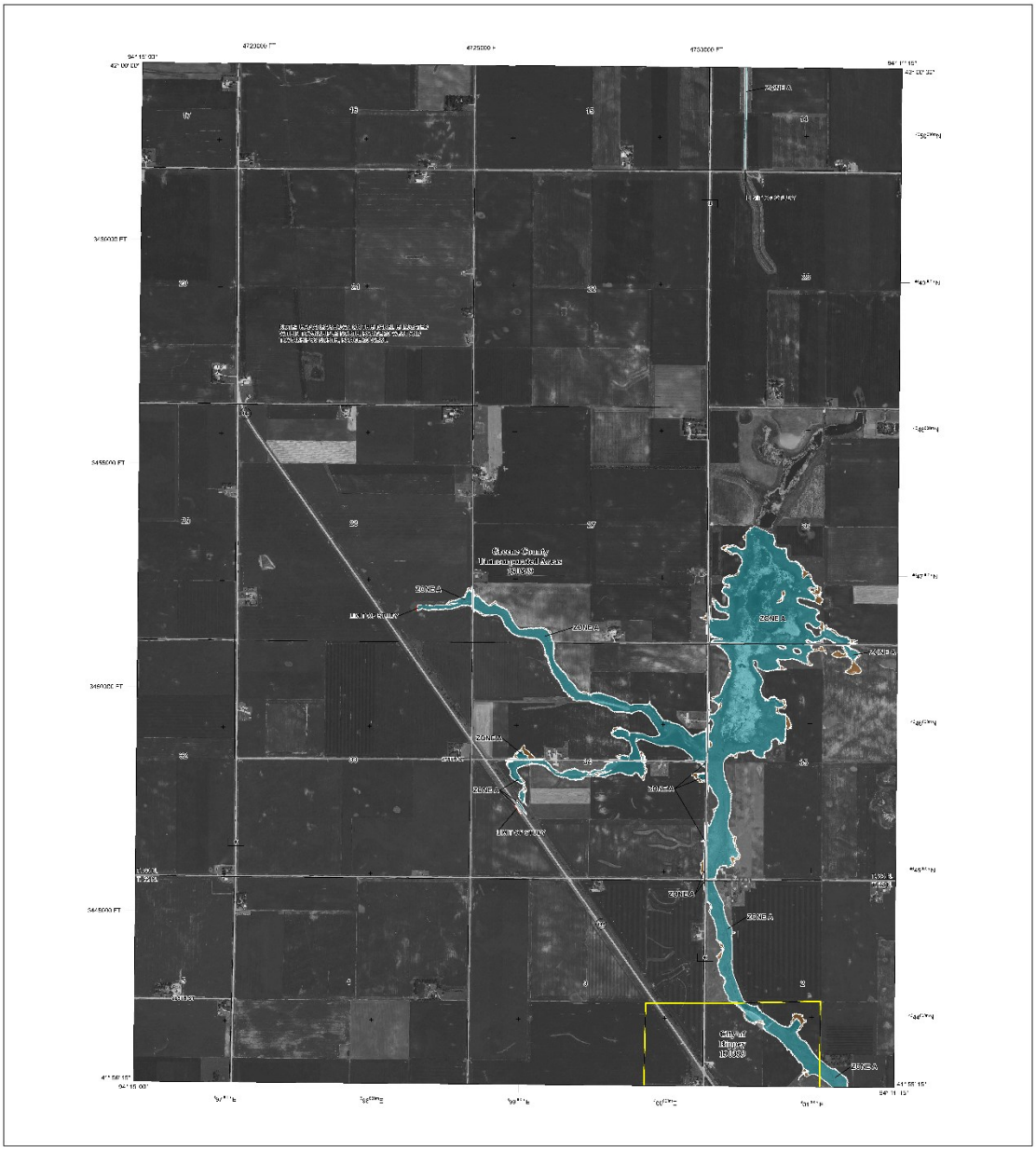
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GREENE COUNTY	190580	0350	C
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VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0350C

EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
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- Area with Reduced Flood Risk due to Levee See Notes. Zone X

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- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 1,000 feet 1:12,000
0 1,000 2,000 4,000 Feet
0 260 520 1,040 Meters

PANEL LOCATOR

C240 0240
C355 0355 0375
C365 0365

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

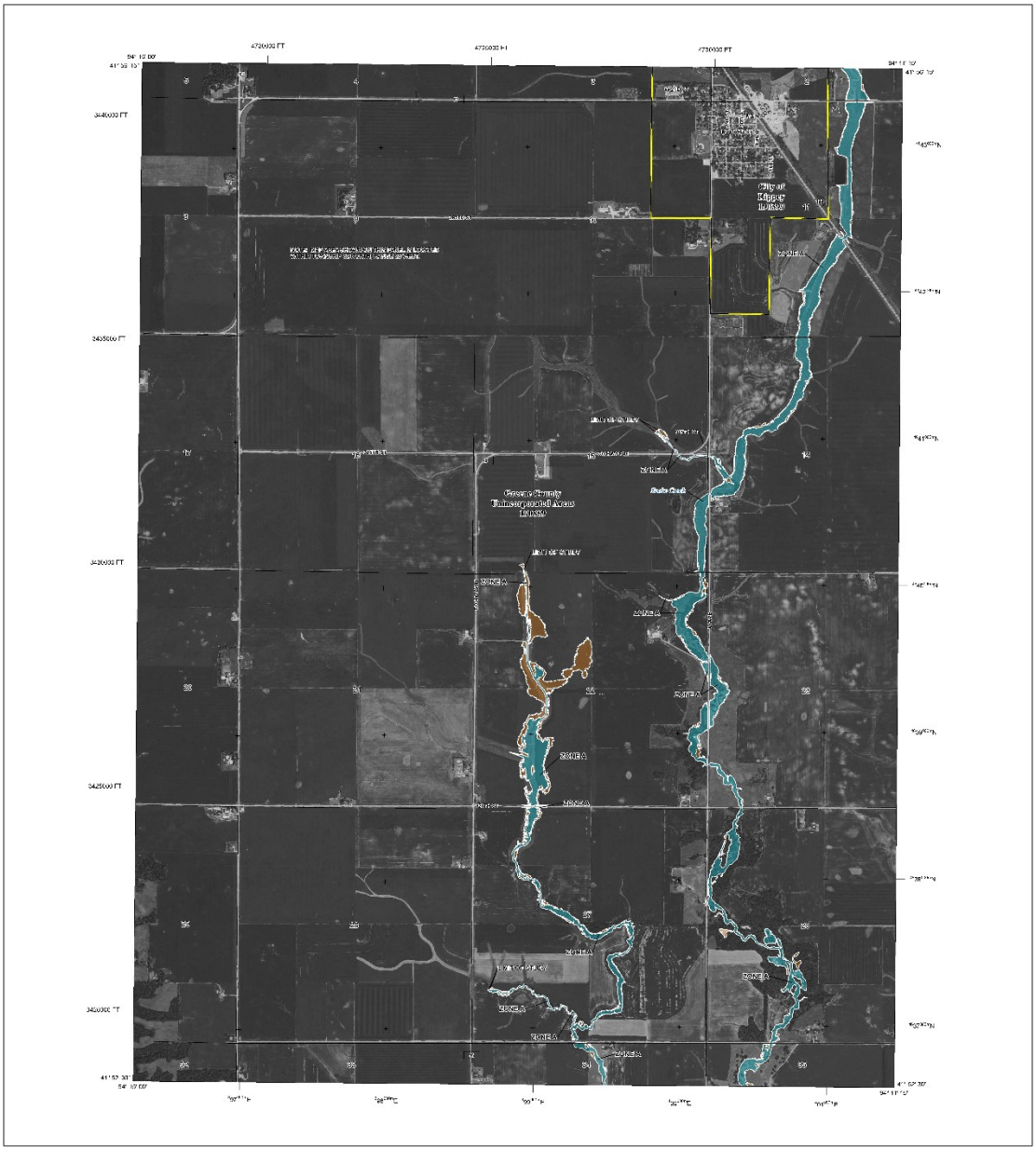
Greene County, Iowa
and Incorporated Areas
PANEL 355 OF 500

FEMA

Panel Contains:

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GREENE COUNTY	190730	0355	C
[illegible]	190744	0355	C

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0355C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
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GENERAL STRUCTURES
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- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 1,000 feet 1:12,000
0 1,000 2,000 4,000 Feet
0 260 520 1,040 Meters

PANEL LOCATOR

0365 0360 0375 0380 0500

APPROX. NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas
PANEL 365 OF 500

FEMA

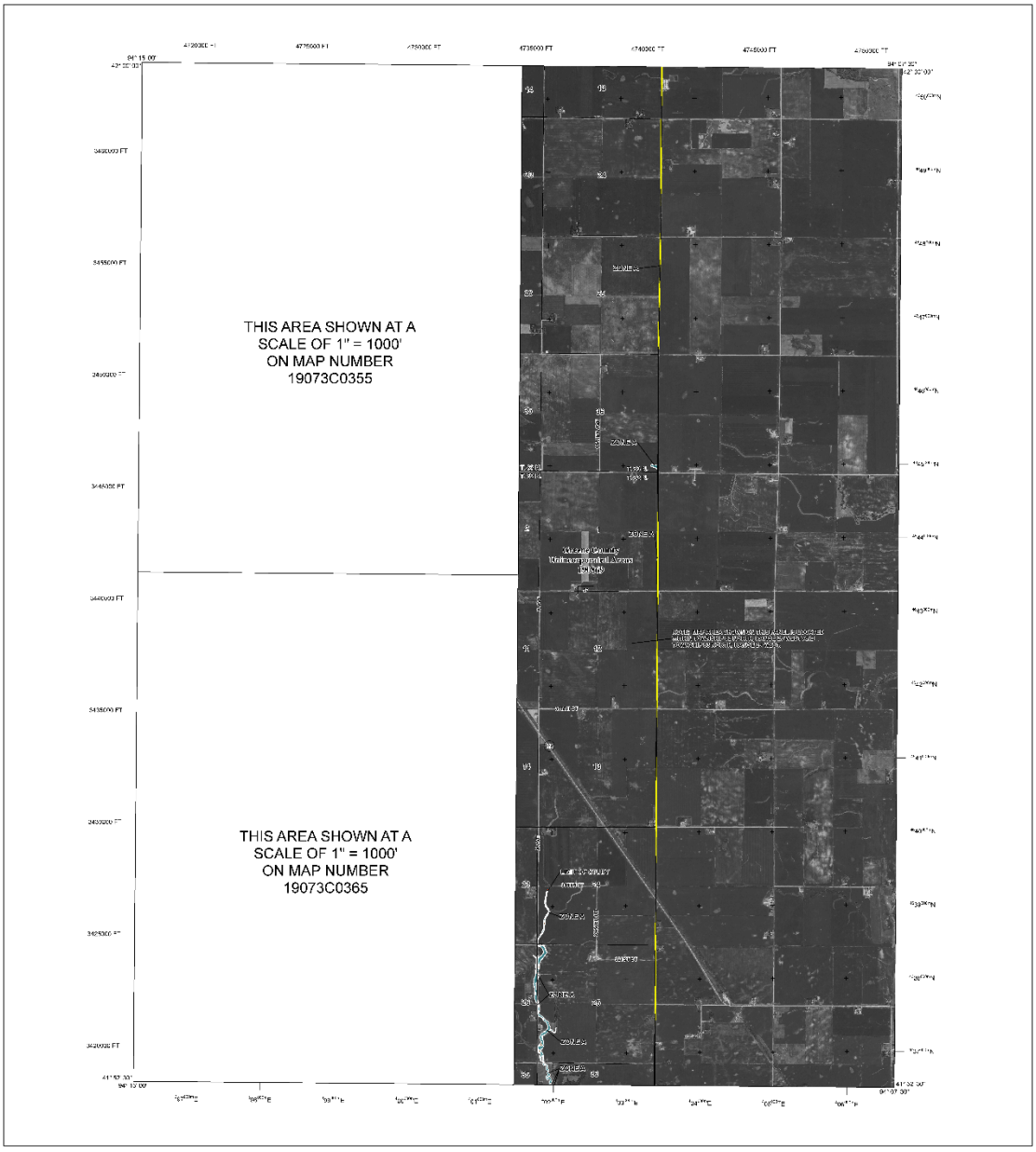
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COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190363	0365	C
JEFFERSON	190364	0365	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0365C

EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
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SPECIAL FLOOD HAZARD AREAS
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- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

N

1 inch = 2,000 feet 1:24,000
0 2,000 4,000 8,000 Feet
0 500 1,000 2,000 Meters

PANEL LOCATOR

0240 0253 0355 0350 0375 0365 0475 0500

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

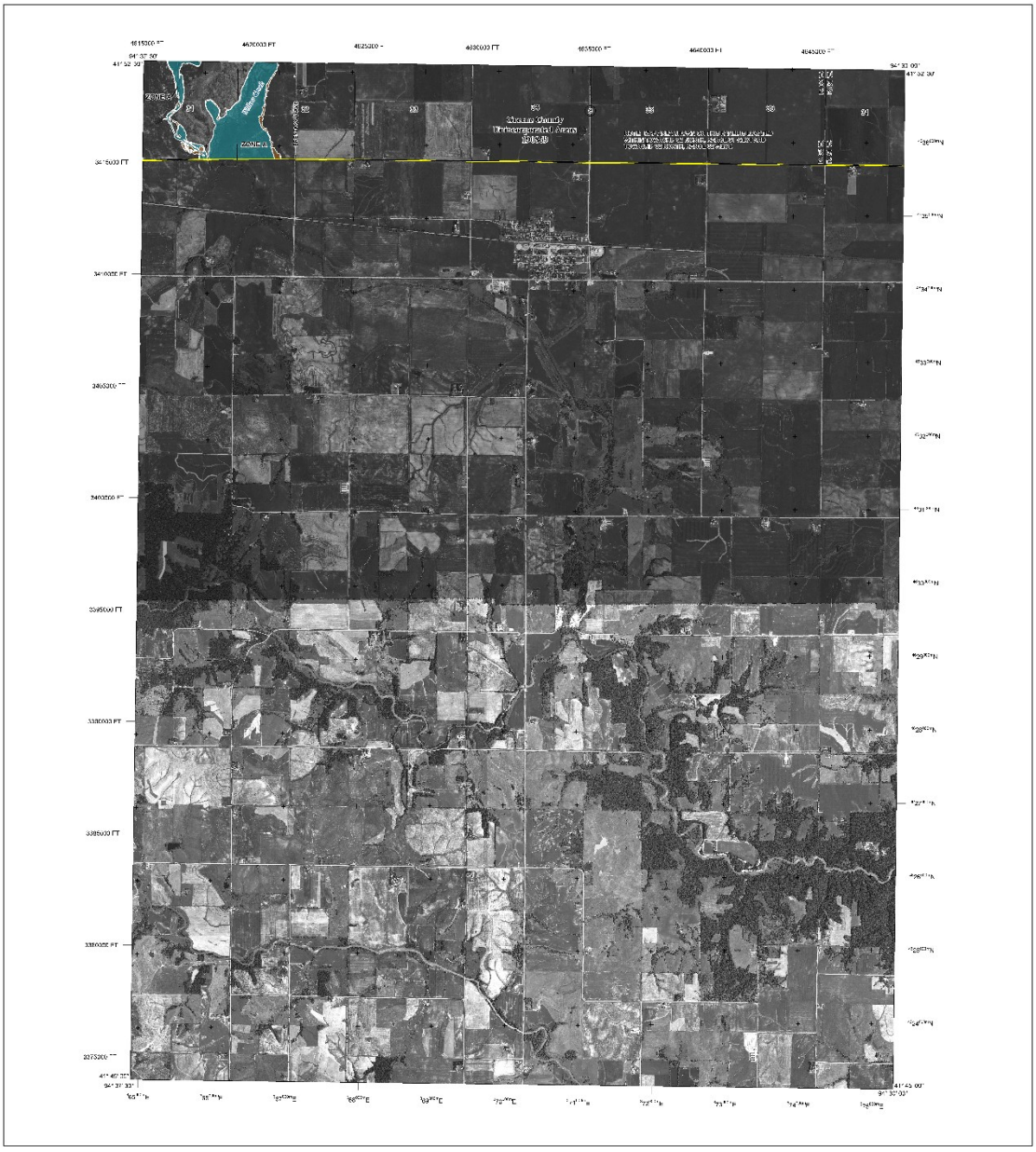
Greene County, Iowa
and Incorporated Areas
PANEL 375 OF 500

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190680	0375	C

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0375C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
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GENERAL STRUCTURES
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- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

N

1 inch = 2,000 feet 1:24,000
0 2,000 4,000 8,000 Feet
0 500 1,000 2,000 Meters

PANEL LOCATOR

0030 0395 0400 0425 0450

NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
PANEL 425 OF 500

FEMA

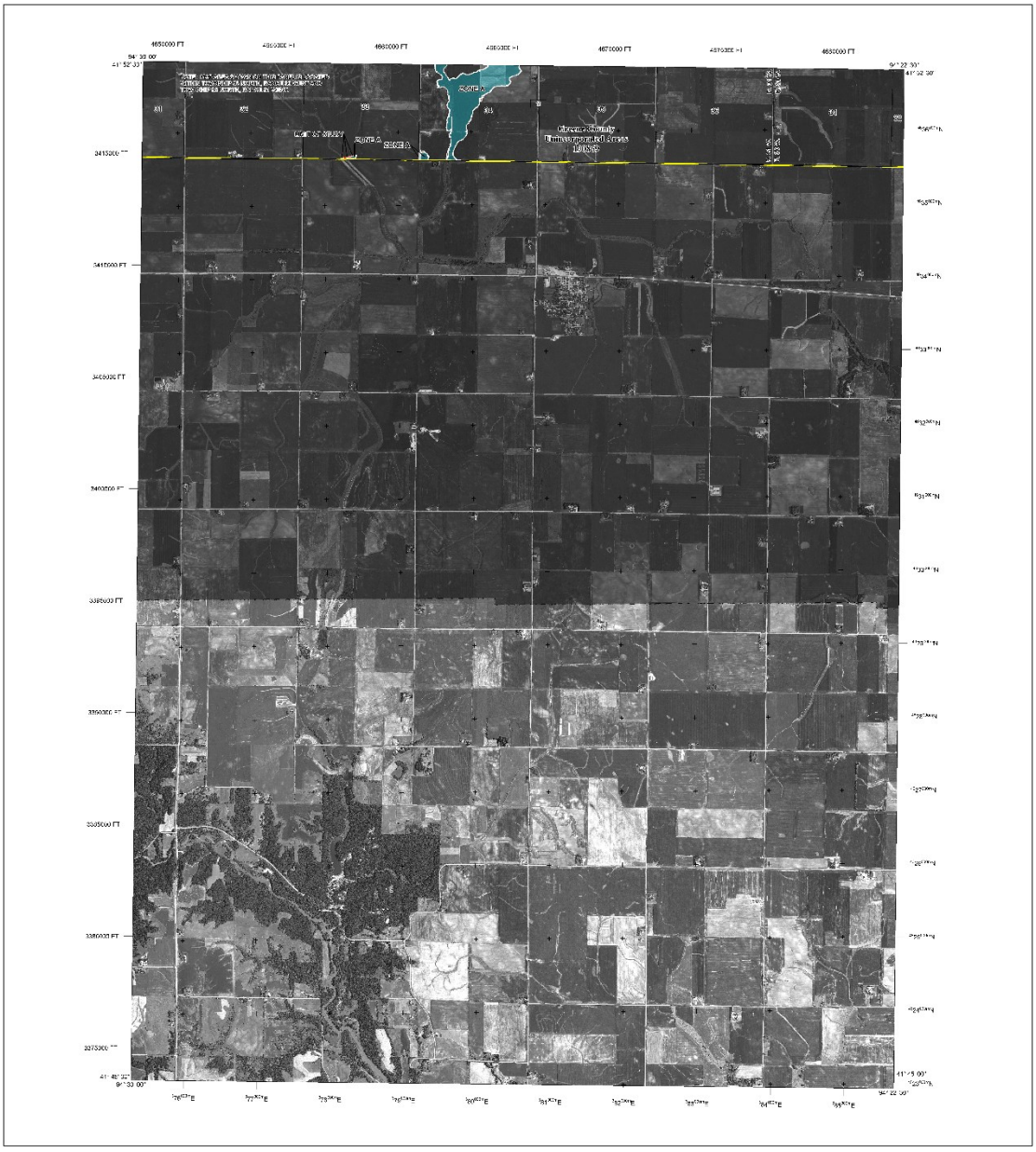
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GREENE COUNTY	190540	0425	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0425C

EFFECTIVE DATE
APRIL 19, 2016

Greene County Hazard Mitigation Plan Appendix A- Rural Greene County



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
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- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
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- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 2,000 feet 1:24,000
0 2,000 4,000 8,000 Feet
0 500 1,000 2,000 Meters

PANEL LOCATOR

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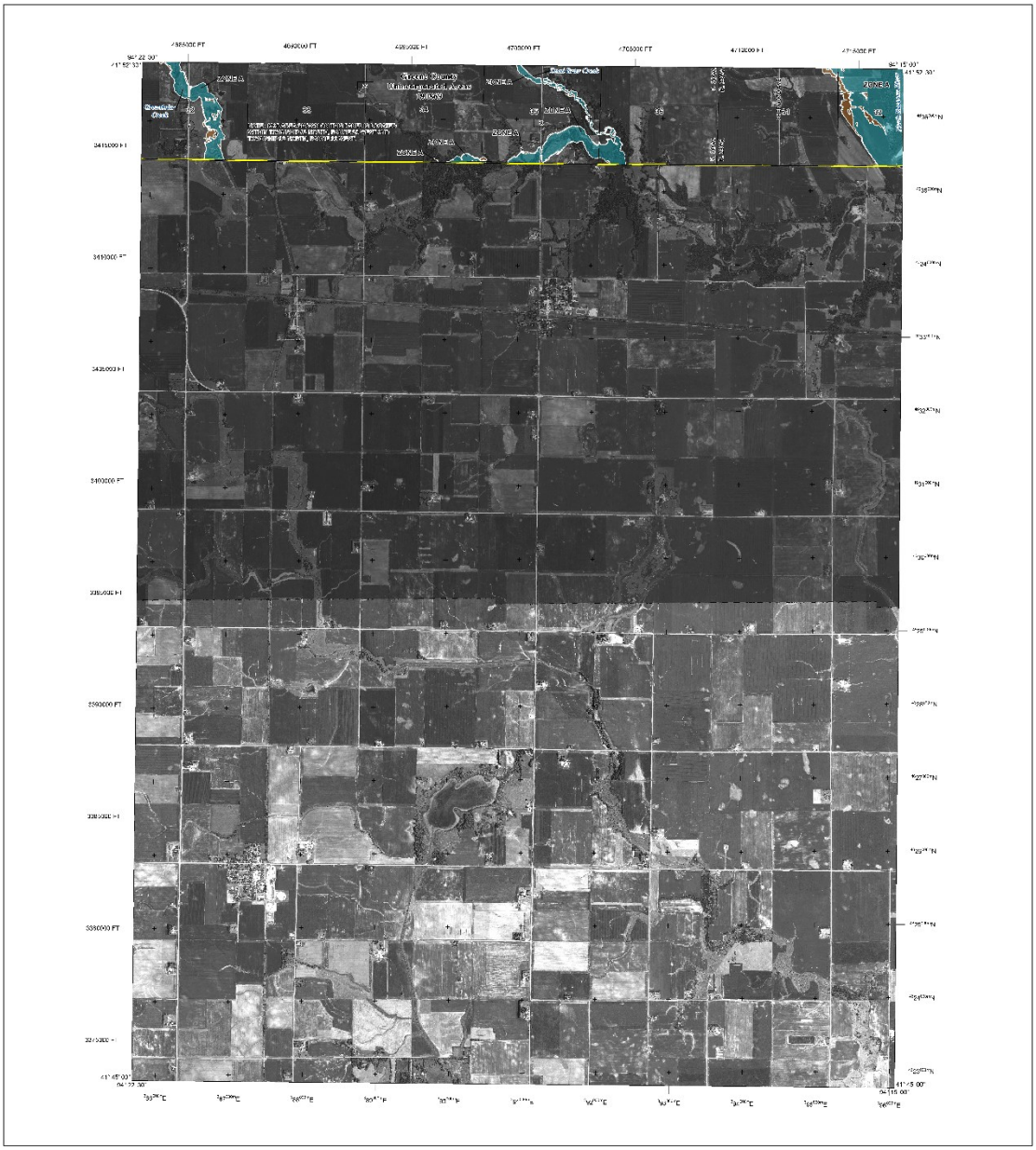
FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
PANEL 450 OF 500

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190680	0450	C

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0450C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

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1 inch = 2,000 feet 1:24,000

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PANEL LOCATOR

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FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa

PANEL 475 OF 500

FEMA

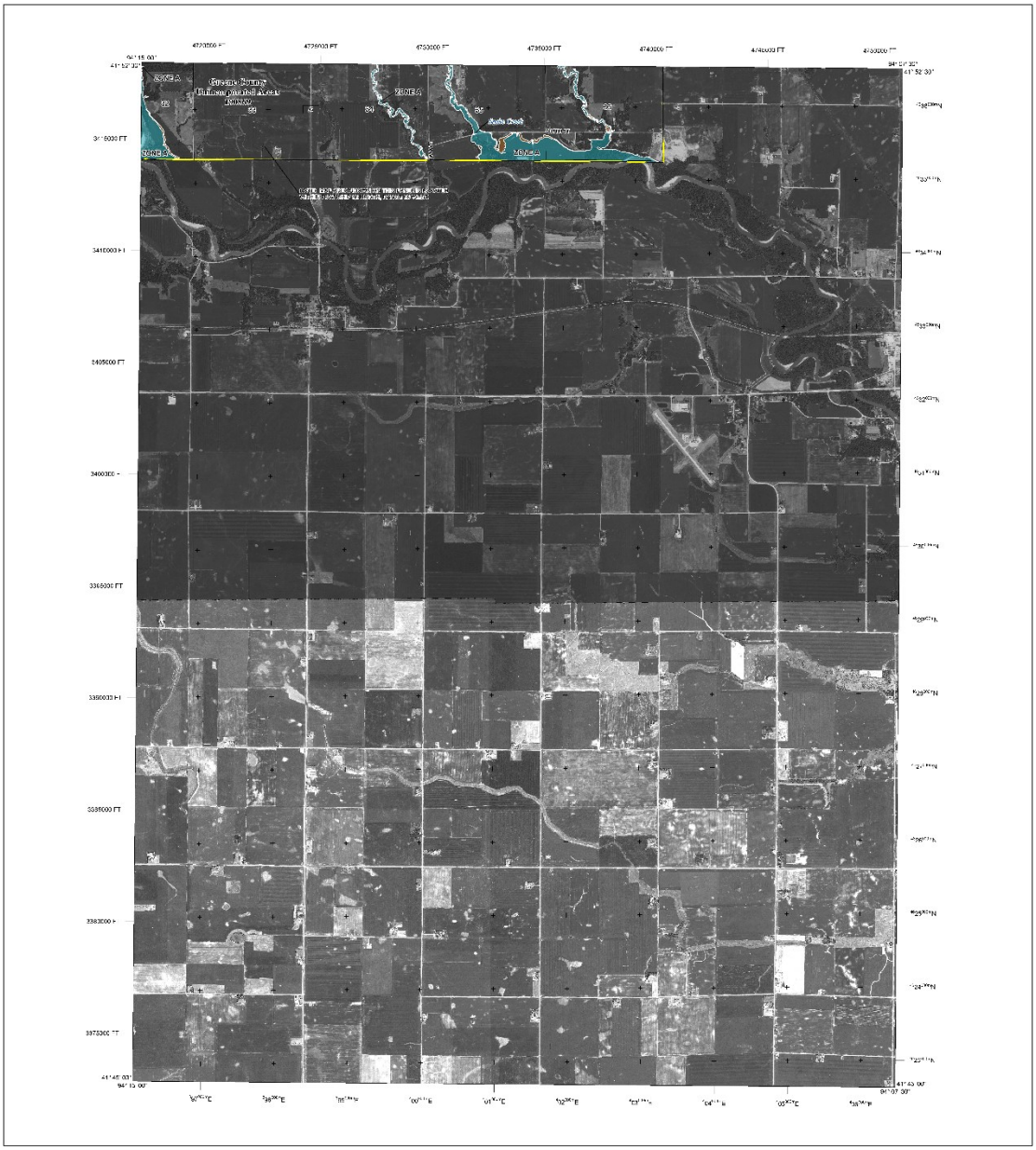
COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190580	0475	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0475C

EFFECTIVE DATE
APRIL 19, 2016

Greene County Hazard Mitigation Plan Appendix A- Rural Greene County



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

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- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

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1 inch = 2,000 feet 1:24,000

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PANEL LOCATOR

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FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

Greene County, Iowa

PANEL 500 OF 500

FEMA

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190680	0500	C

VERSION NUMBER 2.3.2.2

MAP NUMBER 19073C0500C

EFFECTIVE DATE APRIL 19, 2016

Appendix B:

Churdan

Community Profile

History

Churdan was named after Joseph Churdan, one of the early settlers in the Greene County region. Railroad development was the primary influence on the settlement of Churdan. Rails for the Wabash, St. Louis and Pacific Railway Company were laid out in 1882, resulting in the city's incorporation in 1884. The first retail building opened in March of 1882. The town quickly began to grow as a hardware and agricultural implement store, a general merchandise store, a drug store, a furniture store, a millinery shop, several restaurants, hotels and various other stores opened for business. The first church was constructed in 1885 by James White, H.G. McBurney, and R.A. White, whom were both Methodist and Presbyterian.

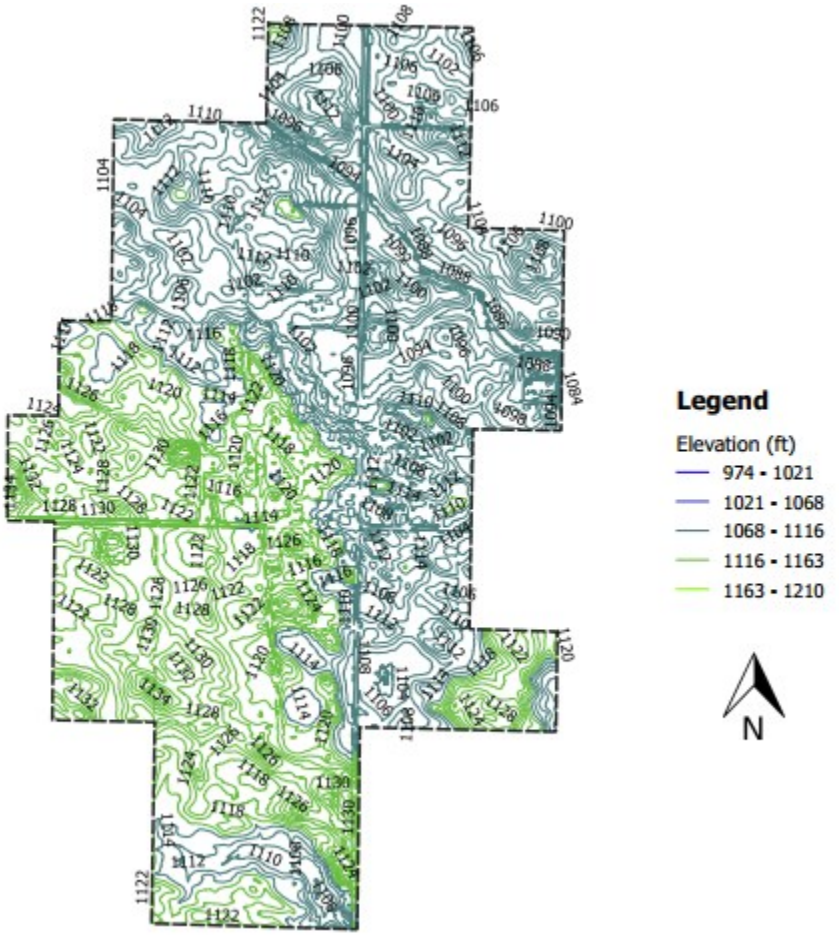
The first school in Churdan was constructed in 1885 and was considered very superior at the time. The building consisted of two stories and four rooms. The first bank in Churdan was the Citizens Bank which opened in 1889. Citizens Bank was bought out of business in 1903 by the First National Bank of Churdan. In 1906, a Cement Block and Tile Factory was established and was a high demand and quickly growing industry. Though many residents and businesses have left Churdan over time, the strong sense of community, which was established through history, still remains.

Geography and Environment

Churdan is located in the north central part of Greene County. IA 4 bisects the community from the east and continues north out of town. U.S. 30 is located 9.1 miles to the south of Churdan. Churdan is located 14.2 miles from Jefferson, 21.2 miles from Lake City, 29.1 miles from Carroll, 52.3 miles from Ames and 85.1 miles from Des Moines.

The highest elevation in Greene County can be found throughout the western part of the county. Here, the elevation can reach as much as 1,230 feet above sea level. The highest point in Churdan is located towards the southwestern corner of the town (1.136 feet) while the lowest point is located in the northeastern corner with elevations hovering around 1,094 feet. Map B.1 displays the City of Churdan's elevation.

Map B.1: City of Churdan Elevation



Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Churdan's population through past, present, and future trends of the region.

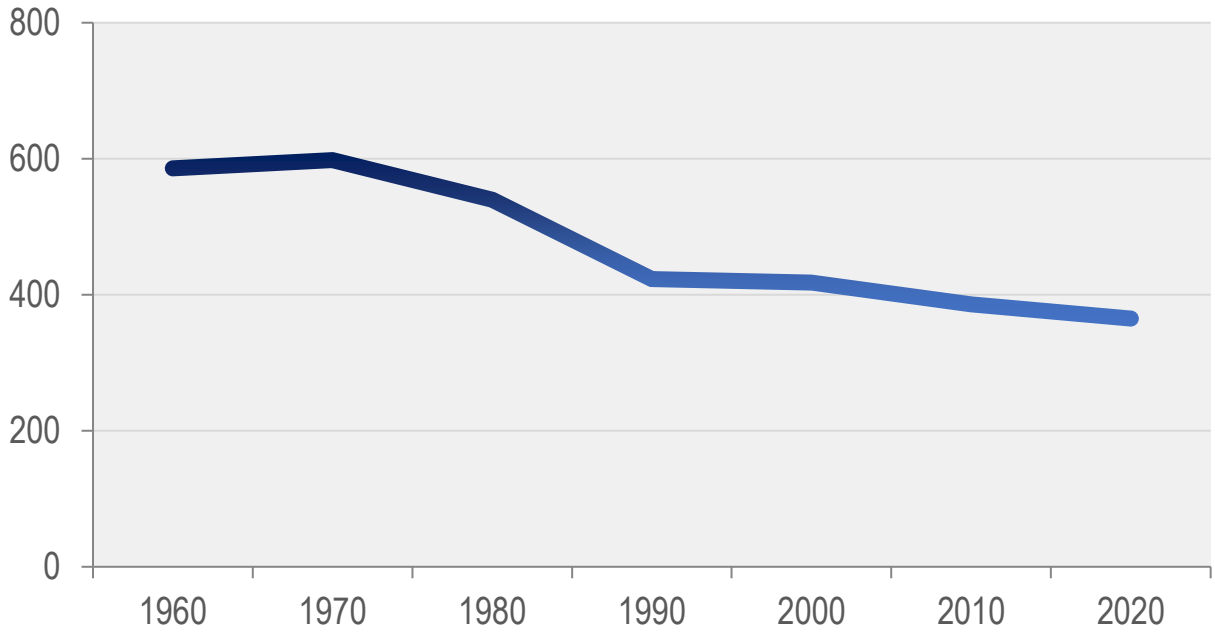
The size and composition of a community's population can exert influence on its development. For instance, population size, composition, and distribution influence the range of businesses a community can support, the pool of workers from which to draw, and the demand for and supply of services. Similarly, the effect people have on the social, economic, and physical environments depends upon the composition, expectations, and distribution of the population. A population's age distribution, income levels, ancestry, and educational attainment are some of the

characteristics that mold a community. Population trends give community leaders and elected officials information on what kind of services need to be provided and offers prospective employers an overview of the local labor force.

Over the past 50 years, the City of Churdan has experienced a gradual decline. In 1960, Churdan had a population of 586. Since then, the City's population has declined 38% (221 residents) to 365 in 2020. The most dramatic change happened between 1980 and 1990 when the city lost 117 residents. Figure B.1 shows the City of Churdan's population trend since 1960.

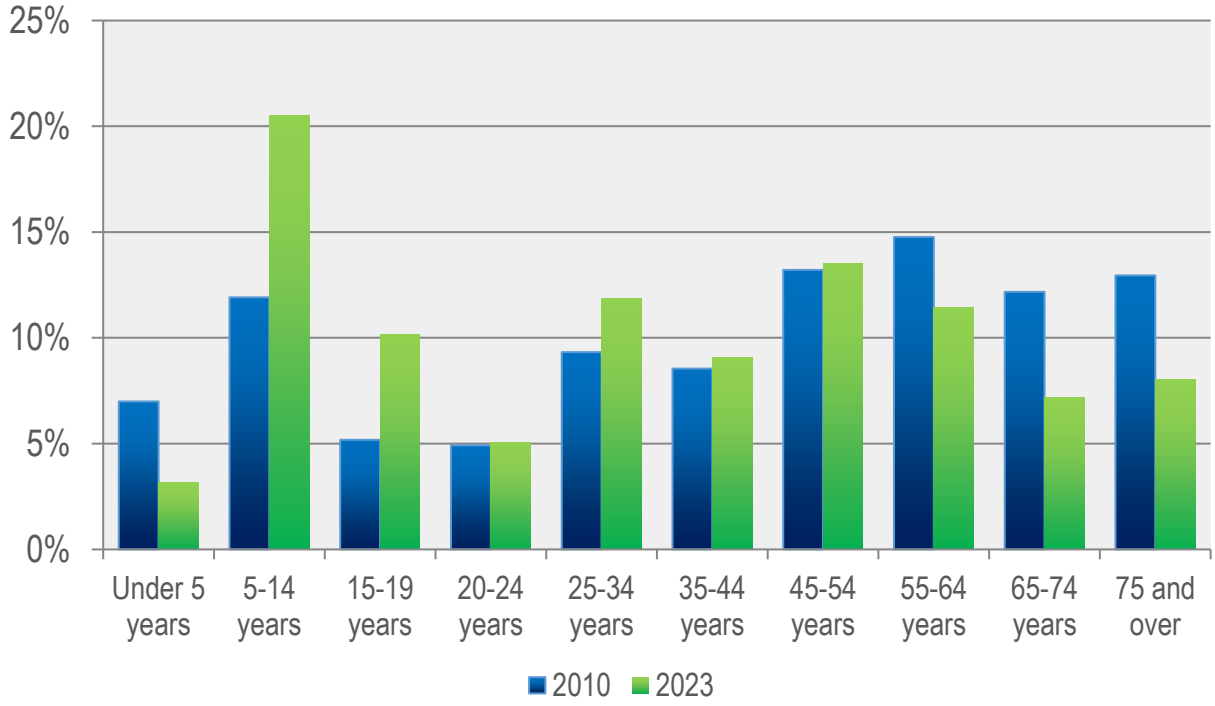
The city's population makeup is not very different from other parts of Greene County, and even most of the State of Iowa. Population cohorts at age 50 and above have general higher numbers than other younger cohorts. This information can be found in figure B.2.

Figure B.1: City of Churdan Historic Population, 1960-2020



Source: US Census

Figure B.2: City of Churdan Age Distribution, 2010 & 2023



Source: US Census

The City's population makeup is slightly different from other parts of Greene County, as there is not the large spike in older residents as seen in other communities. The largest age group in Churdan is aged 5-14 years. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts. This information can be found in figure B.2.

Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has remained constant. During this time, the City saw a 42.3% increase in vacant properties. Table B.1 shows a breakdown of the city's occupied and vacant housing units.

Table B.1: City of Churdan Housing Units, 2010 & 2023

	2010		2023	
	Number	Percent	Number	Percent
Occupied Housing Units	177	87.2%	166	81.8%
Owner-Occupied	140	79.1%	141	84.9%
Renter-Occupied	37	20.9%	25	15.1%
Vacant Housing Units	26	12.8%	37	18.2%
Total Housing Units	203	100.0%	203	100.0%

Source: US Census, American Community Survey

Table B.2: City of Churdan Value of Owner-Occupied Units, 2023

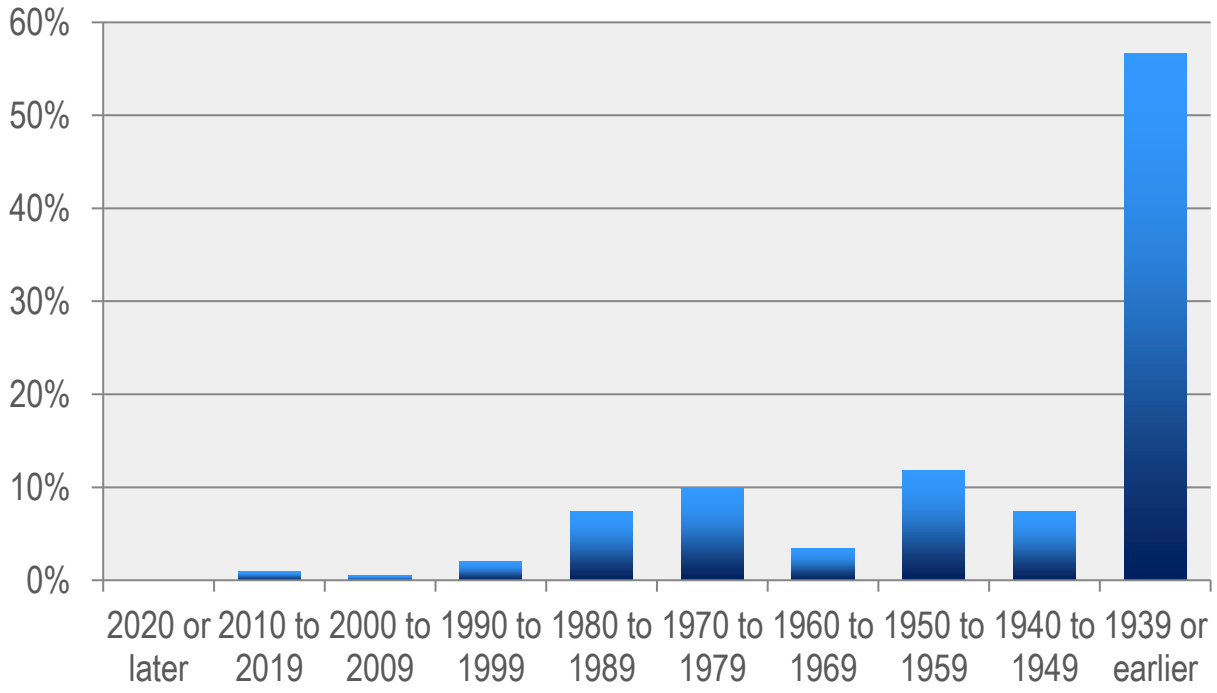
Value of Housing Unit	**Percent of Homes**
Less than $50,000	27.0%
$50,000 to $99,999	48.9%
$100,000 to $149,999	10.6%
$150,000 to $199,999	9.2%
$200,000 to $299,999	4.3%
$300,000 to $499,999	0.0%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%
Median (dollars)	$71,400
Median (Iowa)	$213,300

Source: American Community Survey

Churdan, like many other small rural towns in Iowa, has a lower median housing value of $71,400. The State of Iowa has a median housing value of 213,300. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2023 American Community Survey Estimates, 27% of the city's homes are

valued less than $50,000. A complete breakdown of the value of homes in Churdan can be found in Table B.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Figure B.3: City of Churdan Year Housing Units Constructed, 2023



Source: American Community Survey

Figure B.3 showcases the year housing units within the City of Churdan were constructed. Like most of the county, Churdan has a large portion (56.7%) of the homes constructed in 1939 or earlier. The city also experienced spikes in construction during 1950-1959 and from 1970-1979. The 1950s saw 11.8% of the city's homes being built while the 1970s saw 9.9% of the homes being built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Economics

Household income is an important indicator of the economic base in Greene County. In Churdan, the median household income is $72,500 which would classify a large number of the households in Churdan as "working" or "middle" class. The City of Churdan's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Educational services, and health care and social assistance is the largest industry within the City, which is consistent with the County as a whole. Many

employees from Churdan commute to other larger neighboring cities like Carroll and Jefferson where more employment opportunities are present.

Table B.3: City of Churdan Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	10	6.0%
$10,000 to $14,999	6	3.6%
$15,000 to $24,999	9	5.4%
$25,000 to $34,999	4	2.4%
$35,000 to $49,999	19	11.4%
$50,000 to $74,999	37	22.3%
$75,000 to $99,999	37	22.3%
$100,000 to $149,999	31	18.7%
$150,000 to $199,999	4	2.4%
$200,000 or more	9	5.4%
Median Household Income	$72,500	--
Mean Household Income	$75,501	--

Source: American Community Survey

Churdan, overall, is a small community in a small rural county. A large percentage of the businesses within the county serve the largely agricultural economy. Table B.4 breaks down what industry Churdan residents work in. The educational services, and health care and social assistance industry employs the largest cohort of residents, with 29.7% employed in this industry. The second largest is agriculture, forestry, fishing and hunting, and mining, with 15.8% of the residents employed in this industry.

Table B.4: City of Churdan Employment by Industry, 2022

2022	Estimate	Percent
Civilian employed population 16 years and over	209	100.0%
Agriculture, forestry, fishing and hunting, and mining	33	15.8%
Construction	21	10.0%
Manufacturing	28	13.4%
Wholesale trade	3	1.4%
Retail trade	10	4.8%
Transportation and warehousing, and utilities	13	6.2%
Information	1	0.5%
Finance and insurance, and real estate and rental and leasing	3	1.4%
Professional, scientific, and management, and administrative and waste management services	3	1.4%
Educational services, and health care and social assistance	62	29.7%
Arts, entertainment, and recreation, and accommodation and food services	11	5.3%
Other services, except public administration	16	7.7%
Public administration	5	2.4%

Source: American Community Survey

Existing Documents

Table B.5 provides a compilation of the current planning and regulatory documents in place for the City of Churdan. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which

can reduce the number of transportation incidents. The adoption of state building codes ensures that all new and major renovation structures meet the necessary requirements for electrical, plumbing, structural adequacy. This reduces the impact hazards have on structures as they are built to withstand certain minimums. The City's housing needs assessment has allowed the city to take inventory of the current housing situation and determine what steps are necessary to reduce the impact hazards have on the housing stock.

