2014

Crawford County Multi-Jurisdictional Hazard Mitigation Plan

REGION XII
COUNCIL OF GOVERNMENTS

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Chapter 1 Introduction

Purpose

Crawford County was awarded a grant from the Federal Emergency Management Agency (FEMA) under its Hazard Mitigation Grant Program (HMGP) to develop a Multi-Jurisdictional Hazard Mitigation Plan. The grant is administered through the Iowa Homeland Security and Emergency Management Division (IHSEMD).

The purpose of the Crawford County Multi-Jurisdictional Hazard Mitigation Plan is to reduce the effects that hazards have on people and property in Crawford 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 Crawford County. The plan will meet the requirements of the Disaster Mitigation Act of 2000, which was signed into law on October 30, 2000. This plan was also developed to make the county and its communities eligible for certain federal disaster assistance, specifically the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grand Program, Pre-Disaster Program and the Flood Mitigation Assistance Program.

While an important component of emergency management deals with disaster recovery, an equally important component of emergency management involves hazard mitigation. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage, reconstruction, and repeated damage. The Crawford County Hazard Mitigation Plan demonstrates Crawford County's commitment to reduce risks due to hazards, and serves as a tool to help decision-makers facilitate mitigation activities and resources.

Planning Process and Participation

To develop the Crawford County Multi-Jurisdictional Plan, Crawford County hired Region XII Council of Governments to assist in the plan development. As specified by FEMA, the first step in developing a hazard mitigation plan is to organize resources. In following this initial step, Region XII sent out a resolution for each jurisdiction and school district to adopt stating that they intend to participate in the planning process and creation of the Crawford County Multi-Jurisdictional Hazard Mitigation Plan. Region XII also sent out a letter asking each jurisdiction and school district to appoint at least one individual to participate on the Hazard Mitigation Committee. It stated that representatives should be elected officials or citizens that have

knowledge of city history, especially as it pertains to disasters. The jurisdictions participating include Crawford County, Arion, Aspinwall, Buck Grove, Charter Oak, Deloit, Denison, Dow City, Kiron, Manilla, Ricketts, Schleswig, Vail, Westside, Ar-We-Va Community School District, Boyer Valley Community School District, Charter Oak-Ute Community School District, Denison Community School District, IKM-Manning Community School District, and Schleswig Community School District. The following table lists the appointed hazard mitigation committee members and the jurisdiction they represent.

Crawford County Planning Committee		
Jurisdiction	**Name**	**Position**
Emergency Management	Greg Miller	Emergency Manager
Crawford County	Steve Ulmer	County Supervisor
Arion	Donald Beam	City Council
Aspinwall	Thomas Irlbeck	Mayor
Buck Grove	Darlene Inman	City Council
Charter Oak	Michael Larson	Mayor
	Pamela Tripp	City Clerk
Deloit	Connie Mulligan	City Clerk
	Brian Newell	City Council
	Alan Johnson	Mayor
Denison	Dan Ahart	City Council
	Rod Bradley	Police Chief/Denison CSD
	Dennis Fineran	Mayor
	Gordon Hough	City Council
	Lisa Koch	City Clerk
	Cory Snowgren	Fire Chief
Dow City	Keith Starkweather	City Council
Kiron	Kathy Lickteig	City Council
Manilla	Leonard Kaufmann	Mayor
Ricketts	Pamela Tripp	City Clerk
Schleswig	Troy Kluender	City Council
	Arlen Meseck	Public Works
	Syd Winquist	Mayor
Vail	Kurt Brungardt	City Council
Westside	Steve Mumm	Fire Department
Ar-We-Va School District	Todd Danner	School Board
Boyer Valley School District	Patrick Putnam	School Board
Charter Oak-Ute School District	Bill Magill	School Board
Denison School District	Mike Pardun	Superintendent
IKM-Manning School District	Denny Kasparbauer	School Board
Schleswig School District	Jack Johnson	Former Superintendent

The following table lists people who attended at least one meeting in addition to the official hazard mitigation planning committee members. These contributors provided supplemental input on the plan.

Plan Contributors

Jurisdiction	Name	Position
Crawford County	Cecil Blum	Supervisor
Crawford County	Jerry Buller	Supervisor
Crawford County	Randall Kuhlmann	Supervisor
Crawford County	Eric Skoog	Supervisor
Crawford County	Tim Zenk	Emergency Management
Crawford County	Paul Assman	Engineer
Crawford County	Laura Beeck	Public Health
Crawford County	Dolares Kuhlmann	Citizen
Arion	Kristi Stephens	Citizen
Buck Grove	Joe Klein	City Council
Buck Grove	Karen Kolln	Mayor
Deloit	Jerry Lorenzen	Fire Chief
Deloit	Robert Segebart	City Council
Deloit	Richard Lorenzen	City Council
Denison	Robert Arambula	Flood Control Officer
Denison	John Emswilek	Citizen
Dow City	Deb Garrett	City Clerk
Kiron	Fred Coltrain	Fire Department
Kiron	Jesses Coltrain	Fire Department
Kiron	John Larson	Fire Department
Kiron	Mike Lickteig	Fire Department
Kiron	Jay Miller	Fire Department
Kiron	Karl Sandberg	Fire Chief
Kiron	Dennis Wellsandt	Fire Department
Kiron	Kyle Wulf	Fire Department
Manilla	Corey Gaskill	Fire Department
Manilla	Bob Macumber	Fire Department
Manilla	Bill Simonsen	Fire Department
Manilla	Kenny Steckelberg	Fire Department
Schleswig CSD	Brian Johnson	Superintendent
Vail	Ainsley Brungardt	Citizen

Meeting Schedule

Region XII moderated all of the committee meetings and was also responsible for recording the meeting minutes. The amount of time each meeting lasted depended on the committee.

Meetings generally ranged from one to two hours and were typically held in the Denison Community Room. There were seven meetings held in all. Agendas, sign-in sheets and minutes can be found in Appendix 0. The table on the following page lists the schedule of meetings.

Crawford County Hazard Mitigation Committee Meetings		
Meeting	Topic	Date
#1	Overview of Hazard Mitigation Planning Process; Identify Critical Facilities	2-27-12
#2	Risk Assessment	3-26-12
#3	Review of Risk Assessment; Community Profiles	8-23-12
#4	Mitigation Goals; Community Objectives and Actions	1-16-13
#5	Review of Mitigation Actions; STAPLEE Evaluation	3-21-13
#6	Review of STAPLEE Evaluation; Action Plan	4-3-13
#7	Draft Plan	7-10-13

The first meeting of the planning committee was held on February 27, 2012. This was an introductory meeting for the committee members. Region XII staff presented an overview of the plan requirements as outlined in FEMA guidance, with particular note of multi-jurisdictional requirements. At the meeting, representatives were given a map of their community and a worksheet for identifying critical infrastructure.

At the second meeting, representatives were given a copy of the mapped critical infrastructure. Copies were also sent to the city clerks for review by city staff. The hazard mitigation committee discussed which hazards should be included in the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, referencing hazards identified in the 2010 State of Iowa Hazard Mitigation Plan. Data worksheets were handed out referencing hazards that previously occurred in the county. Committee members scored hazards based on probability, severity, warning time and duration.

The third meeting consisted of reviewing the hazard rankings from the previous meeting and providing the jurisdictions with their community profiles. Committee members were asked to review their responses on the risk assessment worksheet and make any necessary changes. Next, draft community profiles were handed out. Each jurisdiction was asked to go through the profiles and note any additional information they would like to see.

At the fourth meeting, information from the first three meetings was handed out; including identified critical infrastructure and the risk assessment. The committee was asked to identify mitigation goals for the plan. Next, the committee filled out a worksheet identifying issues the jurisdiction had experienced with identified hazards. From this list, along with the identified critical facilities and risk assessment, committee members determined mitigation objectives and actions for their jurisdiction. Fliers were put up in the communities and at the Courthouse,

and notices were put in local papers letting the public know about the meeting and requesting their input.

At the fifth meeting, committee members evaluated mitigation actions using the STAPLEE analysis. This included looking at the mitigation actions from a social, technical, administrative, political, legal, economic and environmental perspective.

At the sixth meeting, committee members reviewed their STAPLEE analysis and made any necessary changes. The final piece that committee members needed to complete was the Action Plan. The Action Plan determines which hazards the action addresses, if the project is a low, medium or high priority for the jurisdiction, the responsible department, the estimated cost of the project, potential funding sources, mitigation measure categories, and the estimated completion date.

At the seventh meeting, committee members reviewed the draft plan. Modifications provided prior to the Board of Supervisor's meeting were incorporated into a revised draft. Fliers were put up in the communities and at the Courthouse, and radio announcements were made on KDSN notifying the public about the meeting and requesting their input.

Several meetings to further input were held in addition to the committee meetings. These include school board meetings and fire department meetings. The meeting agendas, sign-in sheets and minutes can be found in Appendix 0.

Public Involvement

The public was welcome to participate in the planning process and attend the hazard mitigation meetings at any time during the development of the hazard mitigation plan. Committee meetings were open session meetings, as required by the Code of Iowa. Meeting agendas were posted in the Courthouse prior to each meeting. Many cities posted notice of meetings prior to each meeting. Public outreach was strongly sought after at the mitigation actions meeting, as well as the draft plan meeting. All meetings were 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 conducted in compliance with the Iowa Open Meeting Law-Iowa Code Chapter.

Neighboring emergency management official and county boards of supervisors were notified of the completion of the Crawford County Hazard Mitigation Plan through notifications from Region XII COG. These agencies were provided an opportunity to provide comment on the plan.

Referenced Plans and Resources

Plans that were referred to in the planning process:

- Crawford County Hazard Mitigation Plan, 2006
- Crawford County City Hazard Mitigation Plan, 2006
- Iowa State Hazard Mitigation Plan, 2010
- FEMA State and Local Mitigation Planning How-to Guides
- Adair County Multi-Jurisdictional Hazard Mitigation Plan, 2012
- Grundy County Multi-Jurisdictional Hazard Mitigation Plan, 2012
- Guthrie County Hazard Mitigation Plan, 2010
- Jasper County Multi-Jurisdictional Hazard Mitigation Plan, 2011
- Lower Platte North Multi-Jurisdictional Hazard Mitigation Plan, 2010
- Neosho County Multi-Hazard Mitigation Plan, 2009
- Scott County Multi-Jurisdictional Hazard Mitigation Plan, 2012
- Wright County Multi-Jurisdictional Hazard Mitigation Plan, 2013

The planning committee referenced the aforementioned plans during the planning process. The committee reviewed the previous Crawford County Hazard Mitigation Plan and the Crawford County City Hazard Mitigation plans to analyze previous hazard analysis, critical facilities and previous mitigation efforts.

Plan Content

The plan looks at all aspects of hazard mitigation. The plan is split into six chapters. These chapters serve as an overview for the plan. The first chapter explains the planning process used in the development of the plan. The second chapter gives a general background on Crawford County. Chapters three, four and five put the planning process in motion by explaining the specific steps taken to generate each jurisdiction's risk assessment (3), vulnerability assessment and loss estimates (4), and mitigation strategies (5). The final chapter of the plan (6) explains how the plan was adopted and will continue to be maintained.

Appendices A-N articulate the details of each jurisdiction's hazard mitigation plan outcomes. Each appendix includes the jurisdiction's profile, critical infrastructure, risk assessment, vulnerability and loss estimates, and mitigation strategies. Appendix O includes all meeting agendas, sign-in sheets and minutes.

Chapter 2 Community Profiles

The community profile contains information specific to Crawford County and each community within the county. This information includes history, development, location, geography, and demographics. The information gathered identified population and economic trends, helping to identify critical facilities and mitigation actions.

Crawford County Community Profile

Crawford County History

Crawford County was named for William H. Crawford, a senator from Georgia and the United States Secretary of Treasury from 1817-1825 under President Monroe. The county was created in 1854 and organized in 1855. The first railway arrived in Crawford County in 1867. The railroad greatly improved transportation and access to markets and thus affected the settlement and development of the entire county.

Geography and Environment

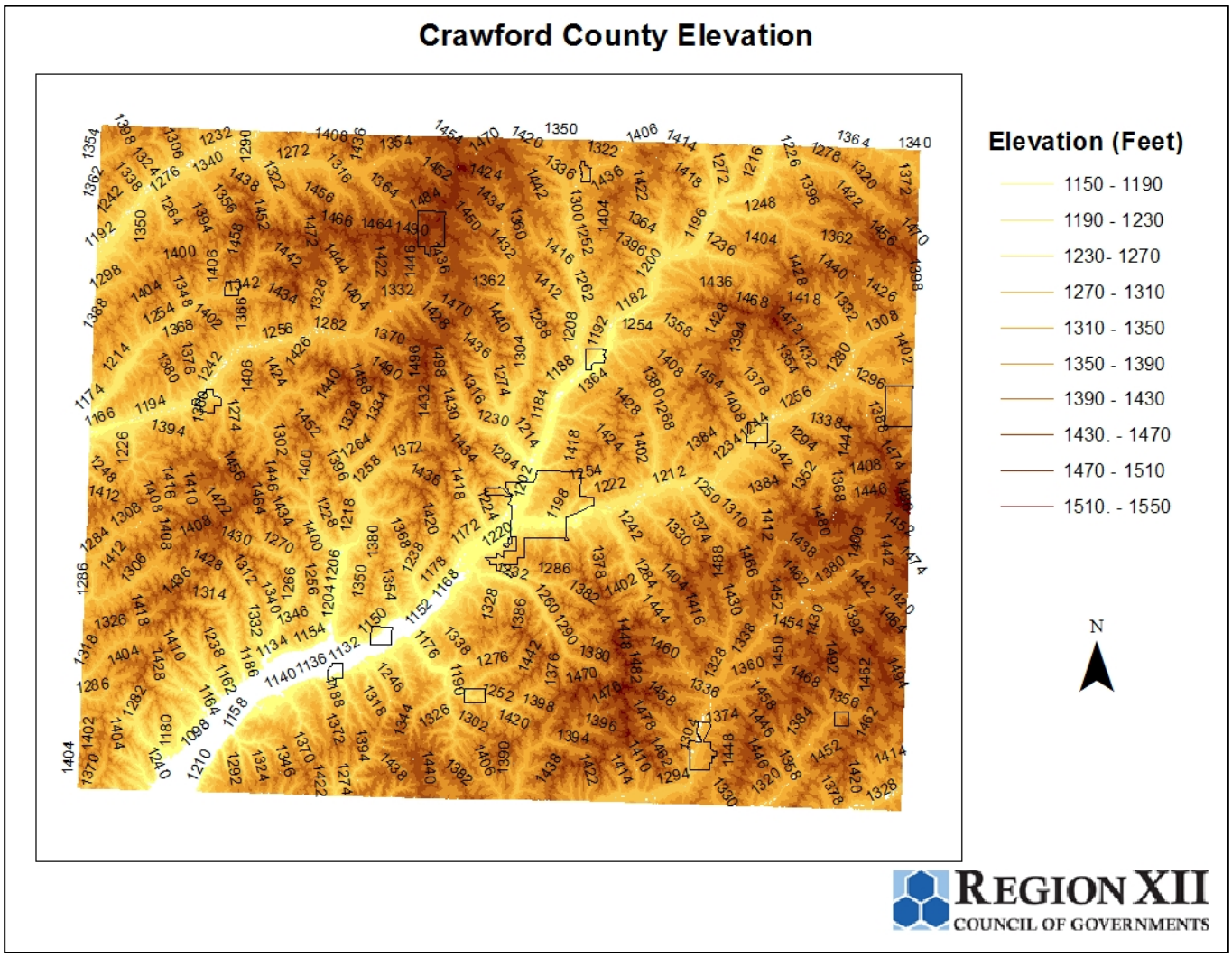
Location

Crawford County is located in west central Iowa. Carroll, Shelby, Harrison, Monona, Ida and Sac Counties are bordering counties. The main highways in Crawford County include Highway 30 passing through Westside, Vail, Denison, Arion and Buck Grove; Highway 59 passing through Schleswig and Denison; Highway 141 located just south of Aspinwall and passing through Denison and Charter Oak; and Highway 39 passing through Kiron, Deloit and Denison. Denison is the county seat and is located in the center of the county. The dimensions of the county are approximately 29.91 miles by 23.93 miles, with a total area of 714 square miles. The county has thirteen incorporated communities located within its borders: Arion, Aspinwall, Buck Grove, Charter Oak, Deloit, Denison, Dow City, Kiron, Manilla, Ricketts, Schleswig, Vail and Westside.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The lowest points in Crawford County can be found along the Boyer River. Here the elevation dips to 1,132 feet. The following map displays the elevation distribution of Crawford County.

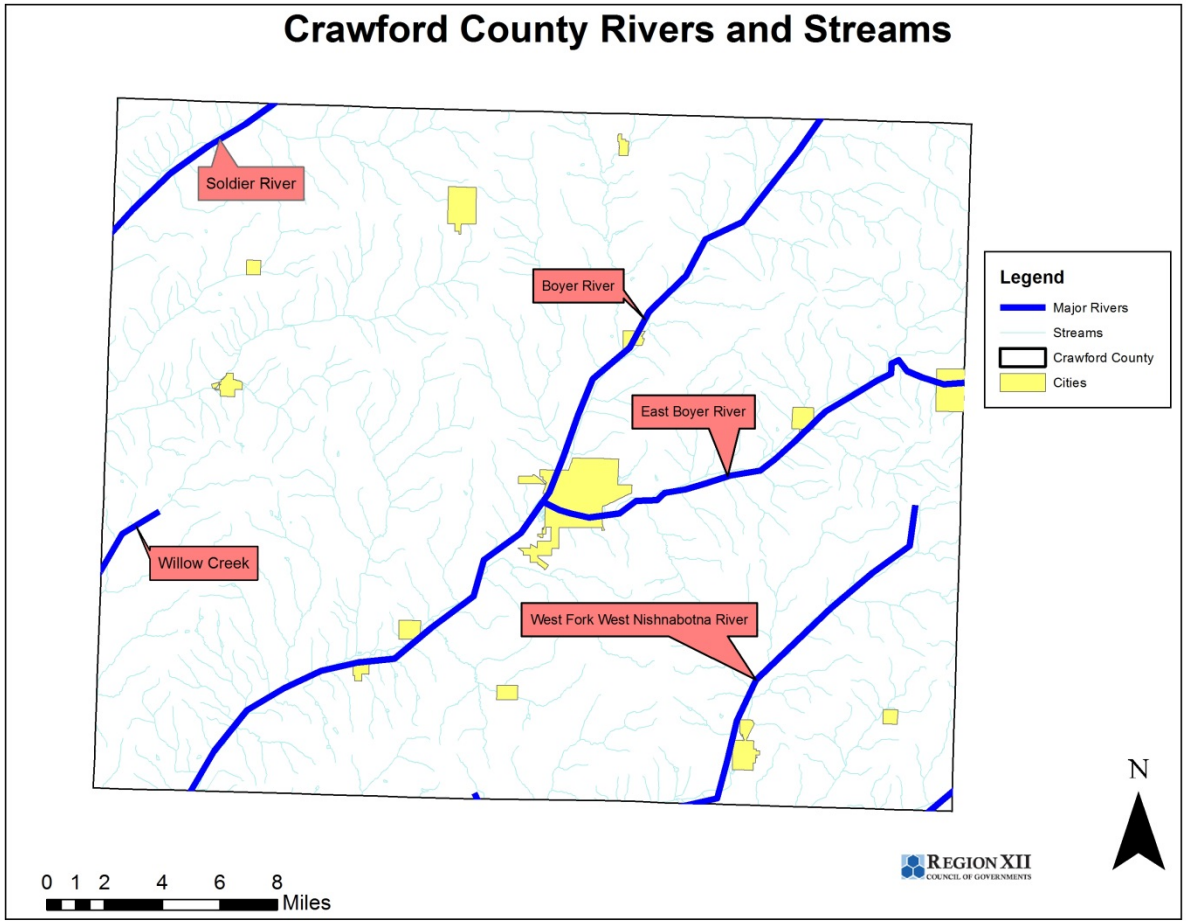
Map 1



Rivers, Streams and Watersheds

There are a number of major rivers located in Crawford County. Map 2 displays the major rivers and streams located in Crawford County. Map 3 on page 2-4 shows the local watersheds of Crawford County. Crawford County is located in five watersheds, with the Soldier, Boyer and Nishnabotna watersheds being dominant.

Map 2


Crawford County Rivers and Streams
Soldier River
Boyer River
East Boyer River
Willow Creek
West Fork West Nishnabotna River
Legend
Major Rivers
Streams
Crawford County
Cities
N
0 1 2 4 6 8
Miles
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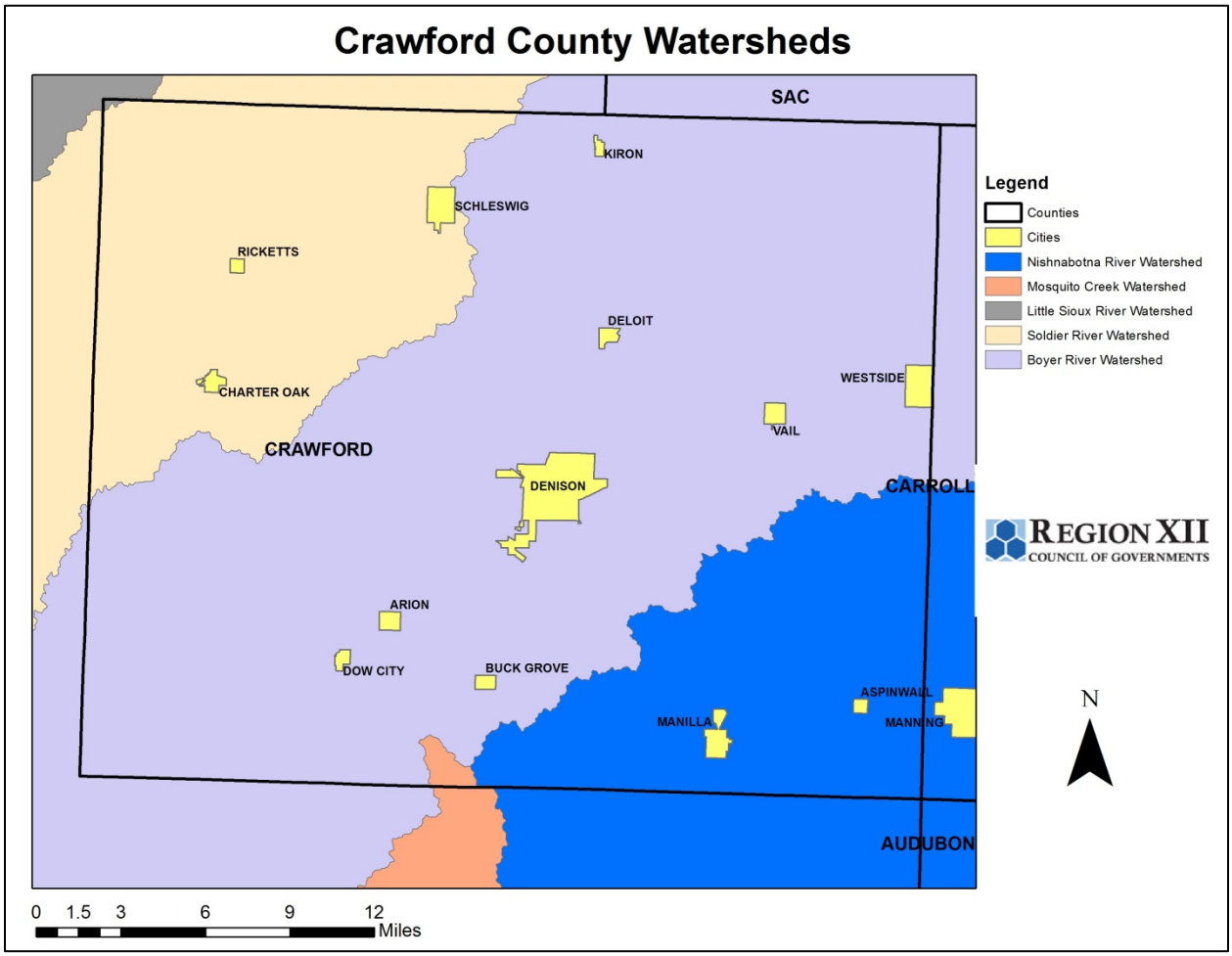
Map 3



Source: Iowa Department of Natural Resources

Demographics

Population

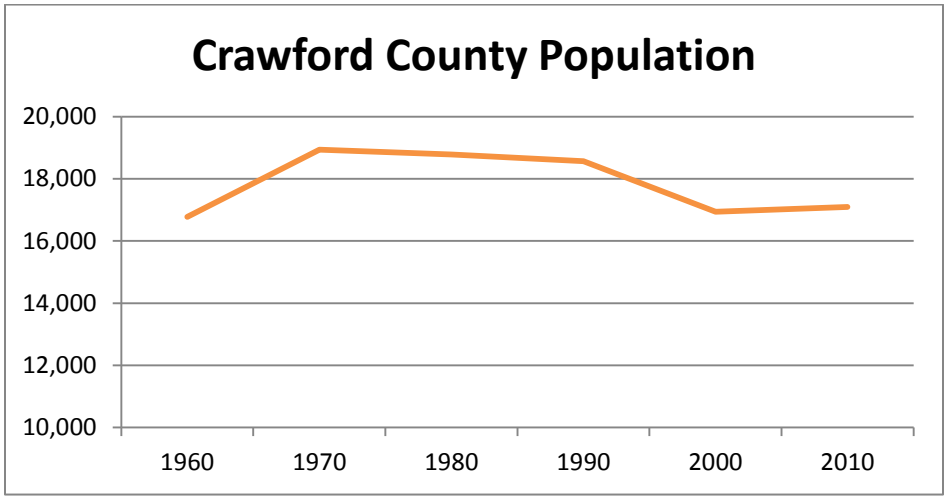
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Crawford County's population through the past, present and future trends of the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

The size and composition of a county's population can exert influence on its development. For instance, 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. 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 education attainment are some of the characteristics that mold a community. 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.