The City of Churdan is a proactive community, which benefits them in regards to mitigation of hazards. Creating a comprehensive plan would allow the city to take inventory of the city's current assets and evaluate them through the comprehensive planning process. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table B.5: City of Churdan Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	No	-
Building Code	Yes	IBC 2024
Zoning Ordinance	Yes	1994
Strategic Plan	Yes	2001
Housing Needs Assessment	Yes	1999
NFIP Participant	Yes	2001
Floodplain Regulations	Yes	2001

NFIP Participation

In the past, there have been instances of significant flooding within the city limits of Churdan. Churdan started participating in the NFIP in 2001, and the flood map was updated in 2016. The city's FIRM can be found later in this appendix. Any development/demolition in the floodplain is required to obtain a permit which regulates the development/demolition and lays out the NFIP regulations that must be followed. Churdan participates in the NFIP and implements substantial improvement / substantial damage provisions in the following manner: Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD determinations and provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Schools and school districts do not Participate in the National Flood Insurance Program (NFIP) because participation is strictly limited to local governments and communities (like cities, towns, and counties). Individual properties, including public schools, can only purchase NFIP Policies if their surrounding municipality volunteers to join the program.

Outlook and Future Development

Since the last plan update, the City of Churdan has experienced limited new development. Changes have primarily included improvements to the existing housing stock, minor improvements along Main Street, and upgrades to the City's water system, including a new water tower. No significant new development has occurred within identified hazard prone areas. As a result, development since the previous plan has not increased the City's vulnerability to identified hazards. Improvements to existing infrastructure, particularly the water system, have increased community resiliency and may reduce vulnerability to service disruptions. Churdan anticipates that future development will continue to occur as a similar scale and within existing developed areas.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Churdan's critical facilities can be found on Map B.2.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table B.6.

Table B.6: City of Churdan Essential Infrastructure and Services

Major Arterials	IA Highway 4	**Air Service**	Jefferson Municipal Airport
Water Service	City of Churdan	**Sewer Service**	City of Churdan
Electric Service	Alliant Energy	**Gas Service**	Propane
Sanitation/Solid Waste	Local Haulers	**Landfill**	Boone County Landfill
Phone and Internet	WCCTA	**Law Enforcement**	Greene County Sheriff
Fire Service	Churdan Fire Department	**Ambulance Service**	Churdan Ambulance

Paton-Churdan Community School District

The Paton-Churdan Community School District is located within Churdan at 606 Adrian Street. The school is home to grades Pre-K-8. After 8th grade, the students attend high school at Greene County Schools. This section of the plan will focus on the school building located in Churdan. Students and staff participate in drills and educational programs related to hazards and the mitigation of them. The District maintains its own equipment and supplies to maintain roads and walkways on campus.

Table B.7: Paton-Churdan Community School District Enrollment

School Year	Elementary Enrollment	Jr High Enrollment	Total Enrollment
2020-2021	**125**	**30**	**155**
2021-2022	**127**	**27**	**154**
2022-2023	**103**	**38**	**141**
2023-2024	**117**	**33**	**150**
2024-2025	**100**	**30**	**130**

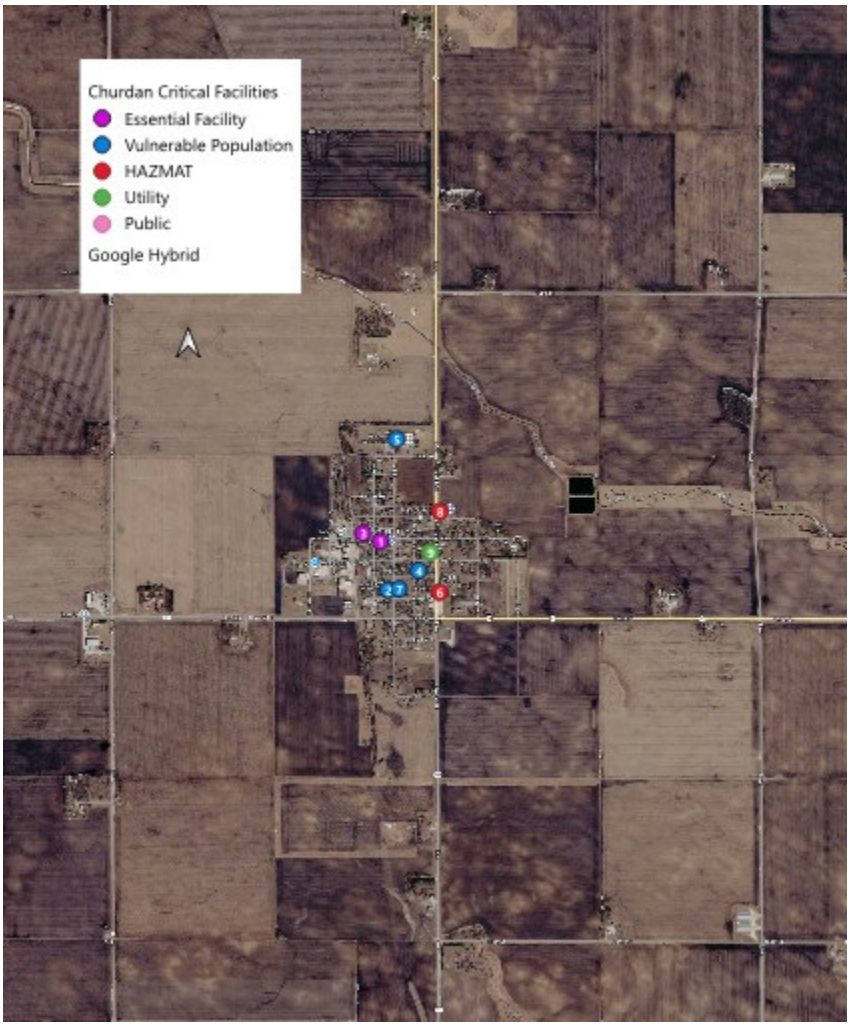
The Paton-Churdan Community School District's ability to expand and improve their hazard mitigation capability is primarily limited by available financial and staff resources. The budget for the school district is largely supported by property tax revenue and is focused on fulfilling educational and operational responsibilities. The district has a limited ability to hire additional staff specifically dedicated to hazard mitigation or to fund mitigation projects outside of planned facility and operational improvements. Opportunities to expand mitigation capabilities depends largely on the availability of outside funding, technical assistance, partnerships and the ability to incorporate mitigation activities into existing staff responsibilities. The district will continue to seed funding and coordinate with local governments and partners when the opportunities arise.

Staff training, improved emergency planning, and consideration of hazard mitigation during future facility and capital improvement planning may also allow the district to improve its mitigation capabilities without requiring additional dedicated staff.

Table B.8: City of Churdan Critical Facilities

Number on Map	Name	Address	Type
1	City Hall	507 Sand Street	Essential Facility
2	Churdan United Methodist Church	804 Head Street	Vulnerable Population
3	Fire Department	Sand Street	Essential Facility
4	First Baptist Church	700 North Street	Vulnerable Population
5	Paton-Churdan School	606 Adrian Street	Vulnerable Population
6	Rocket Fuel	807 Fitzpatrick Street	HAZMAT
7	St. Columbkille Catholic Church	805 Head Street	Vulnerable Population
8	Star Energy Fuel	Fitzpatrick Street	HAZMAT
9	Water Tower	Fitzpatrick Street & Sand Street	Utility

MAP B.2: City of Churdan Critical Facilities



Hazard Scores

Table B.8: City of Churdan Risk Assessment

Hazard	Comments
Drought	Drought occurrences have increased in the past ten years and Churdan has been affected. This hazard can cause both direct and indirect issues for the city and its residents.
Earthquake	There have been no instances of damaging earthquakes in the City of Churdan. The committee feels there will be no instances during the life of this plan.
Expansive Soils	Expansive soils are not uncommon in this area, due to high clay content and dramatic changes in soil moisture and temperature. This hazard has the greatest impact on individual properties, especially those not engineered to withstand the hazard. This is a very localized hazard (e.g., individual home) and not a major priority for public response. The City of

	Churdan's leaders have no knowledge of problems affecting city infrastructure, city facilities, or their personal homes and property.
Extreme Heat	Extreme heat events continue to impact Churdan. Education may be one of the best action tools to combat this hazard's impact on the human body. Given current conditions and resources available, there is no risk of widespread losses due to this hazard, although power lines and other infrastructure can be damaged or can break.
Flash Flood	Since 2020, the City of Churdan has reported no instances of flash flooding. While flash floods have little to no warning time, the committee has determined this hazard is not a high priority hazard to address but will consider mitigation actions to prepare the community for response to an event. It is anticipated that the city will not experience a flash flood event in the next five years.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and can immediately surround the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
Levee/Dam Failure	There are no dams or levees in the city or in the immediate vicinity of the city.
River Flooding	River flooding has not been reported in Churdan recently. However, the most recent FIRM maps adopted in 2016 show several flood hazard areas in the city. Churdan joined the NFIP in 2011 and historically there have been people buying flood insurance through the program.
Severe Winter Storm	Severe winter storms continue to impact Churdan. While meteorological advances can warn people in advance, there is always a segment of the population caught in a storm. Heavy snow and the winds associated with storms can cause tremendous damage. Severe cold can cause fatalities. Thawing pipes and roadways can crack, break, and fail, causing considerable damage.
Thunderstorm/ Lightning/Hail	Thunderstorm, lightning, and hail events are common in Churdan, but most of them do not have major impact to life and property, and only a few storms per year would be considered severe. A single building may be damaged by lightning and power may be disrupted in parts of town for a few minutes to a few hours. Hail can damage buildings and property throughout the city, which has occurred in the past. Strong thunderstorm winds also damage property. In 2026, a severe hailstorm occurred in the City of Churdan and resulted in several residential properties needing their roofs replaced.
Tornado	While tornadoes have touched down in the county, there is no report of tornadoes damaging Churdan directly in the recent past. Although the city has been spared major tornado damage, vigilance is important, as there is no way to know where one will occur. Based on the size of Churdan, the chances are low in any given year. Meteorological warnings have improved, but storms can still spawn tornadoes with no notice. It is vital that the public is prepared for this hazard and that there are places for people to shelter.
Windstorm	Recent windstorms have caused damage to properties and crops even though the available data shows otherwise. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos impacted Churdan, prompting the community to prepare more effectively for these hazards.

Hazard	Reason for Omission
Earthquake	Iowa, as a whole, has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table B.9: City of Churdan Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	2	$122,000	365
Commercial	20	$3,117,300	
Industrial	0	$0	
Residential	203	$14,554,600	

The extent of future losses cannot be precisely predicted because the location, magnitude, and duration of future hazard events are uncertain. Table B.9 represents Churdan's maximum community-wide exposure and should not be interpreted as the anticipated loss from any individual hazard. Potential impacts vary significantly by hazard. Table B.10 evaluates anticipated physical damage, service disruption, economic and social consequences, impacts to vulnerable populations, and potential losses to identified assets for each hazard.

Table B.10: City of Churdan Hazard Impact and Vulnerability Summary

Hazard	Anticipated Impacts and Potential Losses
Drought	Drought may affect the entire community through reduced water availability and increased demand on the municipal water system, however, significant structural damage is not anticipated. Prolonged drought may increase operating demands on the water system, affect vegetation, and increase grass/wildland fire risk. Economic impacts may occur indirectly through impacts to the surrounding agricultural community. Older adults, households with limited financial resources, and residents dependent on reliable municipal water service may be more vulnerable to prolonged drought conditions.
Extreme Heat	Significant direct damage to buildings is not anticipated. Extreme heat may affect the entire population and increase demand on the electrical system and cooling equipment. Power outages could interrupt municipal services and leave residents without adequate cooling. Older adults, young children, individuals with medical conditions, outdoor workers, and residents without adequate air conditioning are particularly vulnerable. Potential losses are

	primarily associated with increased utility costs, lost productivity, medical impacts, and service interruptions rather than structural damage.
Flash Flood	Churdan has reported no flash flooding since 2020; however, intense rainfall could produce localized street, yard, basement, or property flooding where drainage is limited. Streets, culverts, utilities, and structures in low-lying or poorly drained areas would be most vulnerable. Temporary road closures could affect access and emergency response. Because there has been no recent flash-flood losses, widespread structural losses are not anticipated.
Grass/Wildland Fire	Agricultural land and open vegetation surrounding Churdan presents a potential for a grass or field fire to approach the city. Homes, businesses, utility infrastructure, and other structures along the perimeter of the city would be most vulnerable. Smoke could affect the majority of the community and particularly individuals with respiratory conditions. A fire could also temporarily close roads or interrupt utilities. Structural losses would depend on the location, wind conditions, and ability of responders to contain the fire.
Levee/Dam Failure	There are no dams or levees within Churdan or in the vicinity of the city and therefore do not pose a threat to the community. Therefore, no significant direct structural damage, service disruption, displacement, vulnerable-population impacts, or property losses from dam or levee failure are currently anticipated.
River Flooding	The 2016 FIRM identifies flood hazard areas within Churdan; therefore, structures, streets, utilities, and other assets located within or adjacent to those mapped areas have greater vulnerability than assets elsewhere in the community. Flooding could damage buildings and contents, temporarily restrict transportation, interrupt utilities or municipal services, and displace affected residents. Residents with limited mobility, transportation, or financial resources may have greater difficulty evacuating or recovering. Potential property losses are concentrated within the identified flood hazard areas rather than distributed evenly throughout the city.
Severe Winter Storm	Severe Winter Storms may affect the entire community but generally do not cause uniform structural damage. Heavy snow, ice, wind, and extreme cold can damage trees, roofs, overhead utilities, water infrastructure, and transportation systems. Power outages and blocked roads could interrupt municipal services and emergency response. Older adults, individuals with medical needs and/or limited mobility, and households without alternative heat sources are particularly vulnerable during extended outages or extreme cold. Economic losses may include snow removal, infrastructure repairs, business interruption, and increased heating costs.
Thunderstorm/Lightning/Hail	All developed area in the City of Churdan is exposed to severe thunderstorms, lightning, and hail. The 2026 hailstorm demonstrated the potential for widespread roof damage to residential properties. Future storms could damage roofs, siding,

	windows, vehicles, trees, utility infrastructure, and public facilities. Lightning and wind may cause power outages and fires in localized areas of the city. Potential economic losses include building and vehicle repairs, utility restoration, debris removal, and temporary business interruption.
Tornado	All structures and residents of Churdan are potentially exposed to tornadoes, although actual damage would generally be concentrated along the path of the tornado rather than affecting a fixed percentage of the community. A direct strike could cause severe or complete damage to homes, businesses, public buildings, utilities, and other critical facilities; block streets with debris; interrupt utilities, communications, and emergency services; and result in displacement, injuries, or fatalities. Residents without access to adequate shelter and those requiring assistance to shelter quickly would be particularly vulnerable. Potential structural losses could be substantial in the area directly affected.
Windstorm	All of the developed areas of the City of Churdan are exposed to high winds and derecho events. Recent events have demonstrated the potential to damage roofs, siding, trees, crops, vehicles, and overhead electrical and communications infrastructure. Downed trees and utility lines may block streets, cause extended power outages, and interfere with emergency response and municipal services. Older structures and buildings with large roof areas may experience greater damage. Economic losses may include structural repairs, utility restoration, debris removal, business interruption, and agricultural losses.

Table B.11 depicts the Paton-Churdan Community School District Hazard Impact and Vulnerability Summary. The school district's vulnerability to hazards includes not only potential damage to buildings and other physical assets, but also impacts to students, staff, transportation, and continuity of education and support services. Temporary or extended school closures may affect families throughout the school district, including the disruption of transportation, school meal programs, childcare, extracurricular activities, and the parent/guardian's ability to work. Students and staff with disabilities, medical needs, limited mobility, or other functional needs may require additional assistance during emergency response, evacuation, sheltering, or extended service disruptions.

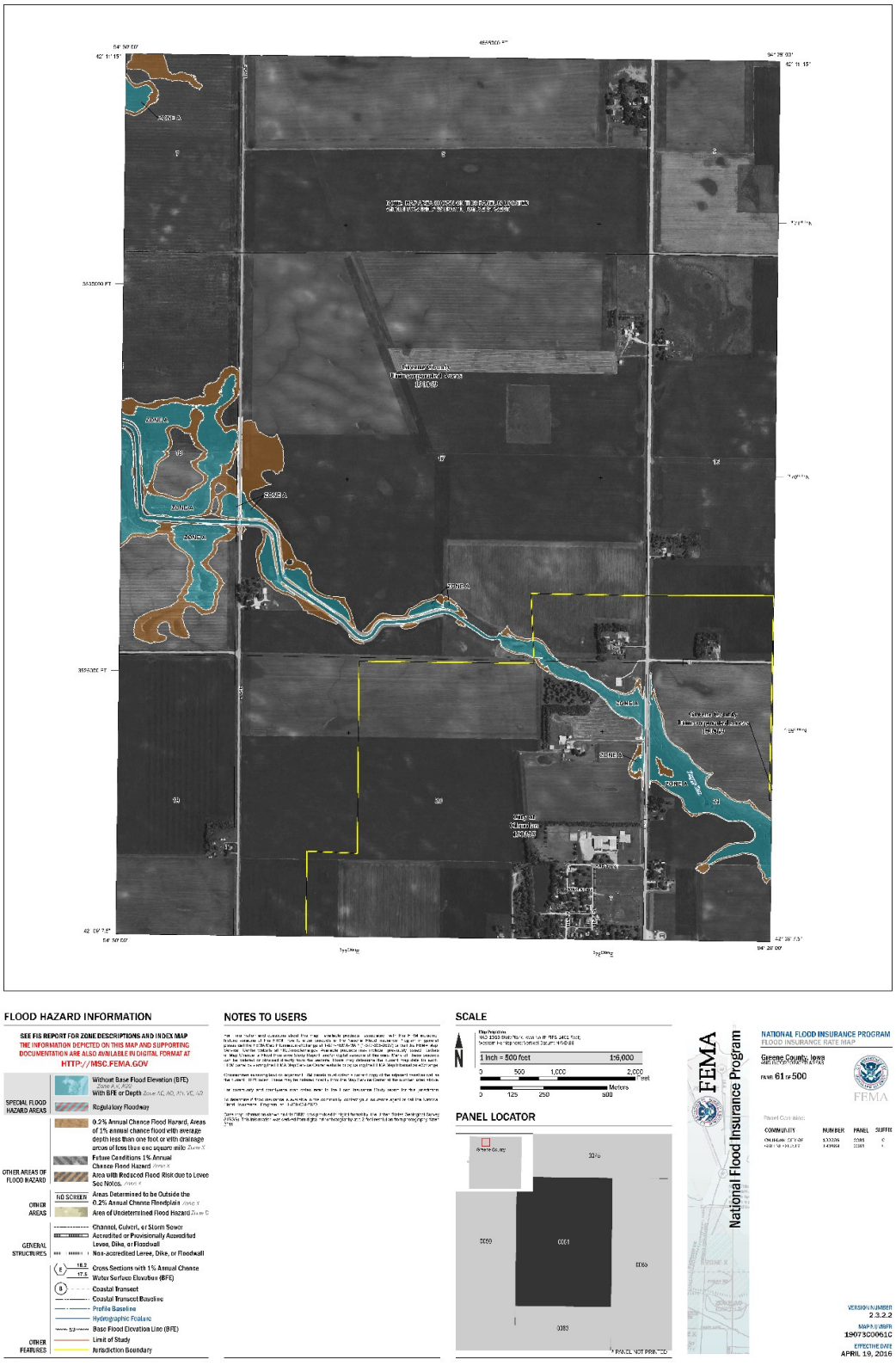
Table B.11: Paton- Churdan Community School District Hazard Impact and Vulnerability Summary

Hazard	Anticipated Impacts and Potential Losses
Drought	Direct structural damage to school facilities is not anticipated. Prolonged drought may lead to water use restrictions, affect outdoor athletic fields and activities, and increase grass/wildland fire risk, particularly to the north of the school property. Drought may also indirectly affect district families through impacts to agricultural community. Educational operations would generally be expected to

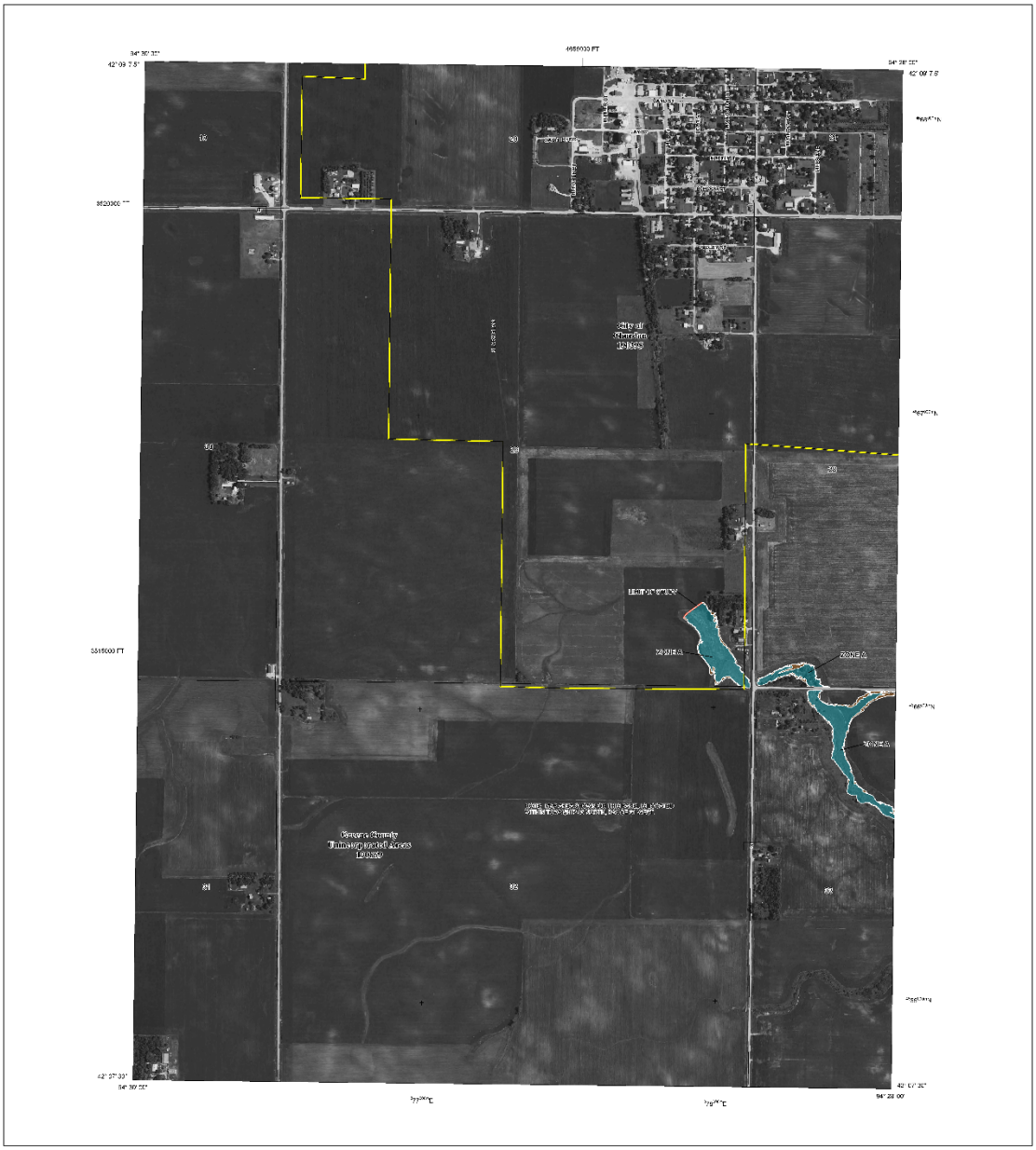
	continue unless municipal water supplies or other essential services were disrupted.
Extreme Heat	Significant direct damage to buildings is not anticipated. Extreme heat may increase cooling demands and utility costs and could affect outdoor recess, athletic practices, competitions and other activities. Failure or interruption of electrical services or cooling systems could require modification or cancellation of classes and activities. Students and staff with medical conditions and those participating in outdoor activities are particularly vulnerable.
Flash Flood	Heavy rainfall and flash flooding could affect school property, transportation routes, or access to district facilities. Flooded roads may prevent buses, students, and staff from safely reaching or leaving school and could result in delayed starts, early dismissal, or cancellation. District property on low-lying and poorly drained areas may experience water intrusion or damage to building systems and contents.
Grass/Wildland Fire	Grass or field fires could threaten school property if a fire occurs near the school, particularly to the north and west. Transportation routes could be affected by smoke, reduced visibility or road closures. Smoke may be particularly hazardous to students and staff with respiratory conditions. A nearby fire could require students and staff to shelter in place or evacuate. Direct property losses would depend upon the proximity and severity of the fire.
Levee/Dam Failure	District facilities are not located within an identified dam or levee inundation area, and therefore, direct losses are not anticipated. A failure affecting surrounding transportation routes could potentially interfere with student and staff access or school transportation even if district property is not directly inundated.
River Flooding	River flooding could affect transportation routes and access to the school even where school buildings are outside mapped flood hazard areas. Flooding of school property could damage buildings, equipment, furnishings, vehicles, athletic facilities, and other district assets and could interrupt educational operations. Students who rely on district transportation may be particularly affected by flooded or closed roads.
Severe Winter Storm	Severe Winter Storms represent a significant operational concern for the district. Snow, ice, extreme cold, and poor visibility can make student and staff travel unsafe and result in delayed starts, early dismissal, or cancellation of school and/or activities. Heavy snow, ice, and wind may damage roofs, trees, electrical infrastructure, and other facilities. Extended power or heating outages could make school buildings unusable until services are restored. Students who depend on school for meals or other services may experience additional impacts during extended closures.
Thunderstorm/Lightning/Hail	Severe thunderstorms may damage the roof, windows, siding, HVAC equipment, vehicles, athletic facilities, tress, and electrical systems. Hail may result in substantial repair costs even when buildings

	remain usable. Lightning and wind may cause power outages and require cancellation or relocation of outdoor activities. Students participating in outdoor athletics and activities are particularly vulnerable when sever weather develops.
Tornado	A direct tornado strike could cause severe or complete damage to school buildings, buses, vehicles, utilities, and other district property and could result in significant injuries or fatalities. Students and staff present during the school day represent a concentrated population requiring rapid access to appropriate shelter. Damage to the school building or essential building systems could result in an extended interruption of educational services and require temporary relocation of students.
Windstorm	High winds and derecho events may damage the roof, windows, siding, HVAC systems, tress, athletic facilities, busses, and overhead utilities. Power outages or building damage could temporarily prevent use of school facilities and interrupt educational services. Downed trees and power lines may also affect bus routes and access to district facilities. Potential losses include building and vehicle repairs, debris removal, utility restoration, and costs associated with temporary disruption of school operations.

Flood Maps



Greene County Hazard Mitigation Plan Appendix B- City of Churdan



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, A99 With BFE or Depth Zone AE, AO, AH, VE, AR Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee See Notes. Zone X
OTHER AREAS	NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Accredited or Provisionally Accredited Levee, Dike, or Floodwall Non-accredited Levee, Dike, or Floodwall Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

Greene County, Iowa

PANEL 63 OF 500

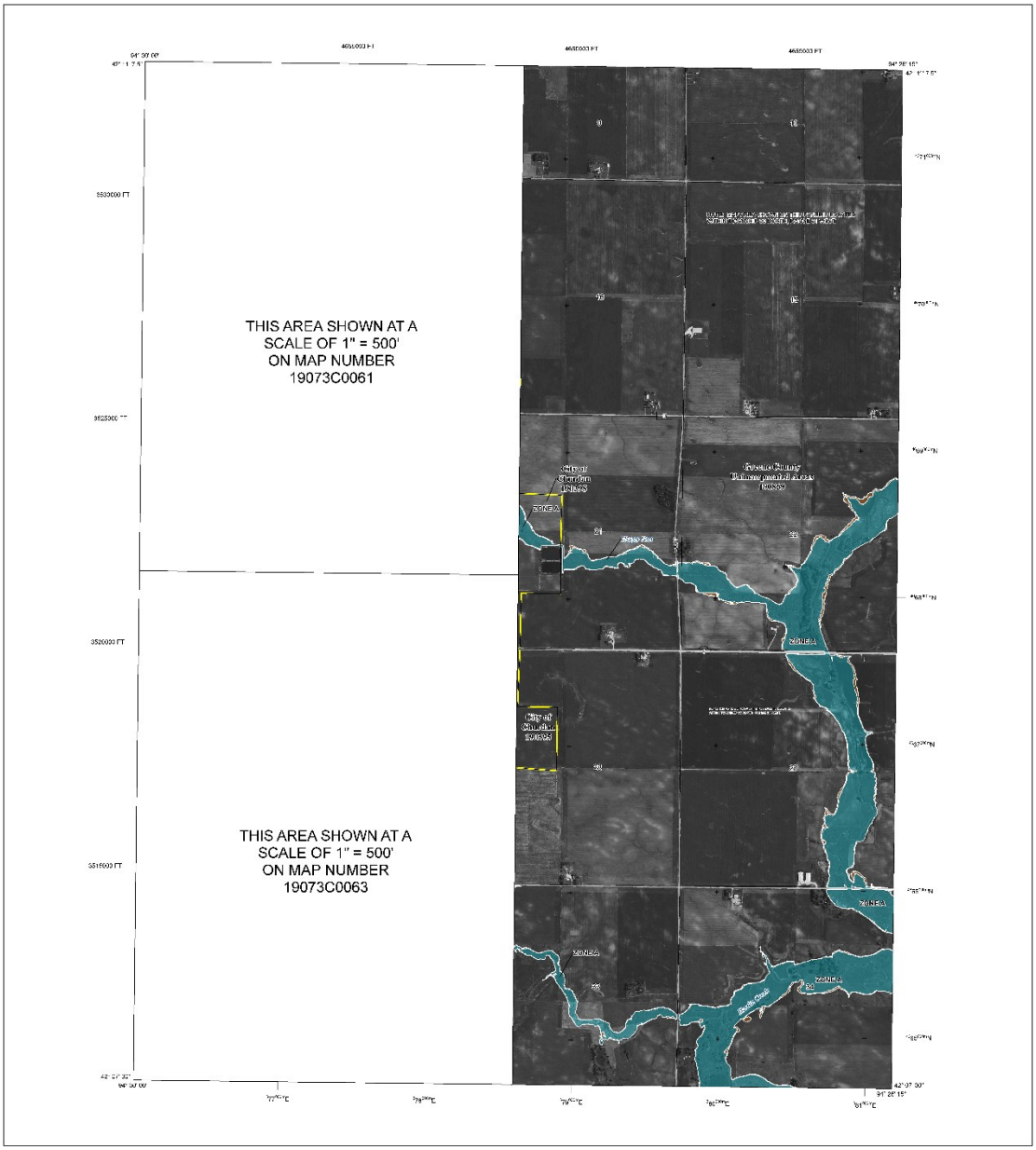
FEMA

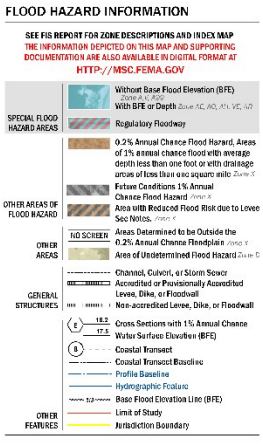
COMMUNITY	NUMBER	PANEL	SUFFIX
CHURDAN, CITY OF	190336	0063	C
GREENE COUNTY	190064	0063	C

VERSION NUMBER
2.3.2.2

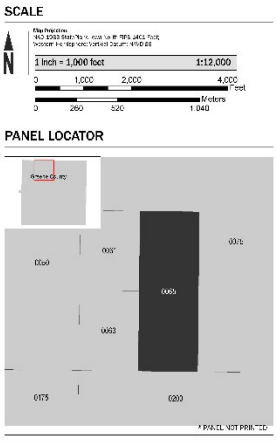
MAP NUMBER
19073C0063C

EFFECTIVE DATE
APRIL 19, 2016





NOTES TO USERS





NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa

PANEL 65 OF 500

FEMA

COMMUNITY	NUMBER	PANEL	SUFFIX
CHURDAN, CITY OF	190336	0065	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0065C

EFFECTIVE DATE
APRIL 19, 2016

There have been changes in the City's mitigation priorities since the previous plan update. Some projects that were identified as a high priority have been completed utilizing available grant and local funds. Other projects that were not high priority were implemented as funds were available, and those that either had no funding available or were not a high priority were not implemented during this planning period. The City's Mitigation Actions were reviewed and updated with the city's new priorities in mind which have shifted from the last planning period due to changes in elected officials and staff, available financial resources, and hazards that have affected the community.

During the previous planning period, the City did not formally incorporate the Hazard Mitigation Plan into other adopted plans, ordinances, or policies. However, mitigation actions identified in the plan were integrated informally into the City's annual budgeting, capital improvement decisions, infrastructure projects, and ongoing operations as applicable. Examples of this include funding and completing the new community room/shelter/fire station, purchasing generators for the water and wastewater facilities, purchasing emergency response equipment, and continuing drainage, flood prevention and emergency preparedness activities. This resulted in the completion and continued implementation of several mitigation actions identified in the previous plan as shown in the table below. No other formal integration of the previous Hazard Mitigation Plan into adopted City plan, ordinance, or policy occurred during the planning period.

Status of Previous Mitigation Actions

The Paton- Churdan Community School District had no previous Action Plan/Mitigation Actions, therefore there is no Status of Previous Mitigation Actions.

Table B.13: City of Churdan Status of Previous Mitigation Actions

	Status				
Previous actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not implemented**
Place water restrictions on during key times during a drought					X
Install/purchase back-up generator for the Community Room	X				
Local road flood prevention			X		
Improve storm water drainage system			X		
Improve culverts, curbs, and gutters			X		
Promote NOAA Weather Radios					X
Continue community drills and awareness of severe weather			X		
New community room/shelter/fire station	X				
Purchase generator for water treatment plant and wastewater plant	X				

Inform public of cooling centers			X		
Develop an evacuation plan				X	
Develop website link about hazards				X	
Put hazard information in newsletter			X		
Install mobile technology to communicate with emergency services	X				
Do table and real-time drills			X		
Work with cable company to implement warning system			X		
Purchase essential vehicles and equipment			X		
Purchase SCBA for emergency responders			X		
Purchase bunker gear for emergency responders			X		
Purchase pumper/tanker NFPA	X				
Install GPS units in emergency vehicles	X				
Purchase generators and pumps			X		
Continued participation in and compliance of NFIP			X		
Continue the addition of new hydrants			X		

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): [The mitigation strategy shall include] 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.

Section 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.

Table B.14: City of Churdan Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards**
Objective 1	Maintain adequate water level during a drought
Objective 2	Offer relief to extreme heat
Objective 3	Improve public infrastructure
Objective 4	Enact and enforce regulatory measures that protect property
Goal 2	**Minimize injuries and loss of life due to the impacts of hazards**
Objective 1	Improve public warning capabilities
Objective 2	Increase public safety
Objective 3	Improve public awareness to threats and hazards
Goal 3	**Improve coordination and communication with other relevant organizations and build support for hazard mitigation**
Objective 1	Utilize tele-health

Objective 2	Increase public awareness of hazards
Goal 4	**Maintain and support public safety facilities, including equipment and training**
Objective 1	Improve emergency responder equipment
Objective 2	Improve first responder resources and capabilities

Table B.?? Paton-Churdan Community Schools Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other school assets from the effects of hazards**
Objective 1	Improve early warning signs
Objective 2	Improve infrastructure
Objective 3	Provide Backup assistance for all critical systems
Goal 2	**Minimize to the greatest possible extent the vulnerability to the impacts of all identified hazards**
Objective 1	Protection of children, staff and visitors
Goal 3	**Improve coordination, communication, and response operations with other relevant organizations**
Objective 1	Provide education and training
Objective 2	Improve first responder resources and capabilities
Goal 4	**Improve public communication, education, and awareness of hazards and risks to the Paton-Churdan Community School District**
Objective 1	Provide education and training

Table B.15: City of Churdan Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Place water restrictions on during key times during a drought	Drought	Low	Public Works	Minimal	City Public Works Fund	Prevention	Ongoing
Maintain back-up generator for the community room	Windstorm, severe winter storms	Mod	Public Works/Fire Department	Low	City Public Safety Fund, FEMA HMGP with State Match, Grow Greene County, FEMA BRIC Program	Emergency Services	Mid
Local road flood prevention	Flash flood	Mod	Public Works	Minimal	City General Fund	Prevention	Mid
Improve storm water drainage system	Flash flood	Mod	Public Works	Low	City Public Works Fund	Structural Project	Mid
Improve culvert, curbs, and gutters	Flash flood	Mod	Public Works	Low	City Public WorksFund	Structural Project	Long
Promote NOAA weather radios	Flash flood, tornado, windstorm, extreme heat, hailstorm, severe winter storms, thunderstorm, and lightning	High	Fire Department	Minimal	Grow Greene County, Fire Department Budget, State Fire Marshal	Public education and awareness	Short
Continue community drills and awareness of severe weather	Flash flood, tornado, windstorm, extreme heat, hailstorm, severe winter storms, thunderstorm, and lightning	High	City Council, County Emergency Management, Fire Department	Minimal	City Public Safety Fund	Public education and awareness	Short

Maintain generator for water treatment plant and wastewater plant	Windstorm, extreme heat, severe winter storms, thunderstorm and lightning	Low	City Council	Low	City Public Works Fund, FEMA HMGP with State Match, Grow Greene County, FEMA BRIC Program	Emergency Services	Mid
Inform public of cooling centers	Extreme heat	Mod	Fire Department	Minimal	City Public Safety Fund	Public Education and awareness	Mid
Develop an evacuation plan	Tornado	Mod	Fire Department	Minimal	City Public Safety Fund	Prevention	Short
Develop website link about hazards	Drought, Extreme Heat, Flash Flood, River Flooding, Grass/Wild Land Fire, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Windstorm	Low	Fire Department, County Emergency Management	Minimal	City General Fund, Grow Greene County	Public Education and Awareness	Short
Put hazard information in newsletter	Drought, Extreme Heat, Flash Flood, River Flooding, Grass/Wild Land Fire, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Windstorm	Low	Fire Department, County Emergency Management	Minimal	City General Fund	Public Education and Awareness	Short
Do table and real-time drills	Drought, Extreme Heat, Flash Flood, River Flooding, Grass/Wild Land Fire, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Windstorm	Mod	Fire Department, County Emergency Management	Minimal	City Public Safety Fund	Emergency Services	Short

Work with cable company to implement warning system	Flash flood, tornado, windstorm, thunderstorm and lightning, severe winter storms	Mod	Fire Department	Minimal	City General Fund	Emergency Services	Short
Purchase essential vehicles and equipment	Drought, Extreme Heat, Flash Flood, River Flooding, Grass/Wild Land Fire, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Windstorm	High	Fire Department	Moderate	City General Fund, Fire Department Budget, Grow Greene County	Emergency Services	Mid
Purchase SCBA for emergency responders	Grass or wild land fire	High	Fire Department	Low	City General Fund, Fire Department Budget, Grow Greene County, AFG	Emergency Services	Short
Purchase bunker gear for emergency responders	Drought, Extreme Heat, Flash Flood, River Flooding, Grass/Wild Land Fire, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Windstorm	High	Fire Department	Low	City Public Safety Fund, Fire Department Budget, Grow Greene County, AFG	Emergency Services	Short
Purchase generators and pumps	Flash flood	Low	Fire Department	Low	City Public Works Fund, FEMA HMGP with State Match, Local Foundations, FEMA BRIC Program	Emergency Services	Mid
Continued participation in and compliance of NFIP	River flooding	Mod	City Council	Minimal	City General Fund	Property Protection	Ongoing

Continue the addition of new hydrants	Extreme heat, grass or wild land fire and drought	Mod	City Council, Public Works	Low	City Public Works Fund	Property Protection	Ongoing
Monitor Levee/Dam Failure Risk	Levee/Dam Failure	Low	City Council	Minimal	City General Fund	Emergency Services	Ongoing

Table B.16: Paton-Churdan Community Schools Mitigation Actions

Action	**Hazard(s) Addressed**	**Priority**	**Responsible Department**	**Estimated Cost**	**Potential Funding Source(s)**	**Mitigation Measure Category**	**Target Completion Date**
Backup generator	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail	Med	Superintendent, School Board, Maintenance	Moderate	School Funds, FEMA HMGP, Grow Greene	Emergency Services	Mid
Build a safe room	Tornado, Severe winter storms	High	School Board, Superintendent, School District's Engineering Firm	High	School fund, City Funds, FEMA HMGP, Grow Greene	Prevention	Short
Training on bus evacuation	Flash Flood, River Flooding, Levee/Dam Failure	High	Transportation Director, Bus Drivers	Low	School Funds, Training Grants	Emergency Services	Ongoing
Continue to train local volunteers as much as feasibly possible	Severe Winter Storms, Thunderstorm/ Lightning/Hail, Tornado, Flash Flood, Windstorm, Drought, Extreme Heat	High	Paton-Churdan School District	Minimal	School Funds, FEMA AFG & SAFER	Public Education and Awareness	Ongoing
Install GPS in all school buses	Flash flood, River Flooding, Tornado, Levee/Dam Failure	Low	Paton-Churdan School District	Moderate	School Funds, Iowa Department of Education	Emergency Services	Mid
Continued practice of drills and safety procedures with children at school	Tornado, Thunderstorm/Lightning/Hail, Windstorm, Flash Flood,	High	Paton-Churdan School District	Low	City Funds, School Funds	Public Education	Ongoing

	River Flood, Grass/Wildland Fire, Severe Winter Storm, Windstorm					and Awareness	
Create emergency operations plan	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, Severe Winter Storms, Thunderstorm/ Lightning/Hail	High	Paton-Churdan Community schools District, Greene County Emergency Management	Minimal	School Funds	Prevention	Short

Incorporation into Other Planning Mechanisms

Where possible, findings and recommendations from this Hazard Mitigation Plan will be integrated into the City of Churdan's existing and future planning and operating documents. The City Council will be responsible for ensuring that the Hazard Mitigation Plan is reviewed when applicable local plans, ordinances, policies, and capital improvement documents are developed or updated. During these updates, the city will review applicable hazard risk information and mitigation actions contained in this plan and determine whether relevant information or actions should be incorporated into the document being updated. The integration of information from the Hazard Mitigation Plan will be documented through the applicable planning document, ordinance or resolution, budget or capital improvement records, meeting minutes, or other City records.

Information from the Hazard Mitigation Plan will be reviewed and incorporated, as applicable, when the following documents are updated:

- City Code
- Zoning Ordinance

The City of Churdan does not currently have the following plans or documents. If any are developed during the life of this Hazard Mitigation Plan, applicable hazard risk information, mitigation goals, and mitigation actions will be reviewed and incorporated into their development, as appropriate:

- Comprehensive Plan
- Housing Needs Assessment
- Strategic Plan
- Building Code
- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans

Incorporation into Other Planning Mechanisms- Paton-Churdan Community School District

The update of the mitigation strategy will be provided to the School Superintendent for consideration in the next update cycle of the capital improvement plan. Information will be utilized to expand and improve the school's mitigation to potential hazard events.

Appendix C:

Dana

Community Profile

History

The City of Dana was named after Samuel Dana, one of the first settlers of the current city location. Dana is most notably known for the establishment of the railroad trading center and was once considered one of the best trading stations along the railroad. The first housing unit was constructed in 1880. In 1881 the first mercantile enterprise was constructed by E.E. Hutchings. Over the next fourteen years ownership of the enterprise changed quite often. The first bank in Dana was established in 1897 by the Brendon Brothers of Dallas Center. The bank burned down a year later in one of the three historical fires that took place in Dana. The bank was reconstructed the same year. Other businesses in Dana included grain, lumber and coal businesses, meat markets, blacksmiths, shoe shops, and the famous "Cooperative Cheese Factory."

The cheese factory was destroyed in the fire of 1904 and was reconstructed in just six weeks. The factory was again closed in 1906 due to causing sickness resulting in $745 worth of cheese to be burned. The first church (presbyterian) in Dana was organized at the Oxley school house in 1885. The M.E. Church of Dana was established in 1893 and the church was constructed in 1895. Dana was incorporated in 1907.

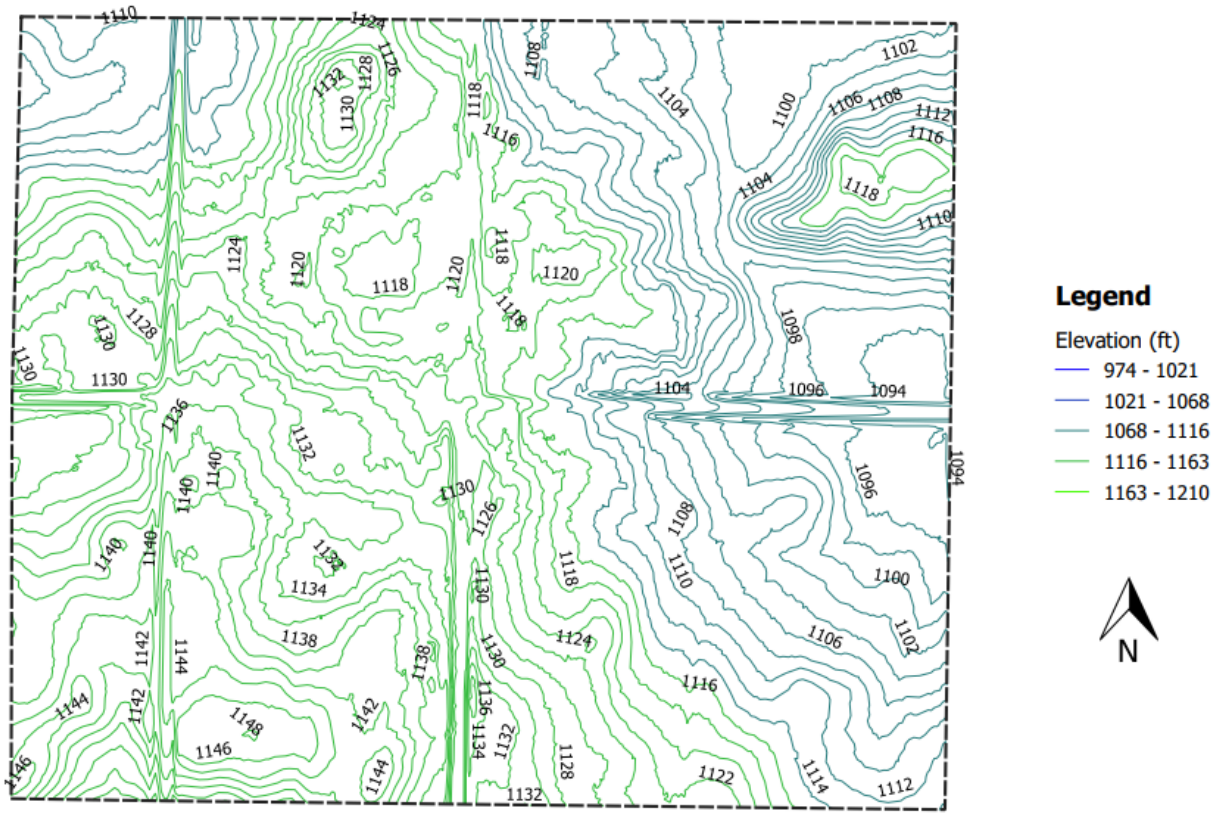
Geography and Environment

Dana is located in the northeast corner of Greene County. IA 144 bisects the community running north/south through town. U.S. 30 is located 5.2 miles south of Dana, and U.S. 169 is roughly 6.8 miles to the east of town. Sana is located 5.6 miles from Grand Junction, 13.4 miles from Jefferson, 25.6 miles from Boone, 37.3 miles from Ames and 70.2 miles from Des Moines.