The population of Crawford County increased from 1960 to 1970, decreased from 1970 to 2000, and then increased from 2000 to 2010. Between 1990 and 2000, the largest population decline of 1,627 occurred. Crawford County's population as of the 2010 U.S. Census was 17,096 residents. Figure 1 below displays the historic population trend for Crawford County.

Figure 1



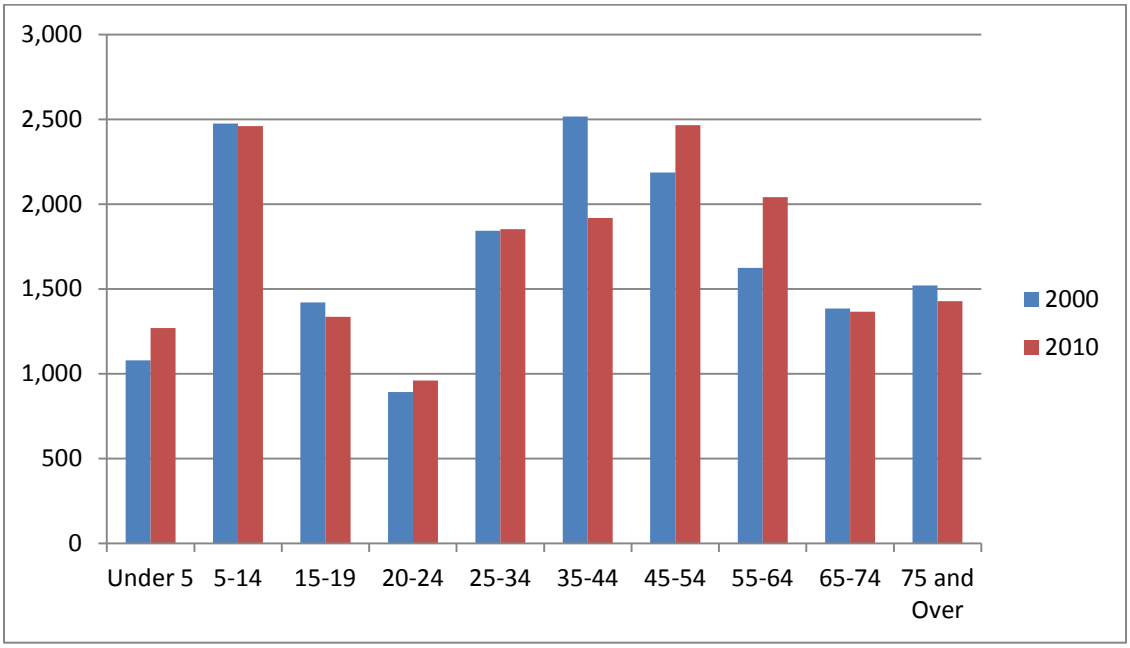
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Crawford County from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 35-44 age cohort, which lost 597 individuals. Other significant losses came in the 75 and over (-92) and 15-19 (-85) age groups. Significant increases in population were seen in the 55-64 (416) and 45-54 (279) age groups.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 35-44 age cohort in 2000 would be in the 45-54 age cohort in 2010. Therefore, the 35-44 ago cohort from 2000 only lost fifty individuals, a much smaller total than in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa counties. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as "brain drain."

Figure 2

Crawford County Age Distribution



Source: US Census Bureau

Housing

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

The number of occupied housing units, along with the total number of housing units, decreased over the last ten years in Crawford County. Although the number of occupied housing units decreased, the percentage remained nearly the same, only decreasing by 0.2 percent. The vacancy rate went from 7.4 percent in 2000 to 7.6 percent in 2010. Table 1 shows the housing trends for Crawford County from 2000 to 2010.

Table 1

Crawford County Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	6,441	92.6%	6,413	92.4%
Owner Occupied	4,703	73.0%	4,688	73.1%
Renter Occupied	1,738	27.0%	1,725	26.9%
Vacant Housing Units	517	7.4%	530	7.6%

Total Housing Units	6,958	100.0%	6,943	100.0%

Source: US Census Bureau

Over thirty percent of the housing units in Crawford County are valued at less than $50,000. These homes are likely to be aging and in need of revitalization. Due to this, these homes are more susceptible to hazards such as fires, serious storms and other weather related hazards. Table 2 below displays the value of housing units in Crawford County in 2012.

Table 2

Value of Owner-Occupied Housing Units

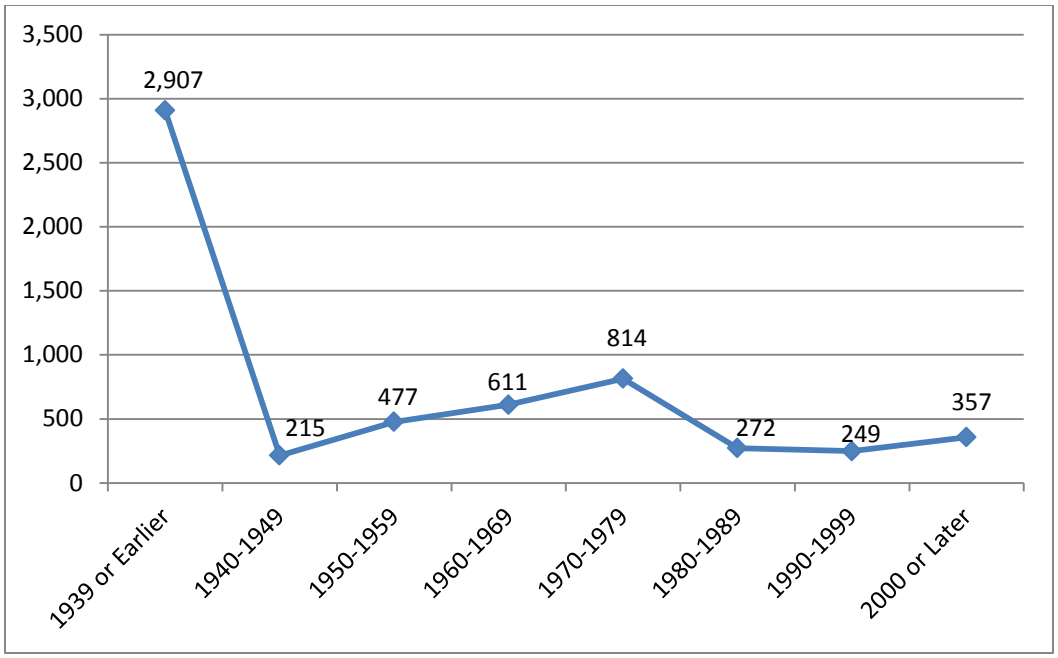
Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	1,781	30.2%
$50,000-$99,999	2,481	42.0%
$100,000-$149,999	1,003	17.0%
$150,000-$199,999	391	6.6%
$200,000-$299,999	207	3.5%
$300,000 and above	39	0.7%

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Nearly half of the current housing stock in Crawford County was constructed prior to 1940. Ten percent of homes have been constructed since 1990. Figure 3 shows the distribution of housing unit construction in Crawford County.

Figure 3

Year Housing Unit Constructed



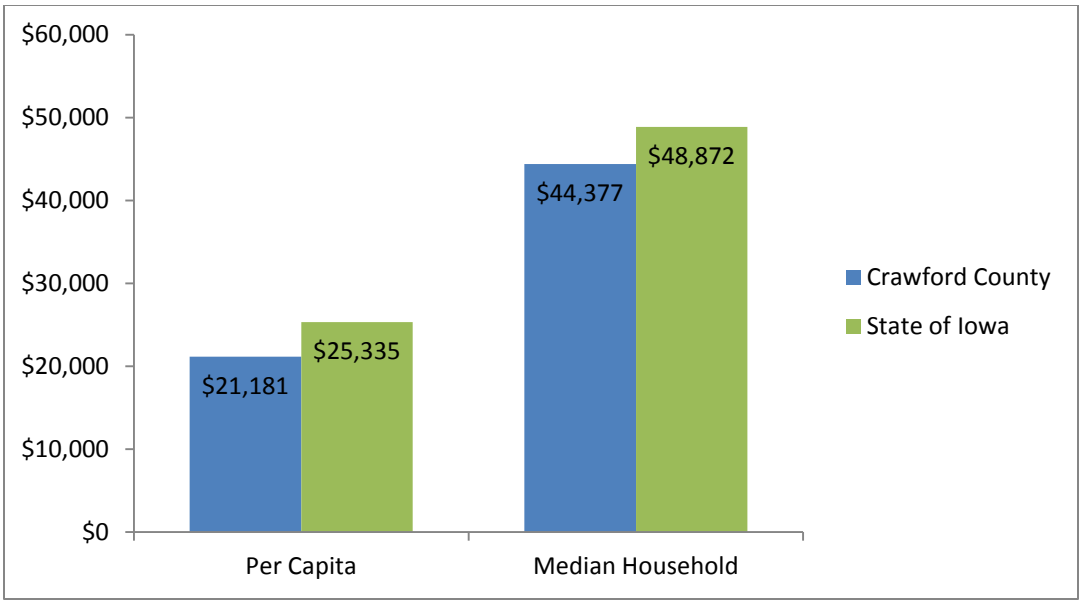
Source: Crawford County Housing Report, October 2012

Economic

An important indicator of the economic base in Crawford County is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 4 below shows that the incomes of those living in Crawford County are lower than the state average. The average per capita personal income in Crawford County, from the 2006-2010 American Community Survey 5-Year Estimate, was $4,154 less than the average for the State of Iowa. The median household income in Crawford County for the same time period trailed that of the state by $4,495 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area.

Figure 4
Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Crawford County, according to the American Community Survey, included the $50,000-$74,999 (20.5%) group, followed closely by $35,000-$49,999 (19.3%) income group. Slightly over twenty-five percent of households in Crawford County make less than $25,000 and twenty-one percent of households have an income of $75,000 or more. Table 3 on the following page shows a breakdown of household income in Crawford County.

Table 3
Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	472	7.3%
$10,000-$14,999	325	5.0%
$15,000-$24,999	865	13.5%
$25,000-$34,999	843	13.0%
$35,000-$49,999	1,252	19.3%
$50,000-$74,999	1,331	20.5%
$75,000-$99,999	737	11.4%
$100,000-$149,999	418	6.4%
$150,000-$199,999	107	1.7%
$200,000 or more	125	1.9%
Median Household Income	$44,377	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these

communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Manufacturing (25.5%), and Educational Services, and Health Care and Social Assistance (18.7%). These percentages are based on the total number of individuals 16 years and older that are from Crawford County and are employed.

Table 4
Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	641	7.8%
Construction	655	7.9%
Manufacturing	2,102	25.5%
Wholesale Trade	209	2.5%
Retail Trade	795	9.6%
Transportation and Warehousing, and Utilities	475	5.8%
Information	66	0.8%
Finance and Insurance, and Real Estates and Rental and Leasing	339	4.1%
Professional, Scientific, and Management, and Administrative and Waste Management Services	249	3.0%
Educational Services, and Health Care and Social Assistance	1544	18.7%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	616	7.5%
Other Services, except Public Administration	394	4.8%
Public Administration	172	2.1%
Civilian Employed Population 16 years and over	8,257	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for Crawford County. The table also shows when the documents were lasted updated.

Table 5
Current Planning and Regulatory Documents for Crawford County

Document	Yes/No	Year
Previous HMP	Yes	2006
Comprehensive Plan	No	-
Building Code	Yes	2010
Zoning Ordinance	Yes	2002
Strategic Plan	Yes	1996
Housing Assessment	Yes	1999
NFIP Participant	Yes	1986

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. As such, 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, electric power, 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 planning committee listed and mapped the critical facilities in their jurisdiction. The critical facilities were grouped into one of sixteen facility types: Agricultural, Chemical Storage/Gas Station, Church, Fire Station, Health Care, Levee, Military, Public Building, School, Shelter, Storm Siren, Telecommunications, Utilities, Vulnerable Population, Wastewater, and Water Utility. The committee was asked to use the primary purpose in identifying the facility type, as several critical facilities can be listed under multiple facility types. Each jurisdiction's critical facilities map is displayed in Section 2 of their referenced appendix (Appendices A-N).

Chapter 3 Local Hazard Analysis and Risk Assessment

The hazard analysis and risk assessment (HARA) was conducted for local jurisdictions to assess their risks from hazards as part of their respective planning processes. The HARA was completed by members of the county, the cities and the school districts. The school districts accept the risk assessment of the jurisdiction in which is structures are located. The hazard analysis and risk assessment is a process for determining the emergency management needs for the jurisdiction. This 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 will enable the jurisdiction to know:

- How frequently damage from a particular event could occur;
- The extent of the damage; and
- Which portions of the jurisdiction could be impacted

Areawide calculations have been completed to identify hazard frequency, extent and impact. These areawide calculations were reviewed by the hazard mitigation planning committee and individual entities ranked each hazard differently and independently based on history and experience.

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 know about?

Many people are only aware of the most obvious risks, usually as a result of a disaster that affected their community or state in recent years such as a tornado or flood. In many cases, there are hazards most people are not aware of because they haven't affected the jurisdiction during the lifetime of current residents.

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 hazard areas that are especially vulnerable, such as elderly 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 case 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 kinds of hazards. 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 the jurisdiction. 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.

The hazard identification portion of the hazard analysis and risk assessment is an inventory of all the hazards that could potentially impact the jurisdiction. This list came from the State of Iowa's 2010 Hazard Mitigation Plan. In all, the list includes twenty-three hazards in two categories, with a total of sixteen natural hazards and seven human caused/combination hazards. The full list of hazards is provided in the table below.

State of Iowa's 2010 Hazard List

Natural Hazards	Human Caused/Combination Hazards
Flash Flood	Human Disease
Tornadoes	Hazardous Materials
Windstorms	Transportation Incident
Extreme Heat	Infrastructure Failure
Hailstorms	Terrorism
Grass or Wild Land Fire	Radiological
Sink Holes	Animal/Plant/Crop Disease
River Flooding	
Severe Winter Storms	
Drought	
Earthquakes	
Landslide	
Expansive Soils	
Thunderstorm & Lightning	
Dam Failure	
Levee Failure	

Hazard Scoring Methodology

The assessment of the risk to people and property throughout the jurisdiction requires a great deal of data from the government and the private sector. To accomplish this task a number of factors were taken into account:

- Probability of occurrence in any given year;
- Magnitude and Severity of impact in terms of life, property, infrastructure, etc.;
- Amount of warning time available before the hazard occurs; and
- Duration of the hazard on the jurisdiction.

Each category of a hazard is rated on a scale of one through four. Totaling and weighing categorical ratings will provide an overall rating for each hazard. A scale of one through four was used because of the large variation in historical occurrences and probabilities, percentages

of vulnerabilities and spatial extent, the number of casualties and the value of property damaged. Using this scale provided the best option for comparison of vastly different types of hazards. It was decided that using a weighted criteria would best allow priorities to be reflected in the final scoring of the hazards and to allow for a higher priority to be placed on hazards that have a higher occurrence in the jurisdiction and have a high potential for adverse impacts. Using the four factors listed above, it was decided that the probability of a hazard is the highest priority for mitigation efforts with the duration of a hazard being the lowest. The formula used for this risk assessment is a follows:

(Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10) = Final Hazard Assessment Score

Probability

Probability is the chance that a given event will occur (Merriam-Webster Dictionary). Each hazard may or may not have a comprehensive documented historical record. Local, state and federal government agencies have made improvements on record-keeping with respect to incidents, accidents and disasters which affect people and property.

The probability score reflects the likelihood of the hazard occurring again in the future, considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year. Many times, historical data can be used to guess future occurrences; however, due to the nature of some hazards, historical data is difficult to use to estimate future occurrences. Also, if a hazard has been addressed through mitigation, the probability of future occurrences decreases and historical data will not be accurate. Hazards that have not occurred in the past may present themselves to the community in the future, further negating historical data. The table below describes the scoring criteria used for hazard probability.

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
1	Unlikely	Event is possible within the next ten years. History of events is less than 10% likely per year.
2	Occasional	Event is probable within the next five years. History of events is between 10% and 19% likely per year.
3	Likely	Event is probable within the next three years. History of events is between 20% and 33% likely per year.
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.

Magnitude/Severity

The magnitude of the impact of a hazard event is related directly to the extent that hazard affects the jurisdiction and is measured using technical measures specific to the hazard. This is also a function of when the event occurs (year-round, seasonal), the location affected, the resilience of the community, and the effectiveness of the emergency response and disaster recovery efforts. When determining the magnitude/severity, a typical storm scenario should be taken into account and extremes should not determine magnitude/severity. The table below describes the scoring criteria used for hazard magnitude/severity. Only one of the three criteria needs to be met in order to receive that score.

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, property and infrastructure, and the degree and extent with which the hazard affects the area		
Score	**Description**	
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
3	Critical	26% to 50% of property severely damaged Shutdown of facilities and services for at least 2 weeks Injuries/illnesses that result in permanent disability
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths

Warning Time

The speed of onset is the amount of warning time available before the hazard occurs. This should be taken as an average warning time. For many of the natural hazards there is some amount of warning time as opposed to the human caused accidental hazards that occur instantaneously or without any significant warning time. The table below describes the scoring criteria used for hazard warning time.

Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs	
Score	Description
1	More than 24 hours
2	12 to 24 hours
3	6 to 11 hours
4	Less than 6 hours

Duration

This consists of the typical amount of time that the jurisdiction is impacted by the hazard. As an example, a snowstorm will likely last several hours, whereas a lightning strike would last less than a second. The duration does not include any cleanup that would be necessary as a result of the hazard. The table on the following page describes the scoring criteria used for hazard duration.

Duration: A measure of the duration of time that the hazard will affect the area	
Score	Description
1	Less than 6 hours
2	Less than 1 day
3	Less than 1 week
4	More than 1 week

Hazard Profiles

The hazard analysis identifies potential hazards that could affect Crawford 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. The following table contains the list of hazards that were reviewed by the Hazard Mitigation Committee.

Natural Hazards		**Human-Caused Hazards**
Dam and Levee Failure	Drought	Animal/Plant/Crop Disease
Earthquakes	Expansive Soils	Hazardous Material
Extreme Heat	Flash Flood	Human Disease
Grass or Wild Land Fire	Hailstorm	Infrastructure Failure
Landslide	River Flooding	Radiological
Severe Winter Storms	Sink Holes	Terrorism
Thunderstorm and Lightning	Tornado	Transportation Incident
Windstorm		

Each of the natural and human-caused hazards could affect all of Crawford County to various degrees. Flash flooding and river flooding will have a greater impact on low-lying areas and areas in close proximity to river and stream corridors.

Not all of the hazards were determined to affect Crawford County. The following hazards were eliminated from the plan for the reasons listed:

Hazards Eliminated	
Hazard	**Reason for Omission**
Earthquake	Planning area located in Seismic Zone 1; the second lowest risk zone in the U.S. (Source: USGS; IADNR)
Expansive Soils	The availability of data on expansive soils varies greatly. The best available data was personal knowledge of the committee. The committee decided to eliminate expansive soils due to their limited occurrences and impacts.
Landslide	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.
Sink Holes	There is no history of sink holes in the county. (Source: IADNR, Iowa Geological Survey)

The following table lists the overall results of the Multi-Jurisdictional Hazard Analysis that the committee members completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 3.1
Multi-Jurisdictional Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Windstorm	Y	Y	4	2	4	2	3.20
Flash Flood	Y	Y	4	2	4	2	3.20
Hailstorm	Y	Y	4	2	4	1	3.10
Tornado	Y	Y	4	2	4	1	3.10
Severe Winter Storms	Y	Y	4	2	2	3	3.00
Thunderstorm and Lightning	Y	Y	4	1	4	2	2.90
River Flooding	Y	Y	4	1	3	3	2.85
Drought	Y	Y	4	1	1	4	2.65
Hazardous Material	Y	Y	2	2	4	3	2.40
Infrastructure Failure	N	Y	2	2	4	3	2.40
Transportation Incident	Y	Y	2	2	4	2	2.30
Grass or Wild Land Fire	N	Y	2	2	4	1	2.20
Extreme Heat	Y	Y	1	2	1	3	1.95
Radiological	N	Y	1	2	4	3	1.95
Human Disease	Y	Y	1	2	3	4	1.90
Terrorism	N	N	1	2	4	2	1.85
Animal/Plant/Crop Disease	N	Y	1	2	2	4	1.75
Dam and Levee Failure	N	Y	1	1	4	3	1.65

Natural Hazards

Dam or Levee 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.

Dam failure is the 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
- Structural failure of materials used in dam construction
- Movement and/or failure of the foundation supporting the dam
- Settlement and cracking of concrete or embankment dams
- Piping and internal erosion of soil in embankment dams
- Inadequate maintenance and upkeep

In Iowa, dams are classified according to the downstream damages that would occur if that dam were to fail. The more risk, the higher the standards that have to be met during dam construction or modification. There are three dam classifications: High Hazard, Significant Hazard and Low Hazard. High Hazard class 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 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 where the dam and its impoundment are themselves of public importance, such as dams associated with public water supply systems, industrial water supply or public recreation, or which are an integral feature of a private development complex. 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 were first built in the United States more than 150 years ago. Farmers traditionally put levees in place to protect agricultural areas from frequent flooding. Since then, levees have been built to protect urban areas. 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. 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 materials such as concrete or steel. They 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 keep erosion to a minimum.

It is important to note that levees reduce the risk of flooding, but do not eliminate the risk. 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, berms 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 eighty-five percent 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.

Multi-Jurisdictional Hazard Score Calculation – Dam or Levee Failure						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
N	Y	1	1	4	3	**1.65**

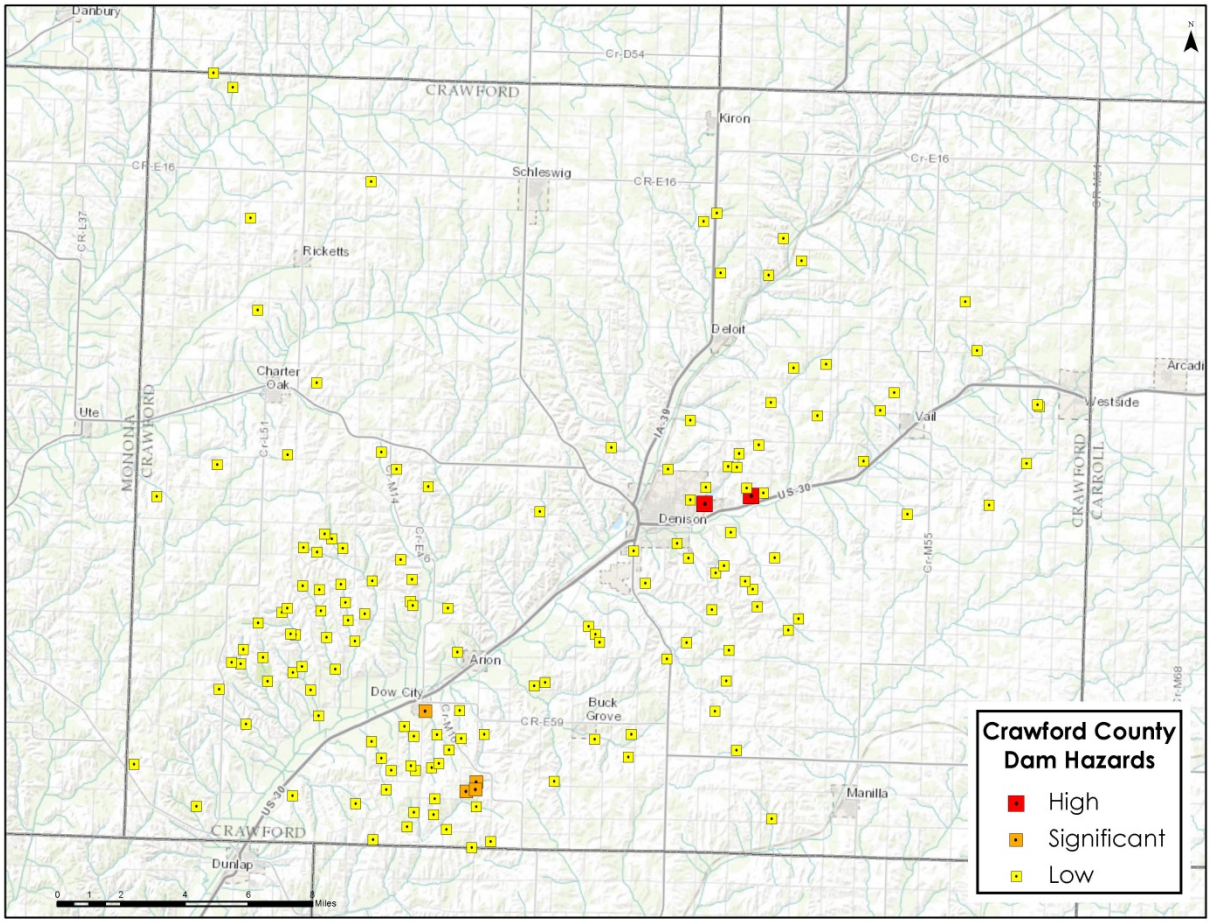
According to the National Inventory of Dams, Crawford County has 144 dams as of May 2013. The dams that are included in the inventory meet at least one of the following criteria:

- 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 exceed 6 feet in height.

Of the 144 dams in the inventory, two are considered to be high hazard dams, four are significant hazard dams and the rest meet the height and storage criteria. Sound design, quality

construction, and continued inspections and repairs reduce the probability of dam failure. Figure 3.1 below illustrates the location of the dams in Crawford County and there hazard ranking.

Figure 3.1 Crawford County Dams



The 2 high hazards dams are located on the east side of Denison. If these dams would fail, the east side of Denison and U.S. Highway 30 would be affected. The 4 significant hazards dams are located in the southwest quadrant of the county. The high hazard dam near Dow City would affect the city if it failed. The other 3 significant hazard dams are located in the rural areas and would cause only minor impacts on rural road infrastructure and residential and ag property.

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 dam 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. Nearly thirty percent of Crawford County's dams were built in the 1960s. This means that between 2010 and 2019 these dams will reach their design life. Nearly forty percent of Crawford County dams were built in the 1970s. These dams will reach their design life between 2020 and 2029. Routine inspections over the next three decades will be crucial to ensure that the dams are still in good condition. One of the high hazard dams was built in 1965 and modified in 1980, while the other was built in 1980. These dams are relatively new and should not fail due to their age. Most of the significant hazards dams were also built relatively recently. Three of the dams were built in the early to mid-1980s. The fourth dam was built in 1961 and has not been modified since.

As a majority of the dams (70%) will reach their design life in the next twenty years, it will be important to conduct routine inspections and maintenance to ensure the dams continue to function properly. People and property located near the floodplain are most vulnerable during a dam failure. The severity of damage ranges from minor property damage to deaths and significant property damage. Only two of the 144 dams in Crawford County are classified as High Hazard dams where the loss of human life is likely if the dam fails.

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 shorty 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.

Drought

Drought is defined as a period 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. There are four different ways that a drought can be defined:

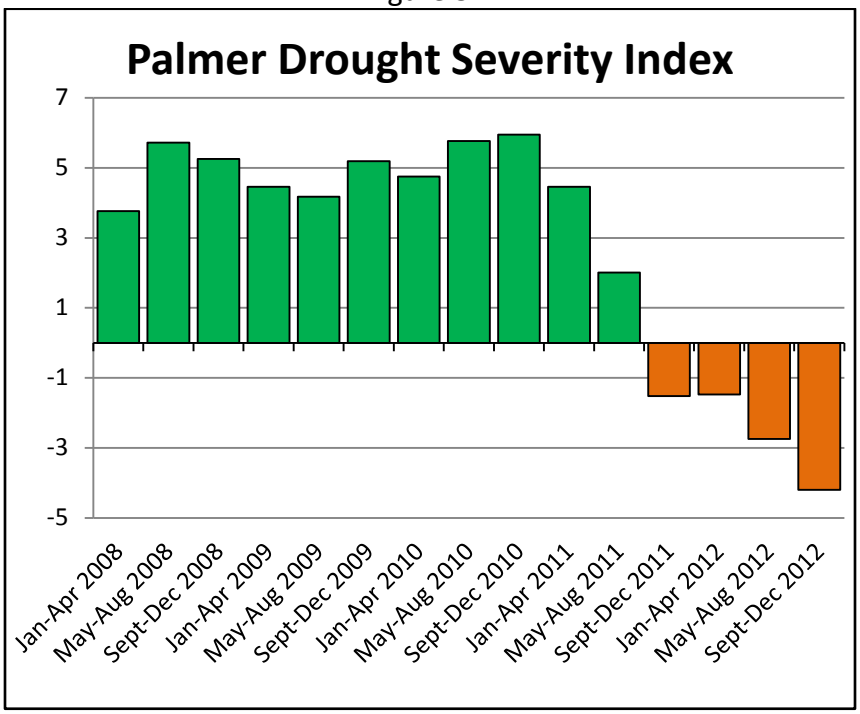
- Meteorological drought-refers to precipitation deficiency;
- Hydrological drought-refers to declining surface and groundwater supplies;
- Agricultural drought-refers to soil moisture deficiencies; and
- Socioeconomic drought-refers to physical water shortages affecting people

The highest occurrences of drought conditions in Iowa are associated with meteorological and agricultural drought as a result of either a decline in precipitation or low soil moisture.

Droughts have wide-spread 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 period of years. A prolonged drought can have serious impacts on a community's water supply and economy. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged or destroyed by a loss of crops or livestock. While droughts are generally associated with extreme heat, droughts can and do occur during cooler months.

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 3.2 displays the Palmer Drought Severity Index for the State of Iowa from 2008-2012.

Figure 3.2



Source: National Climatic Data Center

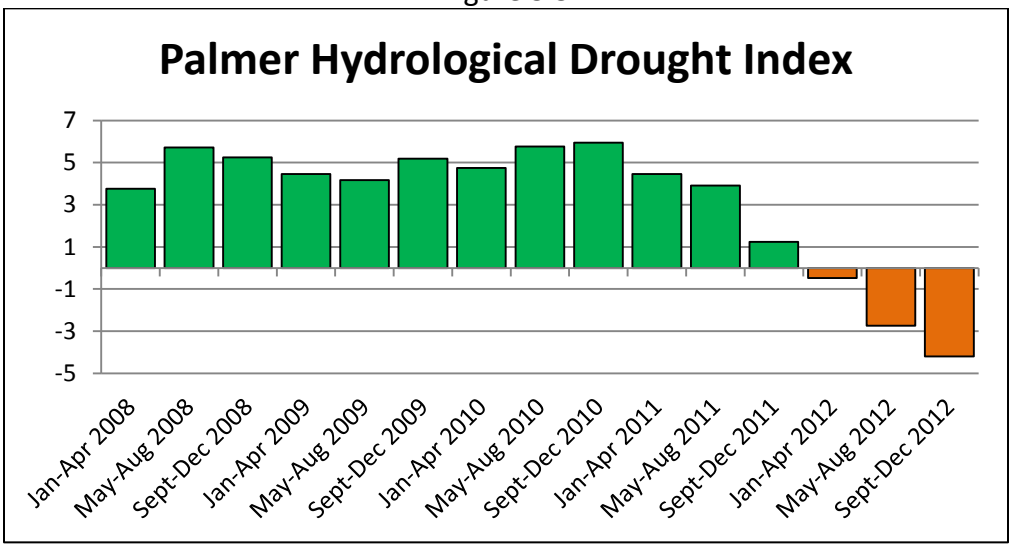
The PDSI has seven categories of dry and wet conditions. The table below displays the categories.

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

Source: NOAA

The Palmer Hydrological Drought Index (PHDI) shows hydrological (long-term cumulative) drought and wet conditions, which more accurately reflect groundwater conditions, reservoir levels, etc. The hydrological impacts of a drought take longer to develop and longer to recover, therefore the PHDI responds more slowly to changing conditions than the PDSI. Figure 3.3 shows the Palmer Hydrological Drought Index for the State of Iowa from 2008-2012.

Figure 3.3



Source: National Climatic Data Center

Multi-Jurisdictional Hazard Score Calculation – Drought						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
Y	Y	3	1	1	4	**2.65**

From 2000-2012 Crawford County experienced eight droughts. Droughts, no matter how short, have an impact on crop production in the state. The eight droughts resulted in $617,070,000 in crop damage. Half of the droughts occurred in August, followed by two during September. While some droughts were more severe than others, agricultural areas were impacted much more than cities, where the impacts tended to be more indirect. According to Crawford County's drought history, droughts lasted for an average of 22.5 days.

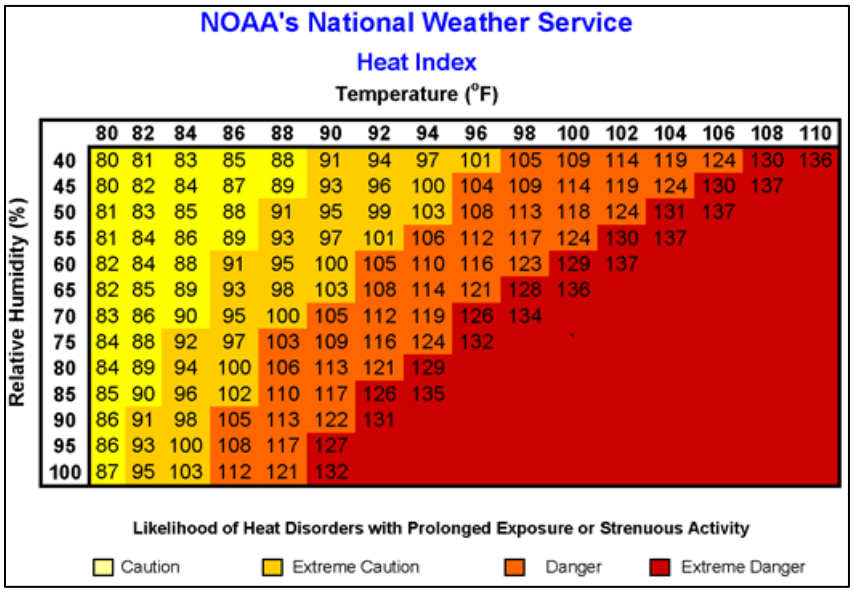
Droughts more than likely affect most of the state, if not the Midwest as a whole, when they occur. The agricultural sector is impacted the most due to the dependence on precipitation and water. Manufacturers who use large amounts of water could also be impacted during a water shortage. Citizens draw their drinking water from surface water and groundwater sources, so a prolonged drought may impact all citizens if there were to be a drop in the stream flow coupled with the drop in the water table.

Studies conducted over the past century have shown that meteorological drought is never the result of a single cause. Scientists are not able to predict when a drought will occur more than a month or so in advance. Predicting droughts depends on forecasting precipitation and temperature. Anomalies of precipitation and temperature may last weeks, to several months, to several decades. How long they last depends on several unstable weather systems at the global level. The potential for improved drought predictions in the future differs by region, season and climate. The U.S. Drought Monitor map provides a summary of drought conditions across the United States. The map is updated weekly by combining a variety of data-based drought indices and indicators and local expert input. The U.S. Drought Monitor is the most widely used gauge of drought conditions in the country.

Extreme Heat

Heat is the number one weather-related killer in the United States. NOAA National Weather Service statistical data shows that heat caused more fatalities in 2012 than tornadoes, flooding and winter storms combined. Extreme heat's twenty-year average (1993-2012) caused an average of 176 fatalities per year. Conditions for extreme heat are defined by summertime weather that is substantially hotter and/or more humid than average for a location at that time of year. This includes temperatures (including heat index) in excess of 100 degrees Fahrenheit or at least three successive days of 90+ degrees Fahrenheit. A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees. The heat index is a number in degrees Fahrenheit that tells how hot it really feels when relative humidity is added to the actual air temperature. Exposure to full sunshine can increase the heat index by at least fifteen degrees. Figure 3.4 displays the heat index and likelihood of experiencing a heat disorder with rising temperatures and humidity.

Figure 3.4



During extremely hot and humid weather, the body's ability to cool itself is affected. When the body heats too rapidly to cool itself properly, or when too much fluid or salt is lost through dehydration or sweating, body temperature rises and heat-related illnesses may develop. Heat-related illnesses can include heat cramps, sunstroke, heat exhaustion and heat stroke. Heat stroke can result in death and requires immediate medical attention. Urban areas are particularly at risk because of air stagnation and large quantities of heat absorbing materials such as streets and buildings.

Multi-Jurisdictional Hazard Score Calculation – Extreme Heat						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
Y	Y	2	2	1	3	**1.95**

From July 1995 to July 2011, Crawford County experienced three extreme heat events. The extreme heat event that occurred in July 1995 had major impacts across the entire state. The event lasted two days, caused 3.8 million dollars of property damage and resulted in three fatalities. A second extreme heat event in August 2001 resulted in one fatality in Crawford County. The third extreme heat event took place in July 2011. This event caused $135,000 in property damage in Crawford County.

Factors or conditions that can make people more susceptible to extreme heat include age (especially older adults and young children), weight, people with disabilities and those who work outdoors. Low income individuals and families can also be susceptible due to limited access to air-conditioned rooms. Livestock and other animals are also adversely impacted by extreme heat. High temperatures at the wrong time inhibit crop yields as well. Extreme heat

can also result in distortion and failure of structures and surfaces such as roadways and railroad tracks.

Periods of extreme heat can be predicted a few days out. The National Weather Service will initiate alert procedures when the heat index is expected to exceed 105 degree Fahrenheit for at least two consecutive days. An extreme heat event has an occurrence of 90+ degree weather for a minimum of three days in the definition, so it is expected for an extreme heat event to last a minimum of three days but no more than seven days.

Flash Flood

Flash flooding is the most dangerous flood event due to little or no warning time. A flash flood is a rapid rise of water along a stream or low-lying urban area. Flash flooding occurs within six hours of a significant rain event and is caused by intense storms that produce heavy rainfall in a short amount of time, slow-moving thunderstorms, or thunderstorms repeatedly moving over the same area. Other types of flash floods can occur from dam or levee failures, or a sudden release of water held by an ice jam. Flash floods are very strong; they can roll boulders, tear out trees, destroy buildings and bridges, and scour out new channels.

Densely populated areas are at a high risk for flash floods. The construction of buildings, highways, driveways and parking lots increases runoff by reducing the amount of rain absorbed by the ground. Sometimes streams through cities and towns are routed underground into storm drains. During heavy rain, the storm drains can become overwhelmed and flood roads and buildings. Low spots, such as underpasses, underground parking garages, and basements can easily become flooded. Areas near rivers are at risk from flash floods. Levees are often built along rivers and are used to prevent high water from flooding bordering land.

Flash floods are not always caused by meteorological events. Variables include knowing how much water runs off and where, how strong the stream is flowing, how wide of an area is receiving rain, how hard and fast it is raining, how long is has been raining in a particular drainage basin, where the storm is located and how fast or slow it is moving, how porous the soil is and how much water it already holds, the amount of vegetation covering the soil, how much surface is paved, whether there are storm drains or closely spaced buildings, and the general geography and slope of the land. Forecasters can usually tell in advance when conditions are right for flash floods to occur, but there is often little lead-time for an actual warning.

Nearly half of all flash flood deaths occur in automobiles as they are swept downstream. Most of these deaths take place when people drive into flooded highway dips of low drainage areas. Six inches of fast-moving water can knock a person off their feet; water only twenty-four inches

deep can carry away most automobiles. The National Weather Service has a program called "Turn Around Don't Drown!" to educate the public about these dangers.

Multi-Jurisdictional Hazard Score Calculation – Flash Flood						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
Y	Y	4	2	4	2	**3.20**

From 1996-2010, Crawford County experienced thirteen flash flood events. These flash floods resulted in $11,593,000 in property damages and $375,000 in crop damages. Four of the flash floods occurred in the City of Denison resulting in $11,410,000 in property damages and $375,000 in crop damages. Dow City also experienced four flash flood events during this time, although the damage is significantly less with a combined $100,000 in property damage for the four events. Other cities to experience flash flooding include Charter Oak with two events, and Schleswig, and Westside each with one event. According to citizen accounts, flash flood events have also occurred in rural Crawford County, Arion, Deloit, Manilla, Ricketts and Vail.

Areas in a floodplain, downstream from a dam or levee, or in low-lying areas are most at risk from flash flooding. People and property with aging storm sewer systems can also be at risk because the drains were not designed to carry the capacity currently needed to handle the increased storm water runoff.

Local National Weather Service forecast offices issue flash flood watches 12-36 hours in advance of a possible flash flood. Often times, warnings are issued about thirty minutes to an hour before a flash flood occurs. Flash floods arrive quickly and leave rather quickly. According to the NOAA Storm Weather Database, the flash floods in Crawford County lasted for an average of 6.5 hours.

Grass or Wildland Fire

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

Wildland fires are a serious threat to life and property in the U.S**.** The combination of drought, warmer temperatures, high winds and an excess of dried vegetation in forests and grasslands has made fire seasons progressively worse over the past fifty years. As the wildland fire threat grows, so does the cost of fighting the fires. Lightning is a common ignition source of wildland fires. However, nine out of ten fires are started directly or indirectly by people thought 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 acts upon 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.

Multi-Jurisdictional Hazard Score Calculation – Grass or Wild Land Fire						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
N	Y	1	2	4	1	**1.75**

According to the National Interagency Fire Center, the United States saw 67,774 fires resulting in 9,326,238 acres burned in 2012. Iowa had ten wildland fires resulting in 349 acres burned in 2012. The ten year total for the State Iowa (2003-2012) is 181 wildland fires resulting in 3,208 acres burned. According to the National Interagency Fire Center, no fire in Iowa has been reported as a historically significant wildfire or a large wildfire (more than 100,000 acres). The National Interagency Fire Center puts out a monthly National Significant Wildland Fire Potential Outlook, warning areas where wildland fires have the potential to breakout.

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 grassfire 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.

Hailstorm

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 hailstones. Nearly all severe thunderstorms produce hail, though it may melt before reaching the ground. Hailstones can have layers like an onion if they travel up and down in an updraft, or they can have few or no layers if they are "balanced" in an updraft. One can tell how many times a hailstone traveled to the top of the 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 the 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 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 fifteen ounces. The stronger the thunderstorm updraft, the larger the hailstone can grow.

Damage from hail approaches $1 billion in the United States annually. Most of the hail damage is to crops. Even relatively small hail can destroy crops in a matter of minutes. Vehicles, roofs, buildings and homes, and landscaping are the other things that are most commonly damaged by hail. Hail has been known to cause injury to humans, and occasionally has been fatal.

Multi-Jurisdictional Hazard Score Calculation – Hailstorm						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
Y	Y	4	2	4	1	**3.10**

From 1993 to 2012, Crawford County experienced 104 hail events. These hail events caused $732,000 in property damage and $1,708,000 in crop damage. Based on the past twenty years, Crawford County can expect to experience approximately five hailstorms per year. Agricultural crops such as corn and beans are particularly vulnerable to hailstorms. Hail can also do considerable damage to vehicles and buildings. Hail only rarely results in loss of life directly although injuries can occur.

While forecasting thunderstorms that have the potential to produce hail is becoming more accurate, there is no clear distinction between storms that do and do not produce hailstones. Most hailstorms do not cover large areas, nor do they last long.

River Flooding

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. In the United States, over the past thirty years (1983-2012), floods have killed more people than tornadoes, hurricanes or lightning. Though the numbers can vary dramatically from year to year, the thirty-year national average for flood deaths is 89. Since 1900, flooding has caused more than 10,000 deaths. It is believed that many of the deaths occurred because people underestimated the force and power of water. Six inches of fast-moving water can knock a person off their feet and water twenty-four inches deep can carry away most automobiles.

A river flood occurs when water levels rise due to heavy rains, persistent thunderstorms over the same area for extended periods of time, snowmelt or an ice jam. Other factors that contribute to flooding include topography, soil conditions and ground cover. Flooding can also happen when dams or levees break. Flooding may impact an area with only a few inches of water, or it may cover a house to the rooftop. Flooding may last only days or could carry on for

weeks. As much as ninety percent of the damage related to all natural disasters (excluding droughts) is caused by flooding and associated debris flow. On average, flooding causes more than two billion dollars in property damage each year.

Multi-Jurisdictional Hazard Score Calculation – River Flooding						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
Y	Y	4	2	3	3	**2.85**

Between 1996 and 2012, Crawford County experienced ten floods. They lasted for an average of 5.4 days. The urban/small stream floods lasted a significantly less amount of time than the large river floods. The urban/small stream floods lasted an average of three hours, while the river floods lasted approximately nine days. The City of Denison was impacted the most by the urban/small stream floods. These occurred three times resulting in $145,000 in property damage and $5,000 in crop damage. Overall, the ten floods resulted in $1,165,000 in property damages and $20,621,040 in crop damages. Citizen accounts also indicate that river and stream flooding have also occurred in Buck Grove, Charter Oak, Deloit, Dow City, Manilla, Ricketts, Vail and Westside.

The National Flood Insurance Program (NFIP) was created by Congress in 1968 to mitigate future flood losses. 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. Crawford County and all of the communities within Crawford County except Aspinwall and Schleswig participate in the NFIP.

River flooding usually develops over the course of several hours or days depending on the river basin. 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.

Severe Winter Storms

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

The various types of severe winter weather can cause considerable damage. Heavy snows can immobilize transportation systems, 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 to 10 mph under freezing conditions. The potential for drifting is substantially higher in open country than in 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 impassable 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 3.2 below displays the definitions for severe winter storms.

Table 3.2

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
Heavy Snow	4" or more of snow in 12 hours or less, or 6" or more of snow in 24 hours or less
Ice Storm	Damaging accumulations of more than ¼" 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 ½" or more
Extreme Cold	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.

Multi-Jurisdictional Hazard Score Calculation – Severe Winter Storms						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
Y	Y	4	2	2	3	**3.00**

Since 2000, Crawford County has experienced thirty-four severe winter storms. Eight of these storms were blizzards, ten were heavy snows, five were ice storms, and ten were classified as winter storms, meaning that more than one significant hazard met or exceeded locally defined warning criteria. The economic impact of winter weather each year is huge, with costs for snow removal, damage repairs and loss of business in the millions. The impact of the thirty-four severe winter storms in Crawford County resulted in $4,585,900 in property damage.

Heavy snow can cause hazardous conditions that can slow or stop the flow of supplies as well as disrupt emergency and medical services. Accumulations of snow can collapse buildings and knock down trees and power lines. In rural areas, farms may be isolated for days, and

unprotected livestock may be lost. Ice storms can make walking and driving dangerous. Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Bridges and overpasses are particularly dangerous because they freeze before other structures. Extreme cold can cause frostbite or hypothermia and become life-threatening. Children and elderly people are most susceptible. When rivers and lakes freeze, a rise in the water level or a thaw can break the ice into large chunks that become jammed at obstructions. Ice jams can act as a dam, resulting in severe flooding.

The National Weather Service has developed effective weather advisories that are widely distributed. Accurate information is made available up to days in advance if a severe winter storm is threatening an area. A winter storm can range from a heavy snow over a few hours to blizzard conditions that last several days. There were a number of storms in Crawford County that lasted over 24 hours.

Thunderstorm and Lightning

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, or a tornado. There are about 100,000 thunderstorms each year in the United States and approximately ten percent 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 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 weak tornado. 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. Multi-cell cluster storms can produce moderate size hail, flash floods, and weak tornadoes. While the multi-cell cluster may last for several hours, each cell in a multi-cell cluster only lasts about 20 minutes. 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 thunderstorms are highly organized, but rare, 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. A supercell thunderstorm is set apart from the other thunderstorm types due to the presence of rotation. The rotating updraft of a supercell thunderstorm helps the thunderstorm 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, lighting can occur anywhere there is a thunderstorm. Lightning 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, over the past thirty years (1983-2012), lightning killed an average of fifty-two people each year, with hundreds of documented injuries per year. It is estimated that lighting causes more than one billion dollars in damage each year.

Lightning is generated by a substantial buildup of charged ions in a thundercloud. As the positive and negative areas grow more distinct within the cloud, an electric field is created between the oppositely-charged thunderstorm base and its top. A current of electricity forces a path thought the air until it encounters something that makes a good connection. The current is discharged as a stroke of lightning. The channel of air through which lightning passes can be heated to 50,000 degrees Fahrenheit, which is hotter than the surface of the sun. The rapid heating and cooling of the air near the lightning channel causes a shock wave that results in the sound known as thunder.

There are three types of lightning: ground flashes, cloud-to-ground, and cloud 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, rockets and towers on mountains. Natural lightning travels from the cloud to the ground; artificially initiated lightning travels from the ground to the cloud. 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 sometimes have visible channels that extend out into the air 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 centered on July, with a rapid increase during May and a 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.

Multi-Jurisdictional Hazard Score Calculation – Thunderstorm and Lightning						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
Y	Y	4	1	4	2	**2.90**

Data collected from the National Climatic Data Center (NCDC) shows that Iowa experiences many thunderstorm and lightning events every year. Between May 1965 and May 2012, Crawford County experienced 142 thunderstorm events. These storms resulted in $1,780,000 in property damages and $7,895,000 in crop damages. Thunderstorms can bring other hazards that the jurisdiction must face such as flash flooding, river flooding, tornadoes, hail, lightning and high winds. Those in unprotected areas, mobile homes or automobiles during a storm are most at risk.

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.

Between 1997 and 2011, Iowa experienced, on average, 645,685 cloud-to-ground flashes per year. This ranks Iowa fifteenth nationally in terms of cloud-to-ground flash densities with 11.4 flashes per square mile. From 1959-2011, Iowa experienced 72 fatalities due to lightning. (Vaisala) Iowa's last reported lightning fatality was in 2008. Lightning injures many more people than it kills and leaves some victims with life-long health problems. Lightning can also cause damage to property by igniting fires and causing electrical failures.