The highest elevation in Greene County can be found throughout the western part of the county. Here, the elevation can reach as much as 1,230 feet above sea level. Dana's highest elevation is

roughly 1,146 feet, located towards the western side of the community. Dana is a relatively level community as the lowest point in town is roughly 1,094 feet above sea level. Map C.1 displays the City of Dana's elevation.

Map C.1: City of Dana Elevation



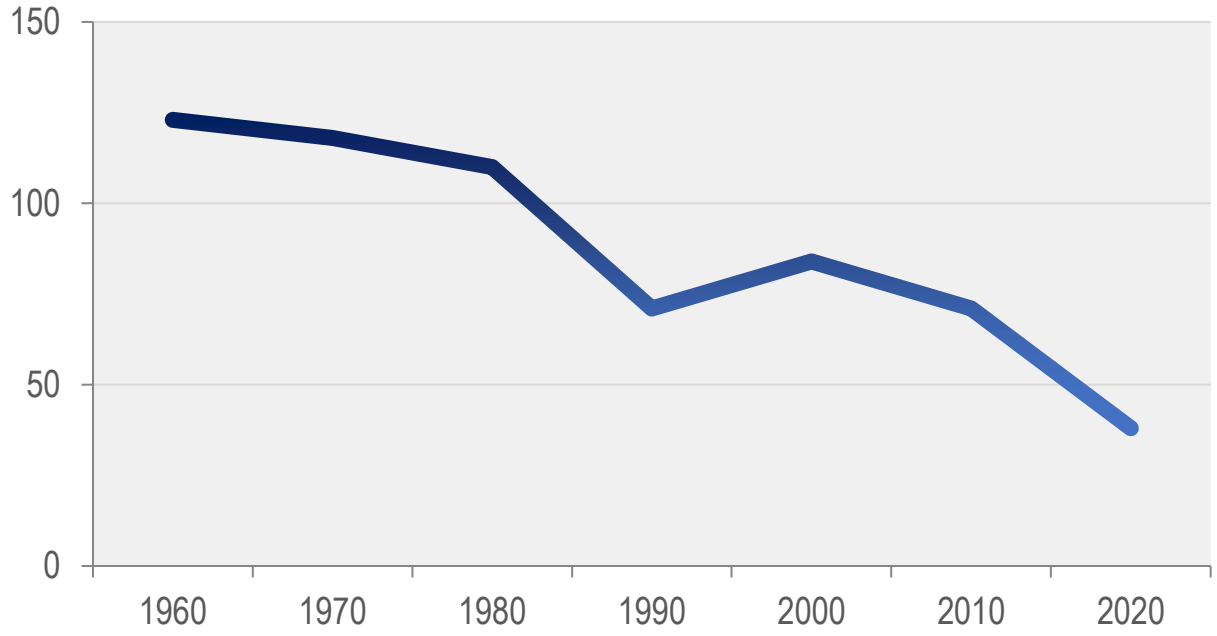
Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Dana's population through past, present, and future trends of the region.

The size and composition of a community's population can exert influence on its development. For instance, population size, composition, and distribution influence the range of businesses a community can support, the pool of workers from which to draw, and the demand for and supply of services. Similarly, the effect people have on the social, economic, and physical environments depends upon the composition, expectations, and distribution of the population. A population's age distribution, income levels, ancestry, and educational attainment are some of the characteristics that mold a community. Population trends give community leaders and elected officials information on what kind of services need to be provided and offers prospective employers an overview of the local labor force.

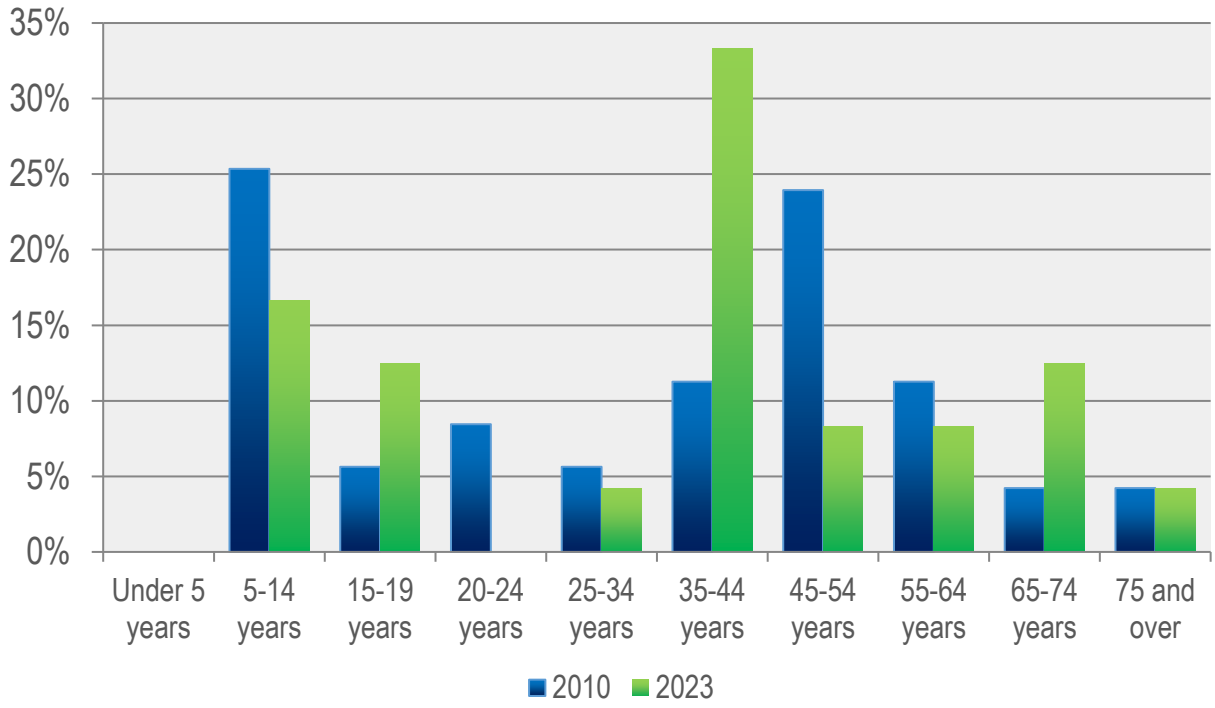
Over the past 50 years, the City of Dana has experienced a gradual decline. In 1960, Dana had a population of 123. Since then, the City's population has declined 69% (85 residents) to 38 in 2020. The most dramatic change happened between 1980 and 1990 when the city lost 39 residents. Figure C.1 shows the City of Dana's population trend since 1960.

Figure C.1: City of Dana Historic Population, 1960-2020



Source: US Census

Figure C.2: City of Dana Age Distribution, 2010 & 2023



Source: US Census

The City's population makeup is slightly different from other parts of Greene County, as there is not the large spike in older residents as seen in other communities. The largest age group in Dana is aged 35-44 years. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts. This information can be found in figure C.2.

Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has declined by 50%. Occupied housing units have decreased by 14 units and vacant housing units decreased by 2 units. Table C.1 shows a breakdown of the city's occupied and vacant housing units.

Table C.1: City of Dana Housing Units, 2010 & 2023

	2010		2023	
	Number	Percent	Number	Percent
Occupied Housing Units	25	78.1%	11	68.8%
Owner-Occupied	15	60.0%	7	63.6%
Renter-Occupied	10	40.0%	4	36.4%
Vacant Housing Units	7	21.9%	5	31.3%
Total Housing Units	32	100.0%	16	100.0%

Source: US Census, American Community Survey

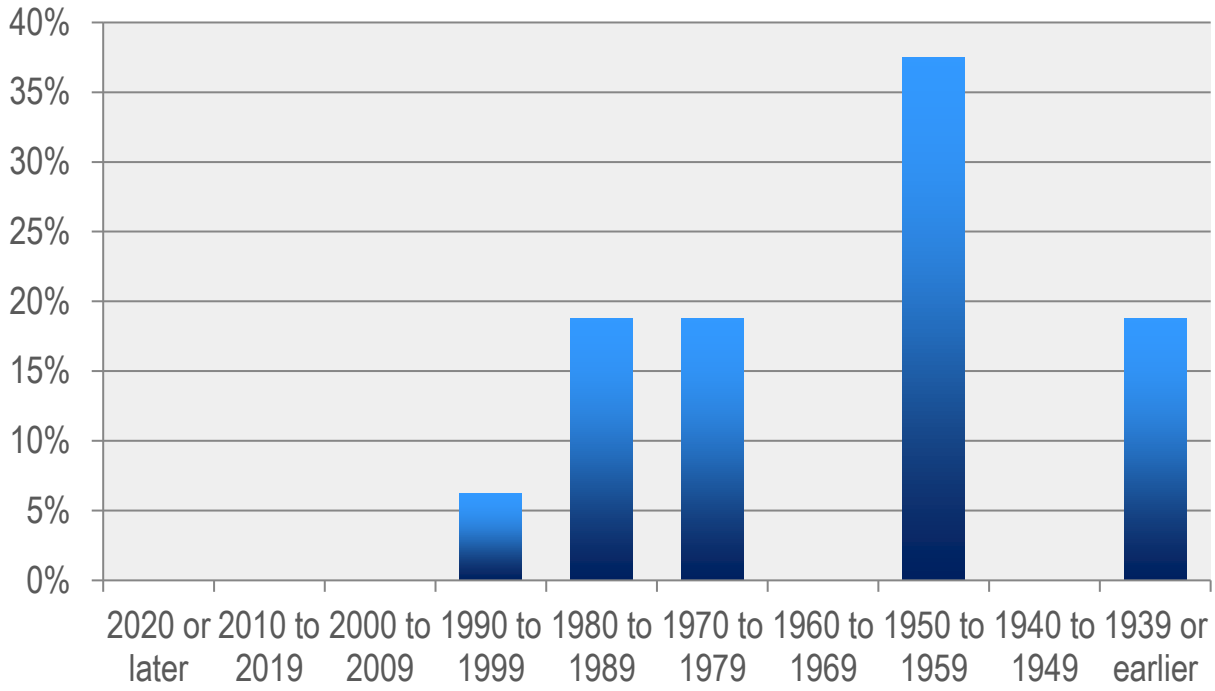
Table C.2: City of Dana Value of Owner-Occupied Units, 2023

Value of Housing Unit	Percent of Homes
Less than $50,000	57.1%
$50,000 to $99,999	14.3%
$100,000 to $149,999	28.6%
$150,000 to $199,999	0.0%
$200,000 to $299,999	0.0%
$300,000 to $499,999	0.0%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%
Median (dollars)	$45,000
Median (Iowa)	$213,300

Source: American Community Survey

Dana, like many other small rural towns in Iowa, has a lower median housing value of $45,000. The State of Iowa has a median housing value of 213,300. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2023 American Community Survey Estimates, 57.1% of the city's homes are valued less than $50,000. A complete breakdown of the value of homes in Dana can be found in Table C.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Figure C.3: City of Dana Year Housing Units Constructed, 2023



Source: American Community Survey

Figure C.3 showcases the year housing units within the City of Dana were constructed. Like most of the county, Dana has a large portion (18.8%) of the homes constructed in 1939 or earlier. Unlike other cities in Greene County, Dana saw a significant portion of homes being built from 1950-1959 (37.5%). Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Economics

Household income is an important indicator of the economic base in Greene County. In Dana, the median household income is unavailable due to its small population. Dana's mean income is $82,891 which would classify a large number of the households in Dana as "working" or "middle" class. The City of Dana's household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Retail trade is the largest industry within the City, which is consistent with the County as a whole. Many employees from Dana commute to other larger neighboring cities like Jefferson and Fort Dodge where more employment opportunities are present.

Table C.3: City of Dana Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	0	0.0%
$10,000 to $14,999	0	0.0%
$15,000 to $24,999	2	18.2%
$25,000 to $34,999	1	9.1%
$35,000 to $49,999	0	0.0%
$50,000 to $74,999	3	27.3%
$75,000 to $99,999	3	27.3%
$100,000 to $149,999	1	9.1%
$150,000 to $199,999	0	0.0%
$200,000 or more	1	9.1%
Median Household Income		--
Mean Household Income	$82,891	--

Source: American Community Survey

Dana, overall, is a small community in a small rural county. A large percentage of the businesses within the county serve the largely agricultural economy. Table C.4 breaks down what industry Dana's residents work in. Retail trade employs the largest cohort of residents, with 26.7% employed in this industry. The second largest is Educational services, and health care and social assistance along with arts, entertainment, and recreation, and accommodation and food services with 20% of the population employed in each sector.

Table C.4: City of Dana Employment by Industry, 2022

2023	Estimate	Percent
Civilian employed population 16 years and over	15	100.0%
Agriculture, forestry, fishing and hunting, and mining	1	6.7%
Construction	0	0.0%
Manufacturing	1	6.7%
Wholesale trade	1	6.7%
Retail trade	4	26.7%
Transportation and warehousing, and utilities	0	0.0%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	0	0.0%
Professional, scientific, and management, and administrative and waste management services	0	0.0%
Educational services, and health care and social assistance	3	20.0%
Arts, entertainment, and recreation, and accommodation and food services	3	20.0%
Other services, except public administration	2	13.3%
Public administration	0	0.0%

Source: American Community Survey

Existing Documents

Table C.5 provides a compilation of the current planning and regulatory documents in place for the City of Dana. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The City's housing needs assessment has allowed the city to take inventory of the current housing situation and determine what steps are necessary to reduce the impact hazards have on the housing stock.

Dana is a very small rural community with very limited resources. A comprehensive plan and a zoning code would work hand-in-hand to guide the future development of the city. The comprehensive plan takes a deep dive into the city's inventory of assets, utilities, and infrastructure. A comprehensive plan would include a hazard chapter which would address some disaster response items as well as mitigation for the future. A zoning code would help to keep certain zones away from one another to reduce the risk to humans and structures. The different zones could pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues

to the overall population. The creation of a zoning code would also include information for street and sidewalk regulations which can reduce the number of transportation incidents.

A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table C.5: City of Dana Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	No	-
Building Code	Yes	1993
Zoning Ordinance	No	-
Strategic Plan	Yes	1995
Housing Needs Assessment	Yes	1999
NFIP Participant	No	-
Floodplain Regulations	No	-

NFIP Participation

The City of Dana does not currently participate in the NFIP. There are no flood hazard areas in the City of Dana and flooding within the city has been limited within the past. The City's FIRMs were updated in 2016 and they can be found later in this appendix.

Outlook and Future Development

Since the last plan update, the City of Dana has experienced limited new development. Changes have primarily included improvements to the existing housing stock. No significant new development has occurred within identified hazard prone areas. As a result, development since the previous plan has not increased the City's vulnerability to identified hazards. Dana anticipates that future development will continue to occur as a similar scale and within existing developed areas.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Dana's critical facilities can be found on Map C.2.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table C.6.

Table C.6: City of Dana Essential Infrastructure and Services

Major Arterials	IA Highway 144	**Air Service**	Jefferson Municipal Airport
Water Service	Xenia Rural Water	**Sewer Service**	Septic Tanks
Electric Service	Alliant Energy	**Gas Service**	LP
Sanitation/Solid Waste	Local Haulers	**Landfill**	Boone County Landfill
Phone and Internet	Wireless	**Law Enforcement**	Greene County Sheriff
Fire Service	Paton Fire Department and Grand Junction Fire Department	**Ambulance Service**	Greene County Ambulance

Table C.7: City of Dana Critical Facilities

Number on Map	Name	Address	Type
1	City Hall	100 Eckstine Street S	Essential Facility

Map C.2: City of Dana Critical Facilities



Hazard Scores

Table C.8: City of Dana Risk Assessment

Hazard	Comments
Drought	Drought occurrences have increased in the past ten years and Dana has been affected. This hazard can cause both direct and indirect issues for the city and its residents.
Earthquake	There have been no instances of damaging earthquakes in the City of Dana. The committee feels there will be no instances during the life of this plan.
Expansive Soils	Expansive soils are not uncommon in this area, due to high clay content and dramatic changes in soil moisture and temperature. This hazard has the greatest impact on individual properties, especially those not engineered to withstand the hazard. This is a very localized hazard (e.g., individual home) and not a major priority for public response. The City of Dana's leaders have no knowledge of problems affecting city infrastructure, city facilities, or their personal homes and property.
Extreme Heat	Extreme heat events continue to impact Dana. Education may be one of the best action tools to combat this hazard's impact on the human body. Given current conditions and resources available, there is no risk of widespread losses due to this hazard, although power lines and other infrastructure can be damaged or can break.
Flash Flood	Since 2020, the City of Dana has reported no instances of flash flooding. While flash floods have little to no warning time, the committee has determined this hazard is not a high priority hazard to address but will consider mitigation actions to prepare the community for response to an event. It is anticipated that the city will not experience a flash flood event in the next five years.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand and can immediately surround the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
Levee/Dam Failure	There are no dams or levees in the city or in the immediate vicinity of the city.
River Flooding	River flooding has not been reported in Dana recently. However, the most recent FIRM maps adopted in 2016 show flood hazard areas near the city. and historically there have been people buying flood insurance through the program.
Severe Winter Storm	Severe winter storms continue to impact Dana. While meteorological advances can warn people in advance, there is always a segment of the population caught in a storm. Heavy snow and the winds associated with storms can cause tremendous damage. Severe cold can cause fatalities. Thawing pipes and roadways can crack, break, and fail, causing considerable damage.
Thunderstorm/ Lightning/Hail	Thunderstorm, lightning, and hail events are common in Dana, but most of them do not have major impact to life and property, and only a few storms per year would be considered severe. A single building may be damaged by lightning and power

	may be disrupted in parts of town for a few minutes to a few hours. Hail can damage buildings and property throughout the city, which has occurred in the past. Strong thunderstorm winds also damage property.
Tornado	While tornadoes have touched down in the county, there is no report of tornadoes damaging Dana directly in the recent past. Although the city has been spared major tornado damage, vigilance is important, as there is no way to know where one will occur. Based on the size of Dana, the chances are low in any given year. Meteorological warnings have improved, but storms can still spawn tornadoes with no notice. It is vital that the public is prepared for this hazard and that there are places for people to shelter.
Windstorm	Recent windstorms have caused damage to properties and crops even through the available data shows otherwise. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos impacted Dana, prompting the community to prepare more effectively for these hazards.

Hazard	Reason for Omission
Earthquake	Iowa, as a whole, has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table C.9: City of Dana Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	1	$9,000	38
Commercial	1	$7,400	
Industrial	2	$883,700	
Residential	16	$848,000	

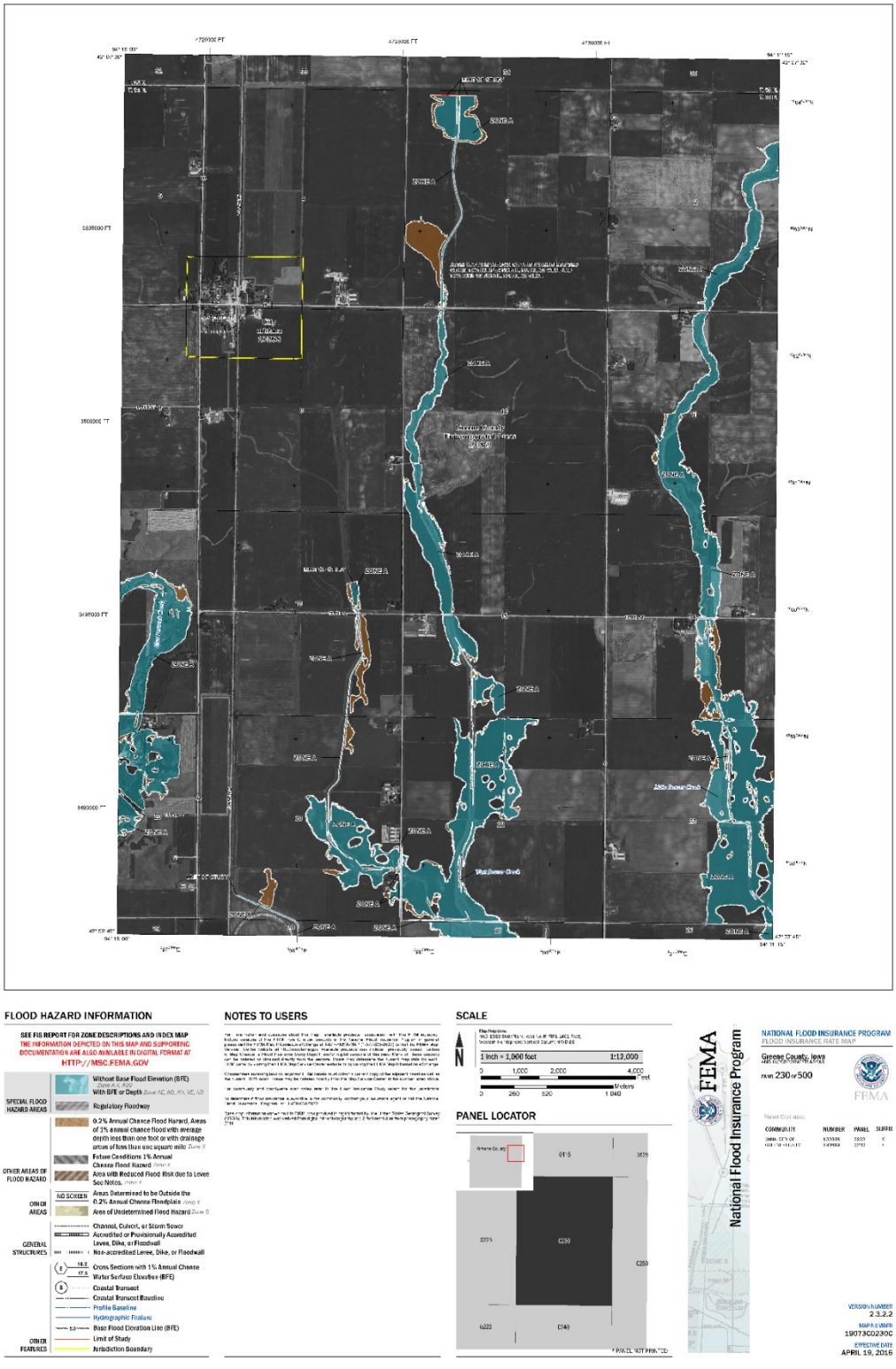
The extent of future losses cannot be precisely predicted because the location, magnitude, and duration of future hazard events are uncertain. Table C.9 represents Dana's maximum community-wide exposure and should not be interpreted as the anticipated loss from any individual hazard. Potential impacts vary significantly by hazard. Table C.10 evaluates anticipated physical damage, service disruption, economic and social consequences, impacts to vulnerable populations, and potential losses to identified assets for each hazard.

Table C.10: City of Dana Hazard Impact and Vulnerability Summary

Hazard	Anticipated Impacts and Potential Losses
Drought	Drought may affect the entire community through reduced water availability and increased demand on the municipal water system, however, significant structural damage is not anticipated. Prolonged drought may increase operating demands on the water system, affect vegetation, and increase grass/wildland fire risk. Economic impacts may occur indirectly through impacts to the surrounding agricultural community. Older adults, households with limited financial resources, and residents dependent on reliable municipal water service may be more vulnerable to prolonged drought conditions.
Extreme Heat	Significant direct damage to buildings is not anticipated. Extreme heat may affect the entire population and increase demand on the electrical system and cooling equipment. Power outages could interrupt municipal services and leave residents without adequate cooling. Older adults, young children, individuals with medical conditions, outdoor workers, and residents without adequate air conditioning are particularly vulnerable. Potential losses are primarily associated with increased utility costs, lost productivity, medical impacts, and service interruptions rather than structural damage.
Flash Flood	Dana has reported no flash flooding since 2020; however, intense rainfall could produce localized street, yard, basement, or property flooding where drainage is limited. Streets, culverts, utilities, and structures in low-lying or poorly drained areas would be most vulnerable. Temporary road closures could affect access and emergency response. Because there has been no recent flash-flood losses, widespread structural losses are not anticipated.
Grass/Wildland Fire	Agricultural land and open vegetation surrounding Dana presents a potential for a grass or field fire to approach the city. Homes, businesses, utility infrastructure, and other structures along the perimeter of the city would be most vulnerable. Smoke could affect the majority of the community and particularly individuals with respiratory conditions. A fire could also temporarily close roads or interrupt utilities. Structural losses would depend on the location, wind conditions, and ability of responders to contain the fire.
Levee/Dam Failure	There are no dams or levees within Dana or in the vicinity of the city and therefore do not pose a threat to the community. Therefore, no significant direct structural damage, service disruption, displacement, vulnerable-population impacts, or property losses from dam or levee failure are currently anticipated.
River Flooding	The 2016 FIRM identifies flood hazard areas within a mile of Dana; therefore, structures, streets, utilities, and other assets located on the east side of the city have greater vulnerability than assets elsewhere in the community. Flooding could damage buildings and

	contents, temporarily restrict transportation, interrupt utilities or municipal services, and displace affected residents. Residents with limited mobility, transportation, or financial resources may have greater difficulty evacuating or recovering. Potential property losses are concentrated within the identified flood hazard areas rather than distributed evenly throughout the city.
Severe Winter Storm	Severe Winter Storms may affect the entire community but generally do not cause uniform structural damage. Heavy snow, ice, wind, and extreme cold can damage trees, roofs, overhead utilities, water infrastructure, and transportation systems. Power outages and blocked roads could interrupt municipal services and emergency response. Older adults, individuals with medical needs and/or limited mobility, and households without alternative heat sources are particularly vulnerable during extended outages or extreme cold. Economic losses may include snow removal, infrastructure repairs, business interruption, and increased heating costs.
Thunderstorm/Lightning/Hail	All developed areas in the City of Dana is exposed to severe thunderstorms, lightning, and hail. The 2026 hailstorm demonstrated the potential for widespread roof damage to residential properties. Future storms could damage roofs, siding, windows, vehicles, trees, utility infrastructure, and public facilities. Lightning and wind may cause power outages and fires in localized areas of the city. Potential economic losses include building and vehicle repairs, utility restoration, debris removal, and temporary business interruption.
Tornado	All structures and residents of Dana are potentially exposed to tornadoes, although actual damage would generally be concentrated along the path of the tornado rather than affecting a fixed percentage of the community. A direct strike could cause severe or complete damage to homes, businesses, public buildings, utilities, and other critical facilities; block streets with debris; interrupt utilities, communications, and emergency services; and result in displacement, injuries, or fatalities. Residents without access to adequate shelter and those requiring assistance to shelter quickly would be particularly vulnerable. Potential structural losses could be substantial in the area directly affected.
Windstorm	All of the developed areas of the City of Dana are exposed to high winds and derecho events. Recent events have demonstrated the potential to damage roofs, siding, trees, crops, vehicles, and overhead electrical and communications infrastructure. Downed trees and utility lines may block streets, cause extended power outages, and interfere with emergency response and municipal services. Older structures and buildings with large roof areas may experience greater damage. Economic losses may include structural repairs, utility restoration, debris removal, business interruption, and agricultural losses.

Flood Map



Greene County Hazard Mitigation Plan Appendix C- City of Dana

There have been changes in the City's mitigation priorities since the previous plan update. Some projects that were identified as a high priority have been completed utilizing available grant and local funds. Other projects that were not high priority were implemented as funds were available, and those that either had no funding available or were not a high priority were not implemented during this planning period. The City's Mitigation Actions were reviewed and updated with the city's new priorities in mind which have shifted from the last planning period due to changes in elected officials and staff, available financial resources, and hazards that have affected the community.

During the precious planning period, the City did not formally incorporate the Hazard Mitigation Plan into other adopted plans, ordinances, or policies. However, mitigation actions identified in the plan were integrated informally into the City's annual budgeting, capital improvement decisions, infrastructure projects, and ongoing operations as applicable. Examples of this include funding and providing NOAA weather radios and improving snow removal equipment. This resulted in the completion and continued implementation of mitigation actions identified in the previous plan as shown in the table below. No other formal integration of the previous Hazard Mitigation Plan into adopted City plan, ordinance, or policy occurred during the planning period.

Status of Previous Mitigation Actions

Table C.11: City of Dana Status of Previous Mitigation Actions

	Status				
Previous actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not implemented**
Pursue grants for NOAA Weather Radios for residents	X				
Add emergency warning system				X	
Provide information/fliers to residents about hazards				X	
Provide improved snow removal equipment	X				
Purchase and place a tornado siren in town				X	
Install new infrastructure throughout the city			X		

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): [The mitigation strategy shall include] 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.

Section 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.

Table C.12: City of Dana Action Plan

Goal 1	**Minimize injuries and loss of life due to the impacts of hazards**
Objective 1	Improve Public Waring Capabilities
Objective 2	Improve Public Awareness
Goal 2	**Maintain and support public safety facilities, including equipment and training**
Objective 1	Improve Public Safety

Table C.13: City of Dana Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Add emergency warning system	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Mod	County Emergency Management and City Council	Low	City Public Safety Fund, Grow Greene County, Fire Department Budget, County Emergency Management	Emergency Services	Short
Provide information/fliers to residents about hazards	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Low	City Council	Minimal	City Public Safety Fund, County Emergency Management	Public Education and Awareness	Mid
Purchase and place a tornado siren in town	Tornado, Windstorm, and Hailstorm	High	City Council	Low	City Public Safety Fund, FEMA HMGP with State match, Grow Greene County, FEMA BRIC Program	Emergency Services	Short
Install new infrastructure throughout the city	Drought	High	City Council	High	City Public Works Fund,	Structural Project	Short
Generator for City Hall	Windstorm, Severe Winter Storm	Mod	City Council	Low	City General Fund, Grow Greene County, FEMA BRIC Program with State Match, FEMA HMGP with State Match	Emergency Services	Mid

Designate City Hall as emergency shelter	Tornado, Windstorm, Severe Winter Storm, Extreme Heat	Mod	City Council	Minimal	City Public Safety Fund	Emergency Services	Short
Improve surface drainage and stormwater storage	Flash Flood, River Flooding	Mod	City Council	Low	City Public Works Fund	Structural Project	Mid
Clear Debris and Flammable Materials from City owned property	Grass/Wild Land Fire	Mod	City Council	Minimal	City Public Works Fund	Emergency Services	Short
Monitor Levee/Dam Failure Risk	Levee/Dam Failure	Low	City Council	Minimal	City General Fund	Emergency Services	Ongoing

Incorporation into Other Planning Mechanisms

Where possible, findings and recommendations from this Hazard Mitigation Plan will be integrated into the City of Dana's existing and future planning and operating documents. The City Council will be responsible for ensuring that the Hazard Mitigation Plan is reviewed when applicable local plans, ordinances, policies, and capital improvement documents are developed or updated. During these updates, the city will review applicable hazard risk information and mitigation actions contained in this plan and determine whether relevant information or actions should be incorporated into the document being updated. The integration of information from the Hazard Mitigation Plan will be documented through the applicable planning document, ordinance or resolution, budget or capital improvement records, meeting minutes, or other City records.

Information from the Hazard Mitigation Plan will be reviewed and incorporated, as applicable, when the following documents are updated:

- City Code
- Zoning Ordinance

The City of Dana does not currently have the following plans or documents. If any are developed during the life of this Hazard Mitigation Plan, applicable hazard risk information, mitigation goals, and mitigation actions will be reviewed and incorporated into their development, as appropriate:

- Comprehensive Plan
- Strategic Plan
- Building Code
- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans

Appendix D:

Grand Junction

Community Profile

History

Grand Junction was incorporated in 1873 after the completion of two major railways through the region. A north and south railroad was built from Keokuk to Fort Dodge two years after the completion of the Cedar Rapids and Missouri River Railway. The "grand junction" of the two railroads quickly became an appropriate location for a new town. Though the location was questionable at first due to low elevation causing flooding, settlers soon began to locate to the area. Before long, construction of many homes, a lumber yard, hardware store, bank and several other buildings were constructed. The town grew rapidly until the late 1880's when the Chicago, Rock Island and Pacific Railroad took possession of the railroad. This caused many of the shops to be moved to Valley Junction resulting in the loss of one third of the population. Growth since then has been somewhat stagnant.

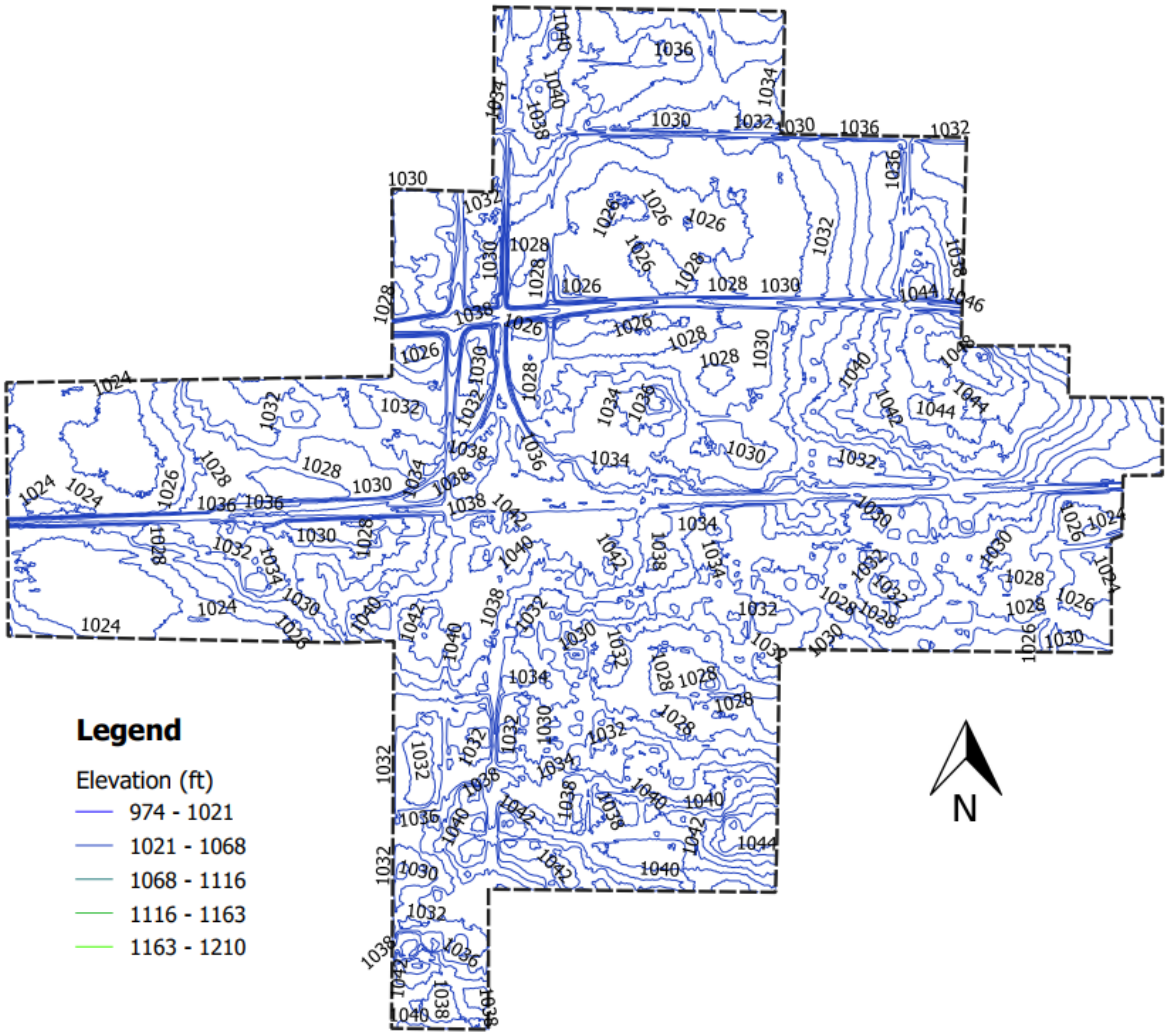
In 1870, the first schoolhouse was constructed out of brick. The building consisted of four rooms and cost $7,000. An addition was constructed in 1883 due to the large population increase. Over time, many churches were constructed including the Methodist Episcopal church (1870), the Baptist Church (1878), the Ebenezer Church of the Evangelical Association (1874), the Presbyterian Church (1870), and St. Bridgett's Church.

Geography and Environment

Grand Junction is located in east central Greene County. U.S. 30 intersects the community of Grand Junction from east/west, while IA 144 intersects the community going north/south. This provides easy access to surrounding communities throughout the region. Grand Junction is roughly 8.9 miles east of Jefferson, 20.8 miles from Boone, 32.5 miles from Ames, 33.9 miles from Carroll, and 57.7 miles from Des Moines.

The highest elevation in Greene County can be found throughout the western part of the county. Here, the elevation can reach as much as 1,230 feet above sea level. Grand Junction, however, is in the lowest part of the county and is relatively flat. The city's elevation ranges from 1,024 feet to 1,046 feet. Grand Junction's elevation can be found in Map D.1.

Map D.1: City of Grand Junction Elevation



Demographics

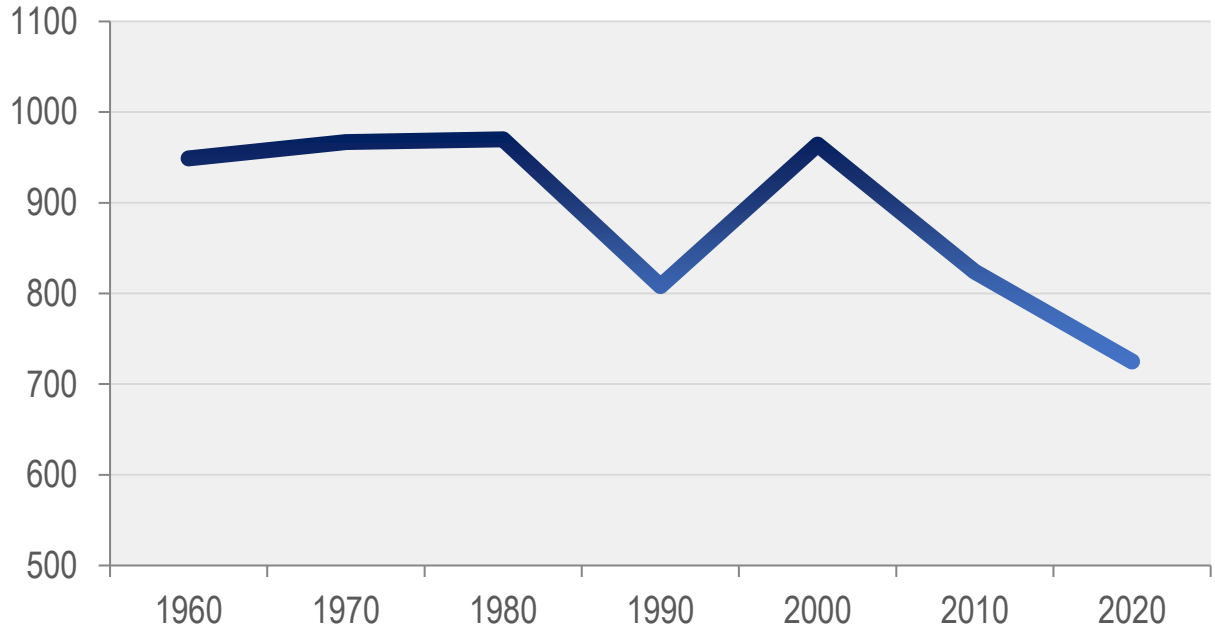
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Grand Junction's population through past, present, and future trends of the region.

The size and composition of a community's population can exert influence on its development. For instance, population size, composition, and distribution influence the range of businesses a community can support, the pool of workers from which to draw, and the demand for and supply

of services. Similarly, the effect people have on the social, economic, and physical environments depends upon the composition, expectations, and distribution of the population. A population's age distribution, income levels, ancestry, and educational attainment are some of the characteristics that mold a community. Population trends give community leaders and elected officials information on what kind of services need to be provided and offers prospective employers an overview of the local labor force.

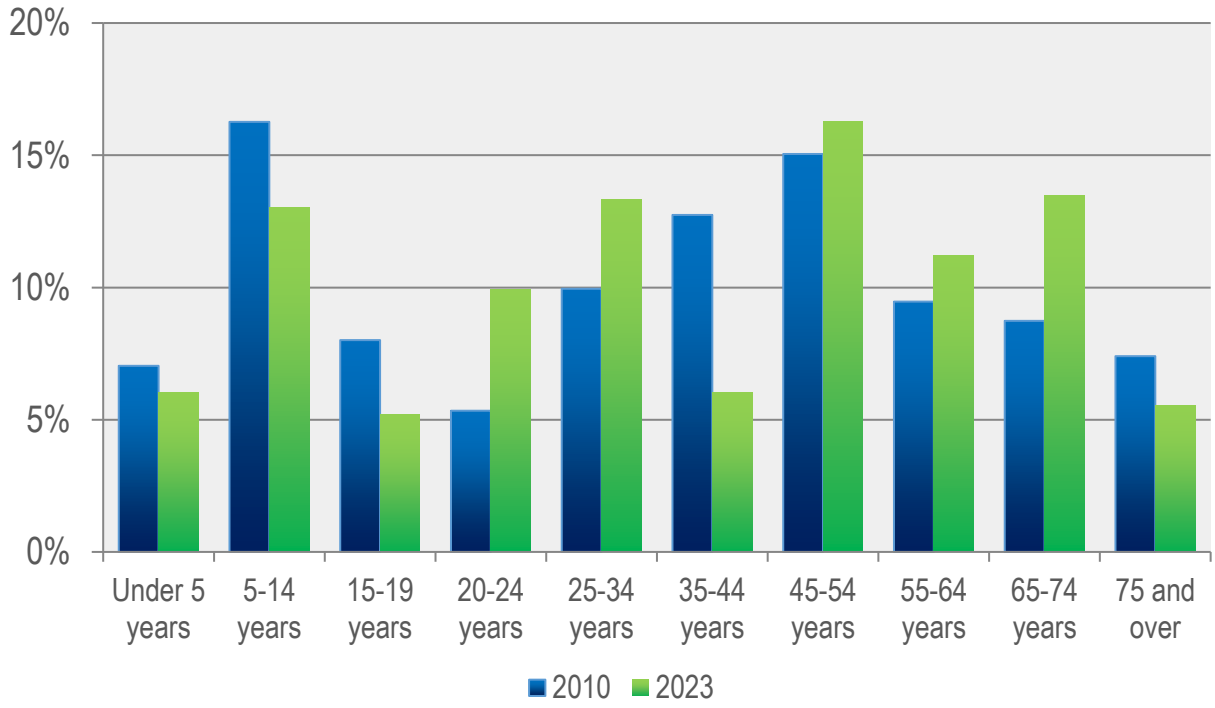
Over the past 50 years, the City of Grand Junction has experienced a slight decline in population. In 1960, Grand Junction had a population of 949. Since then, the City's population has declined 24% (224 residents) to 725 in 2020. The most dramatic change happened between 1980 and 1990 when the city lost 162 residents. From 1990 to 2000, however, the city experienced a short-lived increase in population of 156 which was followed by a decrease in population from 2000 to 2010 of 140. Figure D.1 shows the City of Grand Junction's population trend since 1960.

Figure D.1: City of Grand Junction Historic Population, 1960-2020



Source: US Census

Figure D.2: City of Grand Junction Age Distribution, 2010 & 2023



Source: US Census

The City's population makeup is not very different from other parts of Greene County, and even most of the State of Iowa. The largest age group in Grand Junction is aged 45-54 years. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts. This information can be found in figure D.2.

Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by 75 units. Occupied housing units have decreased by 50 units and vacant housing units decreased by 25 units. Table D.1 shows a breakdown of the city's occupied and vacant housing units.