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. Tornadoes are not always seen due to wind being invisible. 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 a supercell thunderstorm, and those that do not. Tornadoes that form from a supercell thunderstorm are most common, and often

are the most dangerous. Most large and violent tornadoes come from supercell thunderstorms. 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 tall. Field studies show that as few as twenty percent 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 Fujita Scale, or F-Scale, is a damage scale originally developed by T. Theodore Fujita in 1971 to relate the degree of damage to the intensity of the wind. The scale is not absolute, many factors need to be taken into consideration including wind direction, wind duration, flying debris, and the strength of the structure. The official estimate of a tornado's intensity is made after the tornado has passed. Since the Fujita Scale is based on damage and not wind speed or pressure, it can be difficult to determine the intensity of a tornado. Over the years, the F-Scale has revealed the following weaknesses:

- It is subjective based solely on the damage caused by a tornado
- No recognition in difference in construction
- Difficult to apply with no damage indicators
- If the 3/4-mile wide tornado does not hit any structures, what F-scale should be assigned?
- Subject to bias
- Based on the worst damage (even if it is only one building or house)
- Overestimates wind speeds greater than F3 (www.spc.noaa.gov/efscale)

The Enhanced Fujita 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 Enhanced Fujita Scale, detailed descriptions are given for examples of damage to twenty-three types of buildings, taking into account 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.wunderground.com & www.weather.com). Table 3.3 below shows the estimated wind speed for the Fujita Scale and Enhanced Fujita Scale, as well as the expected damage associated

with the tornado's intensity. Table 3.4 displays the relationship between tornado strength and associated damages.

Table 3.3

Fujita Scale		Enhanced Fujita Scale		Type of Tornado	Expected Damage
Scale	**3-Second Gust Speed (mph)**	**Scale**	**3-Second Gust Speed (mph)**		
F0	40-72	EF0	65-85	Gale	**Light**-Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged
F1	73-112	EF1	86-110	Weak	**Moderate**-Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads
F2	113-157	EF2	111-135	Strong	**Considerable**-Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground
F3	158-207	EF3	136-165	Severe	**Severe**-Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown
F4	208-260	EF4	166-200	Devastating	**Devastating**-Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated
F5	261-318	EF5	Over 200	Incredible	**Incredible**-Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters; trees debarked; incredible phenomena will occur

Source: www.spc.noaa.gov

Table 3.4

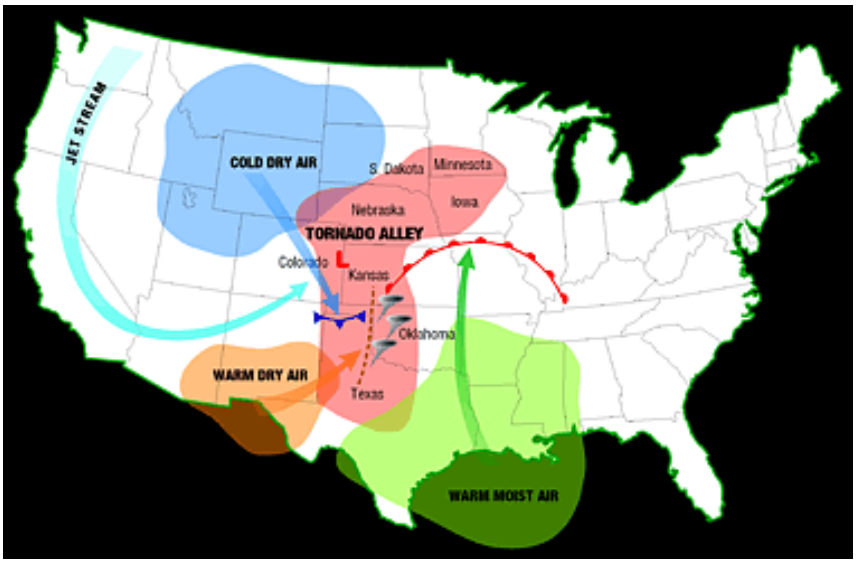
Weak Tornadoes (EF0 and EF1)	Strong Tornadoes (EF2 and EF3)	Violent Tornadoes (EF4 and EF5)
88% of all tornadoes	11% of all tornadoes	1% of all tornadoes
Less than 5% of all tornado deaths	Nearly 30% of all tornado deaths	70% of all tornado deaths
Lasts 1-10+ minutes	May last 20 minutes or longer	Can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

Source: www.nws.noaa.gov

Approximately 1,000 tornadoes hit the nation yearly. Tornadoes kill an average of sixty people per year, mostly from flying or falling debris. Tornado season usually refers to the time of year when the United States sees the most tornadoes. 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. It is important to remember that tornadoes can happen at all hours and any day of the year. Tornado Alley is a nickname for an area 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 form the Gulf of Mexico. A large number of tornadoes form when these two air masses meet. Figure 3.5 depicts the warm and cold air masses, as well as tornado alley.

Figure 3.5



Source: NOAA-"Tornado Climatology"

Multi-Jurisdictional Hazard Score Calculation – Tornado						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
Y	Y	4	2	4	1	**3.10**

According to the National Climatic Data Center, there have been thirty-two tornados in Crawford County from 1952 to through 2012. Thirteen of those tornadoes were categorized as an EF0 and resulted in $59,000 in property damage and $5,000 in crop damage. Ten tornadoes were categorized as an EF1 and resulted in one injury, $925,000 in property damage and $31,500 in crop damage. Seven tornadoes were categorized as an EF2 and resulted in one injury, $1,550,000 in property damage and $50,000 in crop damage. Two of the tornadoes were classified as an EF3 and resulted in three injuries and $5,000,000 in property damage.

The number of reported tornadoes in Crawford County has been increasing over the past twenty years. Between 1952 and 1989 there were nine reported tornado touchdowns. Between 1990 and 2011, Crawford County saw twenty-three tornadoes touch down. The committee decided that due to the number of historical occurrences, as well as the increasing number of reported tornadoes touching down, to rate the probability as highly likely to occur each year.

Tornado movement can range from almost stationary to more than 60 mph. On average, tornadoes travel at around 10-20 mph. Tornadoes have been known to range in diameter from three feet to two miles. Given the small size of most communities in Crawford County, it is believed that tornadoes could cause significant damage to the community if directly hit.

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 30 minutes. Tornadoes can develop and change paths rapidly, limiting the warning time. Tornadoes can last from several seconds to over an hour, though most tornadoes last about five minutes. Between 2001 and 2011, tornadoes in Crawford County lasted an average of 2.2 minutes.

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 forecasters, severe wind is the most difficult threat to forecast because they come from a wider range of environments than supercells, tornadoes, or large hail. Damaging wind events can develop with little advanced warning. Windstorms can occur on their own, with severe winter storms and with severe thunderstorms.

There are several types of damaging winds: straight-line, downdrafts, downbursts, microbursts, gust front, derecho, and bow echo. 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 are a small-scale column of air that rapidly sinks towards the ground. 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 are small concentrated downbursts that produces 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.

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. 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. 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 shear. Major airports routinely use Terminal Doppler Weather Radars, developed during the 1990's. These radars pay particular attention to weather conditions occurring with a few miles of the airport, especially conditions that might cause deadly microbursts.

Multi-Jurisdictional Hazard Score Calculation – Windstorm						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
Y	Y	4	2	4	2	**3.20**

From 2001 to 2011, Crawford County experienced fifteen high wind events. These high winds caused $616,110 in property damages and $25,000 in crop damages. Those most at risk from 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 and broken windows. Crop damage is often associated with windstorms. Damage can include laying down crops, breaking stalks and twisting plants thereby reducing the yield and making it difficult to harvest.

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. Watches are issued when conditions are favorable for windstorms to develop. 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.

Human-Caused Hazards

Animal/Plant/Crop Disease

An outbreak of disease that can be transmitted from animal to animal or plant to plant represents an animal/plant/crop disease. A disease outbreak will likely have economic implications, cause crop production losses, and possibly have environmental damages.

A plant disease is any abnormal condition that alters the appearance or function of a plant. It is a physiological process that affects some or all plant functions and may reduce the quality and/or quantity of the harvested product.

Fungi are the largest and perhaps most well-known group of plant pathogens. The vast majority of fungi do not cause disease. However, numerous fungi can cause plant disease, and a relatively small number of them cause disease in humans and livestock.

Bacteria are perhaps more familiar as the cause of human and animal diseases, such as tuberculosis and pneumonia. Nonetheless, some bacteria can also be destructive plant pathogens. Like bacteria, viruses are probably most familiar as the cause of human and animal diseases, such as influenza, polio, rabies, smallpox and warts. Viruses, however, also cause several plant diseases.

Nematodes are microscopic, non-segmented, round, slender worms. Several thousand species of nematodes are found in soil, in fresh and salt water, in animals and within or on plants throughout the world. Some nematodes are parasites on animals, plants, insects or fungi (Soybean Diseases-ISU Extension Office).

Multi-Jurisdictional Hazard Score Calculation – Animal/Plant/Crop Disease						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
N	Y	1	2	2	4	**1.75**

The table below displays some common plant and crop diseases found in Iowa. The animal diseases are either found in Iowa or could potentially be found in Iowa.

Table 3.5

Animal	Plant	Crop	
Avian Influenza	***Trees***	***Corn***	***Soybean***
BSE "mad cow"	Anthracnose	Anthracnose Leaf Blight	Anthracnose Stem Blight
Brucellosis	Bur Oak Blight	Common Rust	Asian Soybean Rust
Chronic Wasting Disease	Cankers	Common Smut	Bacterial Blight
Epizootic Hemorrhagic Disease	Dutch Elm Disease	Ear Rot	Bacterial Pustule
Exotic Newcastle Disease	Emerald Ash Borer	Eyespot	Bean Pod Mottle
Foot and Mouth Disease	Leaf Spot	Gray Leaf Spot	Brown Spot
Johne's Disease	Oak Wilt	Nematodes	Cercospora Leaf Blight
Pseudorabies	Pine Wilt	Northern Leaf Blight	Downy Mildew
Rabies	Thousand Cankers Disease*	Northern Leaf Spot	Frogeye Leaf Spot
Scrapie	Verticillium Wilt	Southern Rust	Root Rot
Tuberculosis	***Ornamental (Garden)***	Stalk Rot	Soybean Cyst Nematode
West Nile Virus	Anthracnose	Stewart's (Wilt) Disease	Soybean Mosaic Virus (SMV)
	Black Spot		Stem Rot
	Crown Gall	***Alfalfa***	Sudden Death Syndrome (SDS)
	Crown Rot	Bacterial Wilt	
	Gray Mold	Crown Rot	
	Leaf Spot	Fusarium Wilt	
	Nematodes	Nematodes	
	Powdery Mildew	Root Rot	
	Rose Mosaic	Verticillium Wilt	
	Tomato Spotted Wilt Virus		
	Verticillium Wilt		

*Is not present in Iowa currently, but identified as an emerging threat
Source: Iowa State University: Plant Pathology and Microbiology; Iowa State University Extension; IADNR; Iowa Department of Agriculture and Land Stewardship

Avian influenza is a disease found among poultry. Most Avian Influenza strains are classified as low pathogenicity and cause few clinical signs in infected birds. In contrast, high pathogenicity avian influenza causes a severe and extremely contagious illness and death among infected birds. Avian Influenza is a concern because Iowa leads the nation in egg production and has a large turkey population. Production operations randomly test for the disease and will notify the Iowa Department of Agriculture and Land Stewardship (IDALS) if there is sign of the disease.

Iowa's first case of Chronic Wasting Disease (CWD) was reported in 2012. CWD is a contagious neurological disease affecting deer, elk and moose. It causes degeneration of the brain of

infected animals resulting in emaciation, abnormal behavior, and loss of bodily functions. CWD is always fatal, there is no known treatment, vaccine or live animal test for CWD (IDALS).

Epizootic Hemorrhagic Disease (EHD) is an acute, infectious, often fatal viral disease. Signs of the disease include fever, respiratory distress and hemorrhages. The virus is usually transmitted by the Culicoides biting midge. EHD is widespread in white-tailed deer and periodically can be found in cattle, although it is rarely fatal and usually associated with an epidemic in deer. Sheep can be infected by EHD but rarely develop symptoms. Cases of EHD were reported in both domestic and wild ruminants in Iowa and surrounding states in 2012. Through November 30, 2012, the Iowa Department of Natural Resources reported nearly 3,000 suspected EHD cases affecting deer from sixty-three counties. A higher number of cases were reported in the southern half of Iowa and counties bordering the Missouri River. There were five suspected cases in Crawford County (ISU: College of Veterinary Medicine; IDALS).

Rabies is a deadly viral disease of mammals that infects the central nervous system, ultimately causing disease in the brain and death. It is most often transmitted by animal bites. Rabies infection is nearly always fatal unless prompt treatment is administered before symptoms begin. There are two rabies strains that commonly circulate in Iowa (bat and skunk), and many different species can be infected with these strains. Animals most likely to transmit rabies in the United States include bats, skunks, coyotes, foxes and raccoons. In 2012, thirty-one cases of animal rabies were reported in Iowa. Rabies was identified in seventeen bats, nine skunks, four bovine, and one feline. Over the past ten years (2003-2012), there have been 549 reported animal rabies cases. It is important to note that the data is greatly influenced by the number of animals tested (Iowa Department of Public Health).

Scrapie is a fatal, degenerative disease affecting the central nervous system of sheep and goats that is very similar to BSE (mad cow disease), although it does not cause disease in humans. The National Scrapie Eradication Program (NSEP) began in 2001. Since 2003, the number of Scrapie positive animals at slaughter has decreased by 96 percent. The goal for the NSEP is to have Scrapie eradicated by 2017. There have been no new Scrapie infected flocks found in Iowa in Fiscal Years 2011 and 2012.

In 2012, there were thirty-six verified cases of West Nile Virus (WNV) in horses across the state (IDALS). West Nile virus is an infectious disease that first appeared in the United States in 1999. West Nile virus is most commonly spread by infected mosquitoes. Horses represent 96.9 percent of all reported non-human mammalian cases of WNV disease. The fatality rate for horses exhibiting signs of WNV infection is approximately thirty-three percent (AAEP).

All states have a Brucellosis Free and Swine Brucellosis Free status. All states, except for California and Michigan, are classified as tuberculosis free. The entire country is classified as Stage V (free) of pseudorabies (IDALS).

Dutch Elm Disease (DED) was introduced to North America in the 1930s and began killing millions of native elm trees. The first reported cases in Iowa were in Lee and Scott Counties in 1956. Since then, DED has been identified in every county in Iowa and has claimed approximately 95 percent of Iowa's urban elm trees. Typically, the topmost leaves start to yellow, turn brown and then fall off the tree. Next, branches will begin to die until the entire tree is killed. This process can take a few weeks or can stretch out over several months.

The fungus which causes DED, finds its way into elm trees in two ways. One way is elm bark beetles that inadvertently carry the fungus of their backs and infect healthy tree when they feed and breed. These beetles can move the fungus over several miles. The second way is through the root system. The roots of elms located within fifty feet of each other can root graft together allowing the fungus to travel through the root system. Trees that are infected this way usually die quickly (IADNR).

Emerald Ash Borer (EAB) is a small green invasive wood boring beetle that attacks and kills ash trees. The adults live on the outside of ash trees feeding on the leaves during the summer months. The larvae feed on the living plant tissue underneath the bark of ash trees. The trees are killed by the tunneling activity of the larvae under the tree's bark, which disrupts the vascular flow. EAB attacks native ash trees of any size, age, or stage of health. Trees that have been attacked by EAB can die within two years.

Much of Iowa's forestland is densely populated with ash trees, and Iowa's community street trees are heavily planted with ash cultivars. According to sources, Iowa has an estimated fifty million rural ash trees (USFS 2006) and three million urban ash trees (USFS 2008). In early May 2010, EABs were found on an island in the Mississippi River in Allamakee County located in far northeastern Iowa. By 2012, EABs were caught in separate locations in Allamakee County, confirming that the EABs moved inland from the island. The detection of EAB just outside of East Moline, IL in 2012 places this beetle very close to Davenport, IA, which is of concern because of its extreme proximity to Interstate 80 running east/west across the state. Furthermore, EABs have been found in states surrounding Iowa including southeast Minnesota, southwest Wisconsin and in Missouri, as far west as Kansas City. Millions of ash trees have already been killed by the Emerald Ash Borer (IADNR; ISU Extension).

Since the 1990s, black walnut trees have been dying in the western United States due to Thousand Cankers Disease (TCD). The deaths are caused by a walnut twig beetle that carries a

fungus which is spread as the beetle tunnels through tree tissue. Instead of one large canker, tree decline and death appears to result from a high number of cankers. Initial symptoms involve yellowing and thinning of the upper crown, which progresses to include death of progressively larger branches. During final stages, large areas of foliage may rapidly wilt.

Iowa has the third largest volume (one billion board feet) of sawlog size black walnut in the United States. Some experts believe that TCD has the potential to decimate black walnut in the same way Dutch Elm Disease and Emerald Ash Borer have destroyed their respective hosts. The disease has been discovered as close to Iowa as Colorado, and most recently Tennessee (IADNR).

Eyespot has become a common disease in Midwest corn. In Iowa, it is most often found in the northern half of the state. The fungus survives in corn residue and spores are produced under moist conditions. These spores are splashed or blown away by wind onto corn leaves. Leaf wetness is required for infection, so rainy conditions or persistent dews will result in disease outbreak. Rotation with crops other than corn allows the corn residue to decompose and the fungus should die before its time to plan the next corn crop (ISU Extension).

Stewart's disease, or Stewart's wilt, is caused by bacteria. The disease was first reported in New York in 1897. Stewart's disease is generally more destructive on sweet corn than on popcorn or dent corn. Stewart's disease was the most significant bacterial disease of corn in the United States during the first half of the 20th Century. This disease is somewhat unique because its spread depends almost completely on an insect, the corn flea beetle. High levels of ammonium nitrogen and phosphorus tend to increase susceptibility, while high levels of calcium and potassium tend to decrease susceptibility. High temperatures also enhance development of the disease (ISU Extension).

Frogeye Leaf Spot has become more prevalent in Iowa. It is especially problematic in continuous soybean fields. Diseased plants are usually widespread within a field. Warm, humid weather promotes spore production, infection and disease development. On leaves, lesions are small, irregular to circular and gray with reddish-brown borders that most commonly occur on the upper leaf surface (Soybean Diseases: ISU Extension).

The soybean cyst nematode (SCN) is the most important pathogen of soybean in Iowa. Damage from SCN may not be obvious; however, yield losses up to forty percent on susceptible varieties are possible. Infected plants usually occur in patches within a field. SCN survives in the soil as eggs within dead females called cysts. These eggs can survive several years in the absence of a soybean crop. The second stage juvenile hatches from the eggs and infects soybean plants. Unfortunately, conditions that favor soybean growth are also favorable for SCN development.

The number of SCN in a field can be greatly reduced through proper management, but it is impossible to eliminate SCN from a field once it is established (Soybean Diseases: ISU Extension).

Sudden Death Syndrome (SDS) is becoming increasingly prevalent throughout Iowa. Yield losses may range from a few percent to almost 100 percent. Leaves of infected plants initially show scattered, yellow spots between leaf veins. Spots grow to form large blotches between the leaf veins. Leaflets eventually drop, but the petioles remain on the stem. The fungus survives on infested crop residue or in soil for several years. Significant rainfall at or near the flowering stage favors foliar symptom development (Soybean Diseases: ISU Extension).

Hazardous Material

A hazardous material is one that may cause damage to persons, property, or the environment when released to soil, water, or air. Hazardous materials are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous materials can pose a risk to life, health, or property possibly requiring evacuation. A hazardous material incident can occur at a fixed location, in pipeline transportation, and while transporting hazardous materials.

A fixed hazardous materials incident is the accidental release of chemical substances or mixtures, which presents a danger to the public health or safety, during production or handling at a fixed facility. Chemicals are manufactured and used in ever-increasing types and quantities, each year over 1,000 new synthetic chemicals are introduced and as many as 500,000 products pose physical or health hazards and can be defined as hazardous chemicals. Hazardous material incidents generally affect a localized area and the use of planning and zoning can minimize the area of impact.

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

A hazardous materials transportation incident constitutes an accidental release of chemical substances or mixtures that presents a danger to public health or safety during transportation. Large quantities of hazardous materials are transported daily on Iowa streets, highways, interstates, and railways. The DOT regulates the routes and speed limits used by carriers and monitors the types of hazardous materials crossing state lines. More and more potentially

hazardous materials are being used in commercial, agricultural and domestic uses, and are being transported on roadways and railways (Iowa Hazard Mitigation Plan 2010).

Multi-Jurisdictional Hazard Score Calculation – Hazardous Material						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
Y	Y	2	2	4	3	**2.40**

The State of Iowa requires any person manufacturing, storing, handling, transporting, or disposing of a hazardous substance to notify the department and local law enforcement of the occurrence of a hazardous condition. According to the Iowa Department of Natural Resources Hazardous Substance Database, Crawford County had 126 reported hazardous spills between January 1, 2003 and December 31, 2012. Eighty-two (65%) of these spills did not pose a threat to the environment, humans or animals. Two of the reported incidents posed a threat to humans, while thirty-one posed threats to the soil and fifteen threatened surface water. Ground water and livestock were not at risk in any of the spills and fish were threatened in one spill. Five of the spills did not list if anything was threatened.

While there were a large number of reported spills between 2003 and 2012, the committee based their probability score on the likelihood of a high impact spill occurring. A high impact spill is defined as an environmental emergency by the Environmental Protection Agency. An environmental emergency is a sudden threat to the public health or the well-being of the environment, arising from the release or potential release of oil, radioactive materials or hazardous chemicals into the air, land or water (Iowa Hazard Mitigation Plan 2010).

A hazardous material spill can occur almost anywhere, so any area is considered vulnerable to a spill. Twenty-three of the reported spills resulted from a transportation incident and another five occurred because of a railroad incident. Nearly thirty percent of the reported spills occurred at a handling and storage site. People, animals, soil and water in close proximity to areas producing, storing or transporting hazardous materials are at a higher risk. The number of people and the size of the area affected by the spill depend on the type, amount and location of hazardous material released.

Hazardous material incidents occur very rapidly with little or no warning. Public address systems, television, radio, and the NOAA Weather Radios are used to disseminate emergency messages about hazardous material incidents. Most of the spills in Crawford County were small and quickly contained.

Human Disease

This hazard includes a medical, health, or sanitation threat to the general public (such as contamination, epidemics, plagues, insect infestations, and pandemics).

Public health action to control infectious disease in the 21st century is based on the 19th century discovery of microorganisms as the cause of many serious diseases (e.g., cholera and Tuberculosis). Disease control resulted from improvements in sanitation and hygiene, the discovery of antibiotics, and the implementation of universal childhood vaccination programs. Scientific and technologic advances played a major role in each of these areas and are the foundation for today's disease surveillance and control systems. Scientific findings have contributed to a new understanding of the evolving relationship between humans and microbes (Iowa Hazard Mitigation Plan 2010).

Multi-Jurisdictional Hazard Score Calculation – Human Disease						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
Y	Y	1	2	3	4	**1.90**

The Iowa Department of Public Health tracks epidemiological statistics in Iowa. Public health agencies work to protect Iowans from infectious diseases and preserve the health and safety of Iowans through disease surveillance, investigation of suspect outbreaks, education and consultation to county, local, and health agencies. As of January 1, 2010, sixty infectious diseases were designated as notifiable at the national level. A notifiable disease is one for which regular, frequent, and time information regarding individual cases is considered necessary for the prevention and control of the disease.

A pandemic human disease is defined as a disease that has spread around the world to many people. The word, "pandemic", means occurring over a wide geographic area and affecting an exceptionally high proportion of the population (Merriam-Webster Dictionary). Some examples of pandemic diseases past and present include Tuberculosis, Polio, HIV/AIDS, SARS and Influenza. Response and recovery to a pandemic disease will likely be lengthy.

Measles (Rubeola) and Mumps account for nearly half of all reportable diseases in the State of Iowa from 1930-2011, although the number of cases declined dramatically after the 1970s. From 1900-2000, there were three influenza pandemics, all about thirty years apart. This seems to follow the same trend with the next occurrence to affect Iowa beginning in 2009 with the H1N1 influenza virus resulting in 659 hospitalizations and forty-one fatalities (Iowa Department of Public Health). From 1990-2011, STD's accounted for nearly eighty percent of

reportable diseases. The top three non-STD related diseases reported in Iowa were Campylobacteriosis (4.13%), Salmonella (3.49%) and Giardiasis (3.13%).

Similar to statewide reporting, STD's account for the majority of Crawford County's reportable diseases. The top three non-STD related diseases reported in Crawford County from 2006 to 2011 were Campylobacteriosis (7.07%), Giardiasis (2.27%), Cryptosporidum (1.77%), and Salmonella (1.77%).

The goal of Crawford County Home Health, Hospice & Public Health is to control and prevent diseases. The Public Health Nurse coordinates the follow-up of all communicable diseases reported in Crawford County. Once a communicable disease is diagnosed, a case investigation is started. Case investigations involve determining possible sources of the person's infection, assessing the likelihood of the individual transmitting the infection to others, and providing education regarding prevention to the ill person and their contacts. Diseases are reported by physicians, nurses, local health departments, laboratories, and citizens. There are approximately twenty-two reportable diseases that require follow-up in Crawford County (Crawford County Home Health, Hospice and Public Health).