Table D.1: City of Grand Junction Housing Units, 2010 & 2023

	2010		2023	
	Number	Percent	Number	Percent
Occupied Housing Units	329	85.9%	279	90.6%
Owner-Occupied	238	72.3%	175	62.7%
Renter-Occupied	91	27.7%	104	37.3%
Vacant Housing Units	54	14.1%	29	9.4%
Total Housing Units	383	100.0%	308	100.0%

Source: US Census, American Community Survey

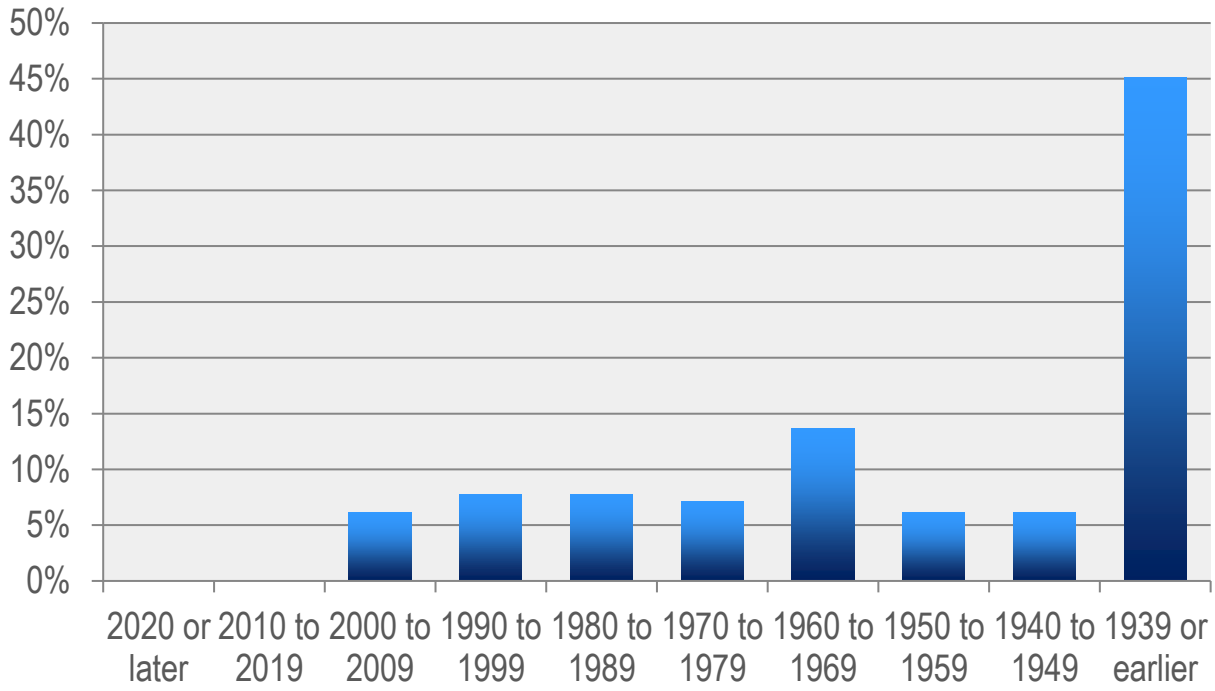
Table D.2: City of Grand Junction Value of Owner-Occupied Units, 2023

Value of Housing Unit	**Percent of Homes**
Less than $50,000	21.7%
$50,000 to $99,999	45.7%
$100,000 to $149,999	16.0%
$150,000 to $199,999	9.1%
$200,000 to $299,999	6.3%
$300,000 to $499,999	1.1%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%
Median (dollars)	$78,000
Median (Iowa)	$213,300

Source: American Community Survey

Grand Junction, like many other small rural towns in Iowa, has a lower median housing value of $78,000. The State of Iowa has a median housing value of 213,300. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2023 American Community Survey Estimates, 21.7% of the city's homes are valued less than $50,000. A complete breakdown of the value of homes in Grand Junction can be found in Table D.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Figure D.3: City of Grand Junction Year Housing Units Constructed, 2023



Source: American Community Survey

Figure D.3 showcases the year housing units within the City of Grand Junction were constructed. Like most of the county, Grand Junction has a large portion (45.1%) of the homes constructed in 1939 or earlier. The city also experiences a spike in home construction from 1960-1969 when 13.6% of the homes were built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Economics

Household income is an important indicator of the economic base in Greene County. In Grand Junction, the median household income is $52,292 which would classify a large number of the households in Grand Junction as “working” or “middle” class. The City of Grand Junction’s household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Educational services, and health care and social assistance is the largest industry with 26.2% of the population being employed. Many employees from Grand Junction commute to other larger neighboring cities like Jefferson, Boone, and Perry where more employment opportunities are present.

Table D.3: City of Grand Junction Household Income, 2022

Income and Benefits (2022 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	14	5.0%
$10,000 to $14,999	13	4.7%
$15,000 to $24,999	29	10.4%
$25,000 to $34,999	42	15.1%
$35,000 to $49,999	36	12.9%
$50,000 to $74,999	47	16.8%
$75,000 to $99,999	40	14.3%
$100,000 to $149,999	33	11.8%
$150,000 to $199,999	9	3.2%
$200,000 or more	16	5.7%
Median Household Income	$52,292	--
Mean Household Income	$77,749	--

Source: American Community Survey

Grand Junction, overall, is a small community in a small rural county. A large percentage of the businesses within the county serve the largely agricultural economy. Table D.4 breaks down what industry Grand Junction's residents work in. Educational Services, and health care and social assistance employs the largest cohort of residents, with 26.2% employed in this industry. The second largest is Manufacturing with 12.1% of the population employed.

Table D.4: City of Grand Junction Employment by Industry, 2022

2022	Estimate	Percent
Civilian employed population 16 years and over	305	100.0%
Agriculture, forestry, fishing and hunting, and mining	23	7.5%
Construction	30	9.8%
Manufacturing	37	12.1%
Wholesale trade	7	2.3%
Retail trade	33	10.8%
Transportation and warehousing, and utilities	12	3.9%
Information	8	2.6%
Finance and insurance, and real estate and rental and leasing	5	1.6%
Professional, scientific, and management, and administrative and waste management services	17	5.6%
Educational services, and health care and social assistance	80	26.2%
Arts, entertainment, and recreation, and accommodation and food services	26	8.5%
Other services, except public administration	22	7.2%
Public administration	5	1.6%

Source: American Community Survey

Existing Documents

Table D.5 provides a compilation of the current planning and regulatory documents in place for the City of Grand Junction. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The City's housing needs assessment has allowed the city to take inventory of the current housing situation and determine what steps are necessary to reduce the impact hazards have on the housing stock.

The City of Grand Junction is working to be a more proactive community, which benefits them in regards to mitigation of hazards. A comprehensive plan would guide the future development of the city alongside the zoning code. The comprehensive plan would take a deep dive into the city's

inventory of assets, utilities, and infrastructure. It would also include a hazard chapter which addresses some disaster response items as well as mitigation for the future. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table D.5: City of Grand Junction Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	No	-
Building Code	Yes	-
Zoning Ordinance	Yes	2004
Strategic Plan	Yes	2000
Housing Needs Assessment	Yes	1999
NFIP Participant	No	-
Floodplain Regulations	No	-

NFIP Participation

The City of Grand Junction does not currently participate in the NFIP. The City's FIRMs were updated in 2016 and they can be found later in this appendix. If the City would choose, they could start the process to participate in NFIP.

Outlook and Future Development

Since the last plan update, the City of Grand Junction has experienced limited new development. Changes have primarily included improvements to the existing housing stock. No significant new development has occurred within identified hazard prone areas. As a result, development since the previous plan has not increased the City's vulnerability to identified hazards. Grand Junction anticipates that future development will continue to occur as a similar scale and within existing developed areas.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Grand Junction's critical facilities can be found on Map D.2.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table D.6.

Table D.6: City of Grand Junction Essential Infrastructure and Services

Major Arterials	U.S. Highway 30 and IA Highway 144	**Air Service**	Jefferson Municipal Airport
Water Service	Grand Junction Municipal Utilities	**Sewer Service**	Grand Junction Municipal Utilities
Electric Service	Grand Junction Municipal Utilities	**Gas Service**	Black Hills Energy
Sanitation/Solid Waste	Walters Sanitary Services	**Landfill**	Boone County Landfill
Phone and Internet	Jefferson Telecom/Windstream/Starlink/BTWI	**Law Enforcement**	Greene County Sheriff
Fire Service	Grand Junction Fire Department	**Ambulance Service**	Grand Junction Fire and Ambulance

Table D.7: City of Grand Junction Critical Facilities

Number on Map	Name	Address	Type
1	Casey's	504 16th Street N	HAZMAT
2	First United Methodist Church	302 13th Street N	Vulnerable Population
3	First United Presbyterian Church	302 12th Street S	Vulnerable Population
4	Grand Junction Community Center	212 Main Street E	Essential Facility
5	Grand Junction Fire Department	107 Main Street E	Essential Facility
6	St. Brigid's Catholic Church	602 Hager Street E	Vulnerable Population
7	Municipal Light & Water	305 11th Street S	Utility
8	Sewer Plant		Utility

Map D.2 Grand Junction Critical Facilities

Hazard Scores

Table D.8: City of Grand Junction Risk Assessment

Hazard	Comments
Drought	Drought occurrences have increased across the state in the past ten years and the City of Grand Junction has not been exempt from this hazard. Droughts continue to increase in severity and while there is little warning, this hazard can cause both direct and indirect issues for the city and its residents.
Earthquake	There have been no instances of damaging earthquakes in the City of Grand Junction. The committee feels there will be no instances during the life of this plan.
Expansive Soils	There have been no instances of expansive soils in the City of Grand Junction, and the committee feels there will be no instances during the life of this plan.
Extreme Heat	Extreme heat events continue to impact Grand Junction. Education may be one of the best action tools to combat this hazard's impact on the human body. The city is likely to experience one of these hazard events annually, based on historical data
Flash Flood	Since 2020, the City of Grand Junction has reported no instances of flash flooding. While flash floods have little to no warning time, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event. It is anticipated that the city will not experience a flash flood event in the next five years.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand and can immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
Levee/Dam Failure	There are no dams or levees in the city or in the immediate vicinity of the city.
River Flooding	River flooding has not been reported in Grand Junction recently. The most recent FIRM maps adopted in 2016 show minimal flood hazard areas in the city. and historically there have been people buying flood insurance through the program.
Severe Winter Storm	Severe winter storms continue to impact Grand Junction. While meteorological advances can warn people in advance, there is always a segment of the population caught in a storm. Heavy snow and the winds associated with storms can cause tremendous damage. Severe cold can cause fatalities. Thawing pipes and roadways can crack, break, and fail, causing considerable damage.
Thunderstorm/ Lightning/Hail	Thunderstorm, lightning, and hail events are common in Grand Junction, but most of them do not have major impact to life and property, and only a few storms per year would be considered severe. A single building may be damaged by lightning and power may be disrupted in parts of town for a few minutes to a few hours. Hail

	can damage buildings and property throughout the city, which has occurred in the past. Strong thunderstorm winds also damage property.
Tornado	While tornadoes have touched down in the county, there is no report of tornadoes damaging Grand Junction directly in the recent past. Although the city has been spared major tornado damage, vigilance is important, as there is no way to know where one will occur. Based on the size of Grand Junction, the chances are low in any given year. Meteorological warnings have improved, but storms can still spawn tornadoes with no notice. It is vital that the public is prepared for this hazard and that there are places for people to shelter.
Windstorm	Recent windstorms have caused damage to properties and crops even though the available data shows otherwise. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos impacted Grand Junction, prompting the community to prepare more effectively for these hazards.

Hazard	Reason for Omission
Earthquake	Iowa, as a whole, has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table D.9: City of Grand Junction Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	50	$54,300	725
Commercial	41	$4,225,000	
Industrial	0	$0	
Residential	308	$21,289,700	

The extent of future losses cannot be precisely predicted because the location, magnitude, and duration of future hazard events are uncertain. Table B.9 represents Grand Junction's maximum community-wide exposure and should not be interpreted as the anticipated loss from any individual hazard. Potential impacts vary significantly by hazard. Table B.10 evaluates anticipated physical damage, service disruption, economic and social consequences, impacts to vulnerable populations, and potential losses to identified assets for each hazard.

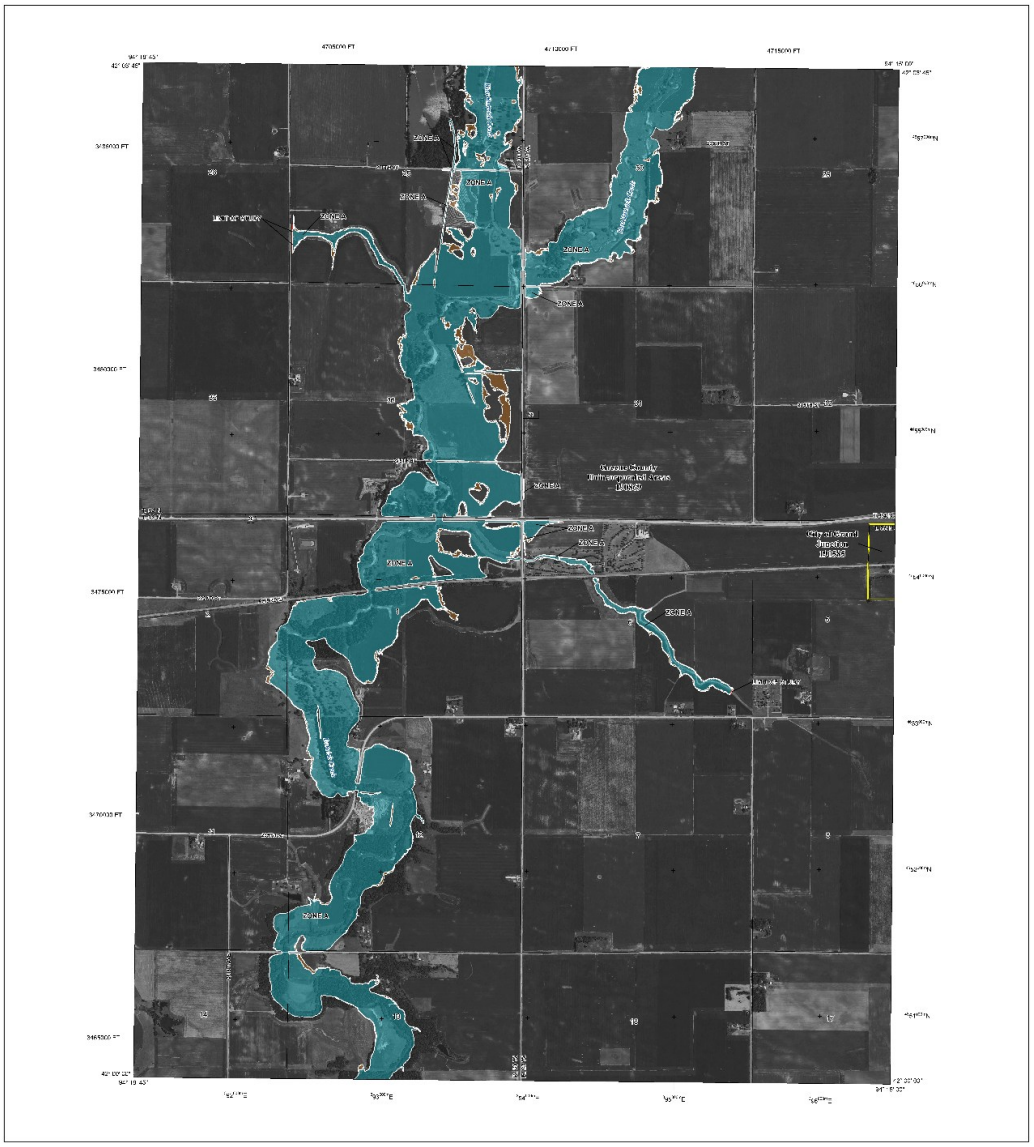
Table B.10: City of Grand Junction Hazard Impact and Vulnerability Summary

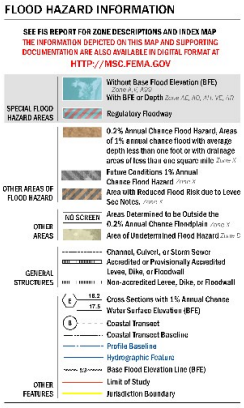
Hazard	Anticipated Impacts and Potential Losses

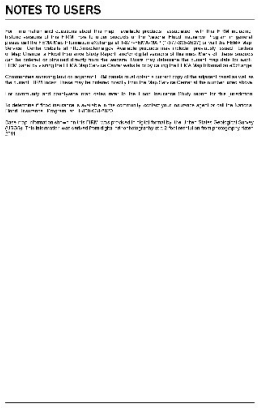
Drought	Drought may affect the entire community through reduced water availability and increased demand on the municipal water system, however, significant structural damage is not anticipated. Prolonged drought may increase operating demands on the water system, affect vegetation, and increase grass/wildland fire risk. Economic impacts may occur indirectly through impacts to the surrounding agricultural community. Older adults, households with limited financial resources, and residents dependent on reliable municipal water service may be more vulnerable to prolonged drought conditions.
Extreme Heat	Significant direct damage to buildings is not anticipated. Extreme heat may affect the entire population and increase demand on the electrical system and cooling equipment. Power outages could interrupt municipal services and leave residents without adequate cooling. Older adults, young children, individuals with medical conditions, outdoor workers, and residents without adequate air conditioning are particularly vulnerable. Potential losses are primarily associated with increased utility costs, lost productivity, medical impacts, and service interruptions rather than structural damage.
Flash Flood	Grand Junction has reported no flash flooding since 2020; however, intense rainfall could produce localized street, yard, basement, or property flooding where drainage is limited. Streets, culverts, utilities, and structures in low-lying or poorly drained areas would be most vulnerable. Temporary road closures could affect access and emergency response. Because there has been no recent flash-flood losses, widespread structural losses are not anticipated.
Grass/Wildland Fire	Agricultural land and open vegetation surrounding Grand Junction presents a potential for a grass or field fire to approach the city. Homes, businesses, utility infrastructure, and other structures along the perimeter of the city would be most vulnerable. Smoke could affect the majority of the community and particularly individuals with respiratory conditions. A fire could also temporarily close roads or interrupt utilities. Structural losses would depend on the location, wind conditions, and ability of responders to contain the fire.
Levee/Dam Failure	There are no dams or levees within Grand Junction or in the vicinity of the city and therefore do not pose a threat to the community. Therefore, no significant direct structural damage, service disruption, displacement, vulnerable-population impacts, or property losses from dam or levee failure are currently anticipated.
River Flooding	The 2016 FIRM identifies flood hazard areas northeast of Grand Junction; therefore, structures, streets, utilities, and other assets located within or adjacent to those mapped areas have greater vulnerability than assets elsewhere in the community. Flooding could damage buildings and contents, temporarily restrict transportation, interrupt utilities or municipal services, and displace affected residents. Residents with limited mobility, transportation,

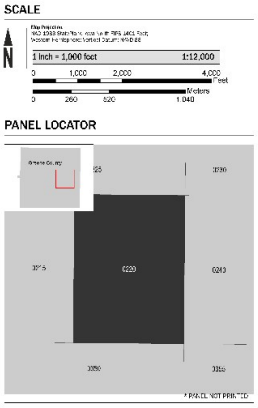
	or financial resources may have greater difficulty evacuating or recovering. Potential property losses are concentrated within the identified flood hazard areas rather than distributed evenly throughout the city.
Severe Winter Storm	Severe Winter Storms may affect the entire community but generally do not cause uniform structural damage. Heavy snow, ice, wind, and extreme cold can damage trees, roofs, overhead utilities, water infrastructure, and transportation systems. Power outages and blocked roads could interrupt municipal services and emergency response. Older adults, individuals with medical needs and/or limited mobility, and households without alternative heat sources are particularly vulnerable during extended outages or extreme cold. Economic losses may include snow removal, infrastructure repairs, business interruption, and increased heating costs.
Thunderstorm/Lightning/Hail	All developed areas in the City of Grand Junction is exposed to severe thunderstorms, lightning, and hail. The 2026 hailstorm demonstrated the potential for widespread roof damage to residential properties. Future storms could damage roofs, siding, windows, vehicles, trees, utility infrastructure, and public facilities. Lightning and wind may cause power outages and fires in localized areas of the city. Potential economic losses include building and vehicle repairs, utility restoration, debris removal, and temporary business interruption.
Tornado	All structures and residents of Grand Junction are potentially exposed to tornadoes, although actual damage would generally be concentrated along the path of the tornado rather than affecting a fixed percentage of the community. A direct strike could cause severe or complete damage to homes, businesses, public buildings, utilities, and other critical facilities; block streets with debris; interrupt utilities, communications, and emergency services; and result in displacement, injuries, or fatalities. Residents without access to adequate shelter and those requiring assistance to shelter quickly would be particularly vulnerable. Potential structural losses could be substantial in the area directly affected.
Windstorm	All of the developed areas of the City of Grand Junction are exposed to high winds and derecho events. Recent events have demonstrated the potential to damage roofs, siding, trees, crops, vehicles, and overhead electrical and communications infrastructure. Downed trees and utility lines may block streets, cause extended power outages, and interfere with emergency response and municipal services. Older structures and buildings with large roof areas may experience greater damage. Economic losses may include structural repairs, utility restoration, debris removal, business interruption, and agricultural losses.

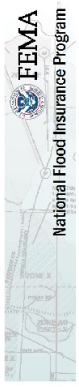
Flood Maps





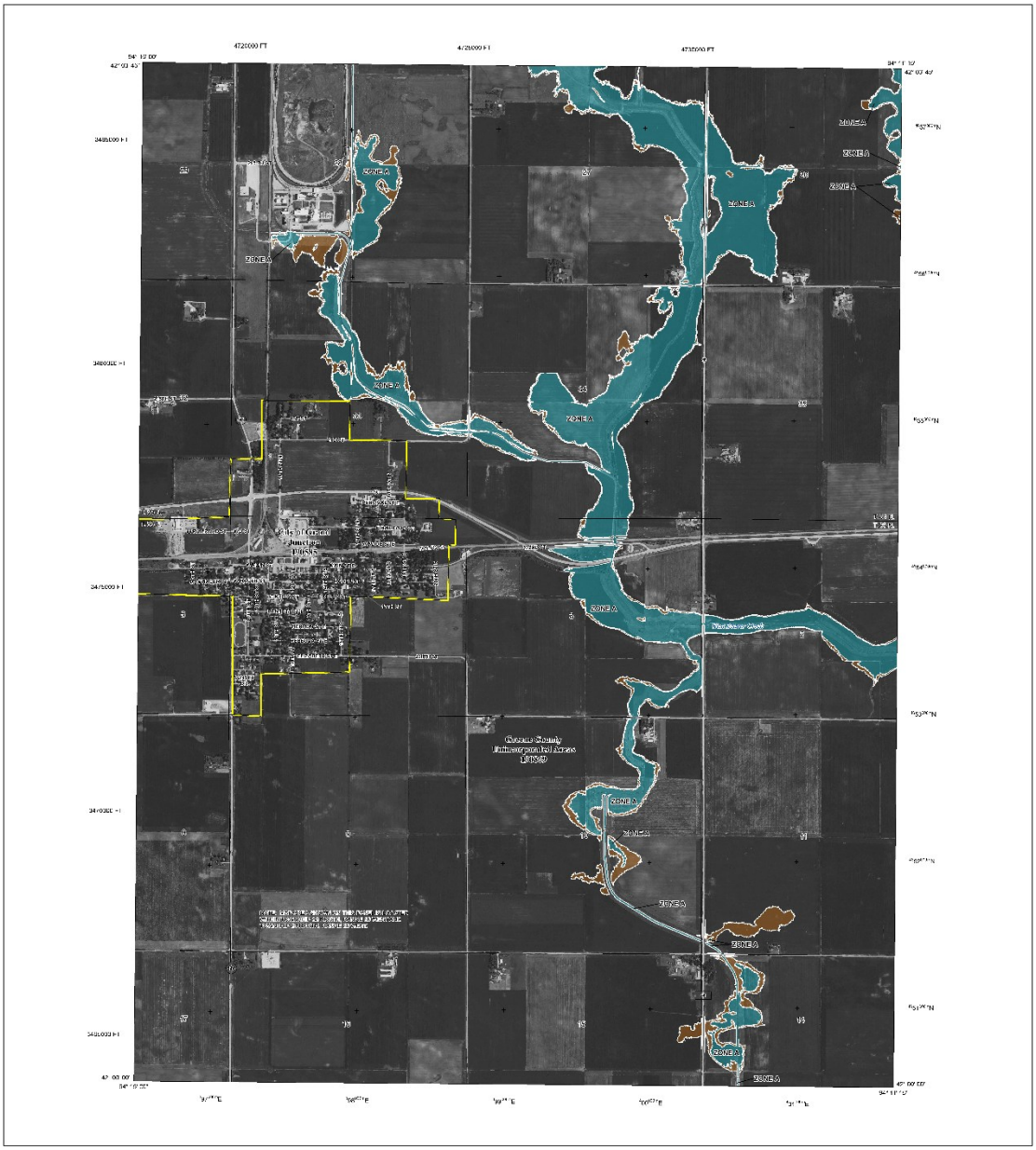








Greene County Hazard Mitigation Plan Appendix D- City of Grand Junction



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- NO SCREEN
- Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

N

1 inch = 1,000 feet 1:12,000
0 1,000 2,000 4,000 Feet
0 260 520 1,040 Meters

PANEL LOCATOR

C250
C240
C255

* PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas
PANEL 240 OF 500

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CITY OF GRAND JUNCTION	190988	0240	C

VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0240C
EFFECTIVE DATE
APRIL 19, 2016

There have been changes in the City's mitigation priorities since the previous plan update. Some projects that were identified as a high priority have been completed utilizing available grant and local funds. Other projects that were not high priority were implemented as funds were available, and those that either had no funding available or were not a high priority were not implemented during this planning period. The City's Mitigation Actions were reviewed and updated with the city's new priorities in mind which have shifted from the last planning period due to changes in elected officials and staff, available financial resources, and hazards that have affected the community.

During the precious planning period, the City did not formally incorporate the Hazard Mitigation Plan into other adopted plans, ordinances, or policies. However, mitigation actions identified in the plan were integrated informally into the City's annual budgeting, capital improvement decisions, infrastructure projects, and ongoing operations as applicable. Examples of this include funding and completing the new community center/emergency services building and establishing it as a storm shelter. This resulted in the completion and continued implementation of important mitigation actions identified in the previous plan as shown in the table below. No other formal integration of the previous Hazard Mitigation Plan into adopted City plan, ordinance, or policy occurred during the planning period.

Status of Previous Mitigation Actions

Table D.11: City of Grand Junction Status of Previous Mitigation Actions

	Status				
Previous actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not implemented**
Refurbish fire hydrants			X		
Replace sidewalks				X	
Construct new emergency services building	X				
Designate the proposed new Community Center/Emergency Services Building as a storm shelter	X				
Participate in NFIP					X
Encourage residents to install NOAA radios				X	
Monitor the storm sewer system to make sure it is working properly			X		
Form a committee to develop the local evacuation plan			X		

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): [The mitigation strategy shall include] 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.

Section 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.

Table D.12: City of Grand Junction Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards**
Objective 1	Improve public infrastructure
Objective 2	Protect public infrastructure
Goal 2	**Minimize injuries and loss of life due to the impacts of hazards**
Objective 1	Protect health and safety
Goal 3	**Maintain and support public safety facilities, including equipment and training**
Objective 1	Improve public safety

Table D.13: City of Grand Junction Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Refurbish fire hydrants	Grass or Wild Land Fire, Drought	High	Municipal Utilities	Moderate	City Public Works Funds,	Emergency Services	Short
Replace sidewalks with necessary grading and drainage	Flash Flood	Low	Public Works	Moderate	City Public Works Funds	Prevention	Mid
Participate in NFIP	River Flooding	Mod	City Council	Minimal	City General Fund	Property Protection	Short
Encourage residents to install NOAA radios	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lighting	High	Emergency Services	Minimal	City Public Safety Fund	Emergency Services	Ongoing
Monitor the storm sewer system to make sure it is working properly	Infrastructure Failure, Flash Flood, Thunderstorm and Lightning	High	Municipal Utilities, City Council	High	City Public Works Fund	Property Protection	Short
Form a committee to develop the local evacuation plan	Flash Flood, Tornado, Windstorms, Extreme Heat, Hail Storm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Mod	City Council	Moderate	City Public Safety Fund	Prevention	Short
Update storm sirens as needed	Tornado,	Mod	City Council	Low	City Public Safety Funds, Grow Greene County, FEMA HMGP	Emergency Services	Mid

					with State match, FEMA BRIC program		
Maintain and update generators as necessary	Severe Winter Storm, Windstorm, Tornado	Mod	City Council	Low	City General Funds, Grow Greene County, FEMA HMGP with State match, FEMA BRIC program	Emergency Services	Mid
Maintain Community Center/Emergency Services Building as a storm shelter	Extreme Heat, Severe Winter Storm, Windstorm, Tornado	High	City Council	Low	City General Funds	Emergency Services	Short
Monitor Levee/dam failure risk	Levee/Dam Failure	Low	City Council	Minimal	City General Funds	Emergency Services	Ongoing

Incorporation into Other Planning Mechanisms

Where possible, findings and recommendations from this Hazard Mitigation Plan will be integrated into the City of Grand Junction's existing and future planning and operating documents. The City Council will be responsible for ensuring that the Hazard Mitigation Plan is reviewed when applicable local plans, ordinances, policies, and capital improvement documents are developed or updated. During these updates, the city will review applicable hazard risk information and mitigation actions contained in this plan and determine whether relevant information or actions should be incorporated into the document being updated. The integration of information from the Hazard Mitigation Plan will be documented through the applicable planning document, ordinance or resolution, budget or capital improvement records, meeting minutes, or other City records.

Information from the Hazard Mitigation Plan will be reviewed and incorporated, as applicable, when the following documents are updated:

- City Code
- Housing Needs Assessment
- Zoning Ordinance

The City of Grand Junction does not currently have the following plans or documents. If any are developed during the life of this Hazard Mitigation Plan, applicable hazard risk information, mitigation goals, and mitigation actions will be reviewed and incorporated into their development, as appropriate:

- Comprehensive Plan
- Strategic Plan
- Building Code
- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans

Appendix E:

Jefferson

Community Profile

History

Residents first settled in the location which is now Jefferson in 1849. Truman and May Davis along with their six children were the first of many immigrants. Late that year, fifteen additional families followed the Davis family and moved up the river in hope of rich farmland. The land was purchased for $1.25 an acre from the federal government. It is said that in prior years, a city in Dubuque County has already registered "Jefferson" as their town name; therefore, the Post Office Department rejected the new community from titling the town the "Jefferson." However, in 1854, Jefferson became the county seat of Greene County after the city in Dubuque County no longer existed. By 1856 the community had a dry goods store, several craft shops, and a new courthouse. The first school was also established, and classes were first held in the newly constructed courthouse. Jefferson officially became incorporated in 1872.

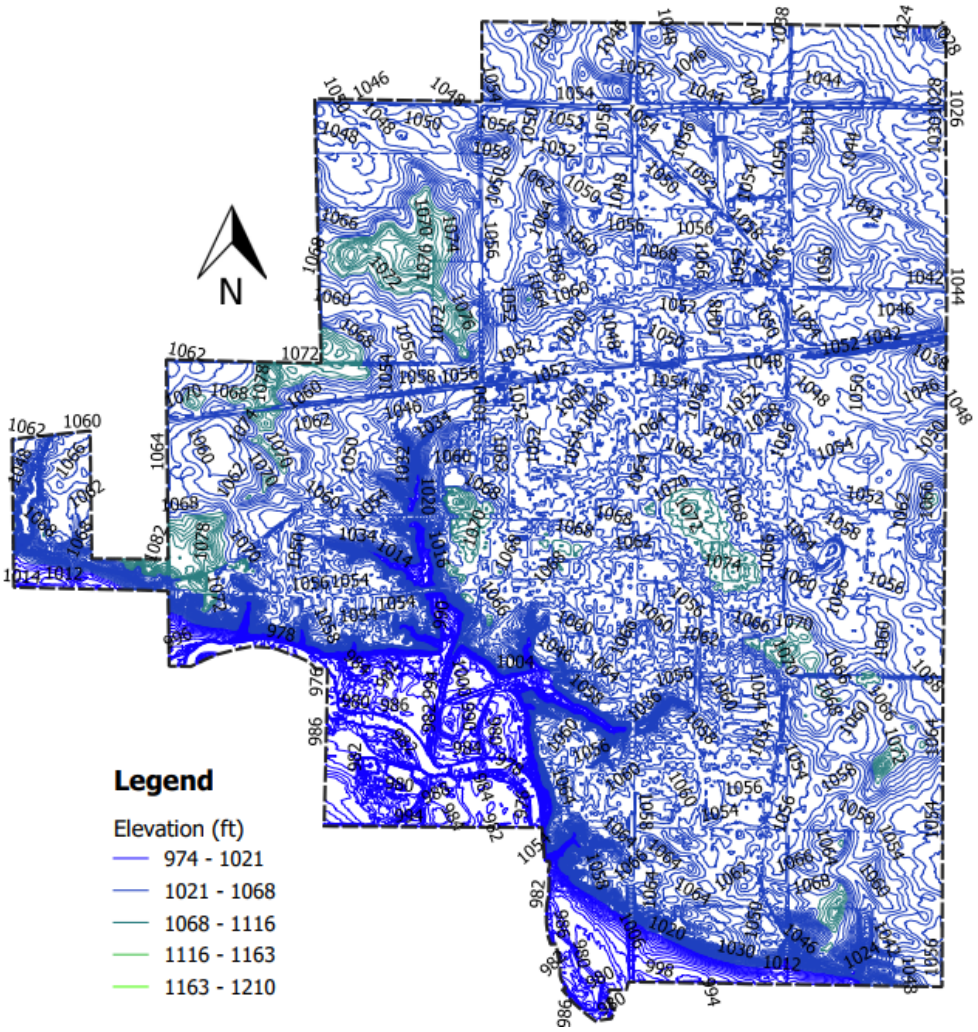
Like most communities in Greene County, Jefferson was a railroad town. The Union Pacific Railroad located in Jefferson in 1866 after the Civil War ended. The railroad helped supply the county with goods and ultimately influenced the growth of the community. By 1880, Jefferson had grown to 1,444 people. Additional buildings constructed over time included two banks, two newspapers, eight lawyers, five physicians, two dentists, five restaurants, two meat markets, seven grocery stores, three hardware stores, four general stores, two hotels, a bookstore and other additional businesses.

Geography and Environment

U.S. 30 runs along the north side of Jefferson, while IA 4 intersects the community running north/south. Jefferson is in the heart of Greene County and receives the highest amount of traffic in the County. Jefferson is conveniently located 27.4 miles from Carroll, 28.7 miles from Boone, 40.4 miles from Ames and 66 miles from Des Moines.

The highest elevation in Greene County can be found throughout the western part of the county. Here, the elevation can reach as much as 1,230 feet above sea level. Parts of Jefferson contain some of the lowest elevations in the county. The southwest corner of Jefferson is 978 feet while the northwest corner rises to 1,078 feet. Map E.1 shows Jefferson's elevation.

Map E.1 City of Jefferson Elevation



Demographics

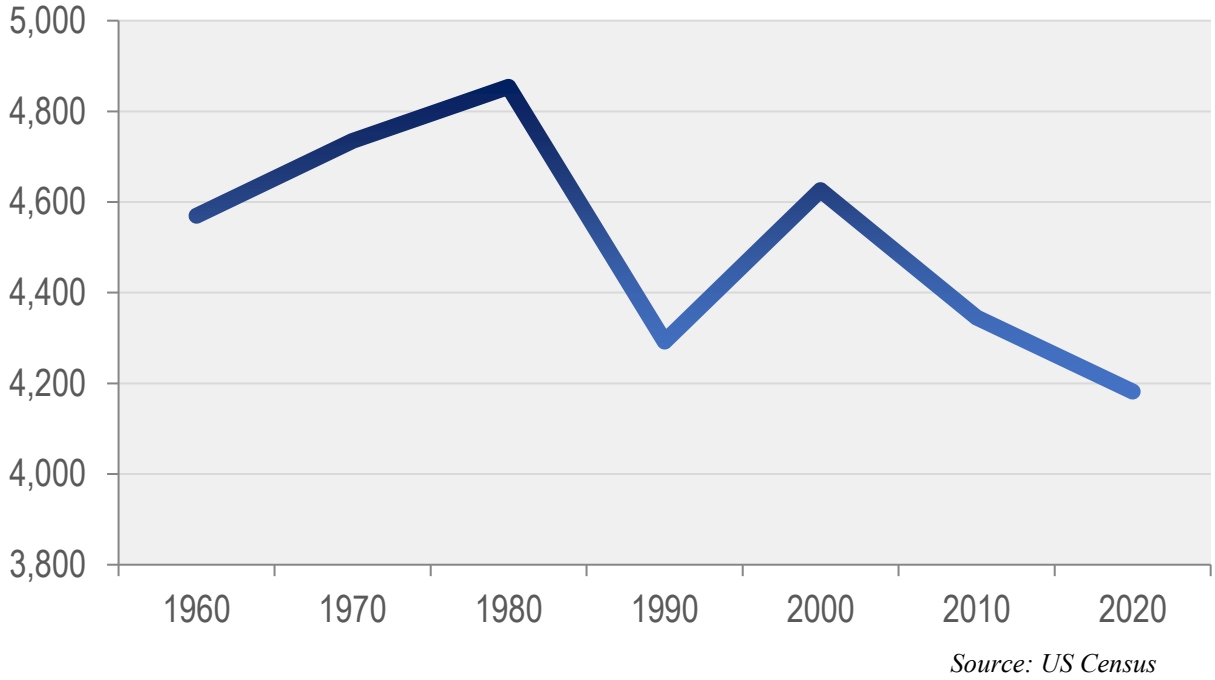
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Jefferson's population through past, present, and future trends of the region.

The size and composition of a community's population can exert influence on its development. For instance, population size, composition, and distribution influence the range of businesses a community can support, the pool of workers from which to draw, and the demand for and supply of services. Similarly, the effect people have on the social, economic, and physical environments

depends upon the composition, expectations, and distribution of the population. A population's age distribution, income levels, ancestry, and educational attainment are some of the characteristics that mold a community. Population trends give community leaders and elected officials information on what kind of services need to be provided and offers prospective employers an overview of the local labor force.

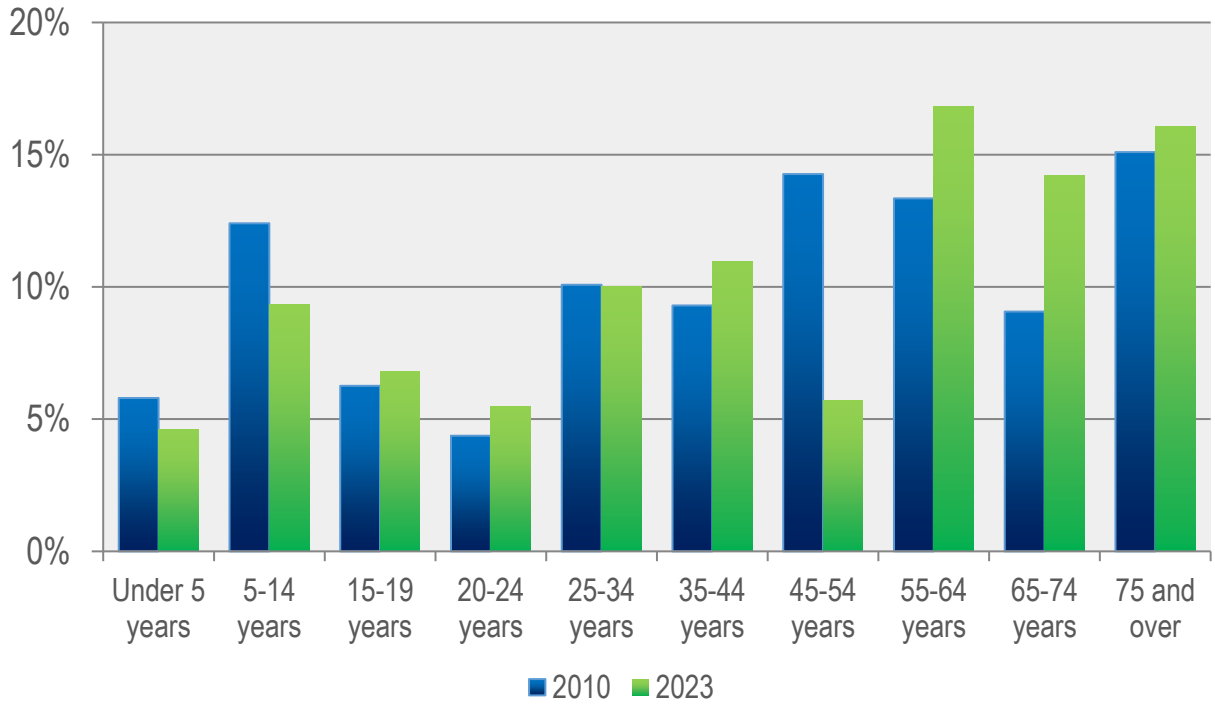
Over the past 50 years, the City of Jefferson has experienced a slight decline in population. In 1960, Jefferson had a population of 4,570. Since then, the City's population has declined 8% (388 residents) to 4,182 in 2020. The most dramatic change happened between 1980 and 1990 when the city lost 562 residents. From 1990 to 2000, however, the city experienced a short-lived increase in population of 334 which was followed by a decrease in population from 2000 to 2010 of 281. Figure E.1 shows the City of Jefferson's population trend since 1960.

Figure E.1: City of Jefferson Historic Population, 1960-2020



Source: US Census

Figure E.2: City of Jefferson Age Distribution, 2010 & 2023



Source: US Census

The City's population makeup is not very different from other parts of Greene County, and even most of the State of Iowa. The largest age group in Jefferson is aged 55-64 years. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts. This information can be found in Figure E.2.

Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has increased by 130 units. Occupied housing units have increased by 208 units and vacant housing units decreased by 78 units. Table E.1 shows a breakdown of the city's occupied and vacant housing units.

Table E.1: City of Jefferson Housing Units, 2010 & 2023

	2010		2023	
	Number	Percent	Number	Percent
Occupied Housing Units	1,900	88.1%	2,108	92.2%
Owner-Occupied	1,368	72.0%	1,485	70.4%
Renter-Occupied	532	28.0%	623	29.6%
Vacant Housing Units	256	11.9%	178	7.8%
Total Housing Units	2,156	100.0%	2,286	100.0%

Source: US Census, American Community Survey

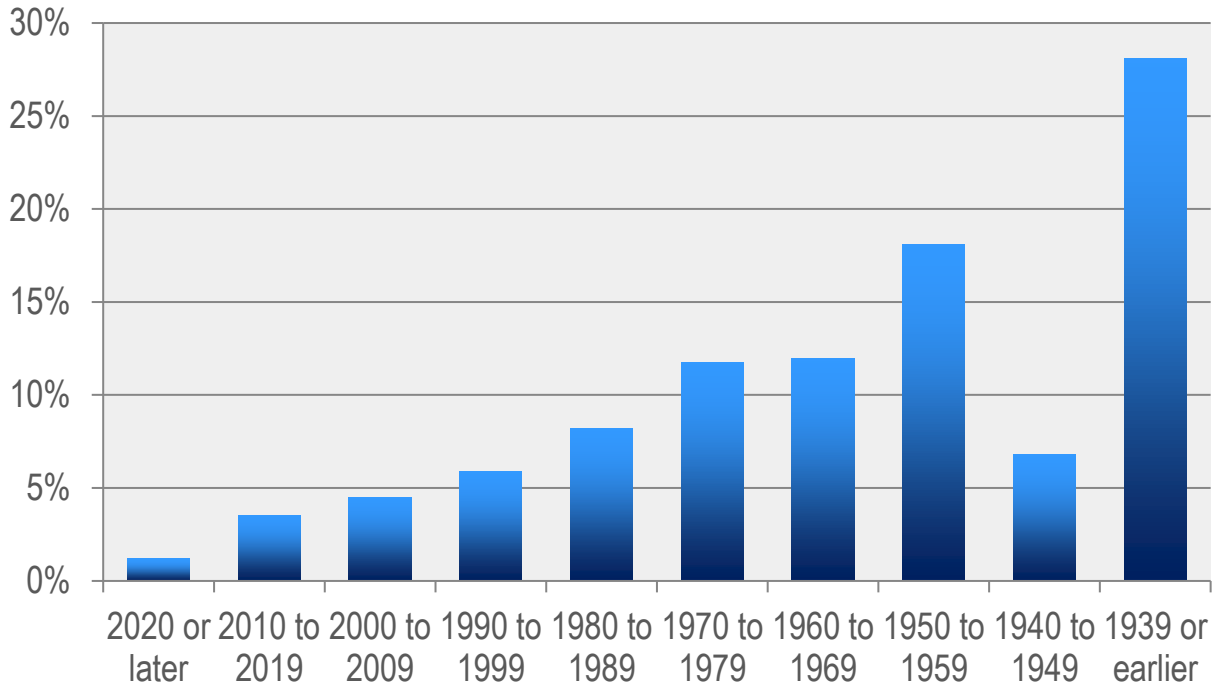
Table E.2: City of Jefferson Value of Owner-Occupied Units, 2023

Value of Housing Unit	Percent of Homes
Less than $50,000	10.2%
$50,000 to $99,999	20.3%
$100,000 to $149,999	22.3%
$150,000 to $199,999	20.1%
$200,000 to $299,999	21.0%
$300,000 to $499,999	5.5%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.5%
Median (dollars)	$126,900
Median (Iowa)	$213,300

Source: American Community Survey

Jefferson, like many other small rural towns in Iowa, has a lower median housing value of $126,900. The State of Iowa has a median housing value of 213,300. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2023 American Community Survey Estimates, 10.2% of the city's homes are valued less than $50,000. A complete breakdown of the value of homes in Jefferson can be found in Table E.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Figure E.3: City of Jefferson Year Housing Units Constructed, 2023



Source: American Community Survey

Figure E.3 showcases the year housing units within the City of Jefferson were constructed. Like most of the county, Jefferson has a large portion (28.1%) of the homes constructed in 1939 or earlier. The city also experiences a spike in home construction from 1950-1959 when 18.1% of the homes were built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Economics

Household income is an important indicator of the economic base in Greene County. In Jefferson, the median household income is $54,286 which would classify a large number of the households in Jefferson as “working” or “middle” class. The City of Jefferson’s household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Educational services, and health care and social assistance is the largest industry with 29.4% of the population being employed. Many employees from Jefferson commute to other larger neighboring cities like Carroll and Boone where more employment opportunities are present.

Table E.3: City of Jefferson Household Income, 2023

Income and Benefits (2023 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	72	3.4%
$10,000 to $14,999	74	3.5%
$15,000 to $24,999	245	11.6%
$25,000 to $34,999	209	9.9%
$35,000 to $49,999	415	19.7%
$50,000 to $74,999	382	18.1%
$75,000 to $99,999	188	8.9%
$100,000 to $149,999	278	13.2%
$150,000 to $199,999	120	5.7%
$200,000 or more	126	6.0%
Median Household Income	$54,286	--
Mean Household Income	$73,678	--

Source: American Community Survey

Jefferson, overall, is a small community in a small rural county. A large percentage of the businesses within the county serve the largely agricultural economy. Table E.4 breaks down what industry Jefferson's residents work in. Educational Services, and health care and social assistance employs the largest cohort of residents, with 29.4% employed in this industry. The second largest is retail trade with 10.8% of the population employed.