Infrastructure Failure

This hazard encompasses the following hazards: Communication Failure, Energy Failure, Structural Failure, and Structural Fire. This includes an extended interruption, widespread breakdown, or collapse (part or all) of any public or private infrastructure that threatens life and property.

Communication failure is the widespread breakdown or disruption of normal communication capabilities. This could include major telephone outages, loss of local government radio facilities, and long-term interruption of electronic broadcast services. Emergency 911, law enforcement, fire, emergency medical services, public works, and emergency warning systems are just a few of the vital services which rely on communication systems to effectively protect citizens. Disruptions and failures can range from localized and temporary to widespread and long-term.

An extended interruption of service either electric, petroleum or natural gas, which by an actual or impending acute shortage of usable energy could create a potential health problem for the population and possibly mass panic. International events could affect supplies of energy producing products while local conditions could affect distribution of electricity, petroleum or natural gas. The magnitude and frequency of energy shortages are associated with international markets. Local and state events such as ice storms can disrupt transportation and

distribution systems. Stockpiles of energy products eliminate short disruptions but can increase the level of risk to the safety of people and property near the storage site.

The collapse (part or all) of any public or private structure including roads, bridges, towers, and buildings is considered a structural failure. A road, bridge, or building may collapse due to the failure of the structural components or because the structure was overloaded. Natural events such as heavy snow may cause the roof of a building to collapse (under the weight of snow). Heavy rains and flooding can undercut and washout a road or bridge. The age of the structure is sometimes independent of the cause of the failure. Enforcement of building codes can better guarantee that structures are designed to hold-up under normal conditions. Routine inspection of older structures may alert inspectors to "weak" points. The level of damage and severity of the failure is dependent on factors such as the size of the building or bridge, the number of occupants of the building, the time of day, day of week, amount of traffic on the road or bridge, and the type, and amount of products stored in the structure (Iowa Hazard Mitigation Plan 2010).

A structural fire is an uncontrolled fire in populated areas that threatens life and property and is beyond normal day-to-day response capability. Structural fires present a significant threat to life and property and the potential for much larger economic losses. Most structural fires occur in residential structures, but the occurrence of a fire in a commercial or industrial facility could affect more people and pose a greater threat to those near the fire or fighting the fire because of the volume or type of material involved.

Multi-Jurisdictional Hazard Score Calculation – Infrastructure Failure						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
N	Y	2	2	4	3	**2.40**

No widespread communications failures have occurred in Iowa. Local incidents due to weather conditions, equipment failure, excavation incidents, and traffic accidents have been reported. The energy crisis of the 1970s had significant impacts on consumers in Iowa. High inflation and unemployment were associated with the dependence on foreign oil during that time. An energy shortage of that magnitude has not affected Iowa since. There have been sporadic structural failures across the county. Most have included homes, commercial structures or communications towers. Structural fires occur occasionally and are quickly extinguished by local fire departments.

Most of the highly necessary communication systems have backup and redundant designs to provide continuity of service. Most communication failures would be limited to localized areas.

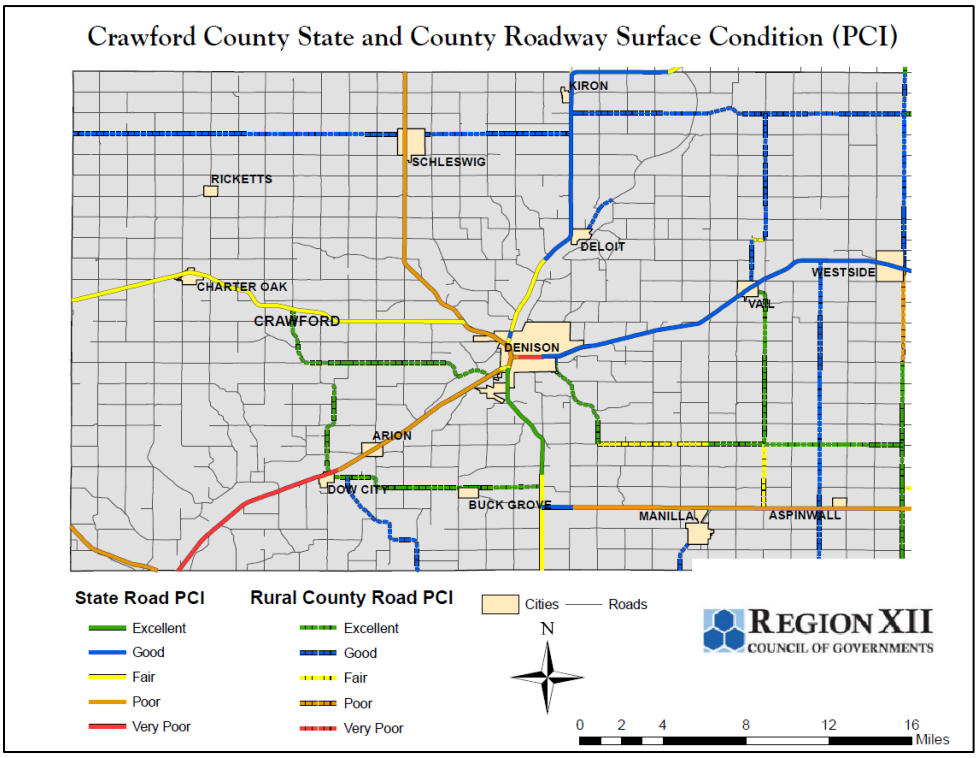
Communication failures can have a negative impact on businesses that are dependent on the internet for servicing and communicating with customers. Communication failures can hamper emergency response efforts. Emergency staff is unable to communicate as quickly and effectively without power and injured citizens may not be able to contact emergency staff.

The effects of a petroleum or natural gas shortage would be felt throughout the state. Iowa is almost entirely dependent on out-of-state resources for oil, coal and natural gas. Iowa has not experienced an energy crisis since the 1970s. Electricity failure can result from many hazard events. Severe winter storms, thunderstorms and lightning, extreme heat, tornadoes, high winds, transportation incidents and others can cause power outages. The loss of electricity can cause many problems throughout town including the shutdown of water pumps, sump pumps and communications.

Damages from structural fires can range from minor aesthetic damage to completely destroying the building. Many factors determine the strength of a fire including: wind, fuel source, and density of buildings. Older structures with outdated electrical systems and fire codes are particularly vulnerable to fires. With modern training, equipment, fire detection devices, and building regulations and inspections, most fires can be quickly contained and limited to the immediate structure involved.

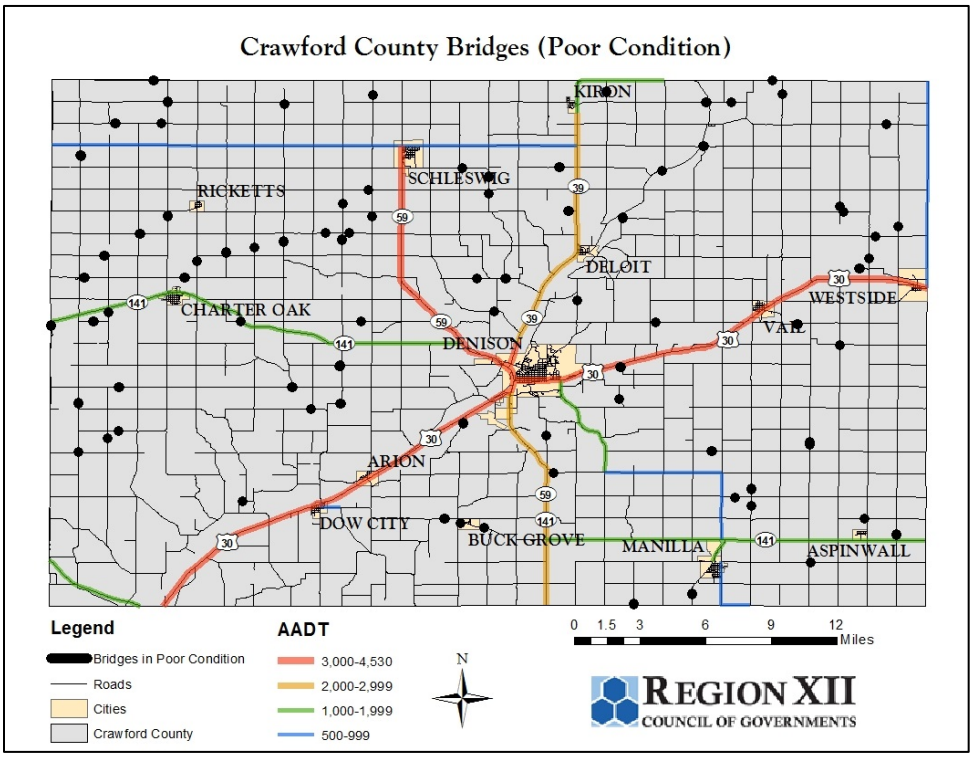
When a structure does fail, the level of damage and severity of the failure is dependent on factors such as the size of the structure, the number of occupants in, on or near the structure, the time of day, day of the week, etc. Structural failure can be caused by the age of the structure, poor maintenance, or by other hazard events such as tornadoes, fires, floods or severe winter storms. Map 3.1 shows the pavement condition of state and county roadways in Crawford County from 2006 data. Map 3.2 shows the number of state and county bridges in good, fair and poor condition for Crawford County as of October 31, 2011. Just over thirty-five percent of Crawford County bridges are in good condition, while thirty-seven percent are in fair condition and the remaining bridges are in poor condition.

Map 3.1



Source: Iowa DOT

Map 3.2



Source: Iowa DOT

Infrastructure failures occur with little or no warning. It is impossible to predict a communication failure, power outage, fires or structural failure. While a petroleum or natural gas shortage may be predicted in advance, emergencies can rise suddenly and unexpectedly. Communication failures and power outages can last from several minutes to several days depending on the nature of the outage and the area that the outage covers. Petroleum and natural gas supply distribution problems can lead to shortages locally for a few days. The duration of structural fires and structural failures is dependent on the size of hazard.

Radiological

A radiological event is an incident resulting in a release of radiological material at a fixed facility to include power plants, hospitals, laboratories and the like. Although the term "nuclear accident" has no strict technical definition, it generally refers to events involving the release of significant levels of radiation. Most commercial nuclear facilities in the United States were developed in the mid-1960s and are designed to withstand aircraft attack. Therefore, they should withstand most natural hazards even though they may not have been specifically designed for those forces (Iowa Hazard Mitigation Plan 2010).

Multi-Jurisdictional Hazard Score Calculation – Radiological						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
N	Y	1	2	4	3	**1.95**

Emergency Classification is a set of plant conditions which indicate a level of risk to the public. Nuclear power plants use the four emergency classifications listed below in order of increasing severity.

- *Notification of Unusual Event* – Under this category, events are in process or have occurred which indicate potential degradation in the level of safety of the plant. No release of radioactive material requiring offsite response or monitoring is expected unless further degradation occurs.
- *Alert* – If an alert is declared, events are in process or have occurred that involve an actual or potential substantial degradation in the level of safety of the plant. Any releases of radioactive material from the plant are expected to be limited to a small fraction of the Environmental Protection Agency (EPA) protective action guides (PAGs).
- *Site Area Emergency* – A site area emergency involves events in process, or which have occurred, that result in actual or likely major failures of plant functions needed for protection of the public. Any releases of radioactive material are not expected to exceed the EPA PAGs except near the site boundary.

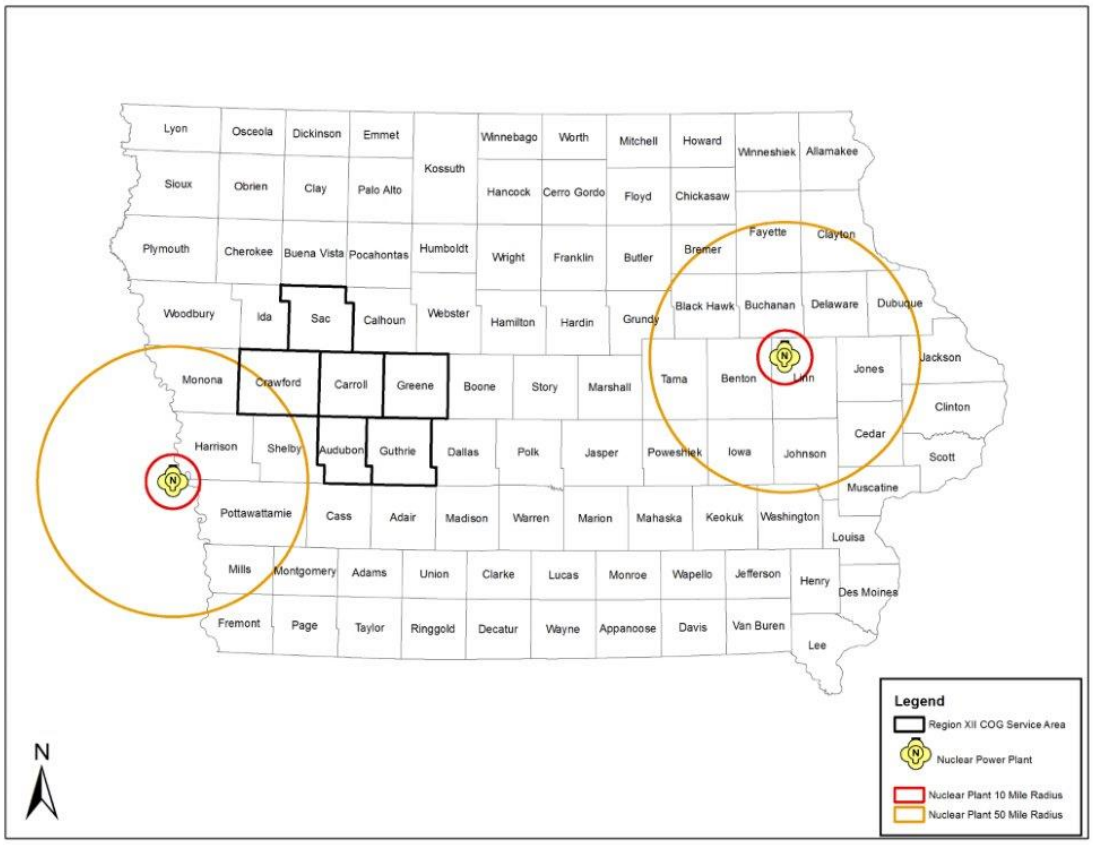
- *General Emergency* – A general emergency involves actual or imminent substantial core damage or melting of reactor fuel with the potential for loss of containment integrity. Radioactive releases during a general emergency can reasonably be expected to exceed the EPA PAGs for more than the immediate site area (US Nuclear Regulatory Commission).

The Nuclear Regulatory Commission (NRC) defines two emergency planning zones around each nuclear power plant. The exact size and configuration of the zones vary from plant to plant due to local emergency response needs and capabilities, population, land characteristics, access routes, and jurisdictional boundaries. Generally, the two types of emergency planning zones are:

- *Plume Exposure Pathway* – extends about ten miles in radius around the plant. The primary concern is exposure of the public to, and the inhalation of, airborne radioactive contamination.
- *Ingestion Pathway* – extends about fifty miles in radius around the plant. The primary concern is ingestion of food and liquid that is contaminated by radioactivity.

If the Fort Calhoun Nuclear Power Plant located nineteen miles north of Omaha were to have an incident, its effects are likely to be felt in Crawford County. Map 3.3 shows the ten mile and fifty mile area that would be impacted by the Fort Calhoun Nuclear Power Plant and the Duane Arnold Energy Center in Linn County.

Map 3.3
Nuclear Plant Planning Zones



Since 1990, the Fort Calhoun Nuclear Power Plant has had seventeen unusual events, two alerts, and no site area emergencies or general emergencies (Iowa Hazard Mitigation Plan 2010). There have been no general emergency incidents in the United States since the NRC established the classification system in 1980. Iowa has one nuclear power plant located in Linn County. There are three other nuclear power plants near Iowa's borders. The only power plant located within fifty miles of Crawford County is the Fort Calhoun Nuclear Power Plant near Omaha. In over fifty years of nuclear power production in the United States, no deaths or injuries from radiation have been recorded among the general public. The danger to residents in Crawford County is minimal. Time, distance, and shielding minimize radiation exposure to the body. It is more likely that a radiological incident in Crawford County would occur because of a transportation incident. Radiological incidents occur with little or no warning.

Terrorism

This hazard encompasses the following: enemy attack, biological terrorism, agro-terrorism, chemical terrorism, conventional terrorism, cyber terrorism, radiological terrorism, and public

disorder. This includes the use of multiple outlets to demonstrate unlawful force, violence, and/or threat against persons or property causing intentional harm for purposes of intimidation, coercion or ransom in violation of the criminal laws of the United States. These actions may cause massive destruction and/or extensive casualties.

Enemy Attack: an incident that would cause massive destruction and extensive casualties. Some areas would experience direct weapons' effects: blast, heat, and nuclear radiation; others would experience indirect weapons' effect, primarily radioactive fallout.

Biological: the use of biological agents against persons or property for purposes of intimidation, coercion or ransom can be described as biological terrorism. Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point of line sources. Biological agents may pose viable threats from hours to years depending upon the agent and the conditions in which it exists. Depending on the agent used and the effectiveness with which it is deployed, contamination can be spread by wind and water. Infections can also be spread by human or animal vectors.

Agro: causing intentional harm to an agricultural product or vandalism of an agricultural/animal related facility. Activities could include the following: intentional release of lab animals, deliberate contamination of bulk milk tanks, poisoning animals, destruction of crops/facilities, theft of agricultural products, machinery or chemicals, and vandalism of agricultural facilities.

Chemical: the use or threat of chemical agents against persons or property for purposes of intimidation, coercion or ransom. Liquid/aerosol or dry contaminants can be dispersed using sprayers or other aerosol generators. Chemical agents may pose viable threats for hours to weeks depending on the agent and the conditions in which it exists. Contamination can be carried out of the initial target area by people, vehicles, water and wind.

Conventional: the use of conventional weapons and explosives against persons or property for purposes of intimidation, coercion, or ransom. Hazard effects are instantaneous; additional secondary devices may be used, lengthening the duration of the hazard until the attack site is determined to be clear. The extent of damage is determined by the type and quantity of explosive. Effects are generally static other than cascading consequences, incremental structural failures, etc. Conventional terrorism can also include tactical assault of sniping from remote locations.

Cyber: an electronic attack using one computer system against another in order to intimidate people or disrupt other systems. Cyber terrorism may last from minutes to days depending upon the type of intrusion, disruption, or infection. Generally, there are no direct effects on the built environment, but secondary effects may be determined depending upon the system being

terrorized. Inadequate security can facilitate access to critical computer systems, allowing them to be used to conduct attacks.

Radiological: the use of radiological materials against person or property for purposes of intimidation, coercion or ransom. Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point of line sources such as munitions, covert deposits and moving sprayers or by the detonation of a nuclear device.

Public Disorder: assembling of people together in a manner to substantially interfere with public peace to constitute a threat, and with use of unlawful force or violence against another person, or causing property damage or attempting to interfere with, disrupting, or destroying the government, political subdivision, or group of people. Examples include mass demonstrations, or direct conflict by large groups of citizens, as in marches, protest rallies, riots and non-peaceful strikes. Labor strikes and work stoppages are not considered in this hazard unless they escalate into a threat to the community (Iowa Hazard Mitigation Plan 2010).

Multi-Jurisdictional Hazard Score Calculation – Terrorism						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
N	Y	1	2	4	2	**1.85**

There are many small military installations in Iowa; most are Iowa National Guard assets spread throughout the state comprised of various military units and functions. The Iowa National Guard headquarters resides at Camp Dodge in Johnston. There have been no enemy attacks on or in Iowa in modern times. It is unlikely that Iowa would be a primary target during an enemy attack. However, an enemy attack is still a possibility due to international conflicts and the large number of weapons in existence throughout the world.

Following September 11, 2001, the country became more aware that terrorism is a very real threat. The Center for Disease Control (CDC) & Health Resources and Services Administration (HRSA) felt public health departments and hospitals would play a large role in preparedness for bioterrorism. In September 2002, the Iowa Department of Public Health (IDPH) received grant funding from the CDC for public health preparedness and funding from HRSA for hospital readiness efforts. All Iowa public health departments and hospitals are responsible for these efforts in their counties. The IDPH has set up six regions across Iowa to work together in these planning and preparedness efforts. Crawford County belongs to Region 3, which consists of sixteen counties in Northwest Iowa (Crawford County Home Health, Hospice and Public Health).

Agro-terrorism incidents have occurred in the state of Iowa, although on a limited scale. Animal rights activists have vandalized or released animals in agricultural facilities; also there

has been vandalism to agricultural facilities or incidents of disgruntled employees causing damage to animals and animal products. There are frequent cases of theft of agricultural machinery, products and chemicals. Chemical terrorism has been even more uncommon than agro-terrorism. There were only two identified chemical terrorism incidents in Iowa. One incident involved mailing rat poison to a number of state and local officials; the other incident involved individuals breaking into a city's water supply and suspected of depositing chemicals in the water supply.

The State of Iowa has experienced many bomb threats. In the spring of 2002, eighteen pipe bombs were found in mailboxes in five states stretching from Illinois to Texas, including Iowa. Five pipe bombs were found in Iowa and six people were injured in the bombings in Iowa and Illinois. In 2005 and 2006, pipe bombs were used in attempted murder cases in Forest City and Altoona.

Cyber-security and critical infrastructure protection are among the most important national security issues facing the United States today, and they will only become more challenging in the future. Recent attacks have disrupted electronic commerce and have had a debilitating effect on public confidence in the internet. There is no history of radiological terrorism in Iowa.

Although large-scale destructive civil disturbances are rare, the potential is always there for an incident to occur. Often times, television, radio and internet coverage helps to spread the incident to other uninvolved or unaffected areas, exacerbating an already difficult situation. Alcohol is often involved in public disorder, especially related to college campuses, sporting events, and concerts (Iowa Hazard Mitigation Plan 2010).

Unfortunately, there will never be a way to totally eliminate all types of terrorism. If a person or persons are inclined to cause death and destruction, they are usually capable of finding a way to carry out their plans. Areas near government buildings, military complexes, and transportation, communication and fuel facilities would experience the largest impacts. Because Iowa serves as a food provider to the world, there is an increased risk of agro-terrorist activity. A full-scale attack in the foreseeable future is not likely; however, a limited attack could take place that could potentially threaten target areas. Acts of terrorism can be immediate and often come after little or no warning. The duration of a terrorist attack depends on the type of terrorism. A biological, chemical or radiological attack could affect people/property for days, weeks, months, even years depending on the substance used and the size of the area impacted. Due to the small size of the communities in Crawford County, if public disorder should occur, it is expected to be resolved within hours. Conventional terrorism usually involves firearms and/or explosives. These events are short-term in nature, and would

not be expected to last very long. The committee determined that on average, a terrorism event would last less than one day.

Transportation Incident

This hazard includes all modes of transportation-air, highway, railway, and waterway. This includes any transportation accident that directly threatens life and which results in property damage and/or death(s)/injury(s) and/or adversely impacts a community's capabilities to provide emergency services.

An air transportation incident may involve a military, commercial, or private aircraft. Air transportation is playing a more prominent role in transportation as a whole. Airplanes, helicopters, and other modes of air transportation are used to transport passengers for business and recreation, as well as thousands of tons of cargo. A variety of circumstances can result in an air transportation incident: mechanical failure, pilot error, enemy attack, terrorism, weather conditions, and on-board fires can all lead to an incident. Statistics from the National Transportation Safety Board and the airline industry show that the majority (over 75%) of airplane crashes and accidents occur during the takeoff or landing phases of a flight.

A highway transportation incident can be single or multi-vehicle requiring responses exceeding normal day-to-day capabilities of response agencies. An extensive surface transportation network exists in Iowa; local residents, travelers, businesses, and industries rely on this network on a daily basis. Hundreds of thousands of trips a day are made on the streets, roads, highways, and interstates in the state; if the designed capacity of the roadway is exceeded, the potential for a major highway incident increases. Weather conditions play a major factor in the ability of traffic to flow safely in and through the state.

Railway incidents may include derailments, collisions, and highway/rail crossing accidents. Train incidents can result from a variety of causes: human error, mechanical failure, faulty signals, and/or problems with the track. Results of an incident can range from minor "track hops" to catastrophic hazardous material incidents and even human/animal casualties. With the many miles of track in Iowa, vehicles must cross the railroad tracks at numerous at-grade crossings.

Waterway incidents will primarily involve pleasure crafts on rivers and lakes. In the event of an incident involving a water vessel, the greatest threat would be drowning, fuel spillage, and/or property damage. Waterway incidents may also include events in which a person, persons, or object falls through the ice on partially frozen bodies of water (Iowa Hazard Mitigation Plan 2010).