Table E.4: City of Jefferson Employment by Industry, 2023

2023	Estimate	Percent
Civilian employed population 16 years and over	1880	100.0%
Agriculture, forestry, fishing and hunting, and mining	8	0.4%
Construction	123	6.5%
Manufacturing	149	7.9%
Wholesale trade	135	7.2%
Retail trade	203	10.8%
Transportation and warehousing, and utilities	66	3.5%
Information	47	2.5%
Finance and insurance, and real estate and rental and leasing	144	7.7%
Professional, scientific, and management, and administrative and waste management services	194	10.3%
Educational services, and health care and social assistance	553	29.4%
Arts, entertainment, and recreation, and accommodation and food services	69	3.7%
Other services, except public administration	72	3.8%
Public administration	117	6.2%

Source: American Community Survey

Existing Documents

Table E.5 provides a compilation of the current planning and regulatory documents in place for the City of Jefferson. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The adoption of state building codes ensures that all new and major renovation structures meet the necessary requirements for electrical, plumbing, structural adequacy. This reduces the impact hazards have on structures as they are built to withstand certain minimums. The City's housing needs assessment has allowed the city to take inventory of the current housing situation and determine what steps are necessary to reduce the impact hazards have on the housing stock.

The City of Jefferson is a proactive community, which benefits them in regards to mitigation of hazards. The City's comprehensive plan has allowed the city to take inventory of the city's current assets and evaluate them through the comprehensive planning process. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table E.5: City of Jefferson Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	2020
Building Code	State	2024
Zoning Ordinance	Yes	2009
Strategic Plan	Yes	2025
Housing Needs Assessment	Yes	2025
NFIP Participant	Yes	1986
Floodplain Regulations	Yes	2009

NFIP Participation

The City of Jefferson has experienced instances of significant flooding within city limits in its history. The City began participating in NFIP in 1986 and the flood map was updated in 2016. The City's FIRMs can be found later in this appendix. Any development/demolition in the floodplain is required to obtain a permit which regulates the development/demolition and lays out the NFIP regulations that must be followed. Jefferson participates in the NFIP and implements substantial improvement / substantial damage provisions in the following manner: Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD determinations and provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Schools and school districts do not Participate in the National Flood Insurance Program (NFIP) because participation is strictly limited to local governments and communities (like cities, towns,

and counties). Individual properties, including public schools, can only purchase NFIP Policies if their surrounding municipality volunteers to join the program.

Outlook and Future Development

Since the last plan update, the City of Jefferson has experienced continued development, particularly in the northern portion of the city. Development in this area has primarily included service and commercial uses. The City has also experienced residential development, including construction of new single-family homes and rehabilitation of existing single-family and multi-family housing. Additional investment and redevelopment have occurred within the downtown district, where the City continues to maintain an active and occupied downtown square.

Development since the previous update has primarily occurred within or adjacent to previously developed areas and has not resulted in significant new development within identified hazard-prone areas. As a result, development since the previous plan has not significantly increased Jefferson's vulnerability to identified hazards. Rehabilitation and improvements to existing buildings and infrastructure may improve the community's resiliency by maintaining and strengthening existing structures and services.

Jefferson anticipates that recent development patterns, including commercial growth, housing development and rehabilitation, and continued downtown investment, will continue through the life of this plan. Future development will be evaluated in relation to identified hazard areas to avoid increasing the City's vulnerability where practicable.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Jefferson's critical facilities can be found on Map E.2.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table E.6.

Table E.6: City of Jefferson Essential Infrastructure and Services

Major Arterials	U.S. Highway 30 and IA Highway 4	**Air Service**	Jefferson Municipal Airport
Water Service	City of Jefferson	**Sewer Service**	City of Jefferson

Electric Service	Alliant Energy & Midland Power Cooperative	**Gas Service**	Alliant Energy
Sanitation/Solid Waste	City of Jefferson	**Landfill**	Metro Park West
Phone and Internet	Jefferson Telephone Company	**Law Enforcement**	Jefferson Police Department
Fire Service	Jefferson Fire Department	**Ambulance Service**	Greene County Ambulance

Greene County Community School District

Greene County Community School District is located within the City of Jefferson. The school district was created in 2014 with the consolidation of Jefferson-Scranton School District and the East Greene School District. The district is made up of three buildings. The Green County Elementary School is located at 401 Russell Street and houses grades PK-4. The Greene County Middle School is located at 203 W Harrison Street and houses grades 5-8. The Greene County High School is located at 101 Ram Drive and houses grades 9-12. Students and staff participate in drills and educational programs related to hazards and the mitigation of them. The District maintains its own equipment and supplies to maintain roads and walkways on campus.

Table E.7: Greene County Community School District Enrollment

School Year	Elementary Enrollment	Middle School Enrollment	High School Enrollment	Total Enrollment
2020-2021	507	366	358	1,231
2021-2022	536	353	364	1,253
2022-2023	539	346	374	1,259
2023-2024	523	357	375	1,255
2024-2025	518	347	375	1,240

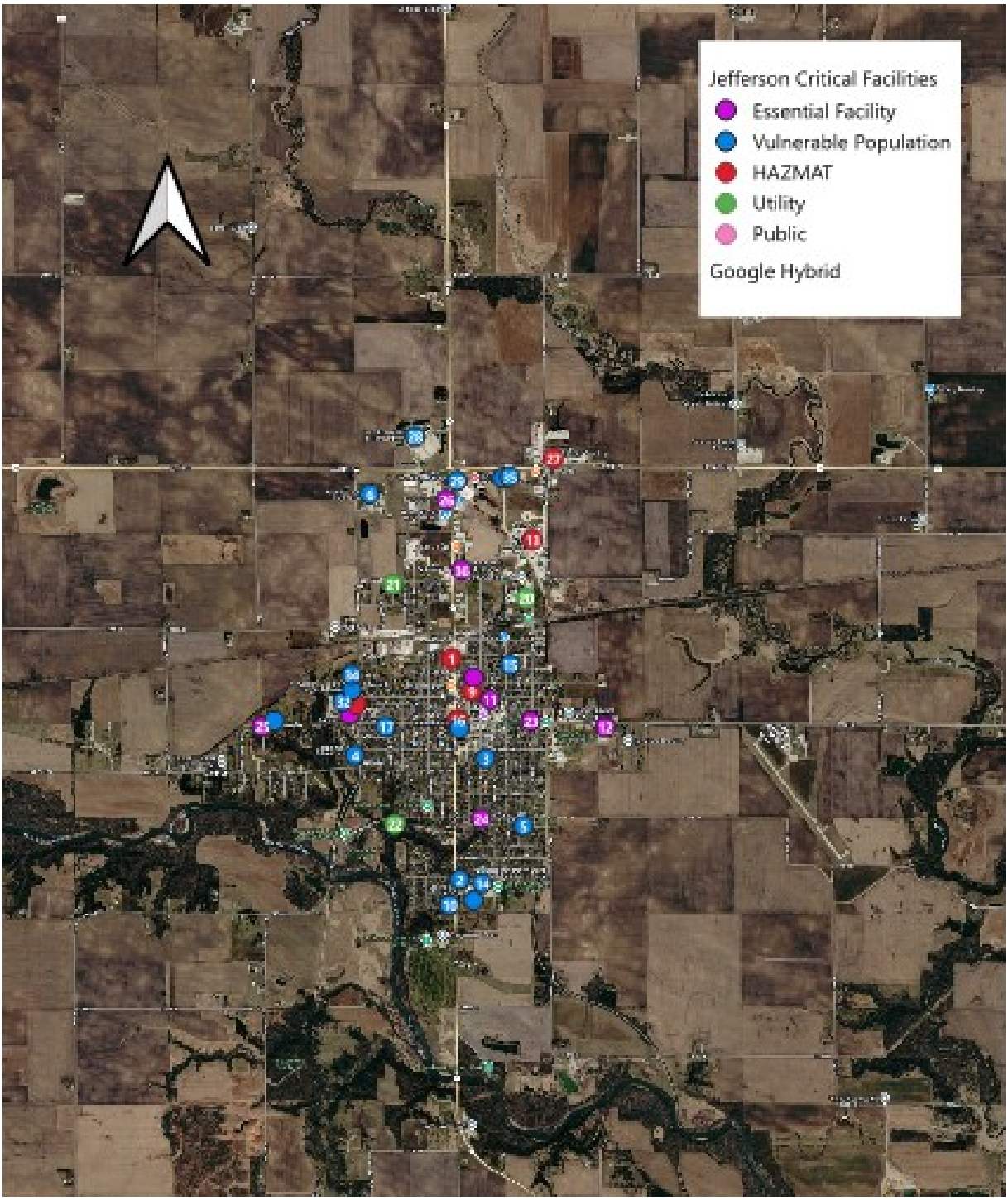
The Greene County Community School District's ability to expand and improve their hazard mitigation capability is primarily limited by available financial and staff resources. The budget for the school district is largely supported by property tax revenue and is focused on fulfilling educational and operational responsibilities. The district has a limited ability to hire additional staff specifically dedicated to hazard mitigation or to fund mitigation projects outside of planned facility and operational improvements. Opportunities to expand mitigation capabilities depends largely on the availability of outside funding, technical assistance, partnerships and the ability to incorporate mitigation activities into existing staff responsibilities. The district will continue to seed funding and coordinate with local governments and partners when the opportunities arise. Staff training, improved emergency planning, and consideration of hazard mitigation during future facility and capital improvement planning may also allow the district to improve its mitigation capabilities without requiring additional dedicated staff.

Table E.8: City of Jefferson Critical Facilities

Number on Map	Name	Address	Type
1	Casey's	508 N Elm Street	HAZMAT
2	Christ Lutheran Church	1201 S Elm Street	Vulnerable Population
3	First United Methodist Church	307 S Wilson Avenue	Vulnerable Population
4	Gospel Open Bible Church	302 S Grimmell Road	Vulnerable Population

5	Greene County Elementary School	401 E Russell Street	Vulnerable Population
6	Greene County High School	1901 Grimmell Road	Vulnerable Population
7	Greene County Medical Center	1000 W Lincoln Way	Essential Facility
8	Greene County Middle School	101 Ram Drive	Vulnerable Population
9	Hy-Vee Fast & Fresh Express	106 W Washington Street	HAZMAT
10	Jefferson Church of Christ	1210 Elm Street	Vulnerable Population
11	Jefferson City Hall/Fire Department	220 N Chestnut Street	Essential Facility
12	Jefferson Police Department/ Communications Tower	1005 E Lincoln Way	Essential Facility
13	Landus Cooperative	1500 N Mulberry Street	HAZMAT
14	Regency Park Nursing and Rehabilitation	100 Ram Strive	Vulnerable Population
15	St. Joseph's Catholic Church	501 N Locust Street	Vulnerable Population
16	Amaco	208 W Lincoln Way	HAZMAT
17	Trinity Lutheran Church	801 W Lincoln Way	Vulnerable Population
18	Ambulance Garage	204 N Grimmell	Essential Facility
19	Rec Center	204 W Harrison Street	Vulnerable Population
20	Water Treatment Plant	1000 N Cedar	Utility
21	Water Tower	701 W Central Street	Utility
22	Wastewater Treatment Plant	702 W Russell Street	Utility
23	Storm Siren	Cedar & Lincoln Way	Essential Facility
24	Storm Siren	Wilson & Russell	Essential Facility
25	Storm Siren	W Lincoln Way & Briarwood	Essential Facility
26	Storm Siren	American Ave & Elm Street	Essential Facility
27	Sparky's	606 Highway 30 East	HAZMAT
28	Wild Rose Casino/ Cobblestone Hotel	777 Wildrose Road	Vulnerable Population
29	Super 8	207 W Gallup Road	Vulnerable Population
30	Redwood Hotel	209 E Gallup Road	Vulnerable Population
31	Abundant Life Church	1308 W Lincoln Way	Vulnerable Population
32	Evergreen Ridge	1000 W Lincoln Way	Vulnerable Population
33	The Gardens	1000 W Washington	Vulnerable Population
34	Greenwood Homes	401 W Greenwood Road	Vulnerable Population
35	The Dwelling Place	303 E Gallup Road	Vulnerable Population
36	Fareway	1207 N Elm Street	Essential Facility
37	Hy-Vee	106 W Washington Street	Essential Facility

Map E.2 City of Jefferson Critical Facilities



Hazard Scores

Table E.9: City of Jefferson Risk Assessment

Hazard	Comments
Drought	Drought occurrences have increased in the past ten years and Jefferson has been affected. This hazard can cause both direct and indirect issues for the city and its residents.
Earthquake	There have been no instances of damaging earthquakes in the City of Jefferson. The committee feels there will be no instances during the life of this plan.
Expansive Soils	Expansive soils are not uncommon in this area, due to high clay content and dramatic changes in soil moisture and temperature. This hazard has the greatest impact on individual properties, especially those not engineered to withstand the hazard. This is a very localized hazard (e.g., individual home) and not a major priority for public response. The City of Jefferson's leaders have no knowledge of problems affecting city infrastructure, city facilities, or their personal homes and property.
Extreme Heat	Extreme heat events continue to impact Jefferson. Education may be one of the best action tools to combat this hazard's impact on the human body. Given current conditions and resources available, there is no risk of widespread losses due to this hazard, although power lines and other infrastructure can be damaged or can break.
Flash Flood	Since 2020, the City of Jefferson has reported no instances of flash flooding. However, the City has a history of flooded basements and sewer backups, indicating that localized flooding and inadequate drainage can still affect properties during significant rainfall events. While flash floods have little to no warning time, the committee has determined that this hazard is not a high-priority hazard for the community. The City will continue to consider mitigation actions that improve drainage, reduce the potential for basement flooding and sewer backups, and prepare the community for response to a flash flood or other significant rainfall event. It is anticipated that the city will not experience a significant flash flood event in the next five years.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
Levee/Dam Failure	There are no dams or levees in the city or in the immediate vicinity of the city.
River Flooding	River flooding has not been reported in the developed portions of the City of Jefferson recently. However, localized flooding occurs routinely at the city park and golf course, demonstrating that certain areas of the community remain susceptible to flooding during periods of heavy rainfall or high-water levels. The most recent FIRM maps adopted in 2016 show minimal flood hazard areas in the city. and historically there have been people buying flood insurance through the program.

	While river flooding is not currently considered a high-priority hazard, the City will continue to monitor areas with a history of flooding and consider mitigation measures to reduce impacts to public recreational facilities, infrastructure, and other vulnerable properties.
Severe Winter Storm	Severe winter storms continue to impact Jefferson. While meteorological advances can warn people in advance, there is always a segment of the population caught in a storm. Heavy snow and the winds associated with storms can cause tremendous damage. Severe cold can cause fatalities. Thawing pipes and roadways can crack, break, and fail, causing considerable damage.
Thunderstorm/ Lightning/Hail	Thunderstorms, lightning, and hail events are common in Jefferson, but most of them do not have major impact to life and property, and only a few storms per year would be considered severe. A single building may be damaged by lightning, and power may be disrupted in parts of town for a few minutes to a few hours. Hail can damage buildings and property throughout the city, which has occurred in the past. Strong thunderstorm winds also damage property.
Tornado	While tornadoes have touched down in the county, there is no report of tornadoes damaging Jefferson directly in the recent past. Although the city has been spared major tornado damage, vigilance is important, as there is no way to know where one will occur. Based on the size of Jefferson, the chances are low in any given year. Meteorological warnings have improved, but storms can still spawn tornadoes with no notice. It is vital that the public is prepared for this hazard and that there are places for people to shelter.
Windstorm	Recent windstorms have caused damage to properties and crops even thought the available data shows otherwise. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos impacted Jefferson, prompting the community to prepare more effectively for these hazards.

Hazard	Reason for Omission
Earthquake	Iowa, as a whole, has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table E.10: City of Jefferson Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People

Agricultural	332	$304,700	4,182
Commercial	177	$39,895,913	
Industrial	6	$15,505,683	
Residential	2,286	$251,847,923	

Table E.11: City of Jefferson Hazard Impact and Vulnerability Summary

Hazard	Anticipated Impacts and Potential Losses
Drought	Drought may affect the entire community through reduced water availability and increased demand on the municipal water system, however, significant structural damage is not anticipated. Prolonged drought may increase operating demands on the water system, affect vegetation, and increase grass/wildland fire risk. Economic impacts may occur indirectly through impacts to the surrounding agricultural community. Older adults, households with limited financial resources, and residents dependent on reliable municipal water service may be more vulnerable to prolonged drought conditions.
Extreme Heat	Significant direct damage to buildings is not anticipated. Extreme heat may affect the entire population and increase demand on the electrical system and cooling equipment. Power outages could interrupt municipal services and leave residents without adequate cooling. Older adults, young children, individuals with medical conditions, outdoor workers, and residents without adequate air conditioning are particularly vulnerable. Potential losses are primarily associated with increased utility costs, lost productivity, medical impacts, and service interruptions rather than structural damage.
Flash Flood	Jefferson has reported no flash flooding since 2020; however, intense rainfall could produce localized street, yard, basement, or property flooding where drainage is limited. Streets, culverts, utilities, and structures in low-lying or poorly drained areas would be most vulnerable. Temporary road closures could affect access and emergency response. Because there has been no recent flash-flood losses, widespread structural losses are not anticipated.
Grass/Wildland Fire	Agricultural land and open vegetation surrounding Jefferson presents a potential for a grass or field fire to approach the city. Homes, businesses, utility infrastructure, and other structures along the perimeter of the city would be most vulnerable. Smoke could affect the majority of the community and particularly individuals with respiratory conditions. A fire could also temporarily close roads or interrupt utilities. Structural losses would depend on the location, wind conditions, and ability of responders to contain the fire.
Levee/Dam Failure	There are no dams or levees within Jefferson or in the vicinity of the city and therefore do not pose a threat to the community. Therefore, no significant direct structural damage, service disruption,

	displacement, vulnerable-population impacts, or property losses from dam or levee failure are currently anticipated.
River Flooding	The 2016 FIRM identifies flood hazard areas within Jefferson; therefore, structures, streets, utilities, and other assets located within or adjacent to those mapped areas have greater vulnerability than assets elsewhere in the community. Flooding could damage buildings and contents, temporarily restrict transportation, interrupt utilities or municipal services, and displace affected residents. Residents with limited mobility, transportation, or financial resources may have greater difficulty evacuating or recovering. Potential property losses are concentrated within the identified flood hazard areas rather than distributed evenly throughout the city.
Severe Winter Storm	Severe Winter Storms may affect the entire community but generally do not cause uniform structural damage. Heavy snow, ice, wind, and extreme cold can damage trees, roofs, overhead utilities, water infrastructure, and transportation systems. Power outages and blocked roads could interrupt municipal services and emergency response. Older adults, individuals with medical needs and/or limited mobility, and households without alternative heat sources are particularly vulnerable during extended outages or extreme cold. Economic losses may include snow removal, infrastructure repairs, business interruption, and increased heating costs.
Thunderstorm/Lightning/Hail	All developed areas in the City of Jefferson are exposed to severe thunderstorms, lightning, and hail. Future storms could damage roofs, siding, windows, vehicles, trees, utility infrastructure, and public facilities. Lightning and wind may cause power outages and fires in localized areas of the city. Potential economic losses include building and vehicle repairs, utility restoration, debris removal, and temporary business interruption.
Tornado	All structures and residents of Jefferson are potentially exposed to tornadoes, although actual damage would generally be concentrated along the path of the tornado rather than affecting a fixed percentage of the community. A direct strike could cause severe or complete damage to homes, businesses, public buildings, utilities, and other critical facilities; block streets with debris; interrupt utilities, communications, and emergency services; and result in displacement, injuries, or fatalities. Residents without access to adequate shelter and those requiring assistance to shelter quickly would be particularly vulnerable. Potential structural losses could be substantial in the area directly affected.
Windstorm	All of the developed areas of the City of Jefferson are exposed to high winds and derecho events. Recent events have demonstrated the potential to damage roofs, siding, trees, crops, vehicles, and overhead electrical and communications infrastructure. Downed trees and utility lines may block streets, cause extended power outages, and interfere with emergency response and municipal services. Older structures and buildings with large roof areas may

	experience greater damage. Economic losses may include structural repairs, utility restoration, debris removal, business interruption, and agricultural losses.

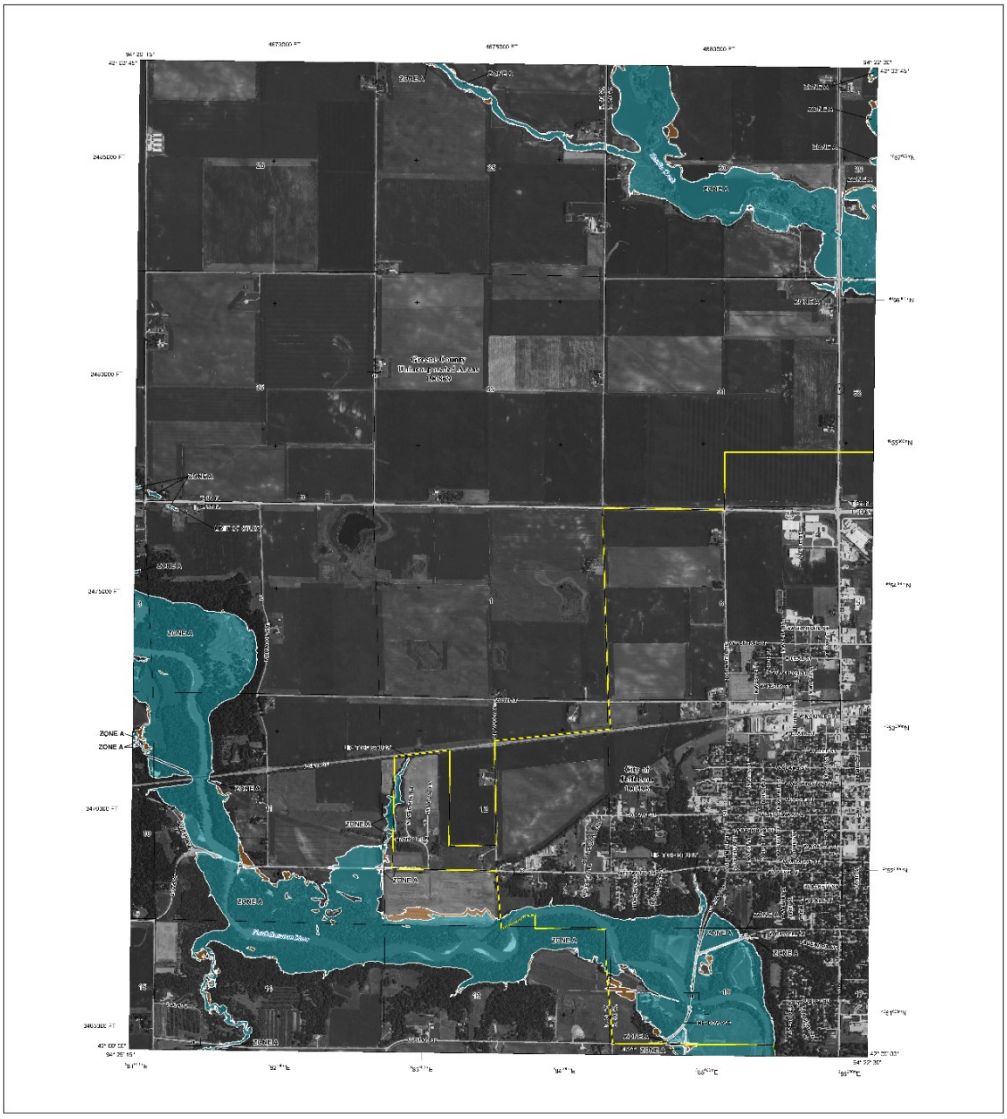
Table E.11 depicts the Greene County Community School District Hazard Impact and Vulnerability Summary. The school district's vulnerability to hazards includes not only potential damage to buildings and other physical assets, but also impacts to students, staff, transportation, and continuity of education and support services. Temporary or extended school closures may affect families throughout the school district, including the disruption of transportation, school meal programs, childcare, extracurricular activities, and the parent/guardian's ability to work. Students and staff with disabilities, medical needs, limited mobility, or other functional needs may require additional assistance during emergency response, evacuation, sheltering, or extended service disruptions.

Table E.12: Greene County Community School District Hazard Impact and Vulnerability Summary

Hazard	Anticipated Impacts and Potential Losses
Drought	Direct structural damage to school facilities is not anticipated. Prolonged drought may lead to water use restrictions, affect outdoor athletic fields and activities, and increase grass/wildland fire risk, particularly to the north of the school property. Drought may also indirectly affect district families through impacts to agricultural community. Educational operations would generally be expected to continue unless municipal water supplies or other essential services were disrupted.
Extreme Heat	Significant direct damage to buildings is not anticipated. Extreme heat may increase cooling demands and utility costs and could affect outdoor recess, athletic practices, competitions and other activities. Failure or interruption of electrical services or cooling systems could require modification or cancellation of classes and activities. Students and staff with medical conditions and those participating in outdoor activities are particularly vulnerable.
Flash Flood	Heavy rainfall and flash flooding could affect school property, transportation routes, or access to district facilities. Flooded roads may prevent buses, students, and staff from safely reaching or leaving school and could result in delayed starts, early dismissal, or cancellation. District property on low-lying and poorly drained areas may experience water intrusion or damage to building systems and contents.
Grass/Wildland Fire	Grass or field fires could threaten school property if a fire occurs near the school. Transportation routes could be affected by smoke, reduced visibility or road closures. Smoke may be particularly hazardous to students and staff with respiratory conditions. A nearby fire could require students and staff to shelter in place or evacuate. Direct property losses would depend upon the proximity and severity of the fire.
Levee/Dam Failure	District facilities are not located within an identified dam or levee inundation area, and therefore, direct losses are not anticipated. A failure affecting surrounding transportation routes could potentially interfere with student and staff access or school transportation even if district property is not directly inundated.

River Flooding	River flooding could affect transportation routes and access to the school even where school buildings are outside mapped flood hazard areas. Flooding of school property could damage buildings, equipment, furnishings, vehicles, athletic facilities, and other district assets and could interrupt educational operations. Students who rely on district transportation may be particularly affected by flooded or closed roads.
Severe Winter Storm	Severe Winter Storms represent a significant operational concern for the district. Snow, ice, extreme cold, and poor visibility can make student and staff travel unsafe and result in delayed starts, early dismissal, or cancellation of school and/or activities. Heavy snow, ice, and wind may damage roofs, trees, electrical infrastructure, and other facilities. Extended power or heating outages could make school buildings unusable until services are restored. Students who depend on school for meals or other services may experience additional impacts during extended closures.
Thunderstorm/Lightning/Hail	Severe thunderstorms may damage the roof, windows, siding, HVAC equipment, vehicles, athletic facilities, tress, and electrical systems. Hail may result in substantial repair costs even when buildings remain usable. Lightning and wind may cause power outages and require cancellation or relocation of outdoor activities. Students participating in outdoor athletics and activities are particularly vulnerable when sever weather develops.
Tornado	A direct tornado strike could cause severe or complete damage to school buildings, buses, vehicles, utilities, and other district property and could result in significant injuries or fatalities. Students and staff present during the school day represent a concentrated population requiring rapid access to appropriate shelter. Damage to the school building or essential building systems could result in an extended interruption of educational services and require temporary relocation of students.
Windstorm	High winds and derecho events may damage the roof, windows, siding, HVAC systems, tress, athletic facilities, busses, and overhead utilities. Power outages or building damage could temporarily prevent use of school facilities and interrupt educational services. Downed trees and power lines may also affect bus routes and access to district facilities. Potential losses include building and vehicle repairs, debris removal, utility restoration, and costs associated with temporary disruption of school operations.

Flood Maps



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS OF FLOOD HAZARD
- NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

OTHER AREAS

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- 16.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

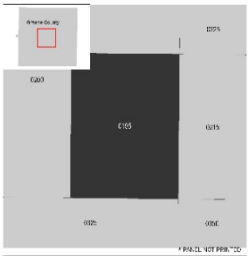
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1 inch = 1,000 feet 1:12,000

0 1,000 2,000 4,000 Feet

0 250 500 1,000 Meters

PANEL LOCATOR



* PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa

PANEL 195 OF 500

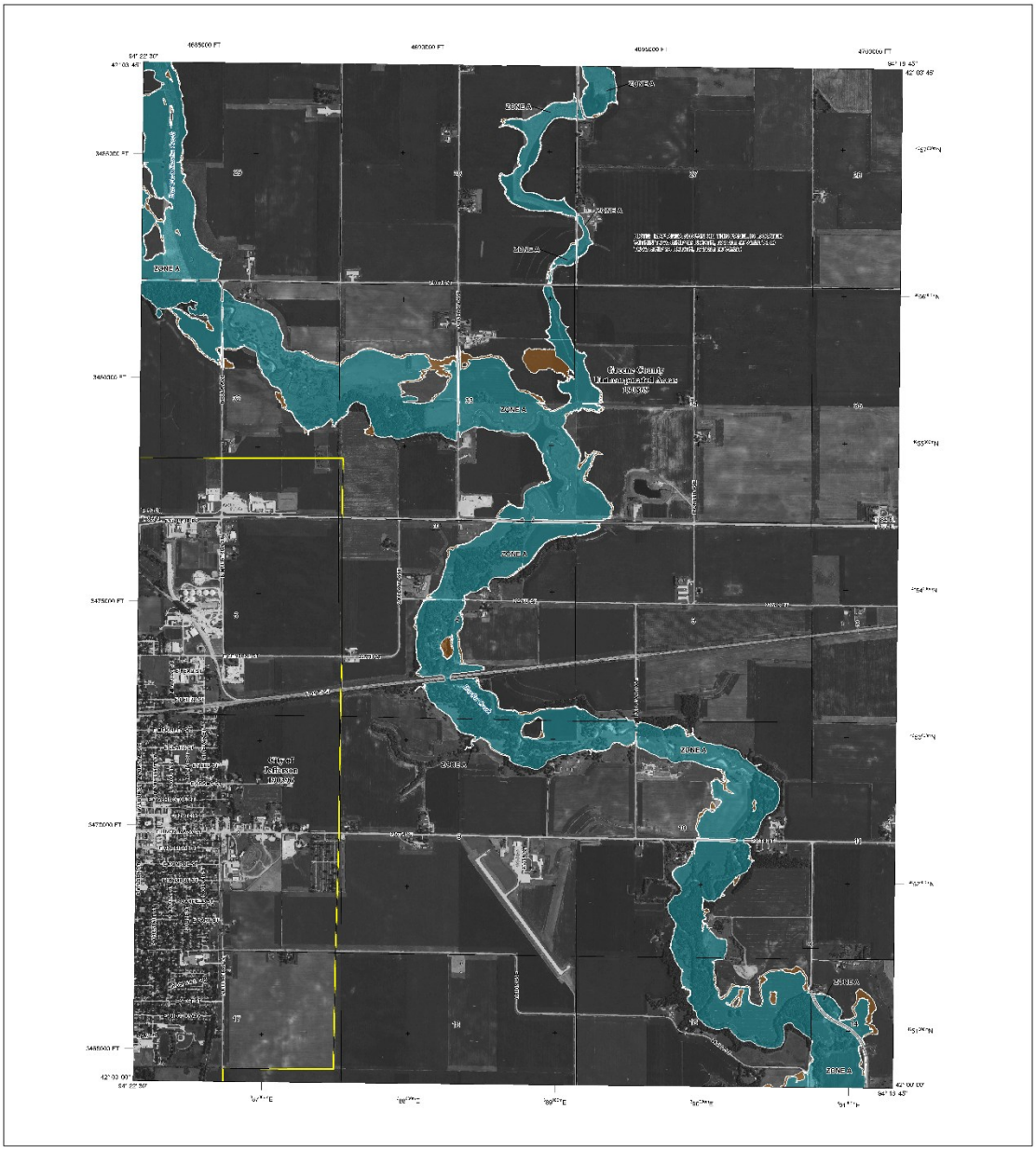
FEMA

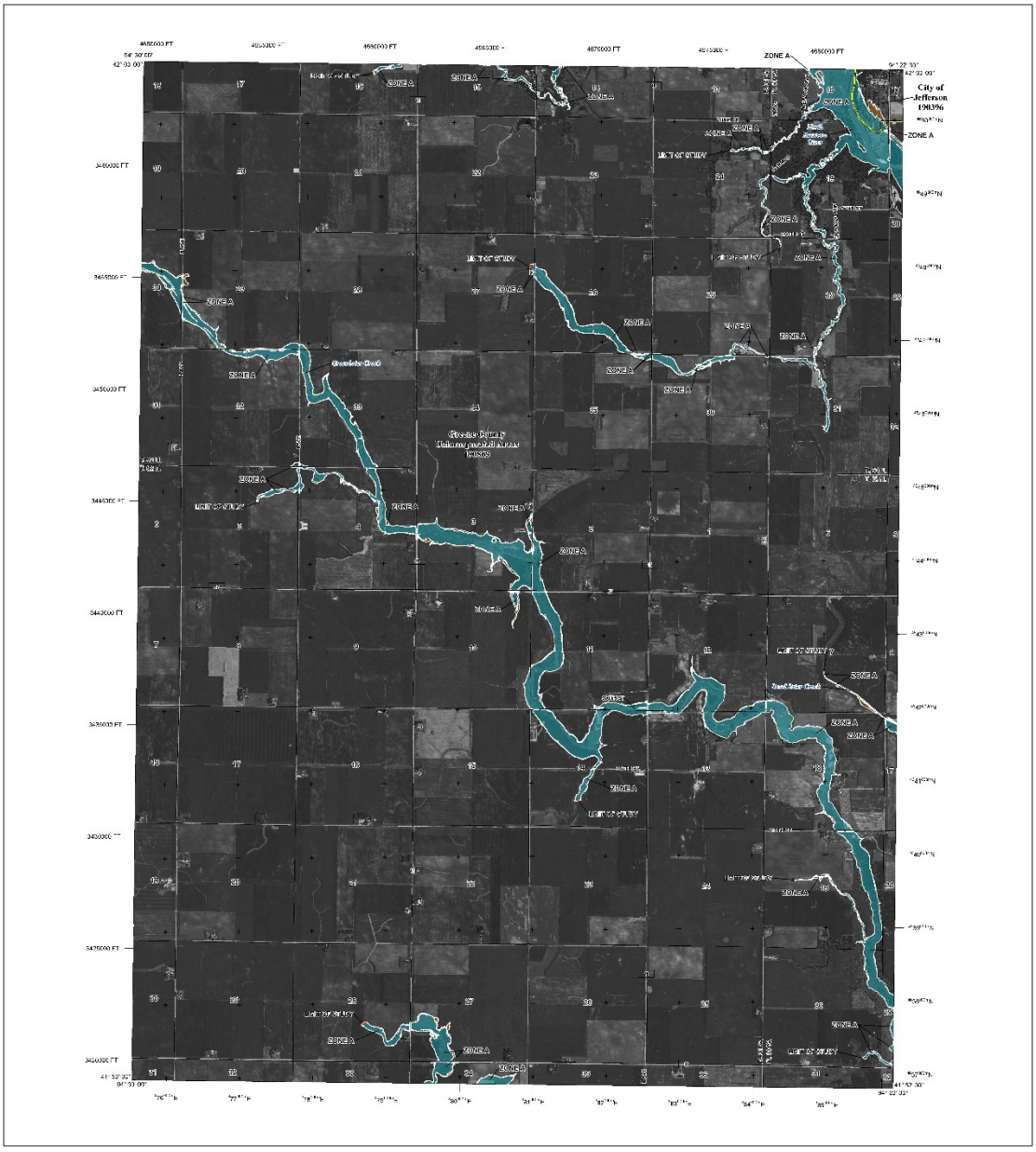
COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190680	0195	C
CITY OF JEFFERSON	190681	0195	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0195C

EFFECTIVE DATE
APRIL 19, 2016


ZONE A
Greene County Unincorporated Areas
City of Jefferson
FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Flood Risk due to Levee
OTHER AREAS
NO SCREEN
Areas Determined to be Outside the 0.2% Annual Chance Floodplain
Area of Undetermined Flood Hazard
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Accredited or Provisionally Accredited Levee, Dike, or Floodwall
Non-accredited Levee, Dike, or Floodwall
Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary
NOTES TO USERS
SCALE
1 inch = 1,000 feet
1:12,000
PANEL LOCATOR
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
Greene County, Iowa
PANEL 215 OF 500
FEMA
COMMUNITY
NUMBER
PANEL
SUFFIX
VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0215C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

N

1 inch = 2,000 feet 1:24,000

0 2,000 4,000 8,000 Feet

0 500 1,000 2,000 Meters

PANEL LOCATOR

A PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas

PANEL 325 OF 500

FEMA

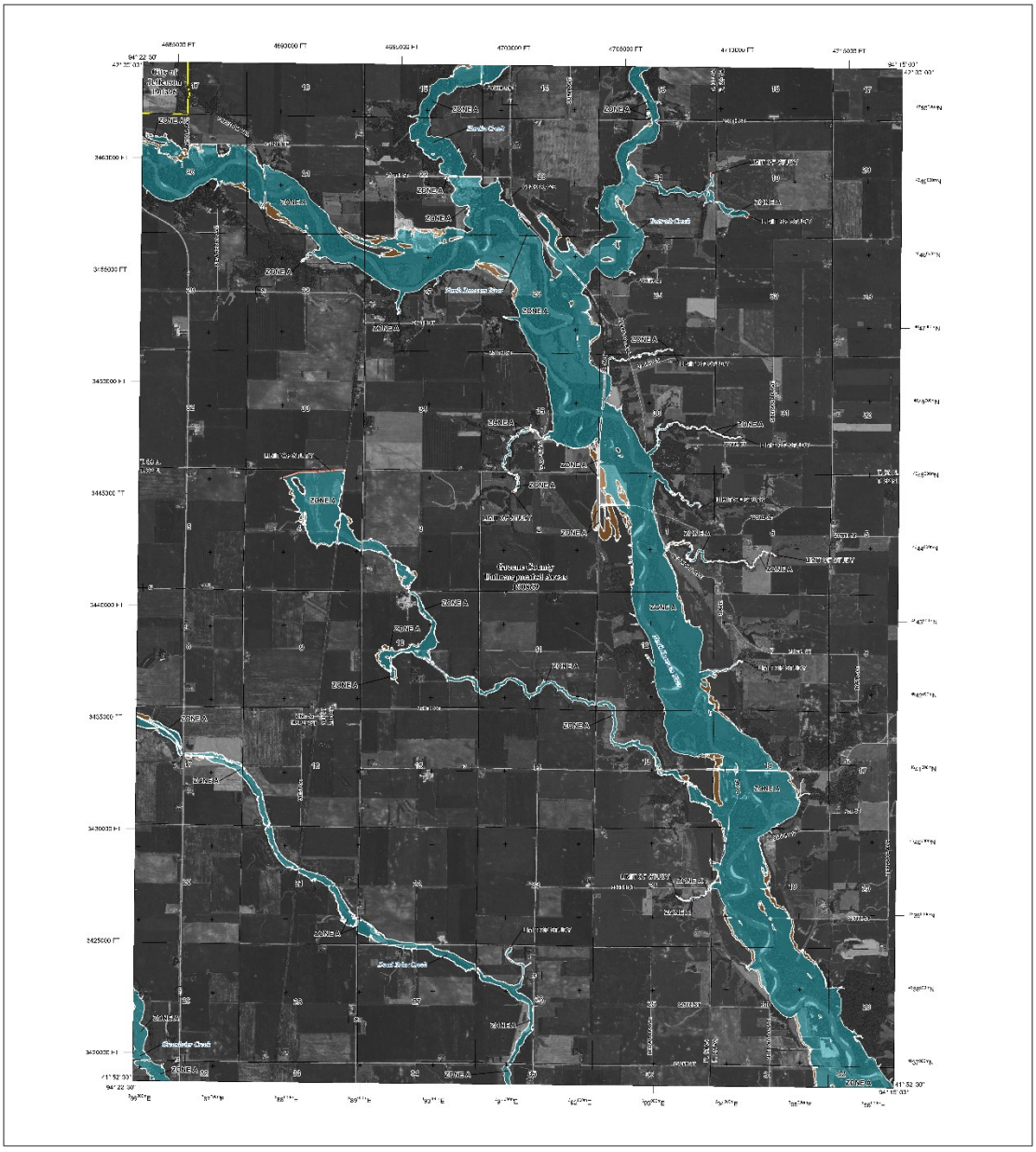
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COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190383	0325	C
CITY OF JEFFERSON	190384	0325	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0325C

EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

N

1 inch = 2,000 feet 1:24,000
0 2,000 4,000 8,000 Feet
0 500 1,000 2,000 Meters

PANEL LOCATOR

0215 0220 0240
0305 0310 0315
0450 0475 0500

A PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas

PANEL 350 OF 500

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190580	0350	C
JEFFERSON, CITY OF	190581	0350	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0350C

EFFECTIVE DATE
APRIL 19, 2016

There have been changes in the City's mitigation priorities since the previous plan update. Some projects that were identified as a high priority have been completed utilizing available grant and local funds. Other projects that were not high priority were implemented as funds were available, and those that either had no funding available or were not a high priority were not implemented during this planning period. The City's Mitigation Actions were reviewed and updated with the city's new priorities in mind which have shifted from the last planning period due to changes in elected officials and staff, available financial resources, and hazards that have affected the community.

During the precious planning period, the City did not formally incorporate the Hazard Mitigation Plan into other adopted plans, ordinances, or policies. However, mitigation actions identified in the plan were integrated informally into the City's annual budgeting, capital improvement decisions, infrastructure projects, and ongoing operations as applicable. Examples of this include the development and integration of a storm sewer improvements plan and utilizing a specific radio station for hazard updates. This resulted in the completion and continued implementation of mitigation actions identified in the previous plan as shown in the table below. No other formal integration of the previous Hazard Mitigation Plan into adopted City plan, ordinance, or policy occurred during the planning period.

Status of Previous Mitigation Actions

The Greene County Community School District had no previous Action Plan/Mitigation Actions, therefore there is no Status of Previous Mitigation Actions.

Table E.13: City of Jefferson Status of Previous Mitigation Actions

	Status				
Previous actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not implemented**
Warning device maintenance			X		
Restriction of usage by community and manufacturer			X		
Develop plan if extra water is needed				X	
Critical limit on well levels				X	
Essential uses only during drought			X		
Coordinate safety plans for city, schools, medical center and area facilities			X		
Develop a rapport with all relevant organizations to create a central network			X		
Review needs in manpower, financials and equipment			X		

Develop an equipment replacement plan			X		
Conduct multi-county disaster drill			X		
Wire Greene County Community Center to be compatible with portable generator				X	
Provide NOAA Weather Radios for Jefferson employees					X
Develop Storm Sewer Improvements Plan		X			
Implement storm sewer projects		X			
Continued compliance with National Flood Insurance Program			X		
Upgrade sewer system and install new lines when necessary			X		
Upgrade water system and install new lines when necessary			X		
Upgrade snow equipment			X		
Purchase/upgrade storm sirens as necessary			X		
Purchase an additional siren				X	
Regularly perform lift station pump maintenance			X		
Purchase new pumps for the lift station as necessary			X		
Purchase new/upgrade patrol equipment as necessary			X		
Continue to train fire personnel			X		
Purchase new/upgrade firefighting equipment as necessary			X		
Purchase new fire trucks			X		
Construct a new fire station				X	
Encourage use of one call to avoid damage to utilities			X		
Continue tree-trimming, enforcing ordinances when needed			X		
Keep updating and upgrading ambulance fleet, snowplow equipment, sand trucks, etc.			X		
Continue to budget for and fund street repairs			X		
Keep fire hydrants updated and working, replacing as needed			X		
Install switching equipment at select locations on the distribution system			X		
Provide curb side brush pick-up services monthly			X		
Regularly monitor and maintain existing outdoor warning sirens			X		

Complete current plan and make plans to update every 5 years			X		
Add chain link fence or surveillance cameras at critical assets				X	
Ensure that back-up generation at water and wastewater facilities are in working condition and maintained			X		
Encourage use of one call to avoid damage to utilities			X		
Make sure fire volunteers are trained to FF levels			X		
Utilize specific radio station for hazard updates	X				
Schedule bridge improvements and inspections			X		
Complete water main improvements			X		
Check water and sewer lines for leaks			X		
Continue surveillance and protection of public facilities			X		
Regularly maintain and inspect the water tower and treatment plant			X		

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): [The mitigation strategy shall include] 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.

Section 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.