Multi-Jurisdictional Hazard Score Calculation – Transportation Incident						
Previous Occurrence?	Likely to Experience?	Probability	Magnitude/Severity	Warning Time	Duration	Weighted Score
Y	Y	2	2	4	2	**2.30**

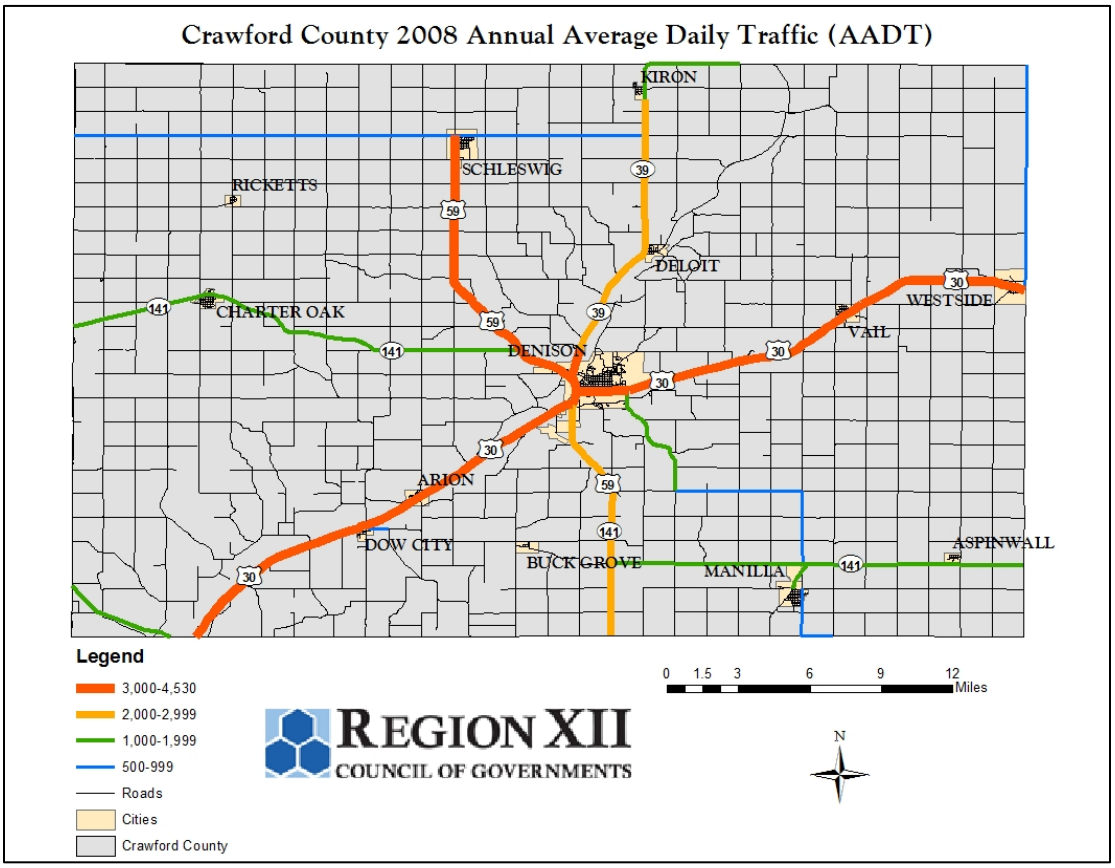
The 2010 IASP classifies airports into five categories: Local Service, Basic Service, General Service, Enhanced Service and Commercial Service. Each system role is defined by a set of criteria based upon current levels of infrastructure and services. Currently there are eight Commercial, fifteen Enhanced, thirty-one General, nineteen Basic and forty-four Local airports within the state.

Crawford County has one general service airport. General Service airports have facilities and services customized to support most general aviation activity, including small to mid-size business jets. The Denison Municipal Airport is owned and operated by the City of Denison. The airport is located approximately two miles southwest of Denison's central business district. The Iowa Aviation System plan 2010-2030 estimates that the Denison Municipal Airport will grow from sixteen based aircraft in 2010 to twenty-one based aircraft in 2030. During the same period, the number of operations will increase from 4,000 to 5,250. As the number of landings and takeoffs increase, so does the probability of a crash or an accident. Currently, Denison Municipal Airport has fifteen single-engine and one multi-engine based aircrafts.

From January 1, 2003 to December 31, 2012, there have been 179 air transportation incidents/accidents in Iowa. One of these incidents/accidents occurred in Crawford County. The incident occurred on August 22, 2003 at 6:25 pm near the City of Westside. The pilot had to conduct an emergency landing in an alfalfa field and suffered minor injuries.

The predominant transportation network in Region XII, as well as in the State of Iowa, is highways and roads. All modes of transportation, including air, rail, trails and transit systems require the use of highways and roads. Map 3.4 shows the major highways and their average annual daily traffic (AADT) in Crawford County. AADT is a measurement providing the average number of vehicles per day on a given roadway segment over a one-year period.

Map 3.4



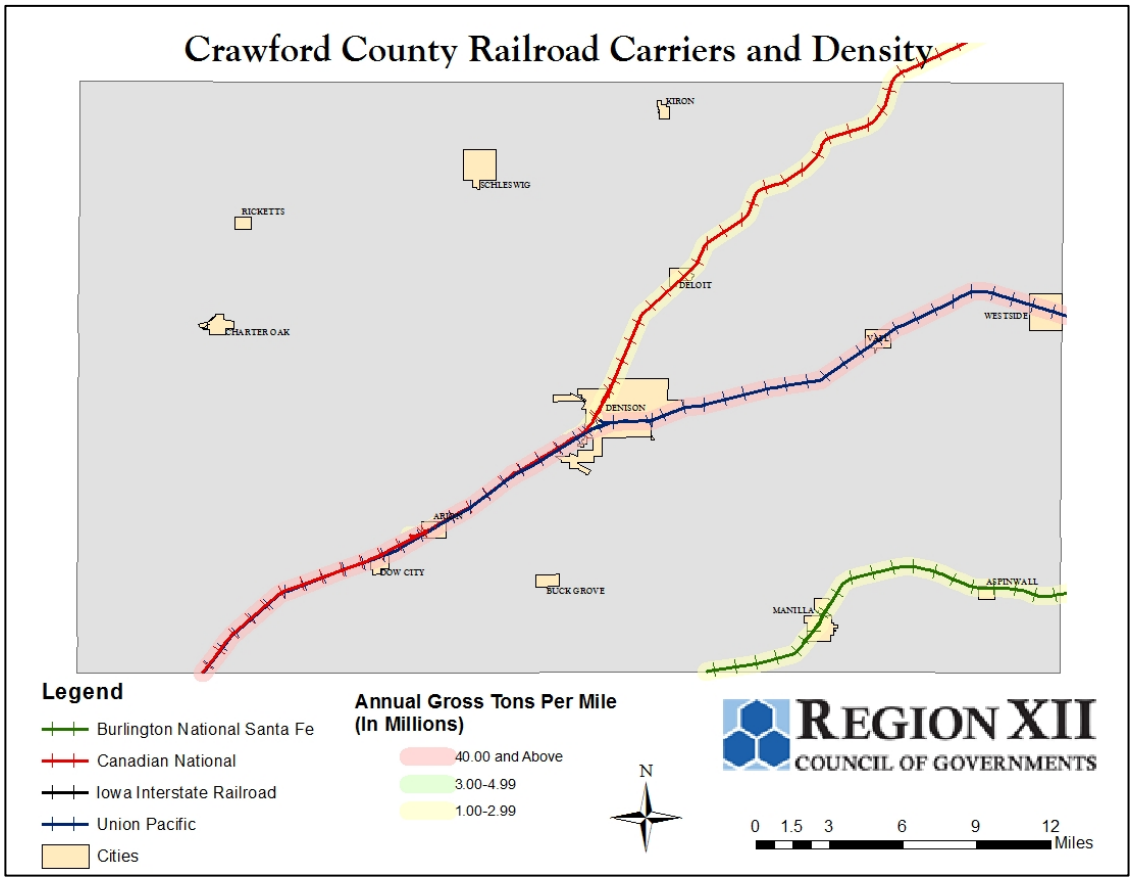
Source: Iowa DOT

From 2001 to 2010, Crawford County had 3,178 traffic accidents. This is the highest number in the region during this time period. These accidents resulted in thirty-five fatalities, 493 injuries, and $14,343,439 in property damages. Crawford County also had the most traffic fatalities in the region during this time period. A majority of the traffic accidents occurred in towns and did not result in a serious highway incident. As the volume of traffic on streets, highways and interstates increase, the number of traffic accidents will increase. The combination of traffic volume, weather conditions, mechanical error and human error creates the potential for a traffic accident.

Railroads are a vital part of Iowa's overall transportation system, helping to move both freight and passengers safely and efficiently. Railroads are critical in moving some of Iowa's commodities, including corn, soybeans, chemicals, motor vehicles, wood and paper products, minerals and ores, coal and biofuels. Maintaining and improving railroad service in Iowa requires a proactive partnership between a number of organizations, including private rail carriers, rail shippers, passengers, the Iowa DOT, other state and federal agencies, and local governments.

Crawford County, being centrally located within western Iowa, lies at the crossroads of rail traffic through Iowa. There are three rail lines that serve Region XII; the Burlington National Santa Fe (BNSF), Canadian National (CN), and Union Pacific (UP). Crawford County is served by Burlington National Santa Fe in the southeast corner, Canadian National from the northeast to southwest corner of the county, and Union Pacific from east-central to the southwest corner of the county. Crawford County had 1,033 thru train movements over a 24-hour period in 2005. On average, 41,147 vehicles within Crawford County crossed railroad tracks daily, with approximately six percent of those being trucks. Map 3.5 below shows the railroad carriers in Crawford County, along with their annual gross tons per mile.

Map 3.5



Even with rail miles decreasing, Iowa's rail traffic has doubled over the last fifteen years and is expected to keep increasing. Iowa ranks eleventh in the country in terms of total rail miles. Rail cars are getting larger and trains are getting longer. In 1990, the majority of trains were twenty-four cars or less; by 1999, the majority of trains increased to fifty to one hundred cars in length. Derailments have declined, as have rail/highway crossing accidents.

Over 37 million rail tons originated in Iowa in 2009, putting Iowa thirteenth in the county. Three commodities dominated Iowa's originations in 2009-food products, farm products, and

chemicals. Iowa led the country in 2009 in originated rail tons of food products at 16,237,000 tons which accounted for 17.7% of the United States' total. Iowa also led the country in rail tons of ethanol, which accounted for 6.1 million of the 7.4 million tons of chemicals originated in Iowa in 2009. Over 40 million rail tons terminated in Iowa in 2009, ranking Iowa seventeenth in the country. Four commodities dominated Iowa's rail terminations in 2009-coal, chemicals, farm products, and food products. Overall, Iowa ranked seventh in the country in terms of rail tons carried (originate, terminate, or passes through).

Rail accidents of all kinds, including derailments and track or equipment failures, have decreased over time. More importantly, crossing accidents involving trains and automobiles have also decreased. This comes at a time when rail traffic is increasing, which means that safety is improving substantially. From 2001 to 2010, Crawford County experienced fifteen rail accidents and four rail-automobile accidents.

There have been no disasters causing waterway incidents in Iowa. There have been numerous search and rescue events involving a single person or small boats with only a few people on board. Small-scale incidents on lakes and rivers have resulted in the loss of life from pleasure craft collisions and/or falls from vessels. Crawford County does not have any navigable waterways for commercial purposes (Iowa Hazard Mitigation Plan 2010).

A number of resources were used in gathering the information used in this chapter. They are as follows: Iowa Hazard Mitigation Plan 2010; 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; and Crawford County Home Health, Hospice and Public Health

Chapter 4 Vulnerability Assessment and Loss Estimates

The final step in the risk assessment is to determine the likely level of losses 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 worksheets distributed at the hazard analysis and risk assessment meeting. The worksheet identified if the 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 scores of the risk assessment were tallied 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 Crawford County and individual jurisdictions in Appendices A through N, varies due to geographical area and jurisdictional representatives' 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.

A structural inventory was completed for the corporate limits of each jurisdiction in Crawford County. Structural inventories were completed to determine the type and number of structures within each jurisdiction. This information is critical to help determine vulnerability and potential losses in each jurisdiction. The structural inventories included the number of units and the value of units. 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.

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, is working on creating new, comprehensive, accurate floodplain maps for Iowa cities and counties. The maps will show the boundaries of flooded areas for the 1 percent annual chance (100-year) and 0.2 percent annual chance (500-year) floods. This is an important development as most of Iowa's communities and counties were last mapped in the 1980s. It is estimated that Crawford County will be mapped by the end of 2013. Due to these new developments, a structural inventory within the 100-year floodplain will be completed in the next plan update. According to Iowa Homeland Security and Emergency Management, there are nine repetitive loss properties in Crawford County, all located within the City of Denison. The nine properties are commercial properties located in the Denison flood hazard area. The results from the structural inventories are discussed in more detail for each jurisdiction in Appendices A through N.

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 and 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 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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 Crawford County is vulnerable to the following hazards:

- Animal/Plant/Crop Disease
- Dam and Levee Failure
- Drought
- Extreme Heat
- Flash Flood
- Grass or Wild Land Fire
- Hailstorm
- Hazardous Material
- Human Disease
- Infrastructure Failure
- Radiological
- River Flooding
- Severe Winter Storms
- Terrorism
- Thunderstorm and Lightning
- Tornado
- Transportation Incident
- Windstorm

Based on the potential impacts of each hazard that is listed above, the vulnerability and loss estimates for each jurisdiction in Crawford County were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 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 no address was listed. 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 jurisdiction 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 vulnerable structures, the number of residents at risk could be calculated.

The following table provides information about maximum building and population exposure for the entire county.

Crawford County			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	4,760	$335,626,280	17,096
Commercial	599	$99,162,550	
Industrial	36	$85,155,170	
Agricultural Structures	1,161	$160,629,410	

The following hazards were determined to have a negligible impact on Crawford County, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the county would be impacted.

Dam and Levee Failure, Drought, River Flooding, and Thunderstorm and Lightning

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	428	$30,206,365	1,539
Commercial	54	$8,924,630	
Industrial	3	$7,663,965	
Agricultural Structures	104	$14,456,647	

The following hazards were determined to have a limited impact on Crawford County, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the county would be impacted.

Animal/Plant/Crop Disease, Extreme Heat, Flash Flood, Grass or Wild Land Fire, Hailstorm, Hazardous Material, Human Disease, Infrastructure Failure, Radiological, Severe Winter Storms, Terrorism, Tornado, Transportation Incident, and Windstorm

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	1,190	$83,906,570	4,274
Commercial	150	$24,790,638	
Industrial	9	$21,288,793	
Agricultural Structures	290	$40,157,353	

Each jurisdiction's vulnerability assessment and loss estimates can be found in Section 4 of their referenced appendix (Appendices A-N).

Chapter 5 Mitigation Strategy

Requirement §201.6(c)(3) states that the plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section shall include:
(i) A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards
(ii) A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard
(iii) An action plan describing how the actions identified in paragraph (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction.
(iv) For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

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. The hazard mitigation plan goals identified are as follows:

- Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards
- Reduce the extent of fatalities and minimize injuries due to the impacts of hazards
- Improve coordination and communication with other relevant organizations and build support for hazard mitigation
- 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 that might 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 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. Committee members were also given copies of their jurisdiction's previous objectives and actions from past hazard mitigation plans. As extensive as the three resources are, they do not prohibit other local ideas for actions to save lives and prevent or reduce damages.

The selected actions were then moved to the next step of feasibility, which is the prioritization of hazard mitigation actions. This step was split into two stages. The first stage was to perform a STAPLEE analysis for each mitigation action. The second stage was to complete and Action Plan. The results of the STAPLEE analysis and Action Plan determined which actions have the highest priority based on the needs of the jurisdiction, benefits of the action, and the likelihood of the action's completion.

STAPLEE Analysis

STAPLEE is an acronym that addresses all the major factors when weighing the relative costs and benefits of implementing one action over another. These factors include the costs, the community's resource capabilities, the community's desires and concerns, and the overall feasibility of the alternative. The committee was asked to consider the questions on the following page for each category when completing the analysis.

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action negatively affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there negative secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

The STAPLEE analysis was scored using a simple scoring system. In each category, for each action, if the action would be considered favorable it would be given a Yes (Y), if negative or less favorable a No (N) was given, and a Maybe (M) for a neutral rating. If the question was not applicable, then it was given a N/A. The scores were then tallied after answering each question for all of the mitigation actions. The maximum possible score is 23. The chart for the STAPLEE analysis is shown on the following page.

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**

Tallying the scoring of the STAPLEE is done by adding one point to every "Yes" answer and subtracting one point for every "No" answer. If jurisdictions gave a "Maybe" or "N/A" answer, no points were added or subtracted for that question. The questions that are shaded in red are questions that received opposite scoring, meaning a "Yes" answer subtracted one point and a "No" answer added one point. Each jurisdiction's hazard mitigation STAPLEE results are displayed in Section 5 of their referenced appendix (Appendices A-N).

Action Plan

The Action Plan is developed using a combination of the STAPLEE, disaster history, previous mitigation efforts, description of the mitigation action, the hazards addressed by each action, 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 combined in an easy to reference chart for future projects. An example of the chart is shown on the following page. Each jurisdiction's hazard mitigation Action Plan is displayed in Section 5 of their referenced appendix (Appendices A-N)

Action	
Hazards Addressed	
Priority	
Responsible Department	
Estimated Cost	
Potential Funding Source	
Mitigation Measure Category	
Target Completion Date	

Estimated costs for each action is 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:

- 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:

- 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
- Shatter-resistant glass
- 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:

- Outreach projects that provide hazard information to the public, business owners 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.

Examples:

- 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:

- 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.

Examples:

- Dams
- Levees
- Floodwalls
- Retaining walls
- Safe rooms
- Reservoirs to store drinking water
- Diversion of storm water

Chapter 6 Plan Maintenance and Adoption

This chapter provides an overview of the overall strategy for plan maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

Monitoring, Evaluating, and Updating Plan

Hazard Mitigation Planning Committee

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 Crawford County Multi-Jurisdictional Hazard Mitigation Plan. The Crawford 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 Crawford 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 compromised 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 Crawford 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.

The plan will be updated within five years if it is found during the evaluation process that the plan has become outdated. The Emergency Management Commission will be responsible for initiating and approving the hazard mitigation plan update process.

Procedures and Techniques for Future Reviews and Updates

Task A. Evaluate the effectiveness of the planning process

1. Reconvene the planning team
2. Review planning process and discuss:
    a. Building the planning team
    b. Engaging the public
    c. Data gathering and analysis
    d. Coordinating with other agencies

Task B. Evaluate the effectiveness of the mitigation actions

1. What were the results of the implemented action? Did the results achieve the goals/objectives outlined in the plan? Did the actions have the intended results?
2. Were the actions cost-effective? Did, or would, the project result in the reduction of potential losses?
3. Document actions that were slow to start, or not implemented.

Task C. Determine why actions did or did not work. Possible reasons are, but are not limited to:

1. Lack of available resources
2. The political or popular support for, or against the action
3. The availability of outside funding
4. The workloads of the responsible parties
5. The actual time necessary to implement the actions

Incorporation into Other Planning Mechanisms

Where possible, Crawford County and all incorporated cities, 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
- Crawford County Comprehensive Plan
- Crawford County Code of Ordinances
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

Continued Public Involvement

The update process provides an opportunity to publicize success stories from the plan's implementation and seek additional public comment. A public hearing(s) to receive public comment on the plan maintenance and updating will be held during the time that the plan is going through the update process. When the Crawford County Emergency Management Commission reconvenes for the update, it will coordinate with all the members participating in the planning process, including those who joined the Crawford County Emergency Management Commission after the initial effort, to update and revise the plan. Public notice will be posted and public participation will be invited, at a minimum, through available posting sources and

press releases to local media outlets.

Resolution No. 78

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CRAWFORD COUNTY BOARD OF SUPERVISORS ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, IA has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division; and

Whereas, all meetings of the Crawford County Planning Committee were open to the public; and

Whereas, the municipalities within Crawford County that participated in the multi-jurisdictional plan process will each pass their own resolutions to approve and adopt the plan.

NOW THEREFORE BE IT RESOLVED, that the Crawford County Board of Supervisors herewith adopts said plan, incorporating citizen comment and recommendation.

PASSED AND ADOPTED THIS 16TH DAY OF JULY 2013.

Chairperson

Supervisors:

Appendix A: Unincorporated Crawford County

Section 1: Community Profile

Crawford County History

Crawford County was named for William H. Crawford, a senator from Georgia and the United States Secretary of Treasury from 1817-1825 under President Monroe. The county was created in 1854 and organized in 1855. The first railway arrived in Crawford County in 1867. The railroad greatly improved transportation and access to markets and thus affected the settlement and development of the entire county.

Geography and Environment

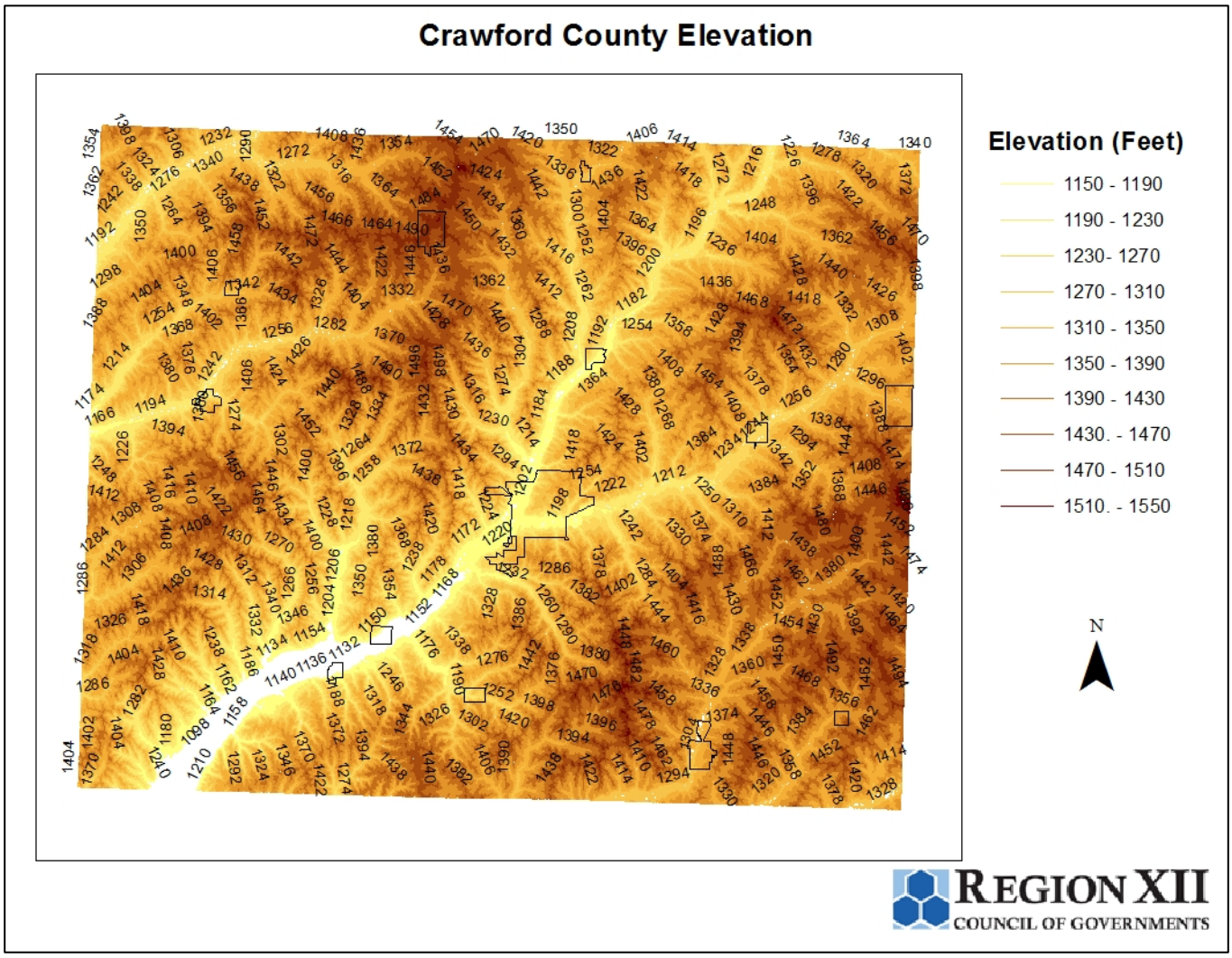
Location

Crawford County is located in west central Iowa. Carroll, Shelby, Harrison, Monona, Ida and Sac Counties are bordering counties. The main highways in Crawford County include Highway 30 passing through Westside, Vail, Denison, Arion and Buck Grove; Highway 59 passing through Schleswig and Denison; Highway 141 located just south of Aspinwall and passing through Denison and Charter Oak; and Highway 39 passing through Kiron, Deloit and Denison. Denison is the county seat and is located in the center of the county. The dimensions of the county are approximately 29.91 miles by 23.93 miles, with a total area of 714 square miles. The county has thirteen incorporated communities located within its borders: Arion, Aspinwall, Buck Grove, Charter Oak, Deloit, Denison, Dow City, Kiron, Manilla, Ricketts, Schleswig, Vail and Westside.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The lowest points in Crawford County can be found along the Boyer River. Here the elevation dips to 1,132 feet. The following map displays the elevation distribution of Crawford County.

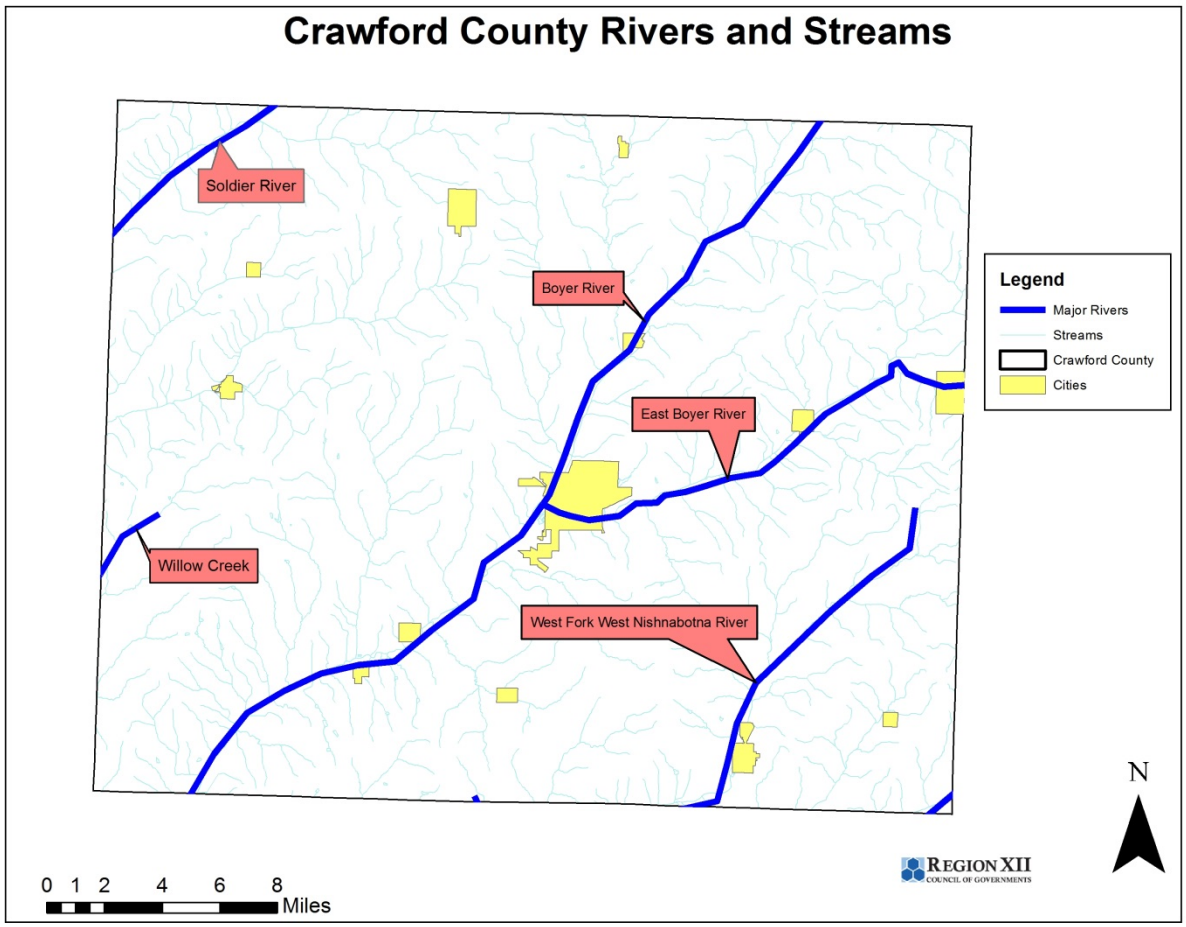
Map 1



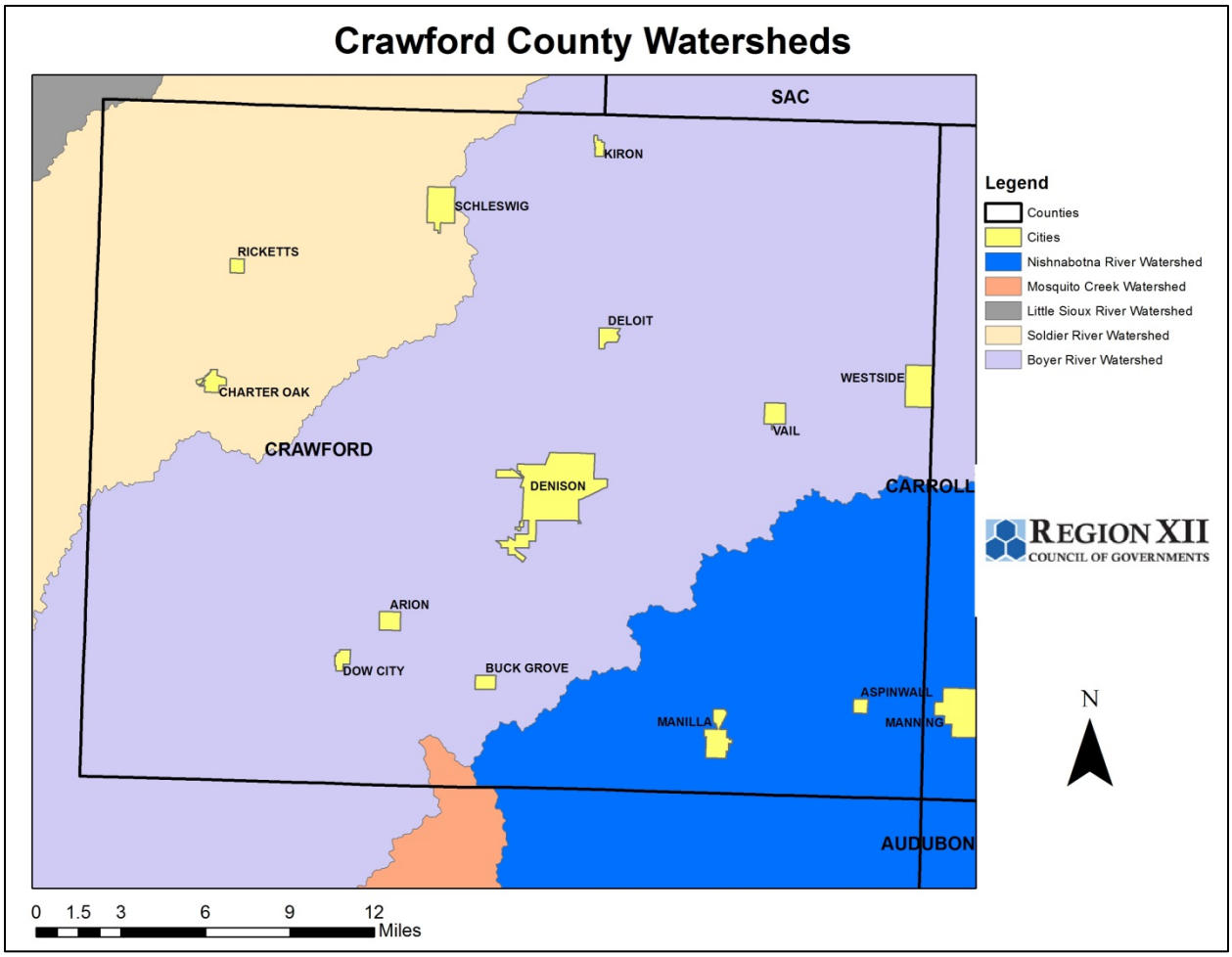
Rivers, Streams and Watersheds

There are a number of major rivers located in Crawford County. Map 2 displays the major rivers and streams located in Crawford County. Map 3 on page A-4 shows the local watersheds of Crawford County. Crawford County is located in five watersheds, with the Soldier, Boyer and Nishnabotna watersheds being dominant.

Map 2


Crawford County Rivers and Streams
Soldier River
Boyer River
East Boyer River
Willow Creek
West Fork West Nishnabotna River
Legend
Major Rivers
Streams
Crawford County
Cities
N
0 1 2 4 6 8
Miles
REGION XII
COUNCIL OF GOVERNMENTS

Map 3



Source: Iowa Department of Natural Resources

Demographics

Population

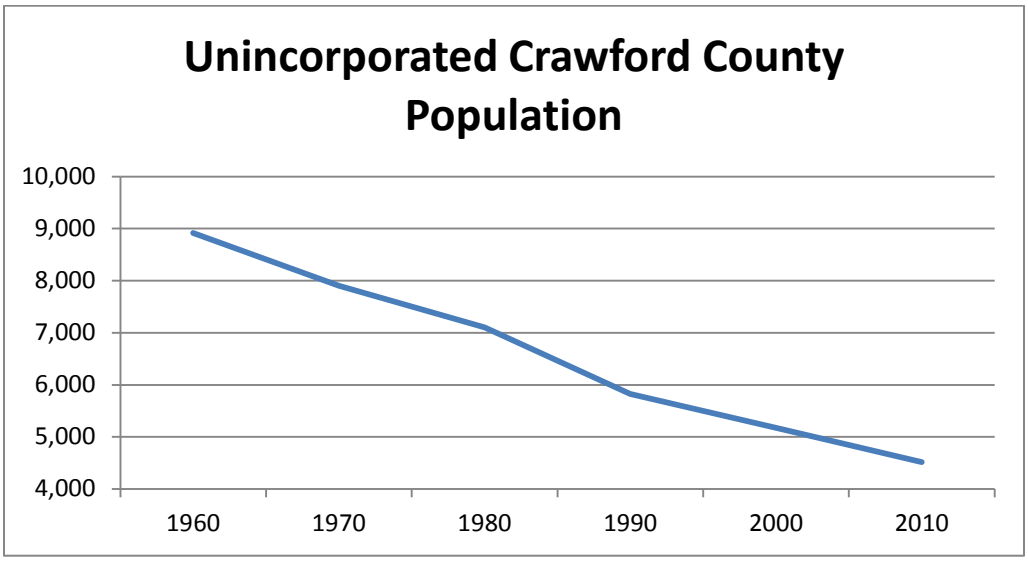
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Crawford County's population through the past, present and future trends of the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

The size and composition of a county's population can exert influence on its development. For instance, 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. 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 education attainment are some of the

characteristics that mold a community. 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.

Over the past fifty years, the population of unincorporated Crawford County has declined every census from 8,917 residents in 1960 to 4,514 residents in 2010. Between 1980 and 1990, the largest population decline of 1,275 occurred. Figure 1 below displays the historic population trend for unincorporated Crawford County.

Figure 1



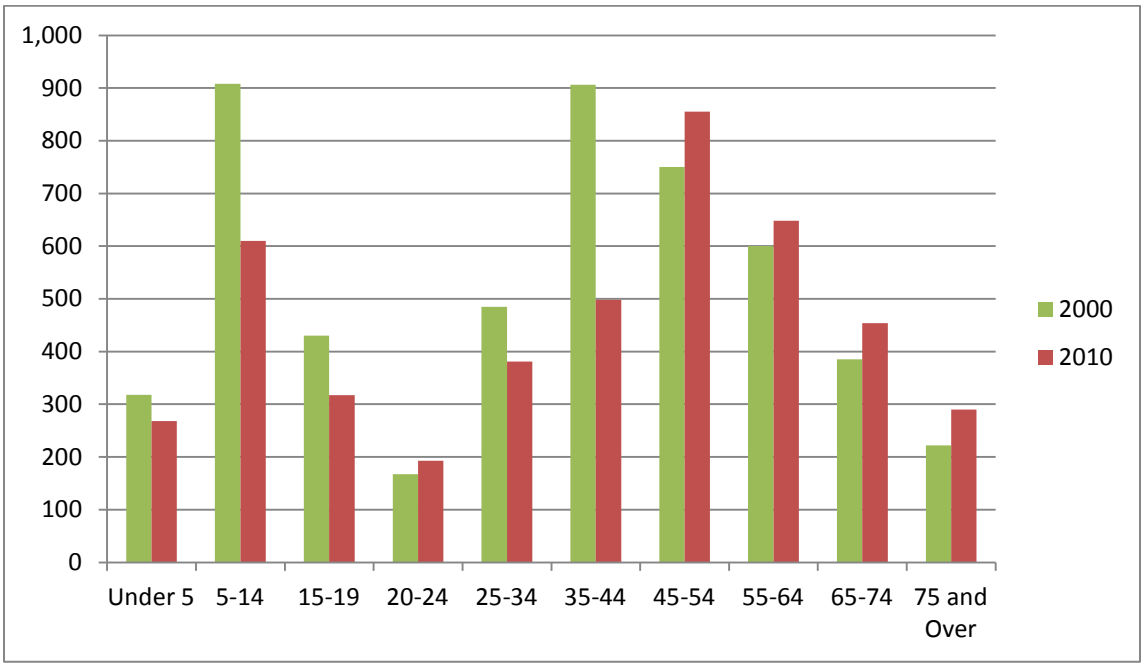
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for unincorporated Crawford County from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 35-44 age cohort, which lost 408 individuals. Other significant losses came in the 5-14 (-298), 25-34 (-104) and 15-24 (-87) age groups. A significant increase in population was seen in the 45-54 (105) age group.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 35-44 age cohort in 2000 would be in the 45-54 age cohort in 2010. Therefore, the 35-44 ago cohort from 2000 only lost fifty-one individuals, a much smaller total than in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa counties. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as “brain drain.”

Figure 2

Unincorporated Crawford County Age Distribution



Source: US Census Bureau

Housing

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

The number of occupied housing units, along with the total number of housing units, decreased over the last ten years in unincorporated Crawford County. Although the number of occupied housing units decreased, the percentage remained nearly the same, only decreasing by .4 percent. The vacancy rate went from 8.7 percent in 2000 to 9.1 percent in 2010. Table 1 shows the housing trends for unincorporated Crawford County from 2000 to 2010.

Table 1

Unincorporated Crawford County Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	1,864	91.3%	1,757	90.9%
Owner Occupied	1,423	76.3%	1,428	81.3%
Renter Occupied	441	23.7%	329	18.7%
Vacant Housing Units	177	8.7%	175	9.1%
Total Housing Units	2,041	100.0%	1,932	100.0%

Source: US Census Bureau

Nearly twenty percent of the housing units in unincorporated Crawford County are valued at less than $50,000. This is over ten percent lower than the average for Crawford County. Table 2 below displays the value of housing units in unincorporated Crawford County in 2012.

Table 2

Value of Unincorporated Crawford County Housing Units

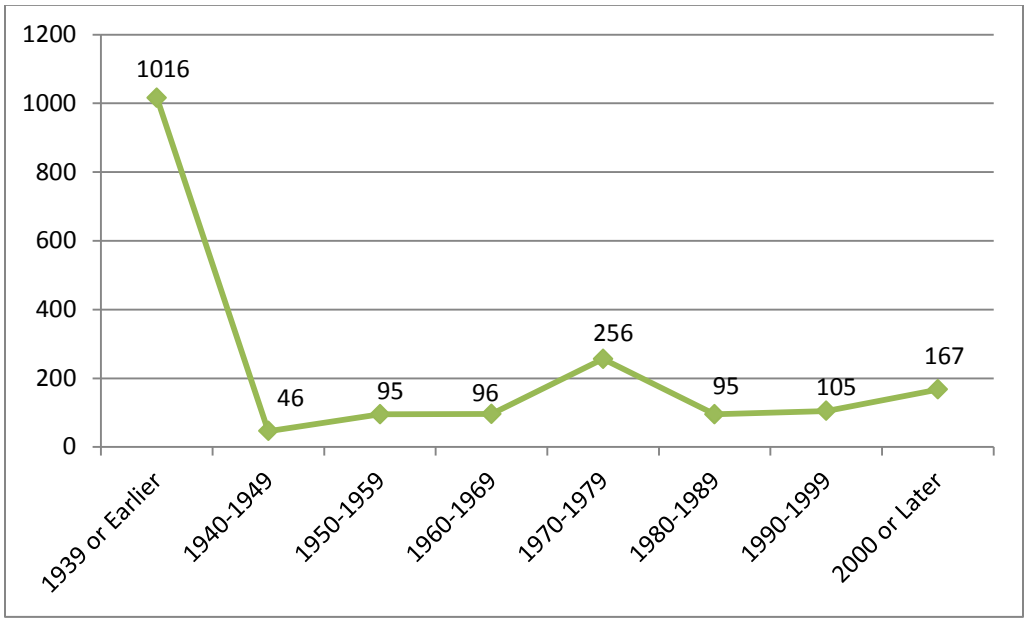
Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	366	19.5%
$50,000-$99,999	714	38.1%
$100,000-$149,999	472	25.2%
$150,000-$199,999	183	9.7%
$200,000-$299,999	118	6.3%
$300,000 and above	23	1.2%

Source: Crawford County Housing Reports, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Nearly half of the current housing stock in Crawford County was constructed prior to 1940. Ten percent of homes have been constructed since 1990. Figure 3 shows the distribution of housing unit construction in Crawford County.

Figure 3

Year Housing Unit Constructed



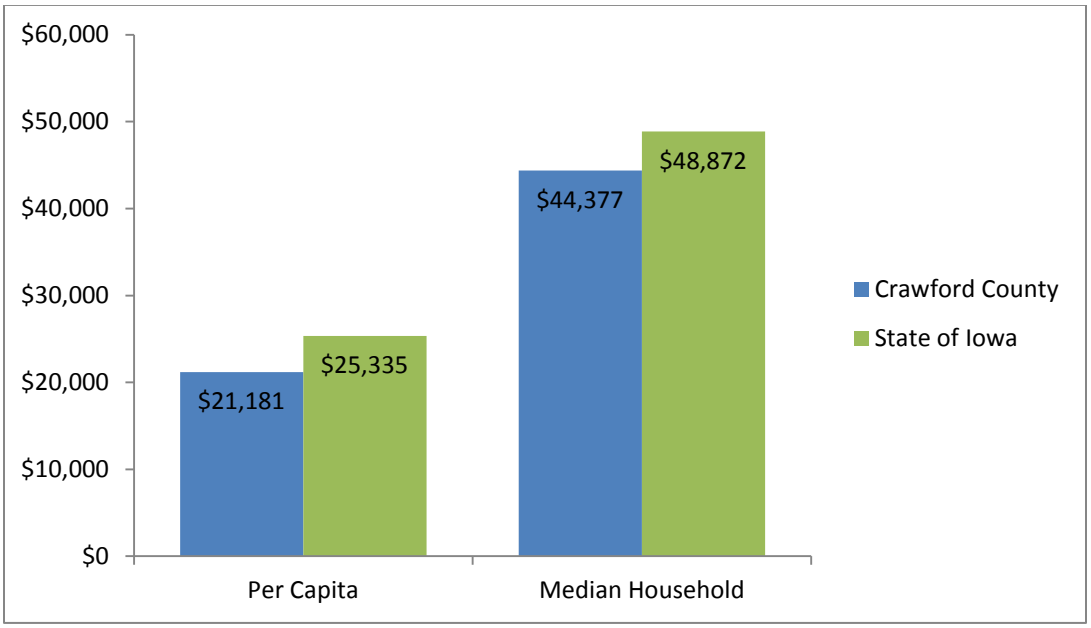
Source: Crawford County Housing Report, October 2012

Economic

An important indicator of the economic base in Crawford County is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 4 on the following page shows that the incomes of those living in Crawford County are lower than the state average. The average per capita personal income in Crawford for the 2006-2010 American Community Survey 5-Year estimate was $4,154 less than the average for the State of Iowa. The median household income in Crawford County for the same time period trailed that of the state by $4,495 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Crawford County.

Figure 4
Income



Source: 2006-2010 American Community Survey 5-Year Survey

The largest income group in unincorporated Crawford County, according to the American Community Survey, included the $50,000-$74,999 (21.9%), followed by the $75,000-$99,999 (16.8%) and $35,000-$49,999 (16.6%) income groups. Slightly over twenty percent of households in unincorporated Crawford County make less than $25,000 and thirty-two percent of households have an income of $75,000 or more. Table 3 below shows a breakdown of household income in unincorporated Crawford County.

Table 3

Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	103	6.0%
$10,000-$14,999	49	2.8%
$15,000-$24,999	201	11.6%
$25,000-$34,999	152	8.8%
$35,000-$49,999	287	16.6%
$50,000-$74,999	378	21.9%
$75,000-$99,999	291	16.8%
$100,000-$149,999	157	9.1%
$150,000-$199,999	59	3.4%
$200,000 or more	51	3.0%

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Educational Services, and Health Care and Social Assistance (19.3%), Agriculture, Forestry, Fishing and Hunting, and Mining (15.7%), and Retail Trade (13.2%). These percentages are based on the total number of individuals 16 years and older that are from unincorporated Crawford County and are employed.

Table 4

Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	390	15.7%
Construction	154	6.2%
Manufacturing	214	8.6%
Wholesale Trade	106	4.3%
Retail Trade	327	13.2%
Transportation and Warehousing, and Utilities	195	7.8%
Information	12	0.5%
Finance and Insurance, and Real Estates and Rental and Leasing	98	3.9%
Professional, Scientific, and Management, and Administrative and Waste Management Services	111	4.5%
Educational Services, and Health Care and Social Assistance	479	19.3%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	144	5.8%
Other Services, except Public Administration	209	8.4%
Public Administration	47	1.9%
Civilian Employed Population 16 years and over	2,486	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Changes in Development

Rural Crawford County has seen limited growth since the last plan update. Limited development has occurred primarily with construction of rural residential structures and ag buildings.

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for Crawford County.

Table 5
Current Planning and Regulatory Documents for Crawford County

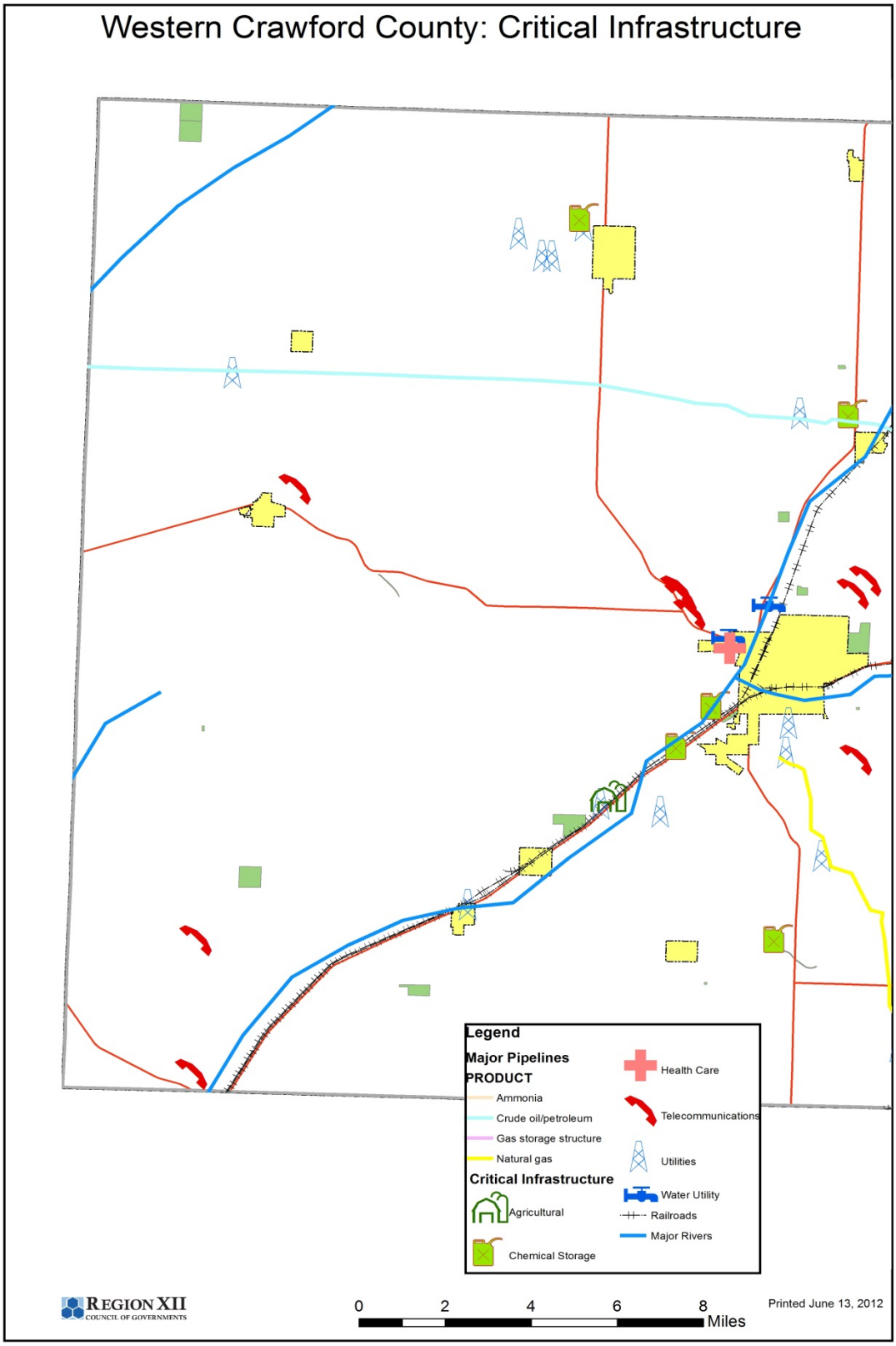
Document	Yes/No	Year
Previous HMP	Yes	2006
Comprehensive Plan	No	-
Building Code	Yes	2010
Zoning Ordinance	Yes	2002
Strategic Plan	Yes	1996
Housing Assessment	Yes	1999
NFIP Participant	Yes	1986