Table E.14: City of Jefferson Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards**
Objective 1	Increase public awareness of impending storm
Objective 2	Maintain adequate water during a drought
Objective 3	Improve drainage and reduce localized flooding
Goal 2	**Minimize injuries and loss of life due to the impacts of hazards**

Objective 1	Educate communities on tornadoes
Goal 3	**Improve coordination and communication with other relevant organizations and build support for hazard mitigation**
Objective 1	Create central network
Goal 4	**Maintain and support public safety facilities, including equipment and training**
Objective 1	Fund Fire and Police Departments at feasible levels

Table E.15 Greene County Community Schools Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other school assets from the effects of hazards**
Objective 1	Improve early warning signs
Objective 2	Improve infrastructure
Objective 3	Provide Backup assistance for all critical systems
Goal 2	**Minimize to the greatest possible extent the vulnerability to the impacts of all identified hazards**
Objective 1	Protection of children, staff and visitors
Goal 3	**Improve coordination, communication, and response operations with other relevant organizations**
Objective 1	Provide education and training
Objective 2	Improve first responder resources and capabilities
Goal 4	**Improve public communication, education, and awareness of hazards and risks to the Greene County Community School District**
Objective 1	Provide education and training

Table E.16: City of Jefferson Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Warning device maintenance	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	High	Police Department	Moderate	City Public Safety Funds	Emergency Services	Ongoing
Restrictions of water usage by community and manufacturer	Extreme Heat and Drought	Mod	City Council	Low	City Public Works Funds	Natural Resource Protection	Ongoing
Develop a plan if extra water is needed	Extreme Heat and Drought	Mod	Water Department	Low	City Public Works Funds	Natural Resource Protection	Short
Critical limit on well levels	Extreme Heat and Drought	High	Water Department	Low	City Public Works Funds	Natural Resource Protection	Ongoing
Essential uses only during drought	Extreme Heat and Drought	Mod	City Council	Low	City General Funds	Natural Resource Protection	Ongoing
Coordinate safety plans for city, schools, medical center, and area facilities	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Mod	City Council, School District, Board of Directors	Low	City Public Safety Funds	Emergency Services	Short

Develop a rapport with all relevant organizations to create a central network	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning, Extreme Heat and Drought	Mod	All Public Organizations	Minimal	City General Funds	Prevention	Ongoing
Review needs in manpower, financials and equipment	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning, Extreme Heat and Drought	Mod	All Public Organizations	Low	City general Funds	Prevention	Ongoing
Develop an equipment replacement plan	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning, Extreme Heat and Drought	Mod	All Public Organizations	Low	City General Funds	Emergency Services	Ongoing
Conduct multi-county disaster drill	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Mod	City Council, Greene County EMS	Low	City Public WorksFunds	Emergency Services	Ongoing

Wire Greene County Community Center to be compatible with portable generator	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Low	Recreation Department	Minimal	City General Funds	Emergency Services	Mid
Install a standby generator at the Greene County Community Center	Tornado, Windstorm, Hailstorm, Severe Winter Storms, Thunderstorm and Lightning	Low	Recreation Department, City Council	Low	City General Funds, Grow Greene County, FEMA BRIC grant, FEMA HMGP with State Match	Emergency Services	Mid
Install a standby generator at the Fire Station	Tornado, Windstorm, Hailstorm, Severe Winter Storms, Thunderstorm and Lightning	Low	City Council, Fire Department	Low	City Public Safety Fund, Grow Greene County, FEMA BRIC grant, FEMA HMGP with State Match	Emergency Services	Mid
Install a standby generator at City Hall	Tornado, Windstorm, Hailstorm, Severe Winter Storms, Thunderstorm and Lightning	Low	City Council	Low	City General Funds, Grow Greene County, FEMA BRIC grant, FEMA	Emergency Services	Mid

					HMGP with State Match		
Develop storm sewer improvement plan	Flash Flood, River Flooding	Mod	Sewer Department, City Engineer	Low	City Public Works Fund	Structural Project	Short
Implement storm sewer projects	Flash flood, River Flooding	Mod	Sewer Department	High	City Public Works Fund, CDBG	Structural Project	Long
Continued compliance with National Flood Insurance Program	Flash Flood, River Flooding	Mod	City Council	Minimal	City General Fund	Property Protection	Ongoing
Upgrade sewer system and install new lines when necessary	Flash Flooding, River Flooding	Mod	City Council, Sewer Department	Mod	City Public Works Fund, CDBG	Structural Project	Ongoing
Upgrade water system and install new lines when necessary	Flash Flooding, River Flooding, Drought	High	City Council, Public Works	High	City Public Works Fund, CDBG	Structural Project	Ongoing
Upgrade snow equipment	Severe Winter Storm	High	City Council, Public Works	Mod	City General Fund	Prevention	Ongoing
Purchase/upgrade storm sirens as necessary	Tornado, Windstorm, Hail, Thunderstorm	High	City Council	Low	City Public Safety Fund, Grow Greene County, FEMA HMGP with Sate Match, FEMA BRIC Program	Emergency Services	Short
Purchase an additional siren	Tornado, Windstorm, Hail, Thunderstorm	High	City Council	Low	City Public Safety Fund,	Emergency Services	Short

					Grow Greene County, FEMA HMGP with Sate Match, FEMA BRIC Program		
Regularly perform lift station pump maintenance	Flash Flooding, River Flooding	High	Public Works	Low	City Public Works Fund	Prevention	Ongoing
Purchase new pumps for the lift station as necessary	Flash Flooding, River Flooding	High	Public Works, City Council	Low	City Public Works Fund,	Prevention	Ongoing
Purchase new/upgrade patrol equipment as necessary	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	High	City Council, Police Department	Mod	City Public Safety Fund, Grow Greene County	Emergency Services	Ongoing
Continue to train fire personnel	Grass/Wild Land Fire, Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	High	Fire Department, City Council	Minimal	City Public Safety Fund, Fire Department Budget	Emergency Services	Ongoing
Purchase new/upgrade firefighting equipment as necessary	Grass/Wild Land Fire, Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River	High	Fire Department, City Council	Low	City Public Safety Fund, Grow	Emergency Services	Ongoing

	Flooding, Severe Winter Storms, Thunderstorm and Lightning				Greene County, State Grants, Assistance to Fire Fighters Grant		
Purchase new fire trucks	Grass/Wild Land Fire, Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	High	Fire Department, City Council	Mod	City Public Safety Fund, Grow Greene County, State Grants, Assistance to Fire Fighters Grant	Emergency Services	Short
Construct a new fire station	Grass/ Wild Land Fire, Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	High	Fire Department, City Council	High	City Public Safety Fund, Grow Greene County, Donations	Emergency Services	Long
Encourage use of one call to avoid damage to utilities	Flash Flooding, River Flooding, Severe Winter Storm, Tornado, Thunderstorm and Lightning	Mod	Public Works	High	City Public Works Fund	Public Education and Awareness	Ongoing

Continue tree trimming, enforcing ordinances when needed	Windstorm, Severe Winter Storm, Tornado	Mod	Public Works	Minimal	City General Funds	Property Protection	Ongoing
Keep updating and upgrading snowplow equipment, sand trucks, etc.	Flash Flood, Tornado, Windstorm, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Mod	City Council	Low	City General Funds	Emergency Services	Ongoing
street repairs as needed to improve drainage	Flash Flooding, River Flooding, Thunderstorm and Lightning, Tornado, Windstorm, Severe Winter Storm	Mod	City Council	Low	City Roads Fund	Emergency Services	Ongoing
Keep fire hydrants updated and working, replacing as needed	Grass/Wild Land Fire	Mod	Public Works	Minimal	City Public Works Fund	Emergency Services	Ongoing
Install switching equipment at select locations on the distribution system	Flash Flooding, River Flooding, Drought	High	Public Works	High	City Public Works Fund	Property Protection	Short
Provide curb side brush pick-up services monthly	Grass/Wild Land Fire	Mod	City Council	Minimal	City General Funds	Property Protection	Ongoing
Regularly monitor and maintain existing outdoor warning sirens	Tornado, Windstorm	Low	City Council, Public Works	Minimal	City Public Safety Fund	Emergency Services	Ongoing
Complete current plan and make plans to update every 5 years	Grass/Wild Land Fire, Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms,	Low	City Council, Fire Department, School District	Minimal	City General Funds, FEMA HMGP with State Match	Prevention	Ongoing

	Thunderstorm and Lightning						
Add chain link fence or surveillance cameras at critical assets	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Mod	City Council	Minimal	City General Fund	Prevention	Mid
Ensure that back-up generation at water and wastewater facilities are in working condition and maintained	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	High	Public Works, City Council	Minimal	City Public Works Fund	Emergency Services	Ongoing
Make sure fire volunteers are trained to FF levels	Grass/Wild Land Fire, Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Mod	Fire Department, Emergency Services	Minimal	City Public Safety Fund	Emergency Services	Ongoing
Utilize specific radio station for hazard updates	Grass/Wild Land Fires, Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms,	Mod	Emergency Services	Minimal	City General Funds	Emergency Services	Ongoing

	Thunderstorm and Lightning						
Schedule bridge improvements and inspections	Grass/Wild Land Fire, Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Low	Board of Supervisors	High	City Roads Fund	Property Protection	Ongoing
Complete water main improvements	Drought, Tornado, Windstorm, Extreme Heat, Hailstorm, Severe Winter Storms, Flash Flooding, River Flooding	High	City Council	Mod	City Public Works Fund, CDBG	Property Protection	Mid
Check water and sewer lines for leaks	Flash Flooding, River Flooding, Drought, Severe Winter Storm	High	City Council	Low	City Public Works Fund	Property Protection	Ongoing
Continue surveillance and protection of public facilities	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Mod	City Council	Minimal	City General Funds	Prevention	Ongoing
Regularly maintain and inspect the water tower and treatment plant	Drought, Tornado, Windstorm, Extreme Heat, Hailstorm, Severe Winter Storms,	Low	City Council	Minimal	City Public Works Funds	Prevention	Ongoing

	Thunderstorm and Lightning						
Monitor Levee/Dam Failure Risk	Levee/Dam Failure	Low	City Council	Minimal	City General Fund	Emergency Services	Ongoing

Table E.16: Greene County Community Schools Mitigation Actions

Action	**Hazard(s) Addressed**	**Priority**	**Responsible Department**	**Estimated Cost**	**Potential Funding Source(s)**	**Mitigation Measure Category**	**Target Completion Date**
Backup generator	Extreme Heat, Severe Winter Storm, Thunderstorm/Lightning/Hail	Med	Superintendent, School Board, Maintenance	Moderate	School Funds, FEMA HMGP, Grow Greene	Emergency Services	Mid
Build a safe room	Tornado, Severe winter storms	High	School Board, Superintendent, School District's Engineering Firm	High	School fund, City Funds, FEMA HMGP, Grow Greene	Prevention	Short
Training on bus evacuation	Flash Flood, River Flooding, Levee/Dam Failure	High	Transportation Director, Bus Drivers	Low	School Funds, Training Grants	Emergency Services	Ongoing
Continue to train local volunteers as much as feasibly possible	Severe Winter Storms, Thunderstorm/ Lightning/Hail, Tornado, Flash Flood, Windstorm, Drought, Extreme Heat	High	Greene County School District	Minimal	School Funds, FEMA AFG & SAFER	Public Education and Awareness	Ongoing
Install GPS in all school buses	Flash flood, River Flooding, Tornado, Levee/Dam Failure	Low	Greene County School District	Moderate	School Funds, Iowa Department of Education	Emergency Services	Mid

Continued practice of drills and safety procedures with children at school	Tornado, Thunderstorm/Lightning/Hail, Windstorm, Flash Flood, River Flood, Grass/Wildland Fire, Severe Winter Storm, Windstorm	High	Greene County School District	Low	City Funds, School Funds	Public Education and Awareness	Ongoing
Create emergency operations plan	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, Severe Winter Storms, Thunderstorm/ Lightning/Hail	High	Greene County Community schools District, Greene County Emergency Management	Minimal	School Funds	Prevention	Short

Incorporation into Other Planning Mechanisms

Where possible, findings and recommendations from this Hazard Mitigation Plan will be integrated into the City of Jefferson's existing and future planning and operating documents. The City Council will be responsible for ensuring that the Hazard Mitigation Plan is reviewed when applicable local plans, ordinances, policies, and capital improvement documents are developed or updated. During these updates, the city will review applicable hazard risk information and mitigation actions contained in this plan and determine whether relevant information or actions should be incorporated into the document being updated. The integration of information from the Hazard Mitigation Plan will be documented through the applicable planning document, ordinance or resolution, budget or capital improvement records, meeting minutes, or other City records.

Information from the Hazard Mitigation Plan will be reviewed and incorporated, as applicable, when the following documents are updated:

- City Code
- Jefferson Comprehensive Plan
- Building Code
- Zoning Ordinance
- Strategic Plan
- Housing Needs Assessment

The City of Jefferson does not currently have the following plans or documents. If any are developed during the life of this Hazard Mitigation Plan, applicable hazard risk information, mitigation goals, and mitigation actions will be reviewed and incorporated into their development, as appropriate:

- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans

Incorporation into Other Planning Mechanisms- Greene County Community School District

The update of the mitigation strategy will be provided to the School Superintendent for consideration in the next update cycle of the capital improvement plan. Information will be utilized to expand and improve the school's mitigation to potential hazard events.

Appendix F:

Paton

Community Profile

History

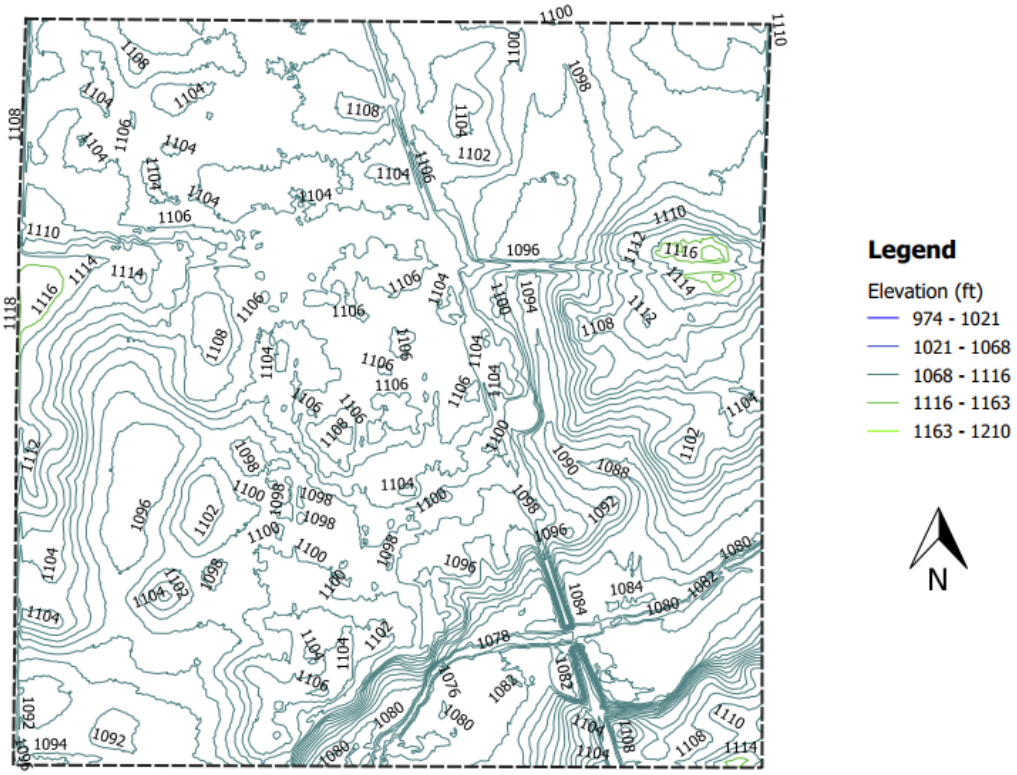
Paton was named after a wealthy pioneer landholder who moved to the area after living in New York City. Mr. Paton helped construct the Presbyterian Church and led the funding efforts for the construction of the public library. Paton, like the other communities in Greene County, was founded along the construction of the Des Moines and Fort Dodge Railway. Paton was established on roughly .56 square miles of land. The Presbyterian Church was organized in 1876 followed by the St. John Evangelist Church in 1894.

Geography and Environment

Paton is located in the northeast corner of Greene County. IA 144 intersects the community running north/south. Paton is 10.4 miles north of U.S. 30. Paton is located 18 miles from Jefferson, 10.3 miles from Grand Junction, 42 miles from Ames and 70.3 miles from Des Moines.

The highest elevation in Greene County can be found throughout the western part of the county. Here, the elevation can reach as much as 1,230 feet above sea level. The elevation in Paton ranges from 1,080 feet to 1,116 feet, a relatively flat community. Paton's elevation can be found in Map F.1.

Map F.1 City of Paton Elevation



Demographics

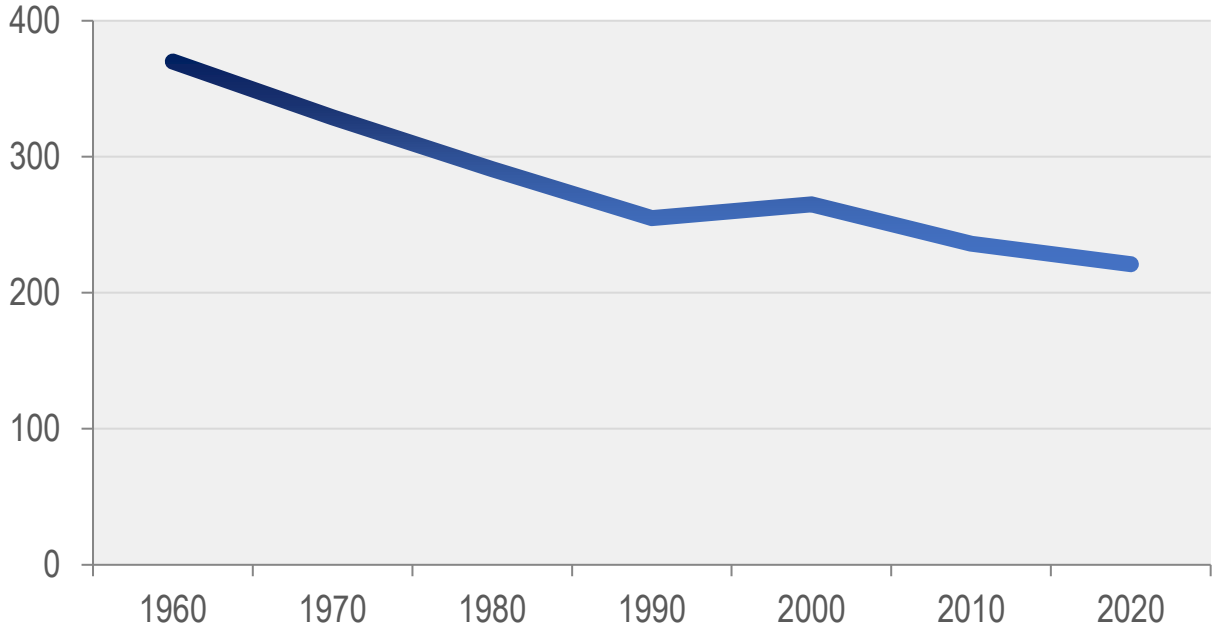
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Paton's population through past, present, and future trends of the region.

The size and composition of a community's population can exert influence on its development. For instance, population size, composition, and distribution influence the range of businesses a community can support, the pool of workers from which to draw, and the demand for and supply of services. Similarly, the effect people have on the social, economic, and physical environments depends upon the composition, expectations, and distribution of the population. A population's age distribution, income levels, ancestry, and educational attainment are some of the characteristics that mold a community. Population trends give community leaders and elected officials information on what kind of services need to be provided and offers prospective employers an overview of the local labor force.

Over the past 50 years, the City of Paton has experienced a decline in population. In 1960, Paton had a population of 370. Since then, the City's population has declined by 40% to 221 in 2020.

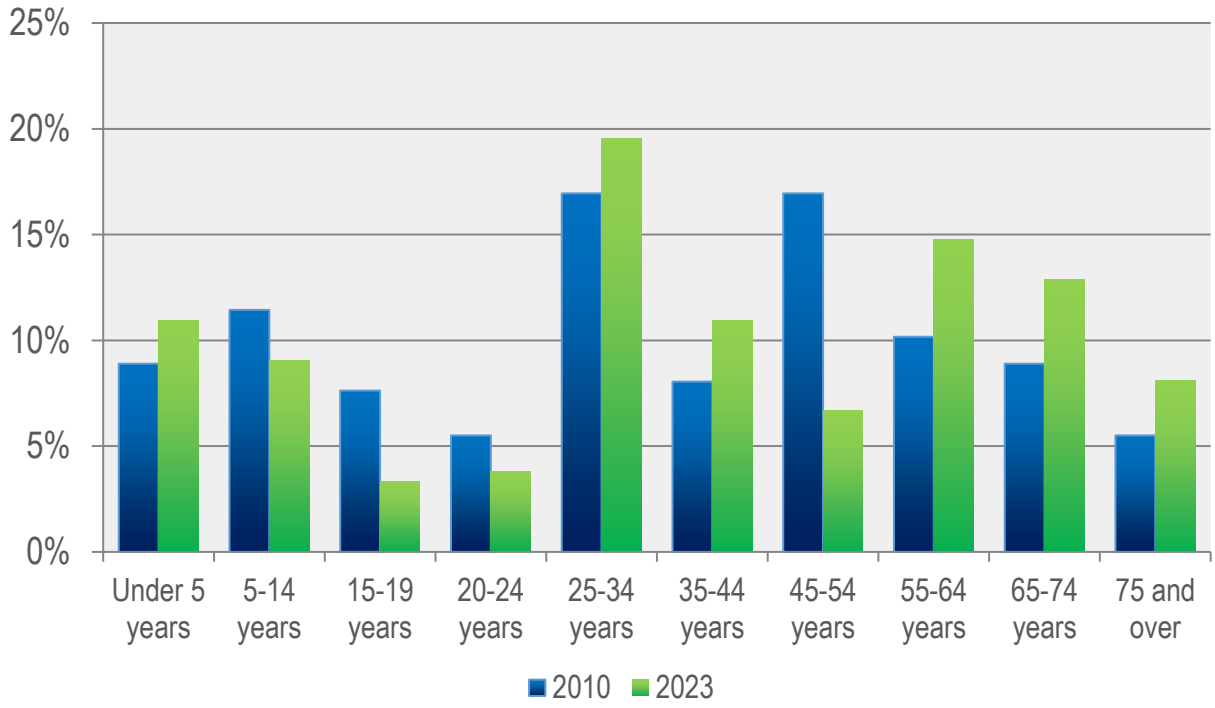
The most dramatic change happened from 1960 to 1970 when the city lost 41 residents. Figure F.1 shows the City of Paton's population trend since 1960.

Figure F.1: City of Paton Historic Population, 1960-2020



Source: US Census

Figure F.2: City of Paton Age Distribution, 2010 & 2023



Source: US Census

The City's population makeup is not very different from other parts of Greene County, and even most of the State of Iowa. Unlike most of the state, the largest age group in Paton is aged 25-34 years. However, population cohorts at age 50 and above have generally higher numbers than other younger cohorts and this is reflected in the higher population of residents aged 55-64 and 65-74 years old. This information can be found in Figure D.2.

Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by 25 units. Occupied housing units have decreased by 21 units and vacant housing units decreased by 4 units. Table F.1 shows a breakdown of the city's occupied and vacant housing units.

Table F.1: City of Paton Housing Units, 2010 & 2023

	2010		2023	
	Number	Percent	Number	Percent
Occupied Housing Units	108	90.0%	87	91.6%
Owner-Occupied	82	75.9%	74	85.1%
Renter-Occupied	26	24.1%	13	14.9%
Vacant Housing Units	12	10.0%	8	8.4%
Total Housing Units	120	100.0%	95	100.0%

Source: US Census, American Community Survey

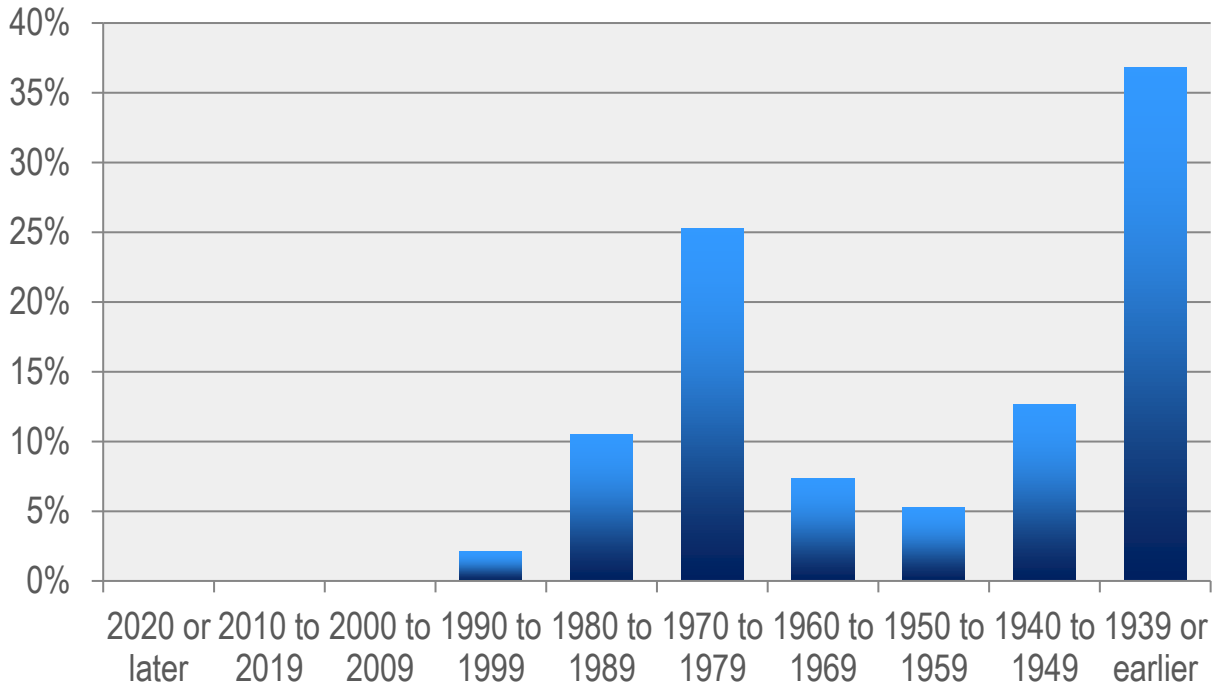
Table F.2: City of Paton Value of Owner-Occupied Units, 2023

Value of Housing Unit	**Percent of Homes**
Less than $50,000	21.6%
$50,000 to $99,999	43.2%
$100,000 to $149,999	14.9%
$150,000 to $199,999	14.9%
$200,000 to $299,999	0.0%
$300,000 to $499,999	5.4%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%
Median (dollars)	$70,000
Median (Iowa)	$213,300

Source: American Community Survey

Paton, like many other small rural towns in Iowa, has a lower median housing value of $70,000. The State of Iowa has a median housing value of 213,300. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2023 American Community Survey Estimates, 21.6% of the city's homes are valued less than $50,000. A complete breakdown of the value of homes in Paton can be found in Table F.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Figure F.3: City of Paton Year Housing Units Constructed, 2023



Source: American Community Survey

Figure F.3 showcases the year housing units within the City of Paton were constructed. Like most of the county, Paton has a large portion (36.8%) of the homes constructed in 1939 or earlier. The city also experiences a spike in home construction from 1970-1979 when 25.3% of the homes were built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Economics

Household income is an important indicator of the economic base in Greene County. In Paton, the median household income is $62,292 which would classify a large number of the households in Paton as “working” or “middle” class. The City of Paton’s household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Manufacturing is the largest industry with 29.4% of the population being employed. Many employees from Paton commute to other larger neighboring cities like Fort Dodge and Jefferson where more employment opportunities are present.

Table F.3: City of Paton Household Income, 2023

Income and Benefits (2023 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	0	0.0%
$10,000 to $14,999	1	1.1%
$15,000 to $24,999	5	5.7%
$25,000 to $34,999	9	10.3%
$35,000 to $49,999	18	19.5%
$50,000 to $74,999	23	25.3%
$75,000 to $99,999	16	17.2%
$100,000 to $149,999	14	14.9%
$150,000 to $199,999	4	4.6%
$200,000 or more	1	1.1%
Median Household Income	$62,292	--
Mean Household Income	$74,023	--

Source: American Community Survey

Paton, overall, is a small community in a small rural county. A large percentage of the businesses within the county serve the largely agricultural economy. Table F.4 breaks down what industry Paton's residents work in. Manufacturing employs the largest cohort of residents, with 29.4% employed in this industry. The second largest is Educational services, and health care and social assistance with 21.4% of the population employed.

Table F.4: City of Paton Employment by Industry, 2023

2023	Estimate	Percent
Civilian employed population 16 years and over	126	100.0%
Agriculture, forestry, fishing and hunting, and mining	2	1.6%
Construction	16	12.7%
Manufacturing	37	29.4%
Wholesale trade	10	7.9%
Retail trade	12	9.5%
Transportation and warehousing, and utilities	0	0.0%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	12	9.5%
Professional, scientific, and management, and administrative and waste management services	5	4.0%
Educational services, and health care and social assistance	27	21.4%

Arts, entertainment, and recreation, and accommodation and food services	0	0.0%
Other services, except public administration	2	1.6%
Public administration	3	2.4%

Source: American Community Survey

Existing Documents

Table F.5 provides a compilation of the current planning and regulatory documents in place for the City of Paton. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The City's housing needs assessment has allowed the city to take inventory of the current housing situation and determine what steps are necessary to reduce the impact hazards have on the housing stock.

The City of Paton is a small but active community, which benefits them in regard to the mitigation of hazards. A zoning code would keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The adoption of state building codes would ensure that all new and major renovation structures meet the necessary requirements for electrical, plumbing, structural adequacy. This reduces the impact hazards have on structures as they are built to withstand certain minimums.

Creating a comprehensive plan would allow the city to take inventory of the city's current assets and evaluate them through the comprehensive planning process. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table F.5: City of Paton Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	No	-
Building Code	No	-
Zoning Ordinance	No	-
Strategic Plan	Yes	1999
Housing Needs Assessment	Yes	1999
NFIP Participant	Yes	1996
Floodplain Regulations	Yes	1996

NFIP Participation

In the past, there have been instances of significant flooding within the city limits of Paton. The City began participating in NFIP in 1996, and the flood maps were updated in 2016. The City's FIRMs can be found later in this appendix. Any development/ demolition in the floodplain is required to obtain a permit which regulates the development/demolition and lays out the NFIP regulations that must be followed. Paton participates in the NFIP and implements substantial improvement / substantial damage provisions in the following manner: Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD determinations and provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Outlook and Future Development

Since the last plan update, the City of Paton has experienced limited new development. Changes have primarily included improvements to the existing housing stock. No significant new development has occurred within identified hazard prone areas. As a result, development since the previous plan has not increased the City's vulnerability to identified hazards. Paton anticipates that future development will continue to occur as a similar scale and within existing developed areas.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Paton's critical facilities can be found on Map F.2.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table F.6.

Table F.6: City of Paton Essential Infrastructure and Services

Major Arterials	IA Highway 144	**Air Service**	Jefferson Municipal Airport
Water Service	City of Paton and Xenia Rural Water	**Sewer Service**	Municipal
Electric Service	Midland Power Cooperative	**Gas Service**	LP
Sanitation/Solid Waste	Local Haulers	**Landfill**	Boone County Landfill
Phone and Internet	Western Calhoun Telephone, Wireless	**Law Enforcement**	Greene County Sheriff
Fire Service	Paton Volunteer Fire Department	**Ambulance Service**	Greene County Ambulance

Table F.7: City of Paton Critical Facilities

Number on Map	Name	Address	Type
1	Water Tower	299 Griffith Avenue	Utility
2	Paton City Hall	207 W State Street	Essential Facility
3	Paton Fire Agency Building/Storm Siren	101 S Main Street	Essential Facility
4	Paton United Methodist Church	304 State Street	Vulnerable Population
5	Community Building	402 State Street	Vulnerable Population
6	Presbyterian Church	502 S Main Street	Vulnerable Population

Map F.2 Paton Critical Facilities



Hazard Scores

Table F.8: City of Paton Risk Assessment

Hazard	Comments
Drought	Drought occurrences have increased in the past ten years and Paton has been affected. This hazard can cause both direct and indirect issues for the city and its residents.
Earthquake	There have been no instances of damaging earthquakes in the City of Paton. The committee feels there will be no instances during the life of this plan.
Expansive Soils	Expansive soils are not uncommon in this area, due to high clay content and dramatic changes in soil moisture and temperature. This hazard has the greatest impact on individual properties, especially those not engineered to withstand the hazard. This is a very localized hazard (e.g., individual home) and not a major priority

	for public response. The City of Paton's leaders have no knowledge of problems affecting city infrastructure, city facilities, or their personal homes and property.
Extreme Heat	Extreme heat events continue to impact Paton. Education may be one of the best action tools to combat this hazard's impact on the human body. Given current conditions and resources available, there is no risk of widespread losses due to this hazard, although power lines and other infrastructure can be damaged or can break.
Flash Flood	Since 2020, the City of Paton has reported no instances of flash flooding. While flash floods have little to no warning time, the committee has determined this hazard is not a high-priority hazard to address but will consider mitigation actions to prepare the community for response to an event. It is anticipated that the city will not experience a flash flood event in the next five years.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand and can immediately surround the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
Levee/Dam Failure	There are no dams or levees in the city or in the immediate vicinity of the city.
River Flooding	River flooding has not been reported in Paton recently. The most recent FIRM maps adopted in 2016 show minimal flood hazard areas in the city. and historically there have been people buying flood insurance through the program.
Severe Winter Storm	Severe winter storms continue to impact Paton. While meteorological advances can warn people in advance, there is always a segment of the population caught in a storm. Heavy snow and the winds associated with storms can cause tremendous damage. Severe cold can cause fatalities. Thawing pipes and roadways can crack, break, and fail, causing considerable damage.
Thunderstorm/ Lightning/Hail	Thunderstorm, lightning, and hail events are common in Paton, but most of them do not have major impact to life and property, and only a few storms per year would be considered severe. A single building may be damaged by lightning and power may be disrupted in parts of town for a few minutes to a few hours. Hail can damage buildings and property throughout the city, which has occurred in the past. Strong thunderstorm winds also damage property.
Tornado	While tornadoes have touched down in the county, there is no report of tornadoes damaging Paton directly in the recent past. Although the city has been spared major tornado damage, vigilance is important, as there is no way to know where one will occur. Based on the size of Paton, the chances are low in any given year. Meteorological warnings have improved, but storms can still spawn tornadoes with no notice. It is vital that the public is prepared for this hazard and that there are places for people to shelter.
Windstorm	Recent windstorms have caused damage to properties and crops even through the available data shows otherwise. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing

	threats to lives. The recent derechos impacted Paton, prompting the community to prepare more effectively for these hazards.

Hazard	Reason for Omission
Earthquake	Iowa as a whole, has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table F.9: City of Paton Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	1	$700	221
Commercial	17	$2,774,400	
Industrial	1	$2,162,600	
Residential	95	$7,375,500	

The extent of future losses cannot be precisely predicted because the location, magnitude, and duration of future hazard events are uncertain. Table F.9 represents Paton's maximum community-wide exposure and should not be interpreted as the anticipated loss from any individual hazard. Potential impacts vary significantly by hazard. Table F.10 evaluates anticipated physical damage, service disruption, economic and social consequences, impacts to vulnerable populations, and potential losses to identified assets for each hazard.

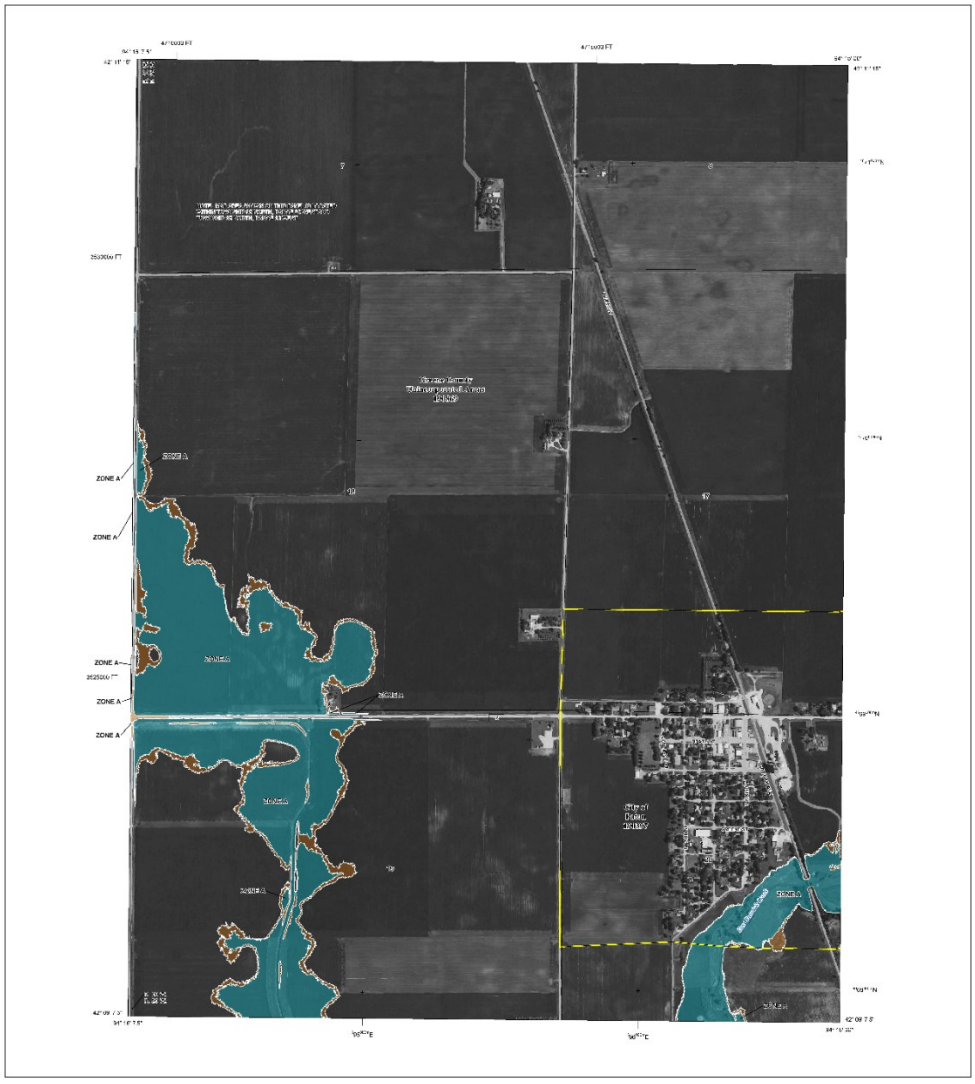
Table F.10: City of Paton Hazard Impact and Vulnerability Summary

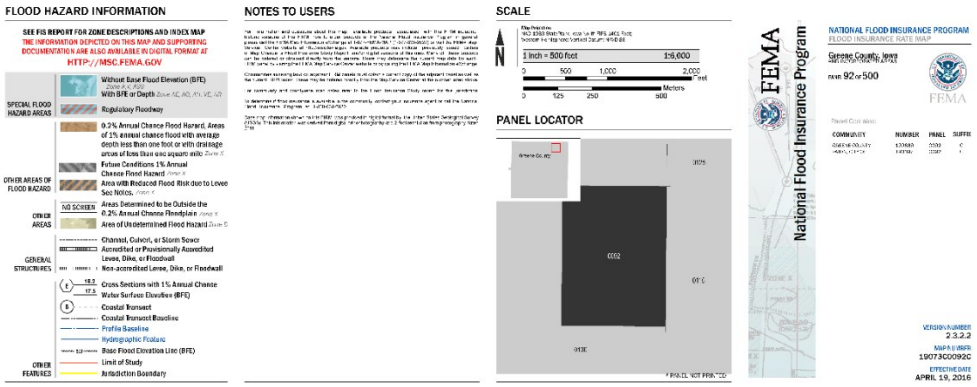
Hazard	Anticipated Impacts and Potential Losses
Drought	Drought may affect the entire community through reduced water availability and increased demand on the municipal water system, however, significant structural damage is not anticipated. Prolonged drought may increase operating demands on the water system, affect vegetation, and increase grass/wildland fire risk. Economic impacts may occur indirectly through impacts to the surrounding agricultural community. Older adults, households with limited financial resources, and residents dependent on reliable municipal water service may be more vulnerable to prolonged drought conditions.
Extreme Heat	Significant direct damage to buildings is not anticipated. Extreme heat may affect the entire population and increase demand on the

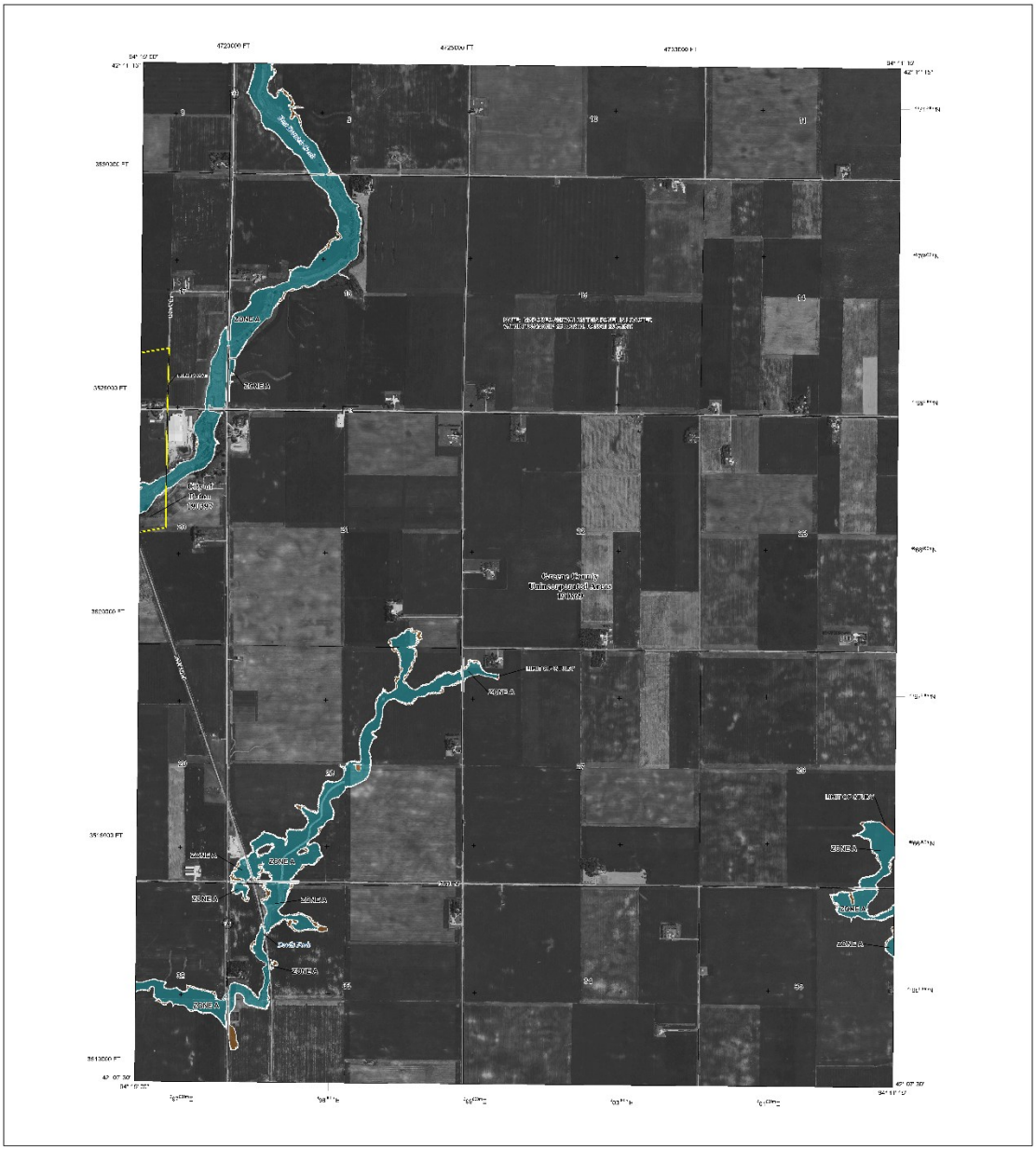
	electrical system and cooling equipment. Power outages could interrupt municipal services and leave residents without adequate cooling. Older adults, young children, individuals with medical conditions, outdoor workers, and residents without adequate air conditioning are particularly vulnerable. Potential losses are primarily associated with increased utility costs, lost productivity, medical impacts, and service interruptions rather than structural damage.
Flash Flood	Paton has reported no flash flooding since 2020; however, intense rainfall could produce localized street, yard, basement, or property flooding where drainage is limited. Streets, culverts, utilities, and structures in low-lying or poorly drained areas would be most vulnerable. Temporary road closures could affect access and emergency response. Because there have been no recent flash-flood losses, widespread structural losses are not anticipated.
Grass/Wildland Fire	Agricultural land and open vegetation surrounding Paton presents a potential for a grass or field fire to approach the city. Homes, businesses, utility infrastructure, and other structures along the perimeter of the city would be most vulnerable. Smoke could affect the majority of the community and particularly individuals with respiratory conditions. A fire could also temporarily close roads or interrupt utilities. Structural losses would depend on the location, wind conditions, and ability of responders to contain the fire.
Levee/Dam Failure	There are no dams or levees within Paton or in the vicinity of the city and therefore do not pose a threat to the community. Therefore, no significant direct structural damage, service disruption, displacement, vulnerable-population impacts, or property losses from dam or levee failure are currently anticipated.
River Flooding	The 2016 FIRM identifies flood hazard areas within Paton; therefore, structures, streets, utilities, and other assets located within or adjacent to those mapped areas have greater vulnerability than assets elsewhere in the community. Flooding could damage buildings and contents, temporarily restrict transportation, interrupt utilities or municipal services, and displace affected residents. Residents with limited mobility, transportation, or financial resources may have greater difficulty evacuating or recovering. Potential property losses are concentrated within the identified flood hazard areas rather than distributed evenly throughout the city.
Severe Winter Storm	Severe Winter Storms may affect the entire community but generally do not cause uniform structural damage. Heavy snow, ice, wind, and extreme cold can damage trees, roofs, overhead utilities, water infrastructure, and transportation systems. Power outages and blocked roads could interrupt municipal services and emergency response. Older adults, individuals with medical needs and/or limited mobility, and households without alternative heat sources are particularly vulnerable during extended outages or extreme cold.

	Economic losses may include snow removal, infrastructure repairs, business interruption, and increased heating costs.
Thunderstorm/Lightning/Hail	All developed areas in the City of Paton are exposed to severe thunderstorms, lightning, and hail. Future storms could damage roofs, siding, windows, vehicles, trees, utility infrastructure, and public facilities. Lightning and wind may cause power outages and fires in localized areas of the city. Potential economic losses include building and vehicle repairs, utility restoration, debris removal, and temporary business interruption.
Tornado	All structures and residents of Paton are potentially exposed to tornadoes, although actual damage would generally be concentrated along the path of the tornado rather than affecting a fixed percentage of the community. A direct strike could cause severe or complete damage to homes, businesses, public buildings, utilities, and other critical facilities; block streets with debris; interrupt utilities, communications, and emergency services; and result in displacement, injuries, or fatalities. Residents without access to adequate shelter and those requiring assistance to shelter quickly would be particularly vulnerable. Potential structural losses could be substantial in the area directly affected.
Windstorm	All of the developed areas of the City of Paton are exposed to high winds and derecho events. Recent events have demonstrated the potential to damage roofs, siding, trees, crops, vehicles, and overhead electrical and communications infrastructure. Downed trees and utility lines may block streets, cause extended power outages, and interfere with emergency response and municipal services. Older structures and buildings with large roof areas may experience greater damage. Economic losses may include structural repairs, utility restoration, debris removal, business interruption, and agricultural losses.

Flood Maps


ZONE A
ZONE A
ZONE A
ZONE A
ZONE A


FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Flood Risk due to Levee
OTHER AREAS
NO SCREEN
Areas Determined to be Outside the 0.2% Annual Chance Floodplain
Area of Undetermined Flood Hazard
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Accredited or Provisionally Accredited Levee, Dike, or Floodwall
Non-accredited Levee, Dike, or Floodwall
Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary
NOTES TO USERS
SCALE
1 inch = 500 feet
1:6,000
PANEL LOCATOR
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
Greene County, Iowa
FEMA
VERSION NUMBER
2.3.2.2
MAP NUMBER
19073C0092C
EFFECTIVE DATE
APRIL 19, 2016



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X

OTHER AREAS
- NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

SCALE

N

1 inch = 1,000 feet 1:12,000

0 1,000 2,000 4,000 Feet

0 260 520 1,040 Meters

PANEL LOCATOR

0062 0125 0075 0025 0050 0100

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

Greene County, Iowa
and Incorporated Areas

PANEL 115 OF 500

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190680	0115	C
PATON, CITY OF	190746	0115	C

VERSION NUMBER
2.3.2.2

MAP NUMBER
19073C0115C

EFFECTIVE DATE
APRIL 19, 2016

There have been changes in the City's mitigation priorities since the previous plan update. Some projects that were identified as a high priority have been completed utilizing available grant and local funds. Other projects that were not high priority were implemented as funds were available, and those that either had no funding available or were not a high priority were not implemented during this planning period. The City's Mitigation Actions were reviewed and updated with the city's new priorities in mind which have shifted from the last planning period due to changes in elected officials and staff, available financial resources, and hazards that have affected the community.

During the precious planning period, the City did not formally incorporate the Hazard Mitigation Plan into other adopted plans, ordinances, or policies. However, mitigation actions identified in the plan were integrated informally into the City's annual budgeting, capital improvement decisions, infrastructure projects, and ongoing operations as applicable. Examples of this replacing water and sewer lines as well as updating wastewater pumps. This resulted in the completion and continued implementation of several mitigation actions identified in the previous plan as shown in the table below. No other formal integration of the previous Hazard Mitigation Plan into adopted City plan, ordinance, or policy occurred during the planning period.

Status of Previous Mitigation Actions

Table F.11: City of Paton Status of Previous Mitigation Actions

	Status				
Previous actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not implemented**
Replace water and sewer lines	X				
Update wastewater pumps	X				
Update fire hydrants					X
Install and update anti-virus on city computers			X		
Replace warning siren				X	
Promote NOAA weather radios					X
Distribute information to citizens about thunderstorms and safety					X
Distribute information to residents about tornado safety					X
Remove the propane tanks from abandoned properties			X		
Continue participation in National Flood Insurance Program (NFIP)			X		

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): [The mitigation strategy shall include] 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.

Section 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.

Table F.12: City of Paton Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards**
Objective 1	Improve Public Infrastructure and Critical Assets in Hazard Impact Areas
Objective 2	Provide Back-Up Systems for All Critical Systems and Assets
Goal 2	**Minimize injuries and loss of life due to the impacts of hazards**
Objective 1	Improve Public Warning Capabilities

Table F.13: City of Paton Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Install and update anti-virus on city computers	Thunderstorm and Lightning, Tornado, Severe Winter Storm	Mod	City Clerk	Minimal	City General Fund	Property Protection	Short
Maintain warning siren	Tornado, Windstorm	High	City Maintenance	Low	City Public Safety Fund, Grow Greene County, FEMA BRIC grant, FEMA HMGP with State Match	Emergency Services	Mid
Distribute information to citizens about thunderstorms and safety	Thunderstorm and Lightning	Low	Fire Department, City Council	Minimal	City General Fund	Public Education and Awareness	Short
Distribute information to residents about tornado safety	Tornado	Low	Fire Department, City Council	Minimal	City General Fund	Public Education and Awareness	Short
Continue participation in National Flood Insurance Program (NFIP)	Flash Flood, River Flooding	Mod	City Council	Minimal	City General Fund	Property Protection	Ongoing

Maintain and replace generators as needed (City Shed, Fire Department, and portable generators)	Thunderstorm and Lightning, Tornado, Severe Winter Storm, Extreme Heat	Mod	City Council, Fire Department	Minimal	City General Funds\, Fire Department Budget, Grow Greene County, FEMA BRIC with state match, FEMA HMGP with state match	Emergency Services	Ongoing
Maintain electrical grid	Thunderstorm and Lightning, Tornado, Severe Winter Storm	High	City Council	Low	City Utility Fund	Property Protection	Ongoing
Bury overhead power lines	Thunderstorm and Lightning, Tornado, Severe Winter Storm	Low	City Council	High	City Utility Fund, FEMA BRIC with state match	Property Protection	Long
Monitor Levee/Dam Failure Risk	Levee/Dam Failure	Low	City Council	Minimal	City General Fund	Emergency Services	Ongoing
Maintain and Replace Fire Hydrants as necessary	Grass/Wild Land Fire	Mod	Public Works	Moderate	City Public Works Fund	Property Protection	Ongoing
Develop and Implement water conservation measures	Drought	Low	City Council	Minimal	City Public Works Fund	Emergency Services	Ongoing

Incorporation into Other Planning Mechanisms

Where possible, findings and recommendations from this Hazard Mitigation Plan will be integrated into the City of Paton's existing and future planning and operating documents. The City Council will be responsible for ensuring that the Hazard Mitigation Plan is reviewed when applicable local plans, ordinances, policies, and capital improvement documents are developed or updated. During these updates, the city will review applicable hazard risk information and mitigation actions contained in this plan and determine whether relevant information or actions should be incorporated into the document being updated. The integration of information from the Hazard Mitigation Plan will be documented through the applicable planning document, ordinance or resolution, budget or capital improvement records, meeting minutes, or other City records.

Information from the Hazard Mitigation Plan will be reviewed and incorporated, as applicable, when the following documents are updated:

- City Code
- Housing Needs Assessment
- Zoning Ordinance

The City of Paton does not currently have the following plans or documents. If any are developed during the life of this Hazard Mitigation Plan, applicable hazard risk information, mitigation goals, and mitigation actions will be reviewed and incorporated into their development, as appropriate:

- Comprehensive Plan
- Strategic Plan
- Building Code
- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans

Appendix G:

Rippey

Community Profile

History

The name Rippey is derived from the pioneer village of Rippey which was established in 1855. A change in emigrant travel caused the relocation of the "new" town of Rippey three and one-half miles to the northeast. The new location was laid out on the Des Moines Valley Railroad in June of 1870. The founders of Rippey where Willaim H. Cartwright, Percival and Hatton. The original town plat included roughly eighty acres of land. The first general merchandise store was opened in 1870 by AE. H. Suydan. Additional businesses such as the Rippey Savings Bank, a blacksmith, a wagon shop, a second merchandise store, a drug store, a hotel and several other businesses continued development during the next twenty years. Rippey was not officially incorporated until 1896.

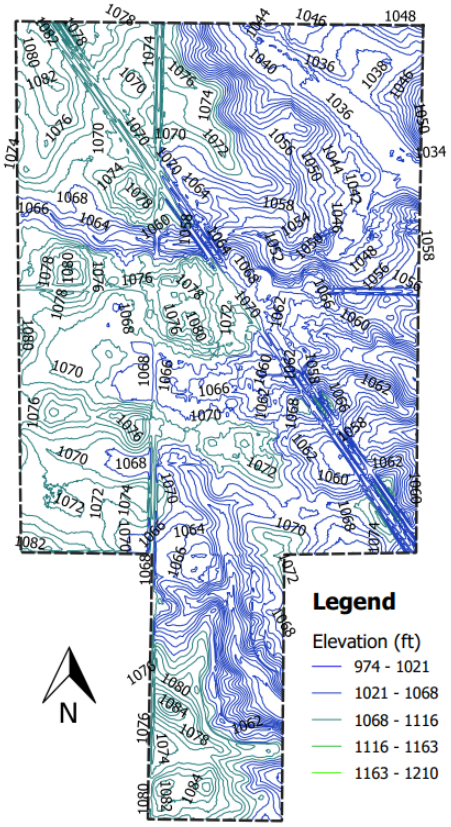
The Rippey Times was the first newspaper and was established in January 1884. The first schoolhouse was built in 1871 and began as an unorganized country school. A total of five churches were established over time including the First Baptist Church of Rippey (1900), The Rippey Methodist Episcopal Church (1855), The Church of Christ (1883), The Presbyterian Church (1880), and The Rippey Class of Bethel U.AD. Church. Rippey was once known as one of the most vibrant little towns in Iowa, but since them it has gradually lost businesses and residents.

Geography and Environment

Rippey is located in the southeast portion of Greene County. IA 144 runs north/south through the town and US 30 is eight miles to the north of Rippey. Rippey is 10.3 miles from Perry, 16.1 miles from Jefferson, 40.1 miles from Ames and 50.2 miles from Des Moines.

The highest elevation in Greene County can be found throughout the western part of the county. Here, the elevation can reach as much as 1,230 feet above sea level. The elevation in Rippey ranges from 1,036 feet in the northeast corner to 1,084 feet in the southern portion. Rippey's elevation can be found in Map G.1.

Map G.1 City of Rippey Elevation



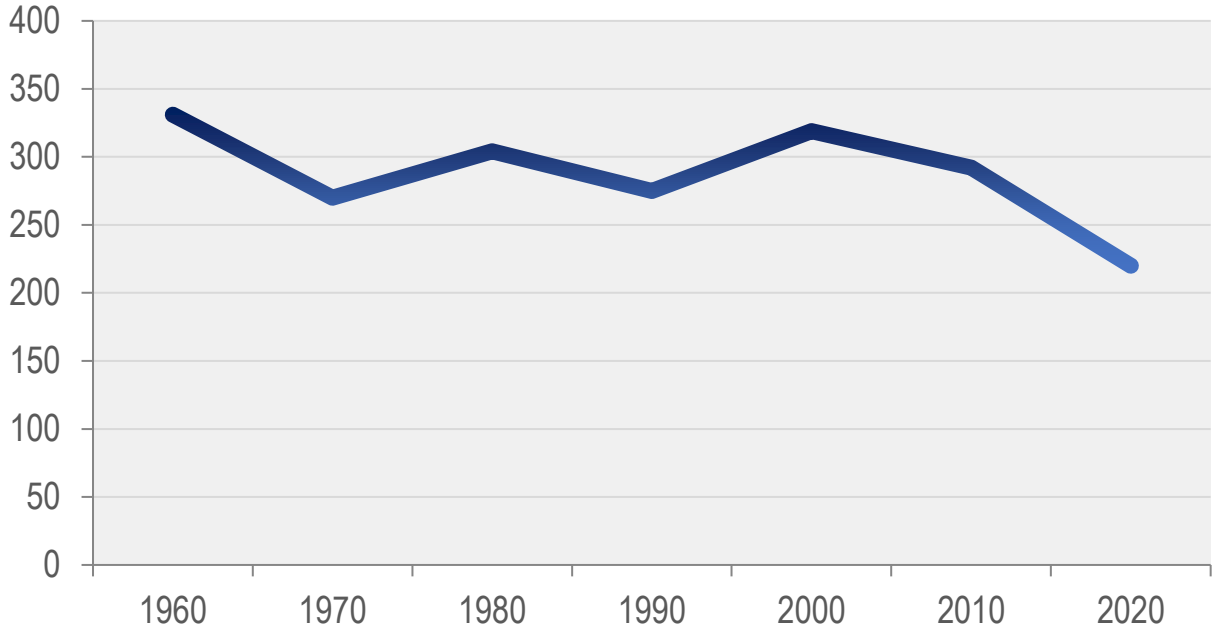
Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Rippey's population through past, present, and future trends of the region.

The size and composition of a community's population can exert influence on its development. For instance, population size, composition, and distribution influence the range of businesses a community can support, the pool of workers from which to draw, and the demand for and supply of services. Similarly, the effect people have on the social, economic, and physical environments depends upon the composition, expectations, and distribution of the population. A population's age distribution, income levels, ancestry, and educational attainment are some of the characteristics that mold a community. Population trends give community leaders and elected officials information on what kind of services need to be provided and offers prospective employers an overview of the local labor force.

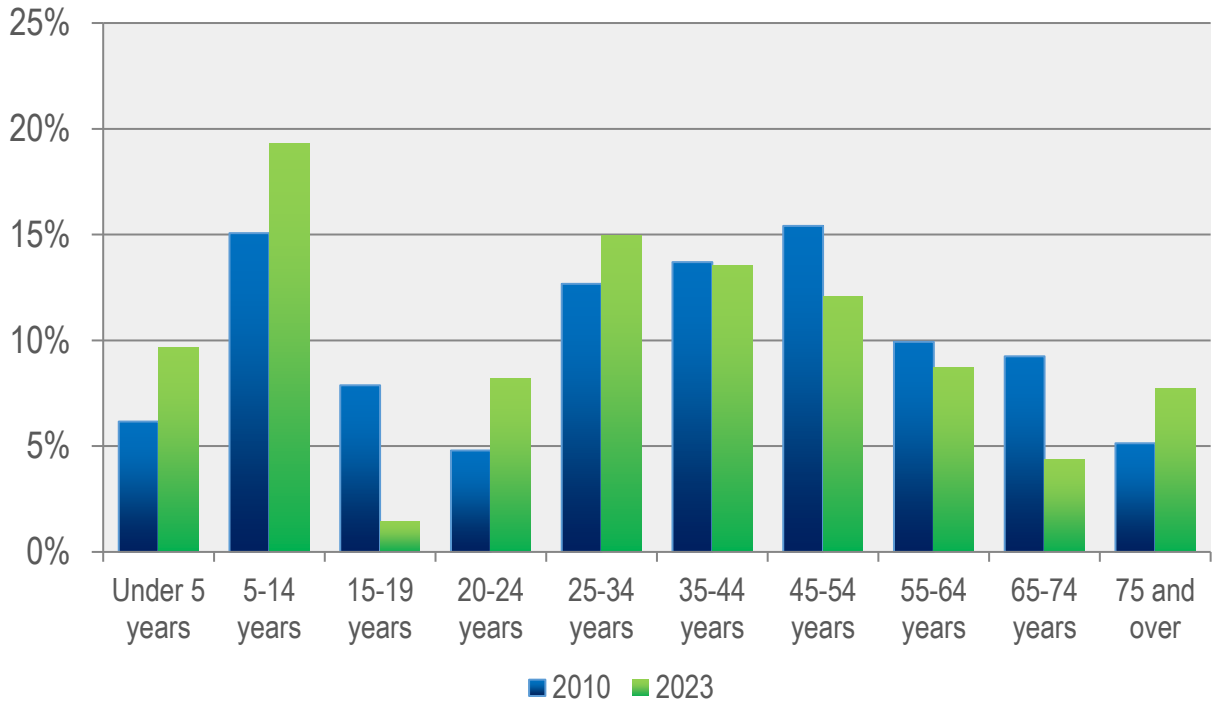
Over the past 50 years, the City of Rippey has experienced a slight decline in population. In 1960, Rippey had a population of 331. Since then, the City's population has declined by 34% to 220 in 2020. The most dramatic change happened from 1960 to 1970 when the city lost 61 residents. Figure G.1 shows the City of Rippey's population trend since 1960.

Figure G.1: City of Rippey Historic Population, 1960-2020



Source: US Census

Figure G.2: City of Rippey Age Distribution, 2010 & 2023



Source: US Census

Rippey's population is slightly different from the county as there is not the large spike in older residents as seen in the other parts of the county. The largest age groups within eh city are aged 25-34years and 35-44 years. Population cohorts at age 50 and above have generally higher numbers than other younger cohorts, but this is not the case for Rippey. This information can be found in Figure G.2.

Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by 25 units. Occupied housing units have decreased by 34 units and vacant housing units increased by 7 units. Table G.1 shows a breakdown of the city's occupied and vacant housing units.

Table G.1: City of Rippey Housing Units, 2010 & 2023

	2010		2023	
	Number	Percent	Number	Percent
Occupied Housing Units	116	89.9%	84	80.8%
Owner-Occupied	90	77.6%	43	51.2%
Renter-Occupied	26	22.4%	41	48.8%
Vacant Housing Units	13	10.1%	20	19.2%
Total Housing Units	129	100.0%	104	100.0%

Source: US Census, American Community Survey

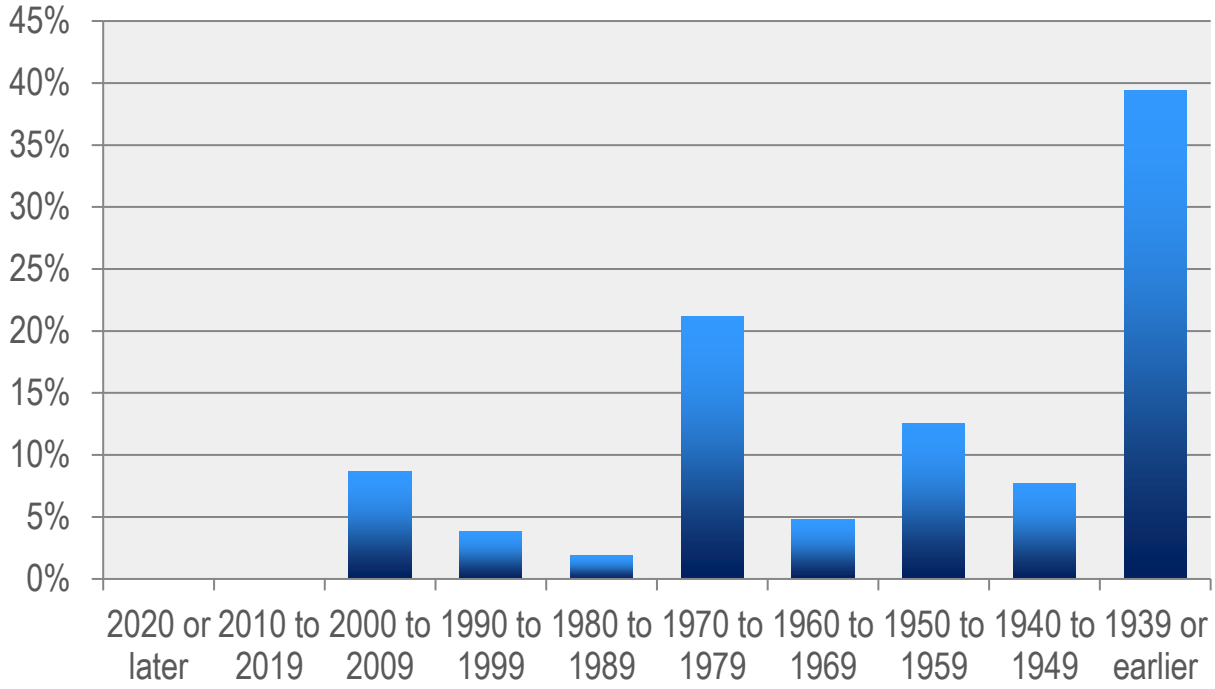
Table G.2: City of Rippey Value of Owner-Occupied Units, 2023

Value of Housing Unit	**Percent of Homes**
Less than $50,000	34.9%
$50,000 to $99,999	48.8%
$100,000 to $149,999	7.0%
$150,000 to $199,999	9.3%
$200,000 to $299,999	0.0%
$300,000 to $499,999	0.0%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%
Median (dollars)	$55,400
Median (Iowa)	$213,300

Source: American Community Survey

Rippey, like many other small rural towns in Iowa, has a lower median housing value of $55,400. The State of Iowa has a median housing value of 213,300. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2023 American Community Survey Estimates, 34.9% of the city's homes are valued less than $50,000. A complete breakdown of the value of homes in Rippey can be found in Table G.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Figure G.3: City of Rippey Year Housing Units Constructed, 2023



Source: American Community Survey

Figure G.3 showcases the year housing units within the City of Rippey were constructed. Like most of the county, Rippey has a large portion (39.4%) of the homes constructed in 1939 or earlier. The city also experiences a spike in home construction from 1970-1979 when 21.2% of the homes were built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Economics

Household income is an important indicator of the economic base in Greene County. In Rippey, the median household income is $65,250 which would classify a large number of the households in Rippey as “working” or “middle” class. The City of Rippey’s household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Manufacturing is the largest industry with 17.1% of the population being employed. Many employees from Rippey commute to other larger neighboring cities like Perry and Jefferson where more employment opportunities are present.

Table G.3: City of Rippey Household Income, 2023

Income and Benefits (2023 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	4	4.8%
$10,000 to $14,999	1	1.2%
$15,000 to $24,999	5	6.0%
$25,000 to $34,999	9	10.7%
$35,000 to $49,999	17	20.2%
$50,000 to $74,999	21	25.0%
$75,000 to $99,999	14	16.7%
$100,000 to $149,999	12	14.3%
$150,000 to $199,999	1	1.2%
$200,000 or more	0	0.0%
Median Household Income	$65,250	--
Mean Household Income	$62,381	--

Source: American Community Survey

Rippey, overall, is a small community in a small rural county. A large percentage of the businesses within the county serve the largely agricultural economy. Table G.4 breaks down what industry Rippey's residents work in. Manufacturing employs the largest cohort of residents, with 17.1% employed in this industry. The educational services, and health care and social assistance industry as well as Professional, scientific, and management, and administrative and waste management services industry each employ 16.2% of the population employed.

Table G.4: City of Rippey Employment by Industry, 2023

2023	**Estimate**	**Percent**
Civilian employed population 16 years and over	105	100.0%
Agriculture, forestry, fishing and hunting, and mining	6	5.7%
Construction	10	9.5%
Manufacturing	18	17.1%
Wholesale trade	4	3.8%
Retail trade	11	10.5%
Transportation and warehousing, and utilities	7	6.7%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	3	2.9%
Professional, scientific, and management, and administrative and waste management services	17	16.2%
Educational services, and health care and social assistance	17	16.2%

Arts, entertainment, and recreation, and accommodation and food services	8	7.6%
Other services, except public administration	2	1.9%
Public administration	2	1.9%

Source: American Community Survey

Existing Documents

Table G.5 provides a compilation of the current planning and regulatory documents in place for the City of Rippey. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The adoption of state building codes ensures that all new and major renovation structures meet the necessary requirements for electrical, plumbing, structural adequacy. This reduces the impact hazards have on structures as they are built to withstand certain minimums. The City's housing needs assessment has allowed the city to take inventory of the current housing situation and determine what steps are necessary to reduce the impact hazards have on the housing stock.

The City of Rippey is a small community with limited resources. Creating a comprehensive plan would allow the city to take inventory of the city's current assets and evaluate them through the comprehensive planning process. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table G.5: City of Rippey Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	No	-
Building Code	Yes	2002
Zoning Ordinance	Yes	1967
Strategic Plan	No	-
Housing Needs Assessment	Yes	1999
NFIP Participant	Yes	1985
Floodplain Regulations	Yes	1985

NFIP Participation

In the past, there have been instances of flooding within the City of Rippey. Due to this, the City began participating in the NFIP in 1985. The City of Rippey's FIRMs were most recently updated in 2016. These FIRMs can be found later in this appendix. Any development/ demolition in the floodplain is required to obtain a permit which regulates the development/demolition and lays out the NFIP regulations that must be followed. Rippey participates in the NFIP and implements substantial improvement / substantial damage provisions in the following manner: Local officials (1) determine the cost of work, (2) determine the market value of buildings, (3) make SI/SD determinations and provide determinations to property owners, and (4) require owners to obtain permits to bring substantially improved and substantially damaged structures into compliance with the floodplain management requirements.

Outlook and Future Development

Since the last plan update, the City of Rippey has experienced limited new development. Changes have primarily included improvements to the existing housing stock. No significant new development has occurred within identified hazard prone areas. As a result, development since the previous plan has not increased the City's vulnerability to identified hazards. Rippey anticipates that future development will continue to occur as a similar scale and within existing developed areas.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list

of critical facilities can vary widely from community to community. Rippey's critical facilities can be found on Map G.2.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table G.6.

Table G.6: City of Rippey Essential Infrastructure and Services

Major Arterials	IA Highway 144	**Air Service**	Jefferson Municipal Airport
Water Service	Xenia Rural Water	**Sewer Service**	City of Rippey
Electric Service	Alliant Energy	**Gas Service**	Black Hills Energy
Sanitation/Solid Waste	Local Haulers	**Landfill**	Boone County Landfill
Phone and Internet	Jefferson Telecom, Windstream, Wireless	**Law Enforcement**	Greene County Sheriff
Fire Service	Grand Junction Fire Department	**Ambulance Service**	Grand Junction Ambulance

Table G.7: City of Rippey Critical Facilities

Number on Map	Name	Address	Type
1	Landus	403 Percival Street	HAZMAT
2	Rippey United Methodist Church	204 Howard Street	Vulnerable Population
3	Gas Hole	103 3rd Street	HAZMAT
4	Rippey Public Library	224 Main Street	Public
5	City Hall	504 2nd Street	Essential Facility
6	Rippey Sr. Citizens Home	400 4th Street	Vulnerable Population

Map G.2 Rippey Critical Facilities



Hazard Scores

Table G.8: City of Rippey Risk Assessment

Hazard	Comments
Drought	Drought occurrences have increased in the past ten years and Rippey has been affected. This hazard can cause both direct and indirect issues for the city and its residents.
Earthquake	There have been no instances of damaging earthquakes in the City of Rippey. The committee feels there will be no instances during the life of this plan.
Expansive Soils	Expansive soils are not uncommon in this area, due to high clay content and dramatic changes in soil moisture and temperature. This hazard has the greatest impact on individual properties, especially those not engineered to withstand the hazard. This is a very localized hazard (e.g., individual home) and not a major priority for public response. The City of Rippey's leaders have no knowledge of problems affecting city infrastructure, city facilities, or their personal homes and property.
Extreme Heat	Extreme heat events continue to impact Rippey. Education may be one of the best action tools to combat this hazard's impact on the human body. Given current conditions and resources available, there is no risk of widespread losses due to this hazard, although power lines and other infrastructure can be damaged or can break.
Flash Flood	Since 2020, the City of Rippey has reported no instances of flash flooding. While flash floods have little to no warning time, the committee has determined that this hazard is not a high-priority hazard to address but will consider mitigation actions to prepare the community for response to an event. It is anticipated that the city will not experience a flash flood event in the next five years.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand in and immediately surrounding the city. This hazard can pose a large threat to the community as elements out of anyone's control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
Levee/Dam Failure	There are no dams or levees in the city or in the immediate vicinity of the city.
River Flooding	River flooding has not been reported in Rippey recently. The most recent FIRM maps adopted in 2016 show minimal flood hazard areas in the city. and historically there have been people buying flood insurance through the program.
Severe Winter Storm	Severe winter storms continue to impact Rippey. While meteorological advances can warn people in advance, there is always a segment of the population caught in a storm. Heavy snow and the winds associated with storms can cause tremendous damage. Severe cold can cause fatalities. Thawing pipes and roadways can crack, break, and fail, causing considerable damage.
Thunderstorm/ Lightning/Hail	Thunderstorm, lightning, and hail events are common in Rippey, but most of them do not have major impact to life and property, and only a few storms per year would be considered severe. A single building may be damaged by lightning and power

	may be disrupted in parts of town for a few minutes to a few hours. Hail can damage buildings and property throughout the city, which has occurred in the past. Strong thunderstorm winds also damage property.
Tornado	While tornadoes have touched down in the county, there is no report of tornadoes damaging Rippey directly in the recent past. Although the city has been spared major tornado damage, vigilance is important, as there is no way to know where one will occur. Based on the size of Rippey, the chances are low in any given year. Meteorological warnings have improved, but storms can still spawn tornadoes with no notice. It is vital that the public is prepared for this hazard and that there are places for people to shelter.
Windstorm	Recent windstorms have caused damage to properties and crops even thought the available data shows otherwise. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos impacted Rippey, prompting the community to prepare more effectively for these hazards.

Hazard	Reason for Omission
Earthquake	Iowa, as a whole, has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table G.9: City of Rippey Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	10	$29,400	220
Commercial	3	$4,387,700	
Industrial	0	$0	
Residential	104	$8,310,300	

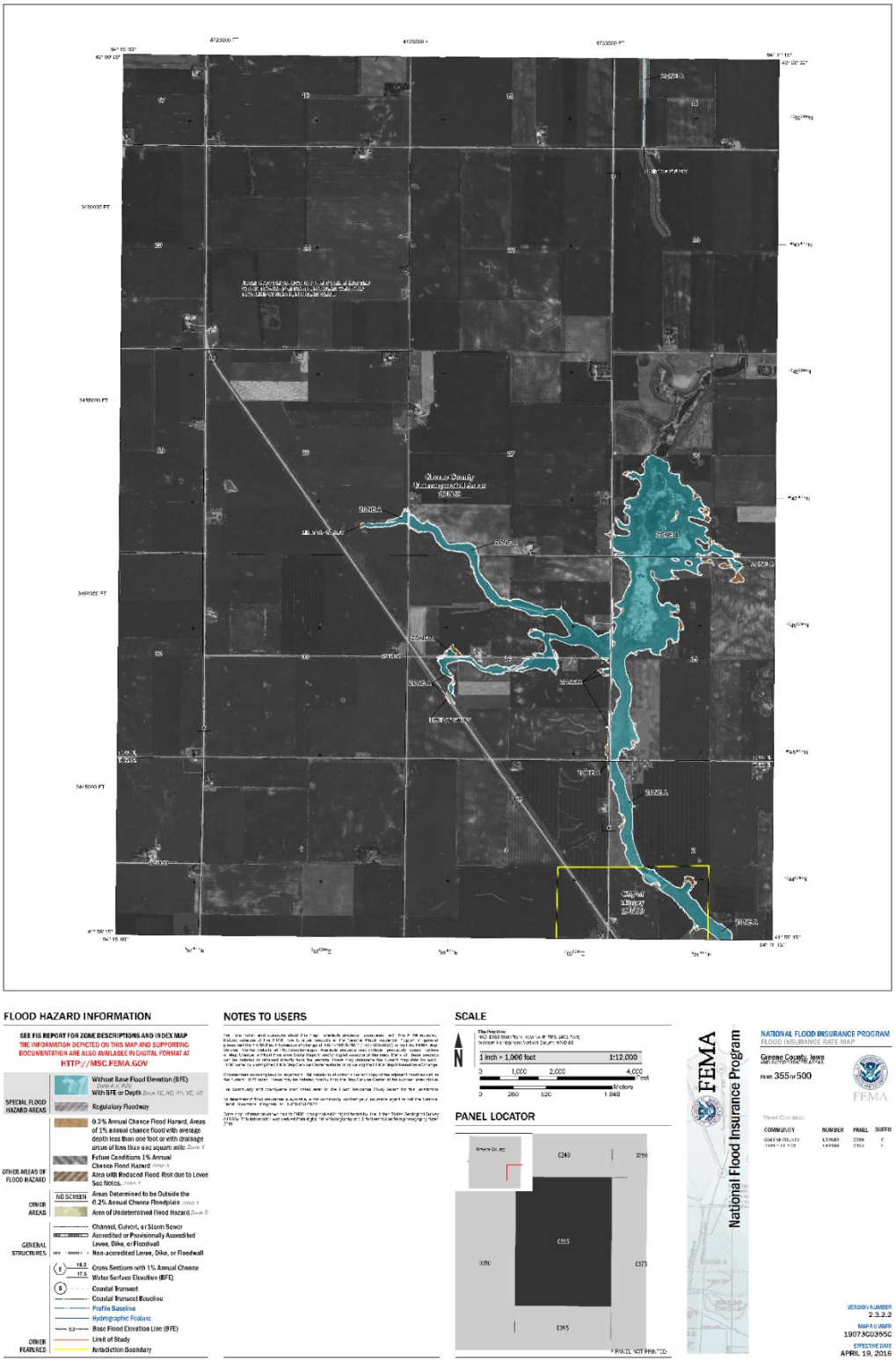
The extent of future losses cannot be precisely predicted because the location, magnitude, and duration of future hazard events are uncertain. Table G.9 represents Rippey's maximum community-wide exposure and should not be interpreted as the anticipated loss from any individual hazard. Potential impacts vary significantly by hazard. Table G.10 evaluates anticipated physical damage, service disruption, economic and social consequences, impacts to vulnerable populations, and potential losses to identified assets for each hazard.

Table G.10: City of Rippey Hazard Impact and Vulnerability Summary

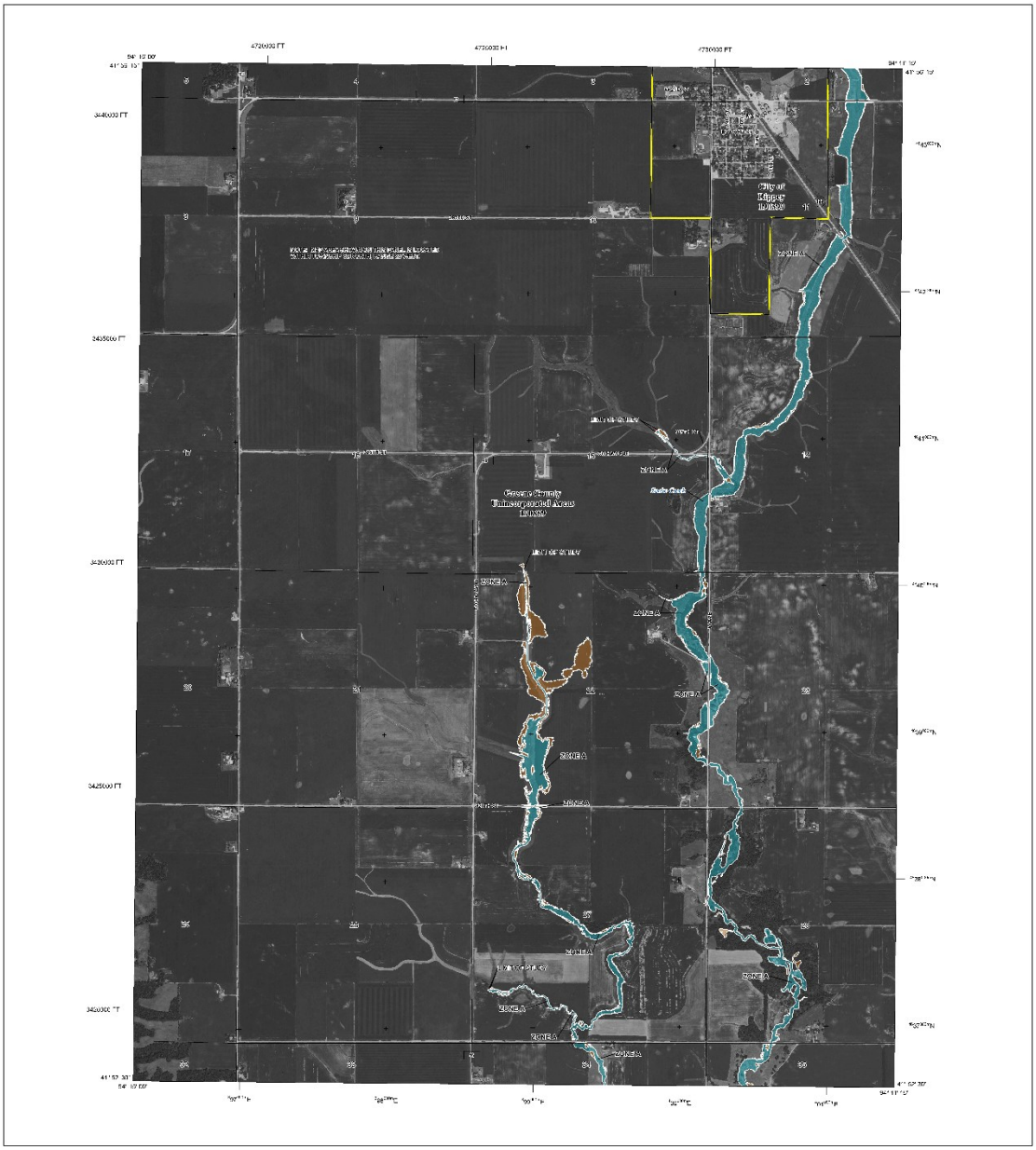
Hazard	Anticipated Impacts and Potential Losses
Drought	Drought may affect the entire community through reduced water availability and increased demand on the municipal water system, however, significant structural damage is not anticipated. Prolonged drought may increase operating demands on the water system, affect vegetation, and increase grass/wildland fire risk. Economic impacts may occur indirectly through impacts to the surrounding agricultural community. Older adults, households with limited financial resources, and residents dependent on reliable municipal water service may be more vulnerable to prolonged drought conditions.
Extreme Heat	Significant direct damage to buildings is not anticipated. Extreme heat may affect the entire population and increase demand on the electrical system and cooling equipment. Power outages could interrupt municipal services and leave residents without adequate cooling. Older adults, young children, individuals with medical conditions, outdoor workers, and residents without adequate air conditioning are particularly vulnerable. Potential losses are primarily associated with increased utility costs, lost productivity, medical impacts, and service interruptions rather than structural damage.
Flash Flood	Rippey has reported no flash flooding since 2020; however, intense rainfall could produce localized street, yard, basement, or property flooding where drainage is limited. Streets, culverts, utilities, and structures in low-lying or poorly drained areas would be most vulnerable. Temporary road closures could affect access and emergency response. Because there have been no recent flash-flood losses, widespread structural losses are not anticipated.
Grass/Wildland Fire	Agricultural land and open vegetation surrounding Rippey presents a potential for a grass or field fire to approach the city. Homes, businesses, utility infrastructure, and other structures along the perimeter of the city would be most vulnerable. Smoke could affect the majority of the community and particularly individuals with respiratory conditions. A fire could also temporarily close roads or interrupt utilities. Structural losses would depend on the location, wind conditions, and ability of responders to contain the fire.
Levee/Dam Failure	There are no dams or levees within Rippey or in the vicinity of the city and therefore do not pose a threat to the community. Therefore, no significant direct structural damage, service disruption, displacement, vulnerable-population impacts, or property losses from dam or levee failure are currently anticipated.
River Flooding	The 2016 FIRM identifies flood hazard areas within Rippey; therefore, structures, streets, utilities, and other assets located within or adjacent to those mapped areas have greater vulnerability than assets elsewhere in the community. Flooding could damage

	buildings and contents, temporarily restrict transportation, interrupt utilities or municipal services, and displace affected residents. Residents with limited mobility, transportation, or financial resources may have greater difficulty evacuating or recovering. Potential property losses are concentrated within the identified flood hazard areas rather than distributed evenly throughout the city.
Severe Winter Storm	Severe Winter Storms may affect the entire community but generally do not cause uniform structural damage. Heavy snow, ice, wind, and extreme cold can damage trees, roofs, overhead utilities, water infrastructure, and transportation systems. Power outages and blocked roads could interrupt municipal services and emergency response. Older adults, individuals with medical needs and/or limited mobility, and households without alternative heat sources are particularly vulnerable during extended outages or extreme cold. Economic losses may include snow removal, infrastructure repairs, business interruption, and increased heating costs.
Thunderstorm/Lightning/Hail	All developed areas in the City of Rippey are exposed to severe thunderstorms, lightning, and hail. Future storms could damage roofs, siding, windows, vehicles, trees, utility infrastructure, and public facilities. Lightning and wind may cause power outages and fires in localized areas of the city. Potential economic losses include building and vehicle repairs, utility restoration, debris removal, and temporary business interruption.
Tornado	All structures and residents of Rippey are potentially exposed to tornadoes, although actual damage would generally be concentrated along the path of the tornado rather than affecting a fixed percentage of the community. A direct strike could cause severe or complete damage to homes, businesses, public buildings, utilities, and other critical facilities; block streets with debris; interrupt utilities, communications, and emergency services; and result in displacement, injuries, or fatalities. Residents without access to adequate shelter and those requiring assistance to shelter quickly would be particularly vulnerable. Potential structural losses could be substantial in the area directly affected.
Windstorm	All of the developed areas of the City of Rippey are exposed to high winds and derecho events. Recent events have demonstrated the potential to damage roofs, siding, trees, crops, vehicles, and overhead electrical and communications infrastructure. Downed trees and utility lines may block streets, cause extended power outages, and interfere with emergency response and municipal services. Older structures and buildings with large roof areas may experience greater damage. Economic losses may include structural repairs, utility restoration, debris removal, business interruption, and agricultural losses.

Flood Maps



Greene County Hazard Mitigation Plan Appendix G- City of Rippey



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, A99 With BFE or Depth Zone AE, AO, AH, VE, AR Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee See Notes. Zone X
OTHER AREAS	NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain Zone X Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Accredited or Provisionally Accredited Levee, Dike, or Floodwall Non-accredited Levee, Dike, or Floodwall Cross Sections with 1% Annual Chance Water Surface Elevation (BFE) Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study Jurisdiction Boundary

NOTES TO USERS

SCALE

1 inch = 1,000 feet 1:12,000

0 1,000 2,000 4,000 Feet

0 260 520 1,040 Meters

PANEL LOCATOR

0365 0360 0375 0380 0500

PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

Greene County, Iowa

PANEL 365 OF 500

COMMUNITY	NUMBER	PANEL	SUFFIX
GREENE COUNTY	190363	0365	C
RIPPEY, CITY OF	190364	0365	C

VERSION NUMBER 2.3.2.2

MAP NUMBER 19073C0365C

EFFECTIVE DATE APRIL 19, 2016

There have been changes in the City's mitigation priorities since the previous plan update. Some projects that were identified as a high priority have been completed utilizing available grant and local funds. Other projects that were not high priority were implemented as funds were available, and those that either had no funding available or were not a high priority were not implemented during this planning period. The City's Mitigation Actions were reviewed and updated with the city's new priorities in mind which have shifted from the last planning period due to changes in elected officials and staff, available financial resources, and hazards that have affected the community.

During the precious planning period, the City did not formally incorporate the Hazard Mitigation Plan into other adopted plans, ordinances, or policies. However, mitigation actions identified in the plan were integrated informally into the City's annual budgeting, capital improvement decisions, infrastructure projects, and ongoing operations as applicable. Examples of this include continued participation in NFIP and other ongoing actions as shown in the table below. No other formal integration of the previous Hazard Mitigation Plan into adopted City plan, ordinance, or policy occurred during the planning period.

Status of Previous Mitigation Actions

Table G.11: City of Rippey Status of Previous Mitigation Actions

	Status				
Previous actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not implemented**
Continue to review building permits			X		
Continue to repair/maintain drainage system			X		
More hazardous material training					X
Hazardous material warning					X
Have meetings and inform about storm warning and spotting					X
Repair and maintain the warning system			X		
Construct a community storm shelter				X	
Continue participation in National Flood Insurance Program (NFIP)			X		
Upgrade fire department equipment					X
Lock and secure city/critical facilities from vandalism/terrorism			X		
Advise county Sherriff's Department to patrol areas of city/critical facilities			X		

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): [The mitigation strategy shall include] 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.

Section 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.

Table G.12: City of Rippey Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards**
Objective 1	Protect infrastructure from tornadoes and thunderstorms
Objective 2	Improve storm water flooding
Objective 3	Improve hazardous material knowledge
Goal 2	**Minimize injuries and loss of life due to the impacts of hazards**
Objective 1	Warning System
Goal 3	**Improve coordination and communication with other relevant organizations and build support for hazard mitigation**
Objective 1	Storm warning and spotting

Table G.13: City of Rippey Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Continue to review building permits	Flash Flood, River Flood, Windstorm, Tornado, Hailstorm	Mod	City Council	Minimal	City General Fund	Prevention	Ongoing
Continue to repair/maintain drainage system	Flash Flood, River Flooding, Thunderstorm	Mod	Public Works, City Council	Low	City Public Works Fund, CDBG grant	Structural	Ongoing
Hazardous material warning	Tornado, Flash Flooding, River Flooding, Windstorm	Low	Public Works, Fire Department	Low	City General Fund, Fire Department Budget	Public Education and Awareness	Ongoing
Repair and maintain the warning system	Tornado, Severe Winter Storm, Thunderstorm, Lightning, Hail, Windstorm	High	City Council	Low	City Public Safety Fund, Grow Greene County, FEMA BRIC Grant,	Emergency Services	Ongoing
Construct a community storm shelter	Tornado, Severe Winter Storm, Thunderstorm, Lightning, Hail, Windstorm, Extreme Heat, Severe Winter Storm	Low	City Council	High	City Public Safety Fund, Grow Greene County	Structural Project	Long
Continue participation in National Flood	Flash Flooding, River Flooding	High	City Council	Low	City General Fund	Property Protection	Ongoing

Insurance Program (NFIP)							
Lock and secure city/critical facilities	Flash Flood, Grass/ Wild Land Fire, River Flooding, Severe Winter Storm, Thunderstorm, Lightning, Hail, Tornado, Windstorm	Low	City Council	Low	City General Fund	Emergency Services	Ongoing
Advise County Sheriff's Department to patrol areas of city/critical facilities	Flash Flood, Grass/ Wild Land Fire, River Flooding, Severe Winter Storm, Thunderstorm, Lightning, Hail, Tornado, Windstorm	Low	City Council	Low	City General Fund	Emergency Services	Ongoing
Monitor Levee/Dam failure risk	Levee/Dam Failure	Low	City Council	Minimal	City General Fund	Emergency Services	Ongoing
Maintain and replace fire hydrants as necessary	Grass/Wild Land Fire	Low	Public Works	Moderate	City Public Works Fund	Property Protection	Ongoing
Develop and implement water conservation measures	Drought	Low	City Council	Minimal	City Public Works Fund	Emergency Services	Ongoing

Incorporation into Other Planning Mechanisms

Where possible, findings and recommendations from this Hazard Mitigation Plan will be integrated into the City of Rippey's existing and future planning and operating documents. The City Council will be responsible for ensuring that the Hazard Mitigation Plan is reviewed when applicable local plans, ordinances, policies, and capital improvement documents are developed or updated. During these updates, the city will review applicable hazard risk information and mitigation actions contained in this plan and determine whether relevant information or actions should be incorporated into the document being updated. The integration of information from the Hazard Mitigation Plan will be documented through the applicable planning document, ordinance or resolution, budget or capital improvement records, meeting minutes, or other City records.

Information from the Hazard Mitigation Plan will be reviewed and incorporated, as applicable, when the following documents are updated:

- City Codes
- Building Code
- Zoning Ordinance
- Housing Needs Assessment

The City of Rippey does not currently have the following plans or documents. If any are developed during the life of this Hazard Mitigation Plan, applicable hazard risk information, mitigation goals, and mitigation actions will be reviewed and incorporated into their development, as appropriate:

- Comprehensive Plan
- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans

Appendix H:

Scranton

Community Profile

History

In 1866, the Cedar Rapids and Missouri River Railroad, now the Chicago and Northwestern Railroad, established its line through what is now Greene County. In 1868, the first station house was built in the present location of Scranton, but the town was not plotted until a year later. Scranton is named after the Scranton family from Scranton, Pennsylvania and was officially incorporated in July of 1880. The first lot was bought in 1870 followed by construction of the first dwelling. The new residents quickly established a lumber yard and post office. Also in 1870, construction of a boarding-house and hotel, schoolhouse and a grain warehouse was completed. Development was slow in the early years of existence. By 1974, Scranton experienced significant growth as many new dwellings, general stores, churches, elevators, a school, and a livery barn were constructed. Nearly forty buildings were completed that year. The population nearly tripled between 1885 and 1895 reaching 714 residents.

In 1883, the Scranton Norman Horse Company was incorporated and responsible for breeding superior horses or farm work. In 1885, the Scranton Tile, Brick, and Stoneware Company was established and stayed in business for fifteen years. The Bank of Scranton was completed in 1877. Churches constructed in Scranton included the United Brethren (1871), Methodist Episcopal Church (1871), The Christian Church (1886), the Catholic Church (1871) and Christ's Scandinavian Church (1898).

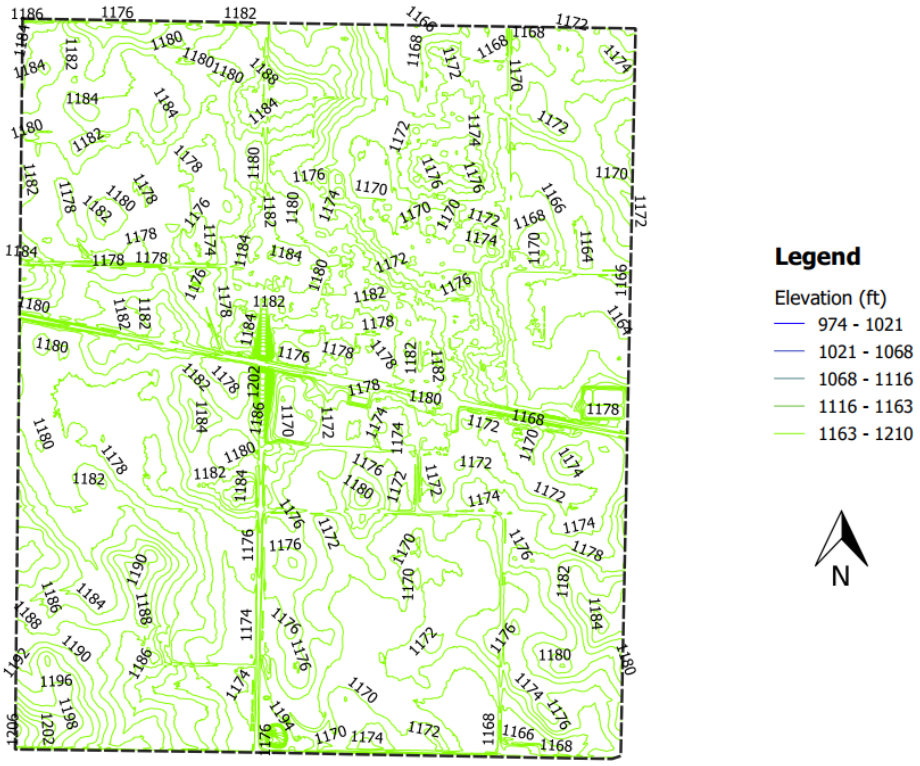
Three major fires occurred in Scranton's early beginnings. The first occurred in 1884 and destroyed the Scranton House, a furniture store, drug store, and two other buildings. The second fire destroyed the Cressler elevator. The third fire happened in 1901 when twenty-one buildings were destroyed.

Geography and Environment

Scranton is located just south of U.S. Highway 30 on the western edge of Greene County. IA 25 runs north/south through the community and connects to IA 141 twelve miles south of Scranton. Scranton is approximately 11.3 miles from Jefferson, 18.5 miles from Carroll, 49.3 miles from Ames and 75.6 miles from Des Moines.

The highest elevation in Greene County can be found throughout the western part of the county. Here, the elevation can reach as much as 1,230 feet above sea level. Scranton is the highest elevated community in Greene County. Scranton's elevation ranges from 1,200 feet in the southwest corner to 1,168 in the northeast corner. Scranton's elevation can be found in Map H.1.

Map H.1: City of Scranton Elevation



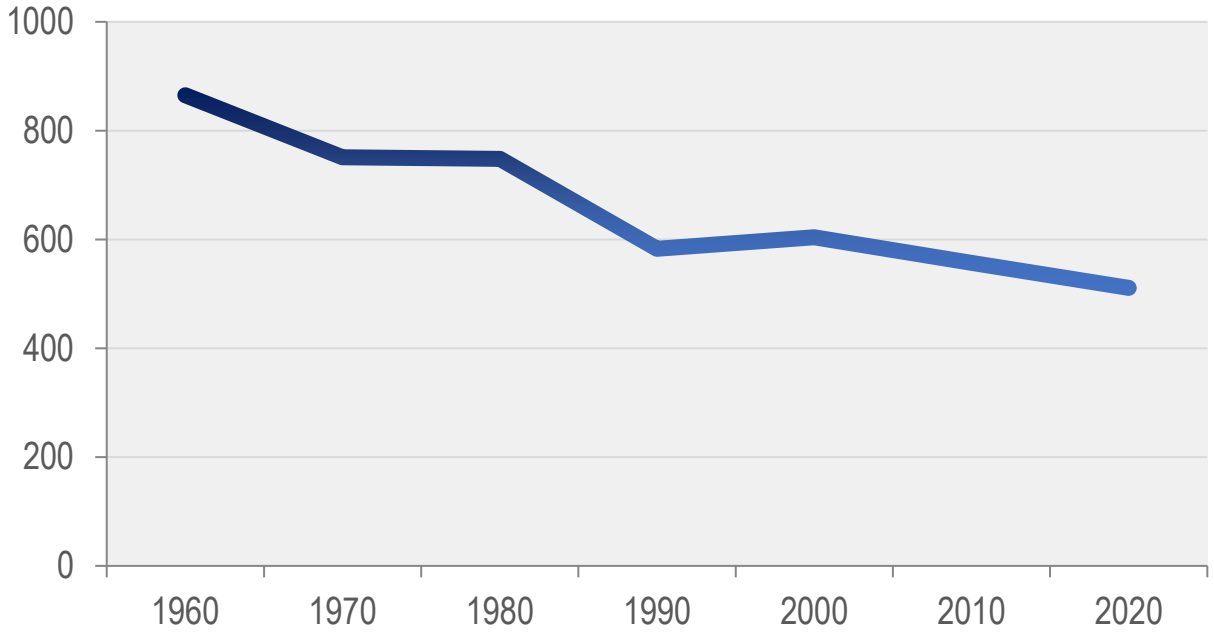
Demographics

The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Rippey's population through past, present, and future trends of the region.

The size and composition of a community's population can exert influence on its development. For instance, population size, composition, and distribution influence the range of businesses a community can support, the pool of workers from which to draw, and the demand for and supply of services. Similarly, the effect people have on the social, economic, and physical environments depends upon the composition, expectations, and distribution of the population. A population's age distribution, income levels, ancestry, and educational attainment are some of the characteristics that mold a community. Population trends give community leaders and elected officials information on what kind of services need to be provided and offers prospective employers an overview of the local labor force.

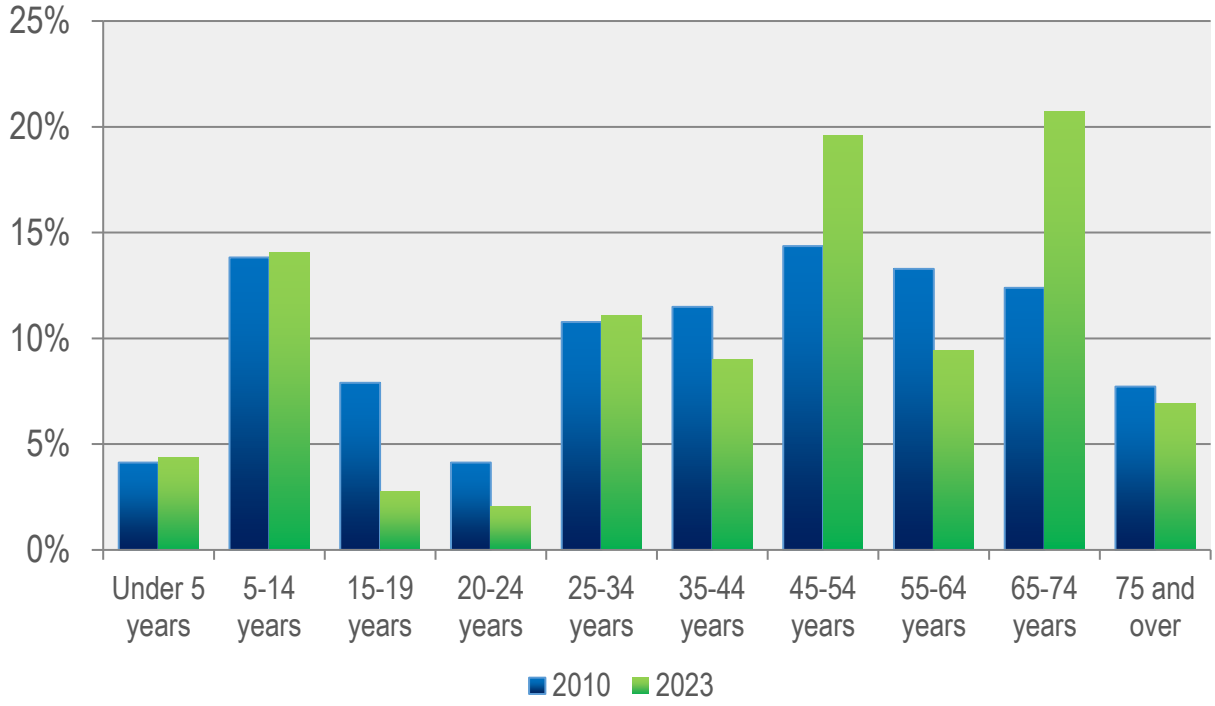
Over the past 50 years, the City of Scranton has experienced a decline in population. In 1960, Scranton had a population of 865. Since then, the City's population has declined by 41% to 511 in 2020. The most dramatic change happened from 1980 to 1990 when the city lost 165 residents. Figure H.1 shows the City of Scranton's population trend since 1960.

Figure H.1: City of Scranton Historic Population, 1960-2020



Source: US Census

Figure H.2: City of Scranton Age Distribution, 2010 & 2023



Source: US Census

The City's population makeup is not very different from other parts of Greene County, and even most of the Sate of Iowa. The largest age range within the city is aged 65-74 years. Population cohorts at age 50 and above generally have higher numbers than other younger cohorts. This information can be found in Figure H.2.

Housing

A community's ability to attract new residents is important. One of the most important aspects to attracting residents is housing. A community's housing stock, type of households, and housing availability and affordability are determining factors.

Since 2010, the city's housing stock has decreased by 32 units. Occupied housing units have decreased by 26 units and vacant housing units decreased by 6 units. Table H.1 shows a breakdown of the city's occupied and vacant housing units.

Table H.1: City of Scranton Housing Units, 2010 & 2023

	2010		2023	
	Number	Percent	Number	Percent
Occupied Housing Units	238	89.1%	212	90.2%
Owner-Occupied	173	72.7%	128	60.4%
Renter-Occupied	65	27.3%	84	39.6%
Vacant Housing Units	29	10.9%	23	9.8%
Total Housing Units	267	100.0%	235	100.0%

Source: US Census, American Community Survey

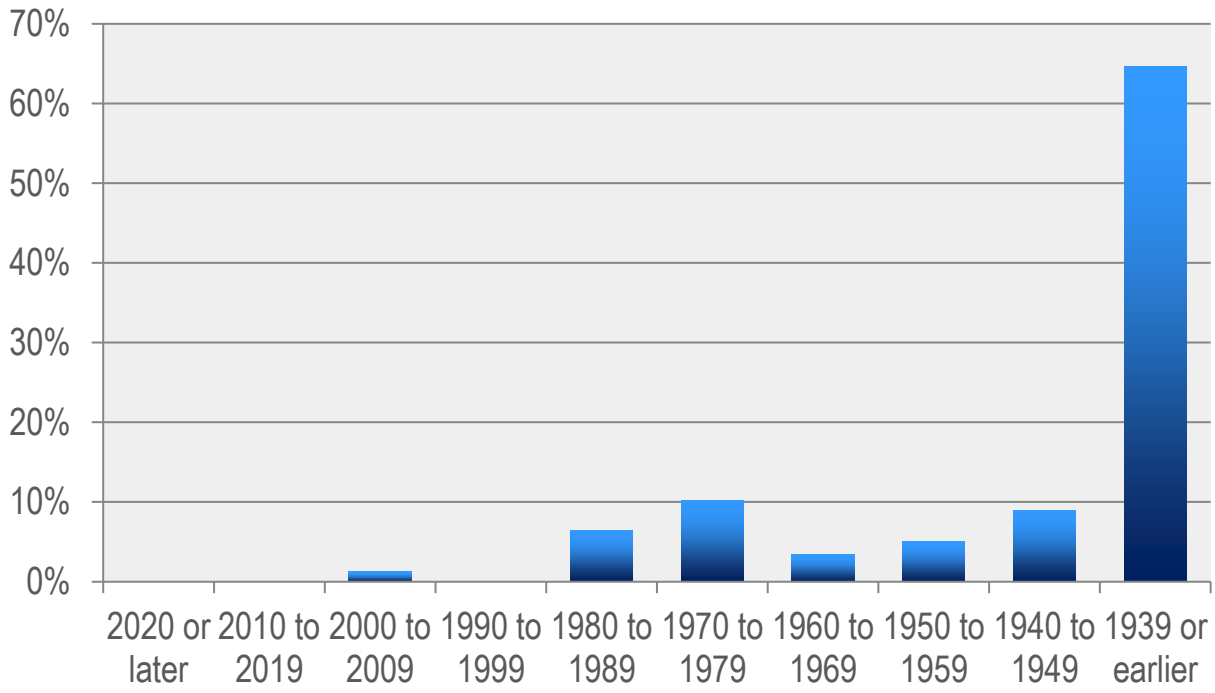
Table H.2: City of Scranton Value of Owner-Occupied Units, 2023

Value of Housing Unit	**Percent of Homes**
Less than $50,000	35.2%
$50,000 to $99,999	36.7%
$100,000 to $149,999	16.4%
$150,000 to $199,999	9.4%
$200,000 to $299,999	0.0%
$300,000 to $499,999	2.3%
$500,000 to $999,999	0.0%
$1,000,000 or more	0.0%
Median (dollars)	$58,600
Median (Iowa)	$213,300

Source: American Community Survey

Scranton, like many other small rural towns in Iowa, has a lower median housing value of $58,600. The State of Iowa has a median housing value of 213,300. The city's homes can be very affordable and can be used to attract new residents, but they may deteriorate faster and will need a number of repairs and updates. According to the 2023 American Community Survey Estimates, 35.2% of the city's homes are valued less than $50,000. A complete breakdown of the value of homes in Scranton can be found in Table H.2. Knowing information about the city's housing stock is useful after a disaster hits to determine how much damage was done, and how it will affect the city moving forward.

Figure H.3: City of Scranton Year Housing Units Constructed, 2023



Source: American Community Survey

Figure H.3 showcases the year housing units within the City of Scranton were constructed. Like most of the county, Scranton has a large portion (64.7%) of the homes constructed in 1939 or earlier. The city also experiences a spike in home construction from 1970-1979 when 10.2% of the homes were built. Building standards of today utilize the most recent construction materials and safety features, ensuring that the new residential structures are as safe as possible. This does not mean that older homes are more unsafe, just that they may be more susceptible to hazard damage.

Economics

Household income is an important indicator of the economic base in Greene County. In Scranton, the median household income is $60,000 which would classify a large number of the households in Scranton as “working” or “middle” class. The City of Scranton’s household income breakdown is similar to the other rural communities in the area, and the combination of more affordable housing with the current incomes generally provides residents with a decent quality of life. Manufacturing is the largest industry with 20.3% of the population being employed. Many employees from Scranton commute to other larger neighboring cities like Carroll and Jefferson where more employment opportunities are present.

Table H.3: City of Scranton Household Income, 2023

Income and Benefits (2023 Inflation-Adjusted Dollars)	Number of Households	Percent of Households
Less than $10,000	6	2.8%
$10,000 to $14,999	20	9.4%
$15,000 to $24,999	35	16.5%
$25,000 to $34,999	4	1.9%
$35,000 to $49,999	33	15.6%
$50,000 to $74,999	63	29.7%
$75,000 to $99,999	30	14.2%
$100,000 to $149,999	18	8.5%
$150,000 to $199,999	2	0.9%
$200,000 or more	1	0.5%
Median Household Income	$60,000	--
Mean Household Income	$56,258	--

Source: American Community Survey

Scranton, overall, is a small community in a small rural county. A large percentage of the businesses within the county serve the largely agricultural economy. Table H.4 breaks down what industry Scranton's residents work in. Manufacturing employs the largest cohort of residents, with 20.3% employed in this industry. Retail trade is the next largest industry within the city with 19.5% of the population employed.

Table H.4: City of Scranton Employment by Industry, 2023

2023	Estimate	Percent
Civilian employed population 16 years and over	231	100.0%
Agriculture, forestry, fishing and hunting, and mining	33	14.3%
Construction	9	3.9%
Manufacturing	47	20.3%
Wholesale trade	15	6.5%
Retail trade	45	19.5%
Transportation and warehousing, and utilities	5	2.2%
Information	6	2.6%
Finance and insurance, and real estate and rental and leasing	13	5.6%
Professional, scientific, and management, and administrative and waste management services	10	4.3%
Educational services, and health care and social assistance	32	13.9%
Arts, entertainment, and recreation, and accommodation and food services	1	0.4%
Other services, except public administration	13	5.6%
Public administration	2	0.9%

Source: American Community Survey

Existing Documents

Table H.5 provides a compilation of the current planning and regulatory documents in place for the City of Scranton. The table also shows the last time the documents were last updated. These documents help understand the process the city has already undertaken and what documents can be created to help guide the city. First and foremost is the previous hazard mitigation plan as this document lays out specific strategies to help the city reduce the impact hazards have on the community and those who live in it. The city's zoning code was created to keep certain zones away from one another to reduce the risk to humans and structures. The different zones can pose different threats to others, such as some industrial uses having a higher HAZMAT incident probability which if located in a residential zone, could pose large health issues to the overall population. The zoning codes also include information for street and sidewalk regulations which can reduce the number of transportation incidents. The adoption of state building codes ensures that all new and major renovation structures meet the necessary requirements for electrical, plumbing, structural adequacy. This reduces the impact hazards have on structures as they are built to withstand certain minimums. The creation of their comprehensive plan allowed the city to take inventory of the city's assets and evaluate them through the comprehensive planning process. The City's housing needs assessment has allowed the city to take inventory of the

current housing situation and determine what steps are necessary to reduce the impact hazards have on the housing stock.

The City of Scranton is a proactive community, which benefits them in regards to mitigation of hazards. A capital improvement plan which lays out future projects and necessary funding would help the city budget for, and allow them to be proactive, not reactive to future needs. Expanding conversations with the local COG and engineering firms would allow the city to explore additional options that have worked in similar communities facing similar situations. Outside organizations are also beneficial with finding funding for projects which otherwise may be out of the city's budget. Road, water, and sewer infrastructure continues to need upgrades and pursuing funding opportunities could reduce impacts of hazards on these infrastructure types. Training staff to current requirements would allow for a more thought-out response to a hazard or hazard warning. Cross training staff regardless of responsibility on different departments can better prepare the city and can lead to things being noticed that previously went unnoticed.

Table H.5: City of Scranton Existing Documents

Document	Yes/No	Year
Previous HMP	Yes	2020
Comprehensive Plan	Yes	2016
Building Code	Yes	2006
Zoning Ordinance	Yes	2017
Strategic Plan	No	-
Housing Needs Assessment	Yes	1999
NFIP Participant	No	-
Floodplain Regulations	No	-

NFIP Participation

The City of Scranton does not currently participate in the NFIP. There are no flood hazard areas within the City, so flooding is minimal. The City's current flood map was updated in 2016 and can be found later in this appendix.

Outlook and Future Development

Since the previous plan update, the City of Scranton has experienced development on a relatively small scale. Scranton Manufacturing/New Way has expanded its operations on the west side of the City. The City has also experienced rehabilitation of existing housing and has initiated nuisance abatement efforts to address deteriorated or unsafe properties.

Development since the previous plan update has primarily occurred within or adjacent to previously developed areas and has not resulted in significant new development within identified hazard-prone areas. As a result, development since the previous plan has not significantly increased Scranton's vulnerability to identified hazards. Housing rehabilitation and nuisance abatement may reduce vulnerability by improving the condition of the City's existing building stock and removing deteriorated structures or other conditions that may be more susceptible to damage during a hazard event. The City of Scranton anticipates that manufacturing development and residential development and rehabilitation will continue at a similar scale throughout the life of this plan. Future development will be evaluated in relation to identified hazard areas to avoid increasing the City's vulnerability where practicable.

Critical Facilities

Critical facilities are facilities that are critical to the health and welfare of the population and are especially important following hazard events. Every jurisdiction is unique in such way that the list of critical facilities can vary widely from community to community. Scranton's critical facilities can be found on Map H.2.

Essential Infrastructure and Services

Knowing what services and infrastructure serve the city can be beneficial in a time of disaster so the appropriate companies can be contacted in need of utility shutoff or transportation routes. The city's essential infrastructure and services can be found in Table H.6.

Table H.6: City of Scranton Essential Infrastructure and Services

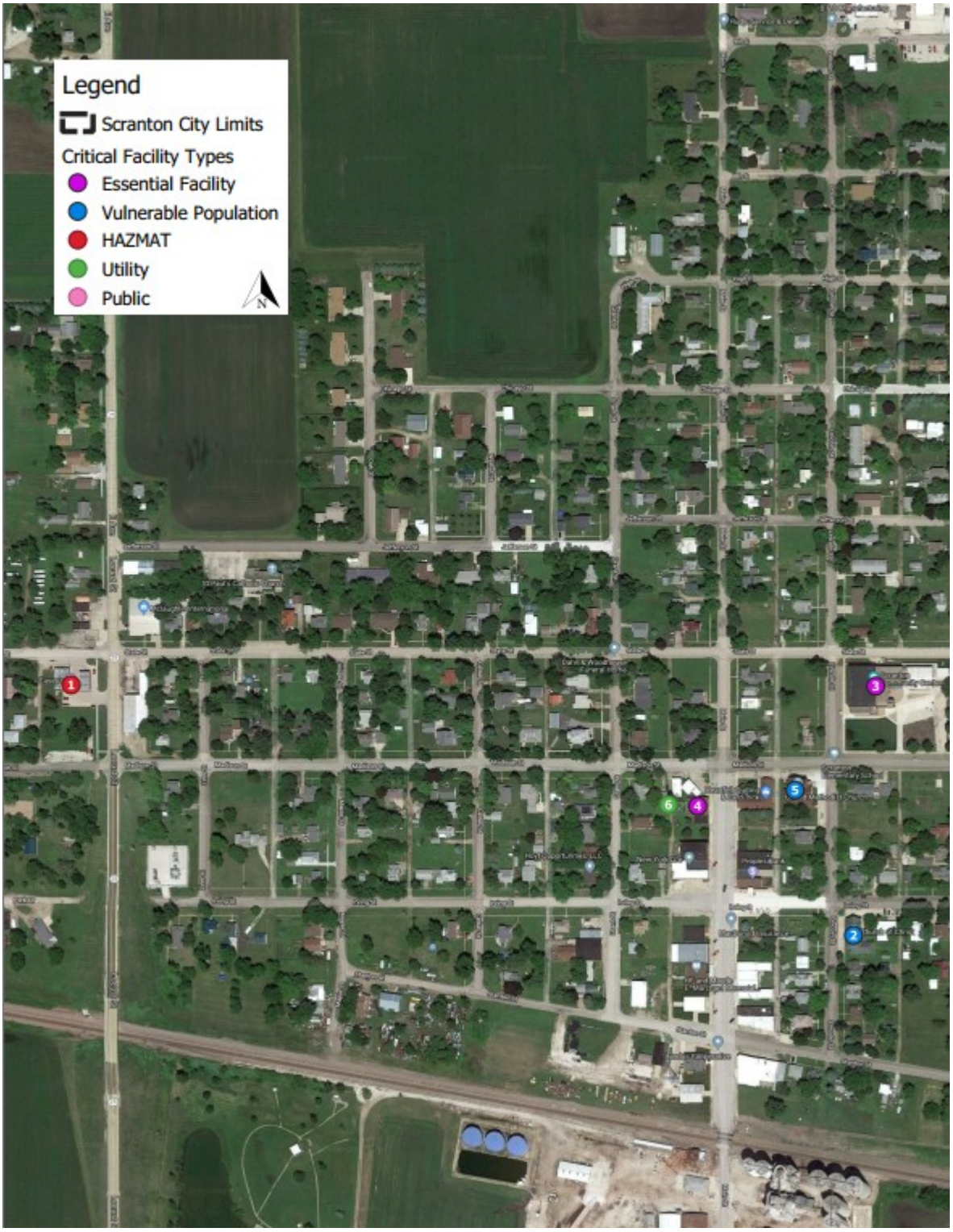
Major Arterials	U.S. Highway 30 & IA Highway 144	**Air Service**	Jefferson Municipal Airport
Water Service	City of Scranton	**Sewer Service**	City of Scranton
Electric Service	Alliant Energy	**Gas Service**	Black Hills Energy
Sanitation/Solid Waste	Local Haulers	**Landfill**	Boone County Landfill
Phone and Internet	Scranton Telephone, Wireless	**Law Enforcement**	Greene County Sheriff
Fire Service	Scranton Fire Department	**Ambulance Service**	Greene County Ambulance

Table H.7: City of Scranton Critical Facilities

Number on Map	Name	Address	Type

1	Casey's	900 Locust Street	HAZMAT
2	Church of Christ	900 Irving Streett	Vulnerable Population
3	Scranton City Hal/Community Center	900 Eagle Street	Essential Facility
4	Scranton Fire Department	1006 Main Street	Essential Facility
5	United Methodist Church	1000 Lincoln Street	Vulnerable Population
6	Water Tower	Main Street	Utility

Map H.2: City of Scranton Critical Facilities



Hazard Scores

Table H.8: City of Scranton Risk Assessment

Hazard	Comments
Drought	Drought occurrences have increased in the past ten years and Scranton has been affected. This hazard can cause both direct and indirect issues for the city and its residents.
Earthquake	There have been no instances of damaging earthquakes in the City of Scranton. The committee feels there will be no instances during the life of this plan.
Expansive Soils	Expansive soils are not uncommon in this area, due to high clay content and dramatic changes in soil moisture and temperature. This hazard has the greatest impact on individual properties, especially those not engineered to withstand the hazard. This is a very localized hazard (e.g., individual home) and not a major priority for public response. The City of Scranton's leaders have no knowledge of problems affecting city infrastructure, city facilities, or their personal homes and property.
Extreme Heat	Extreme heat events continue to impact Scranton. Education may be one of the best action tools to combat this hazard's impact on the human body. Given current conditions and resources available, there is no risk of widespread losses due to this hazard, although power lines and other infrastructure can be damaged or can break.
Flash Flood	Since 2020, The City of Scranton has reported no instances of flash flooding. While flash floods have little to no warning time, the committee has determined this hazard is not a high priority hazard to address, but will consider mitigation actions to prepare the community for response to an event. It is anticipated that the city will not experience a flash flood event in the next five years.
Grass/Wild Land Fire	Grass and wild land fires are most commonly field fires or controlled burns that get out of hand and can immediately surround the city. This hazard can pose a large threat to the community as elements out of anyone's' control, such as wind direction and speed, can change this hazard from harmless and controlled to out of control in a matter of minutes and can pose a threat to life.
Levee/Dam Failure	There are no dams or levees in the city or in the immediate vicinity of the city.
River Flooding	River flooding has not been reported in Scranton recently. The most recent FIRM maps adopted in 2016 show minimal flood hazard areas in the city. and historically there have been people buying flood insurance through the program.
Severe Winter Storm	Severe winter storms continue to impact Scranton. While meteorological advances can warn people in advance, there is always a segment of the population caught in a storm. Heavy snow and the winds associated with storms can cause tremendous damage. Severe cold can cause fatalities. Thawing pipes and roadways can crack, break, and fail, causing considerable damage.
Thunderstorm/ Lightning/Hail	Thunderstorm, lightning, and hail events are common in Scranton, but most of them do not have major impact to life and property, and only a few storms per year would be considered severe. A single building may be damaged by lightning and power

	may be disrupted in parts of town for a few minutes to a few hours. Hail can damage buildings and property throughout the city, which has occurred in the past. Strong thunderstorm winds also damage property.
Tornado	While tornadoes have touched down in the county, there is no report of tornadoes damaging Scranton directly in the recent past. Although the city has been spared major tornado damage, vigilance is important, as there is no way to know where one will occur. Based on the size of Scranton, the chances are low in any given year. Meteorological warnings have improved, but storms can still spawn tornadoes with no notice. It is vital that the public is prepared for this hazard and that there are places for people to shelter.
Windstorm	Recent windstorms have caused damage to properties and crops even though the available data shows otherwise. These hazard events continue to build in magnitude, causing increasingly large amounts of damage to property and posing threats to lives. The recent derechos impacted Scranton, prompting the community to prepare more effectively for these hazards.

Hazard	Reason for Omission
Earthquake	Iowa, as a whole, has experienced the effects of few earthquakes in the past 175 years. The majority of the earthquakes were along the Mississippi River, therefore the city does not feel this hazard will impact them during this planning period.
Expansive Soils	While Iowa has expansive soils, due to the city's history of no issues in the past, the city felt this will not impact the jurisdiction over the life of this plan.

Loss Estimates

Table H.9: City of Scranton Maximum Building and Population Exposure

Type of Structure	Number of Structures	Value of Structures	Number of People
Agricultural	10	$43,700	511
Commercial	24	$2,966,300	
Industrial	2	$3,672,200	
Residential	235	$18,163,100	

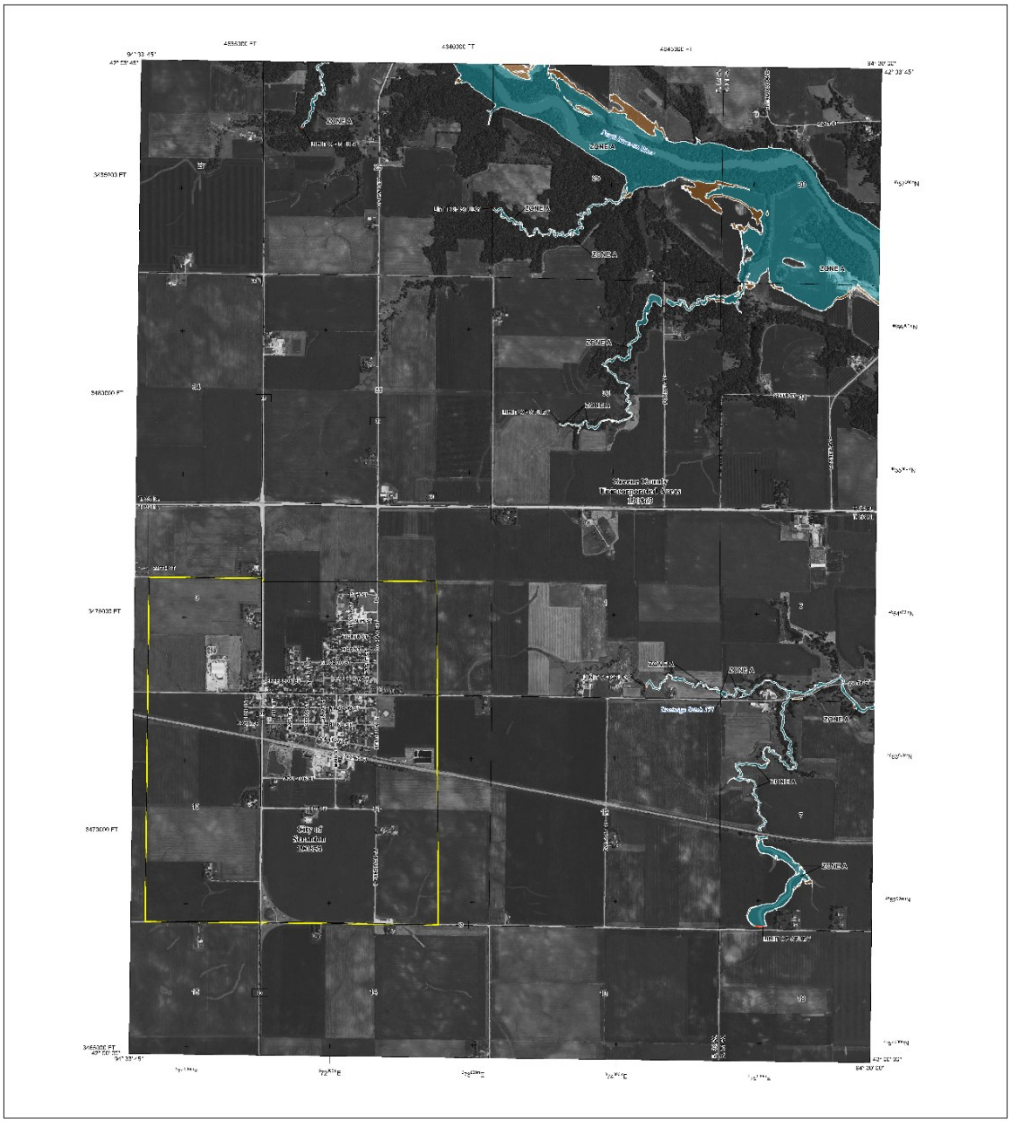
Table H.10: City of Scranton Hazard Impact and Vulnerability Summary

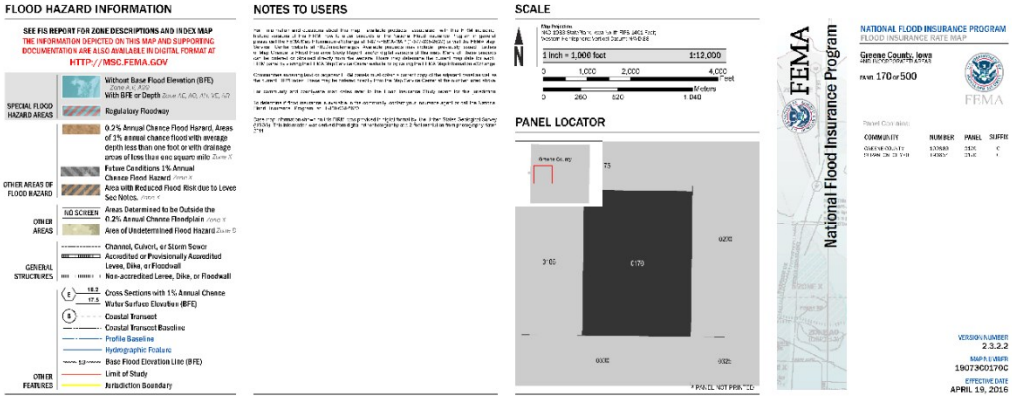
Hazard	Anticipated Impacts and Potential Losses
Drought	Drought may affect the entire community through reduced water availability and increased demand on the municipal water system, however, significant structural damage is not anticipated. Prolonged drought may increase operating demands on the water system, affect vegetation, and increase grass/wildland fire risk. Economic impacts may occur indirectly through impacts to the surrounding

	agricultural community. Older adults, households with limited financial resources, and residents dependent on reliable municipal water service may be more vulnerable to prolonged drought conditions.
Extreme Heat	Significant direct damage to buildings is not anticipated. Extreme heat may affect the entire population and increase demand on the electrical system and cooling equipment. Power outages could interrupt municipal services and leave residents without adequate cooling. Older adults, young children, individuals with medical conditions, outdoor workers, and residents without adequate air conditioning are particularly vulnerable. Potential losses are primarily associated with increased utility costs, lost productivity, medical impacts, and service interruptions rather than structural damage.
Flash Flood	Scranton has reported no flash flooding since 2020; however, intense rainfall could produce localized street, yard, basement, or property flooding where drainage is limited. Streets, culverts, utilities, and structures in low-lying or poorly drained areas would be most vulnerable. Temporary road closures could affect access and emergency response. Because there has been no recent flash-flood losses, widespread structural losses are not anticipated.
Grass/Wildland Fire	Agricultural land and open vegetation surrounding Scranton presents a potential for a grass or field fire to approach the city. Homes, businesses, utility infrastructure, and other structures along the perimeter of the city would be most vulnerable. Smoke could affect the majority of the community and particularly individuals with respiratory conditions. A fire could also temporarily close roads or interrupt utilities. Structural losses would depend on the location, wind conditions, and ability of responders to contain the fire.
Levee/Dam Failure	There are no dams or levees within Scranton or in the vicinity of the city and therefore do not pose a threat to the community. Therefore, no significant direct structural damage, service disruption, displacement, vulnerable-population impacts, or property losses from dam or levee failure are currently anticipated.
River Flooding	The 2016 FIRM identifies flood hazard areas around the City of Scranton; therefore, structures, streets, utilities, and other assets located within or adjacent to those mapped areas have greater vulnerability than assets elsewhere in the community. Flooding could damage buildings and contents, temporarily restrict transportation, interrupt utilities or municipal services, and displace affected residents. Residents with limited mobility, transportation, or financial resources may have greater difficulty evacuating or recovering. Potential property losses are concentrated within the identified flood hazard areas rather than distributed evenly throughout the city.
Severe Winter Storm	Severe Winter Storms may affect the entire community but generally do not cause uniform structural damage. Heavy snow, ice, wind, and

	extreme cold can damage trees, roofs, overhead utilities, water infrastructure, and transportation systems. Power outages and blocked roads could interrupt municipal services and emergency response. Older adults, individuals with medical needs and/or limited mobility, and households without alternative heat sources are particularly vulnerable during extended outages or extreme cold. Economic losses may include snow removal, infrastructure repairs, business interruption, and increased heating costs.
Thunderstorm/Lightning/Hail	All developed areas in the City of Scranton are exposed to severe thunderstorms, lightning, and hail. Future storms could damage roofs, siding, windows, vehicles, trees, utility infrastructure, and public facilities. Lightning and wind may cause power outages and fires in localized areas of the city. Potential economic losses include building and vehicle repairs, utility restoration, debris removal, and temporary business interruption.
Tornado	All structures and residents of Scranton are potentially exposed to tornadoes, although actual damage would generally be concentrated along the path of the tornado rather than affecting a fixed percentage of the community. A direct strike could cause severe or complete damage to homes, businesses, public buildings, utilities, and other critical facilities; block streets with debris; interrupt utilities, communications, and emergency services; and result in displacement, injuries, or fatalities. Residents without access to adequate shelter and those requiring assistance to shelter quickly would be particularly vulnerable. Potential structural losses could be substantial in the area directly affected.
Windstorm	All of the developed areas of the City of Scranton are exposed to high winds and derecho events. Recent events have demonstrated the potential to damage roofs, siding, trees, crops, vehicles, and overhead electrical and communications infrastructure. Downed trees and utility lines may block streets, cause extended power outages, and interfere with emergency response and municipal services. Older structures and buildings with large roof areas may experience greater damage. Economic losses may include structural repairs, utility restoration, debris removal, business interruption, and agricultural losses.

Flood Maps





Greene County Hazard Mitigation Plan Appendix H- City of Scranton

There have been some changes in the City's mitigation priorities since the previous plan update. Some projects identified as high priorities have been completed using available grant and local funds, while other projects were implemented as funding opportunities became available. Projects for which funding was unavailable or that were no longer considered a priority were not implemented during the planning period. The City's mitigation actions have been reviewed and updated to reflect current priorities, changes in elected officials and staff, available financial resources, and hazards that have affected the community.

During the previous planning period, the City of Scranton used the Hazard Mitigation Plan when it updated its Code of Ordinances, incorporating applicable mitigation priorities into the Code, including provisions related to tree trimming and nuisances. The mitigation plan was also used to guide ongoing City operations, budgeting, infrastructure improvements, and emergency preparedness activities. Examples include installation of an additional warning siren, and evaluation of tornado shelter areas. Other areas where the city has utilized the previous plan are in the ongoing activities noted on the table below. These activities demonstrate that the previous Hazard Mitigation Plan was integrated into both the City's Code of Ordinances and its ongoing decision-making and operations.

Status of Previous Mitigation Actions

Table H.11: City of Scranton Status of Previous Mitigation Actions

	Status				
Previous actions	**Complete**	**Underway**	**Ongoing**	**Future**	**Not implemented**
Install anti-virus software				X	
Tree trimming ordinance	X				
Implement and enforce zoning ordinances			X		
Promote hazard mitigation plan to the public			X		
Provide information on location of tornado shelters and cooling centers			X		
Purchase additional siren(s)	X				
Promote NOAA Weather Radios			X		
Evaluate existing school tornado shelter areas	X				
Ensure shelters are stocked to support people for extended periods of time			X		
Annually train key local leaders on hazard mitigation issues			X		
Install new fire hydrants			X		
Increase storm water drainage at Main and Lincoln, and by Scranton Manufacturing			X		

Develop a plan for the use of other possible shelters, ie churches			X		
Equip and train the Fire Department, as needed			X		
Develop a calling tree for citizens susceptible to high temperatures				X	

Action Plan

Section 201.6 (c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

Section 201.6 (c)(3)(iii): [The mitigation strategy shall include] 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.

Section 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.

Table H.12: City of Scranton Action Plan

Goal 1	**Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards**
Objective 1	Provide Back-Up Systems for all critical systems and assets
Objective 2	Enact and enforce regulatory measures that ensure people are protected in existing and future development areas
Goal 2	**Minimize injuries and loss of life due to the impacts of hazards**
Objective 1	Provide education and training to increase public awareness
Objective 2	Improve public warning capabilities
Objective 3	Protect health and safety
Objective 4	Account for vulnerable populations
Goal 3	**Improve coordination and communication with other relevant organizations and build support for hazard mitigation**
Objective 1	Develop plans to become less vulnerable to hazards
Goal 4	**Maintain and support public safety facilities, including equipment and training**
Objective 1	Improve public infrastructure and critical assets in hazard impact areas

Table H.13: City of Scranton Mitigation Actions

Action	Hazard(s) Addressed	Priority	Responsible Department	Estimated Cost	Potential Funding Source(s)	Mitigation Measure Category	Target Completion Date
Tree trimming ordinance	Windstorm, Severe Winter Storm	High	Public Works	Minimal	City General Fund	Property Protection	Short
Promote hazard mitigation plan to the public	Drought, Extreme Heat, Flash Flood, Grass/Wild Land Fire, River Flooding, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Windstorm	High	City Council	Minimal	City General Fund	Public Education and Awareness	Short
Provide information on location of tornado shelters and cooling centers	Windstorm, tornado, Extreme Heat	Mod	Emergency Services	Minimal	City Public Safety Fund	Property Protection	Short
Promote NOAA Weather Radios	Flash flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	Mod	Emergency Services	Minimal	City General Funds, Grow Greene County, Fire Department Budget, State Fire Marshall	Emergency Services	Ongoing
Ensure shelters are stocked to support people for extended periods of time	Flash flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning	High	Emergency Services	Low	Grow Greene County, City Public Safety Fund, Fire Department Budget,	Emergency Services	Short

					Private Donations		
Annually train key local leaders on hazard mitigation issues	Drought, Extreme Heat, Flash Flood, Grass/Wild Land Fire, River Flooding, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Windstorm	High	City Council	Minimal	City Public Safety Fund, Fire Department Budget	Public Education and Awareness	Short
Monitor fire hydrants and replace as necessary	Drought, Grass/Wild Land Fire	Mod	Public Works	Low	City Public Works Fund,	Property Protection	Short
Increase storm water drainage at Main and Lincoln, and by Scranton Manufacturing	Flash Flood	Mod	City Council	High	City Public Works Fund	Structural Project	Long
Develop a plan for the use of other possible shelters, ie churches	Tornado, Thunderstorm/Lightning/Hail, Severe Winter Storm	Mod	Emergency Services	Minimal	City Public Safety Fund	Emergency Services	Short
Equip and train the Fire Department, as needed	Drought, Extreme Heat, Flash Flood, Grass/Wild Land Fire, River Flooding, Severe Winter Storm, Thunderstorm/Lightning/Hail, Tornado, Windstorm	High	Fire Department	Minimal	City Public Safety Fund, Fire Department Budget, AFG, Grow Greene County, Private Donations	Emergency Services	Ongoing
Develop a calling tree for citizens susceptible to high temperatures	Extreme Heat	High	Emergency Services	Minimal	City Public Safety Fund	Emergency Services	Short
Monitor Levee/Dam failure risk	Levee/Dam Failure	Low	City Council	Minimal	City General Fund	Emergency Services	Ongoing

Incorporation into Other Planning Mechanisms

Where possible, findings and recommendations from this Hazard Mitigation Plan will be integrated into the City of Scranton's existing and future planning and operating documents. The City Council will be responsible for ensuring that the Hazard Mitigation Plan is reviewed when applicable local plans, ordinances, policies, and capital improvement documents are developed or updated. During these updates, the city will review applicable hazard risk information and mitigation actions contained in this plan and determine whether relevant information or actions should be incorporated into the document being updated. The integration of information from the Hazard Mitigation Plan will be documented through the applicable planning document, ordinance or resolution, budget or capital improvement records, meeting minutes, or other City records.

Information from the Hazard Mitigation Plan will be reviewed and incorporated, as applicable, when the following documents are updated:

- City Codes
- Housing Needs Assessment
- Zoning Ordinance
- Building Code
- Scranton Comprehensive Plan

The City of Scranton does not currently have the following plans or documents. If any are developed during the life of this Hazard Mitigation Plan, applicable hazard risk information, mitigation goals, and mitigation actions will be reviewed and incorporated into the development, as appropriate:

- Strategic Plan
- Water Conservation Plans
- Storm Water Management Plans
- Parks and Recreation Plans