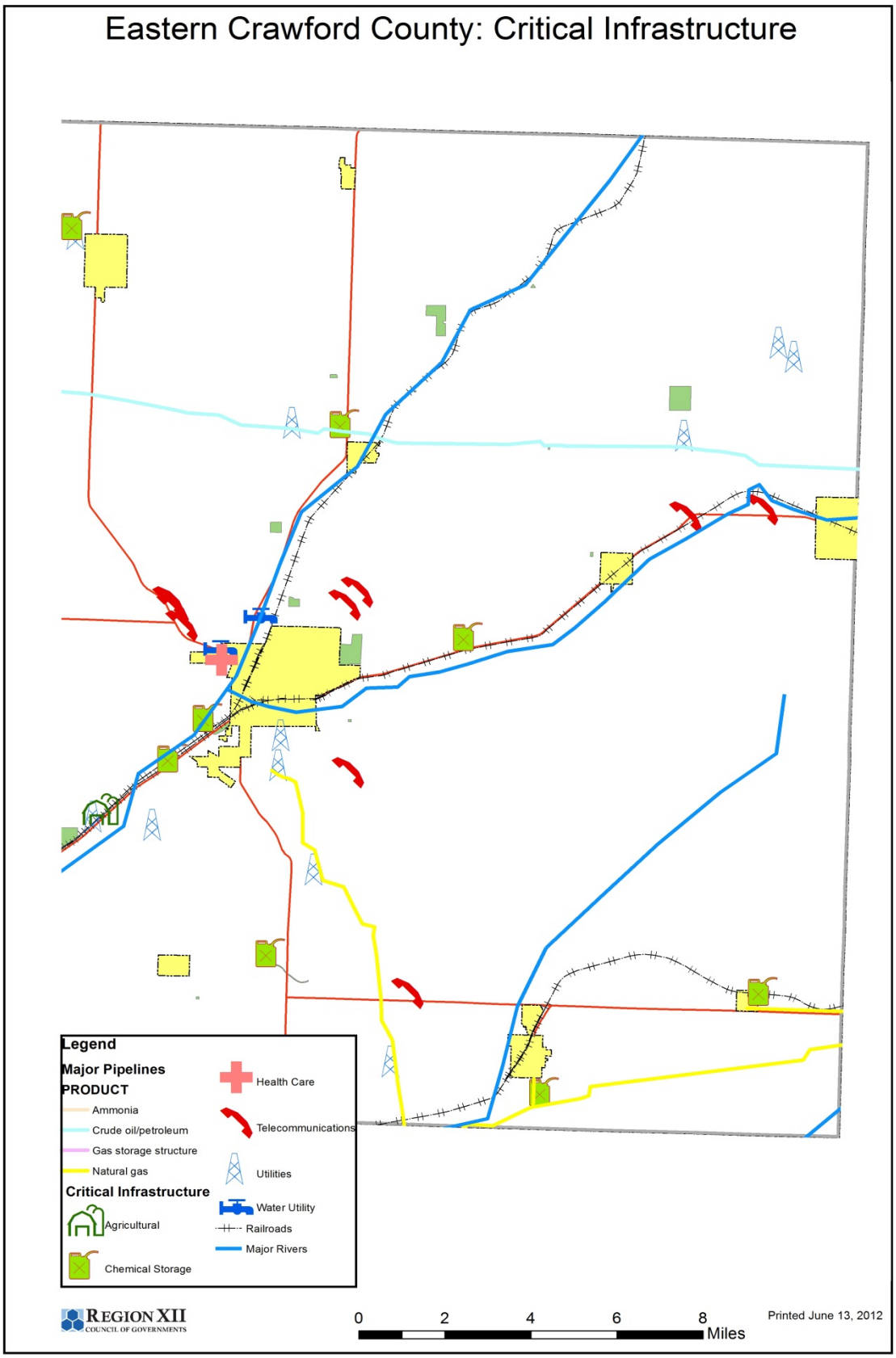
Section 2: Critical Facilities

The following facilities were identified as critical facilities for unincorporated Crawford County. They are identified on Map 4

- Power Substations
- Mid-American Utilities
- Mid-American Substations
- US Cellular Tower
- Verizon Cellular Towers
- IBP
- State of Iowa (DOT) Telecommunications
- Crawford County Telecommunications
- Jeff's Ag Service
- Agri Land FS
- Pioneer
- City of Denison Water Well Field
- City of Denison Rural Water Pumping Station
- Amaizing Energy
- Star Energy
- Black Hills
- Boyer Valley APC
- MAAPCO
- Northern Natural Gas
- Aspinwall Co-Op
- Crawford County Hospital

Map 4


Western Crawford County: Critical Infrastructure
Legend
Major Pipelines
PRODUCT
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Critical Infrastructure
Agricultural
Chemical Storage
Health Care
Telecommunications
Utilities
Water Utility
Railroads
Major Rivers
REGION XII
COUNCIL OF GOVERNMENTS
0 2 4 6 8
Miles
Printed June 13, 2012


Eastern Crawford County: Critical Infrastructure
Legend
Major Pipelines
PRODUCT
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Critical Infrastructure
Agricultural
Chemical Storage
Health Care
Telecommunications
Utilities
Water Utility
Railroads
Major Rivers
REGION XII
COUNCIL OF GOVERNMENTS
0 2 4 6 8
Miles
Printed June 13, 2012

Section 3: Risk Assessment

The following table lists the overall results of the Hazard Analysis that the committee members for Crawford County completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Unincorporated Crawford County Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Thunderstorm and Lightning	Y	Y	4	2	4	2	3.20
Tornado	Y	Y	4	2	4	2	3.20
Infrastructure Failure	Y	Y	3	3	4	3	3.15
River Flooding	Y	Y	4	1	4	4	3.10
Windstorm	Y	Y	4	1	4	3	3.00
Grass or Wild Land Fire	Y	Y	4	1	4	2	2.90
Hailstorm	Y	Y	4	1	4	2	2.90
Flash Flood	Y	Y	3	2	4	3	2.85
Severe Winter Storms	Y	Y	3	2	3	4	2.80
Dam and Levee Failure	Y	Y	3	2	4	2	2.75
Transportation Incident	Y	Y	3	2	4	2	2.75
Extreme Heat	Y	Y	4	1	1	3	2.55
Hazardous Material	Y	Y	2	2	4	4	2.50
Human Disease	Y	Y	2	2	4	4	2.50
Drought	Y	Y	3	1	1	4	2.20
Animal/Plant/Crop Disease	Y	Y	2	2	2	4	2.20
Radiological	N	Y	1	2	4	4	2.05
Terrorism	N	N	1	2	4	2	1.85

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for unincorporated Crawford County were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the unincorporated county.

Unincorporated Crawford County			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	737	$66,332,010	4,514
Commercial	45	$5,369,010	
Industrial	13	$66,761,900	
Agricultural Structures	1,138	$158,487,850	

The following hazards were determined to have a negligible impact on unincorporated Crawford County, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the unincorporated county would be impacted.

Drought, Extreme Heat, Grass or Wild Land Fire, Hailstorm, River Flooding, Windstorm

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	66	$5,969,881	406
Commercial	44	$483,213	
Industrial	1	$6,008,571	
Agricultural Structures	102	$14,263,907	

The following hazards were determined to have a limited impact on unincorporated Crawford County, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the unincorporated County would be impacted.

Dam and Levee Failure, Flash Flood, Severe Winter Storms, Thunderstorm and Lightning, Tornado, Animal/Plant/Crop Disease, Hazardous Material, Human Disease, Radiological, Terrorism, Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	184	$16,583,003	1,129
Commercial	11	$1,342,258	
Industrial	3	$16,690,475	
Agricultural Structures	285	$39,621,963	

The following hazards were determined to have a critical impact on unincorporated Crawford County, were they to occur. A shutdown of some facilities and services could last for at least two weeks and some injuries/illness will result in permanent disability. It is estimated that 50% of the unincorporated County would be impacted.

Infrastructure Failure

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	369	$33,166,005	2,257
Commercial	23	$2,684,515	
Industrial	7	$33,380,950	
Agricultural Structures	569	$79,243,925	

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

Objective 1: Increase Security

Action 1.1: More lighting around critical facilities

Action 1.2: Acquire surveillance equipment

Objective 2: Robust, Harden Infrastructure

Action 2.1: Continue to work with utilities on burying lines

Action 2.2: Berms around power stations

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

Objective 3: Improve Public Warning Capabilities

Action 3.1: Increase testing of current systems

Action 3.2: Create an override for cable, NOAA weather radios and cell phones

Goal: Improve coordination and communication with other relevant organization and build support for hazard mitigation

Objective 4: Increase communication coverage

Action 4.1: Add tower sites

Action 4.2: Increase system redundancy

Action 4.3: Work with local fire departments, sheriff, police departments, and road department on education

Goal: Maintain and support public safety facilities, including equipment and training

Objective 5: Increase Funding Sources for Equipment and Training

Action 5.1: Maintain and acquire equipment and provide training

Objective 6: Backup Power for Outlying Communities

Action 6.1: Work with communities to provide backup power for shelters

Crawford County completed a previous hazard mitigation plan in 2006. Changes in development, progress in local mitigation efforts, and changes in priority have resulted in new goals, objectives and actions. The table on the following page displays the status of the previous actions. Any action marked as ongoing or future was carried over to be included in this plan.

Table 8

Crawford County Previous Mitigation Actions

Crawford County	**Status**				
Previous Actions (2006)	**Complete**	**Underway**	**Ongoing**	**Future**	**Canceled**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills			X		
Upgrade all city warning sirens county to be remote activated		X			
Increase the usage of NOAA radios			X		
Work with cities to construct storm shelters as needed throughout the County			X		
Replace and maintain snow removal equipment as necessary			X		
Complete grade control structure upstream from the Union Pacific Railroad Bridge	X				
Rehabilitate concrete weir structure between the South Main Street Bridge and the Donna Reed Bridge	X				
Complete necessary levee studies of East Boyer River	X				
Construct East Boyer River Levee	X				
Complete storm sewer system upgrades	X				
Implement a storm water utilities				X	
Continue NFIP participation and follow NFIP policies	X				
Provide firefighters, law enforcement and EMS departments with adequate training and equipment	X				
Develop city evacuation plans and a county evacuation plan			X		
Continue fire and emergency response training			X		
Initiate fire prevention program			X		
Reduce water usage			X		
Construct new water tower					X
Develop a contingency plan if water supply is diminished or contaminated			X		
Attend training for terrorism when offered			X		
Post signs and increase police surveillance around critical facilities			X		

Evaluate city facilities and identify potential terrorist targets			X		

*Previous mitigation actions that have been cancelled due to the lack of relevance.

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for Unincorporated Crawford County. Table 10 displays the STAPLEE evaluation criteria.

Table 9

Unincorporated Crawford County STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Add tower sites	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	Y	N/A	N/A	Y	Y	**19**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Continue to work with utilities on burying lines	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	**17**
Increase system redundancy	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**16**
Continue fire and emergency response training	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Increase testing of current systems	Y	N	Y	Y	N	Y	N/A	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**15**

Create override for Cable, NOAA weather radios and cell phones	Y	N	Y	Y	N	Y	N/A	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**15**

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Replace and maintain snow removal equipment as necessary	Y	N	Y	Y	N	Y	Y	Y	N	Y	M	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**15**
Initiate fire prevention program	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N/A	N/A	Y	Y	**15**
Reduce water usage	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	M	Y	Y	M	Y	M	Y	Y	Y	Y	N	Y	Y	**14**
Acquire surveillance equipment	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	N/A	N/A	N/A	N/A	N/A	**12**
Work with local fire departments, sheriff, police departments and road department on education	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	N/A	N/A	N/A	N/A	N/A	**12**
Berms around power stations	Y	N	Y	Y	N	N	N	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	**11**
Increase the usage of NOAA radios	Y	N	Y	Y	N	Y	N	N/A	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N/A	N/A	N/A	N/A	N/A	**11**
Implement a storm water utilities	Y	N	Y	Y	M	N	N	Y	Y	Y	Y	Y	Y	M	Y	Y	Y	Y	M	M	N/A	Y	Y	**11**
More lighting for security around critical facilities	Y	N	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	N/A	N/A	N/A	N/A	N/A	**10**
Attend training for terrorism when offered	Y	N	Y	N	N	Y	N	Y	Y	N	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**10**
Develop a contingency plan if water supply is diminished or contaminated	Y	N	Y	Y	N	Y	N	N	Y	N	Y	Y	Y	N	Y	N	Y	Y	Y	N	N	Y	Y	**9**

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Add tower sites	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	Y	N/A	N/A	Y	Y	**19**
Maintain and acquire equipment and provide training	Y	N	Y	Y	N	N	N	N	Y	N	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**8**
Work with cities to construct storm shelters as needed throughout the county	Y	N	Y	Y	N	N	N	Y	Y	Y	Y	Y	M	N	N	Y	N	Y	N	N	N/A	Y	Y	**7**
Work with communities to provide backup power for shelters	Y	N	Y	Y	N	N	N	N	Y	N	Y	Y	Y	N	Y	N	Y	Y	N/A	N/A	N/A	N/A	N/A	**6**
Evaluate city facilities and identify potential terrorist targets	Y	N	Y	N	N	Y	N	N	Y	N	Y	Y	Y	N	Y	N	N	N	N/A	N/A	N/A	N/A	N/A	**6**
Develop city evacuation plans and a county evacuation plan	Y	N	Y	Y	Y	M	M	Y	Y	Y	Y	Y	Y	M	N	N	N	Y	N/A	N/A	N/A	N/A	N/A	**5**

Table 10

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action negatively affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there negative secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. Crawford County outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 11 displays all of the mitigation actions for Crawford County with their implementation strategy.

Table 11

Crawford County Action Plan

Add Tower Sites	
Hazards Addressed	Infrastructure Failure
Priority	High
Previous Priority	Not Previously Ranked
Responsible Department	EMA, Sheriff, County E911
Estimated Cost	Moderate
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Educate Citizens about Summer Storms via Public Information Announcements through the Local Media or by Notices on Utility Bils	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Thunderstorm and Lightning
Priority	High
Previous Priority	High
Responsible Department	County Emergency Management
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Continue to Work with Utilities on Burying Lines	
Hazards Addressed	Infrastructure Failure, Tornado, Windstorm, Thunderstorm and Lightning
Priority	High
Previous Priority	Not Previously Ranked
Responsible Department	EMA, Utility
Estimated Cost	High
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Structural Project
Target Completion Date	Long

Increase System Redundancy	
Hazards Addressed	Infrastructure Failure
Priority	High
Previous Priority	Not Previously Ranked
Responsible Department	County E911, EMA
Estimated Cost	Moderate
Potential Funding Source	Local, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Continue Fire and Emergency Response Training	
Hazards Addressed	All
Priority	High
Previous Priority	High
Responsible Department	Fire Department, EMA
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Increase Testing of Current Systems	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Ranked
Responsible Department	EMA, Sheriff
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Create Override for Cable, NOAA Weather Radios and Cell Phones	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Ranked
Responsible Department	EMA
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Replace and Maintain Snow Removal Equipment as necessary	
Hazards Addressed	Severe Winter Storms
Priority	High
Previous Priority	High
Responsible Department	Public Works, Secondary Roads
Estimated Cost	Moderate
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Initiate Fire Prevention Program	
Hazards Addressed	Extreme Heat, Drought, Infrastructure Failure, Grass or Wild Land Fire
Priority	High
Previous Priority	High
Responsible Department	Fire Department, EMA
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Reduce Water Usage	
Hazards Addressed	Drought
Priority	High
Previous Priority	High
Responsible Department	Fire Department, Public Works
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Natural Resource Protection
Target Completion Date	Ongoing

Acquire Surveillance Equipment	
Hazards Addressed	Terrorism
Priority	Medium
Previous Priority	Not Previously Ranked
Responsible Department	Sheriff
Estimated Cost	Low
Potential Funding Source	Local, State
Mitigation Measure Category	Property Protection
Target Completion Date	Short

Work with Local Fire Departments, Sheriff, Police Departments and Road Department on Education	
Hazards Addressed	All
Priority	Medium
Previous Priority	Not Previously Ranked
Responsible Department	EMA
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Berms around Power Stations	
Hazards Addressed	Flash Flood, River Flooding, Infrastructure Failure
Priority	High
Previous Priority	Not Previously Ranked
Responsible Department	Utility, ALOE
Estimated Cost	High
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Structural Project
Target Completion Date	Long

Increase the Usage of NOAA Radios	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms Thunderstorm and Lightning
Priority	High
Previous Priority	High
Responsible Department	County Emergency Management
Estimated Cost	Low
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Implement a Storm Water Utilities	
Hazards Addressed	Flash Flood, Infrastructure Failure
Priority	Medium
Previous Priority	Not Previously Ranked
Responsible Department	Public Works
Estimated Cost	Moderate
Potential Funding Source	Local, State
Mitigation Measure Category	Structural Project
Target Completion Date	Long

More Lighting for Security around Critical Facilities	
Hazards Addressed	Terrorism, Transportation Incident
Priority	High
Previous Priority	Not Previously Ranked
Responsible Department	Utility
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Short

Attend Training for Terrorism when offered	
Hazards Addressed	Terrorism
Priority	High
Previous Priority	High
Responsible Department	Law Enforcement
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Develop a Contingency Plan if Water Supply is Diminished or Contaminated	
Hazards Addressed	Drought, Extreme Heat, Hazardous Material
Priority	High
Previous Priority	High
Responsible Department	Public Works, EMA
Estimated Cost	Moderate
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Natural Resource Protection
Target Completion Date	Short

Maintain and Acquire Fire Equipment and Provide Training	
Hazards Addressed	All
Priority	Medium
Previous Priority	Medium
Responsible Department	Fire Department, First Responders, Police Department
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Mid

Work with Cities to Construct Storm Shelters as needed Throughout the County	
Hazards Addressed	River Flooding, Severe Winter Storms, Dam and Levee Failure, Hazardous Material, Terrorism, Radiological
Priority	High
Previous Priority	High
Responsible Department	Public Works
Estimated Cost	Moderate
Potential Funding Source	State, Federal
Mitigation Measure Category	Structural Project
Target Completion Date	Long

Work with Communities to Provide Backup Power for Shelters	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Previous Priority
Responsible Department	EMA, County Board of Supervisors
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Prevention
Target Completion Date	Mid

Evaluate City Facilities and Identify Potential Terrorist Targets	
Hazards Addressed	Terrorism
Priority	High
Previous Priority	High
Responsible Department	Law Enforcement
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Continue NFIP Participation and Follow NFIP Policies by Enforcing Floodplain Management Ordinance	
Hazards Addressed	Flooding
Priority	High
Previous Priority	High
Responsible Department	Board of Supervisors, EMA and Zoning Administrator
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Develop City Evacuation Plans and a County Evacuation Plan	
Hazards Addressed	Grass or Wild Land Fire, River Flooding, Dam and Levee Failure, Hazardous Material, Terrorism, Radiological
Priority	High
Previous Priority	High
Responsible Department	City Councils, County Emergency Management
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Long

Incorporation into Other Planning Mechanisms

Where possible, Crawford County 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:

- Crawford County Zoning Ordinances
- Crawford County Comprehensive Plan
- Crawford County Code of Ordinances
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

Resolution No. 28

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CRAWFORD COUNTY BOARD OF SUPERVISORS ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, IA has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division; and

Whereas, all meetings of the Crawford County Planning Committee were open to the public; and

Whereas, the municipalities within Crawford County that participated in the multi-jurisdictional plan process will each pass their own resolutions to approve and adopt the plan.

NOW THEREFORE BE IT RESOLVED, that the Crawford County Board of Supervisors herewith adopts said plan, incorporating citizen comment and recommendation.

PASSED AND ADOPTED THIS 16TH DAY OF JULY 2013.

Chairperson

Supervisors:

Appendix B: City of Arion

Section 1: Community Profile

City of Arion History

Arion was named for the poet and cithara player of Lesbos of ancient Greek history. This is supposed to be one of the myth names for the Grecian god Apollo. One of the main factors in Arion's development was the railroad. By February 1888, a railroad crossing where the Milwaukee crossed the Northwestern was being called Arion. In 1899, the Illinois Central Railroad was laid through Arion, joining the Milwaukee and Northwestern railroads. Due to the three railroads that ran through Arion, hotels were in great demand to accommodate all the travelers. Arion was officially incorporated in 1894. Arion's post office was established on July 2, 1888. The city water system was installed in 1905. Arion was the second town in Crawford County furnished with electricity by Iowa Public Service. The Arion school system was originally part of the Union Township school system, but became an independent district on August 1, 1910. Today students are bused to Dow City for grade school and Dunlap for high school.

Arion had several large fires in its history, destroying many historical buildings. On October 11, 1909, a fire destroyed the Arion Mercantile Company building along with some other business houses. In 1921 a fire took out an entire row of buildings extending from the post office to Greens' hotel; these buildings were never replaced. The Star Restaurant built in 1909, later remodeled as a parsonage and library, burnt down in 1985.

Geography and Environment

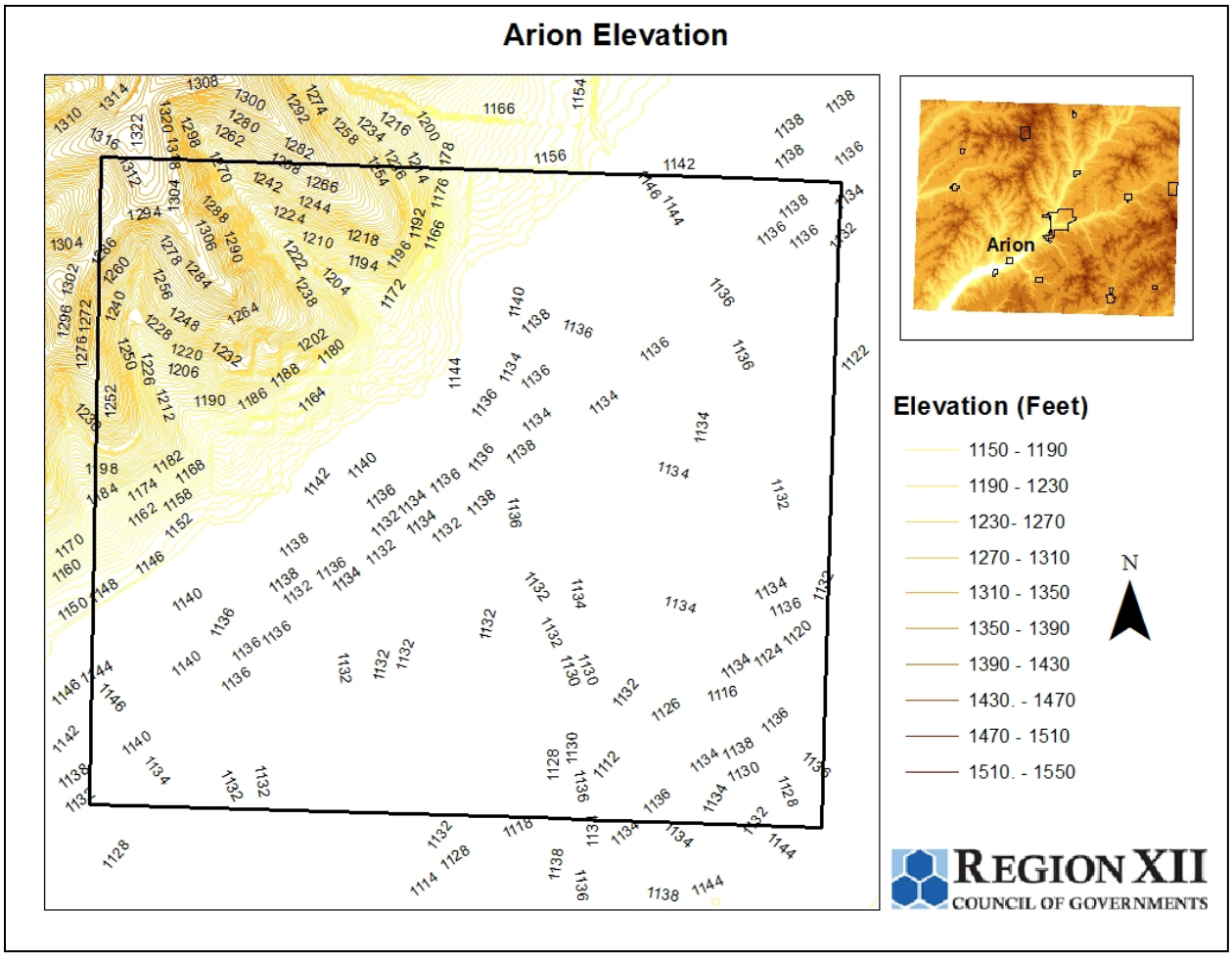
Location

Arion is located in southwestern Crawford County. US Highway 30 runs through the southern portion of the community. Arion is located 8 miles southeast of Denison, 32 miles northwest from Harlan, 66 miles northeast from Omaha, and 199 miles northwest from Des Moines.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The northwest corner of Arion reaches 1,312 feet while the rest of the community hovers around 1,136 feet. The following map shows the elevation of Arion and its relation to the rest of Crawford County.

Map 1



Demographics

Population

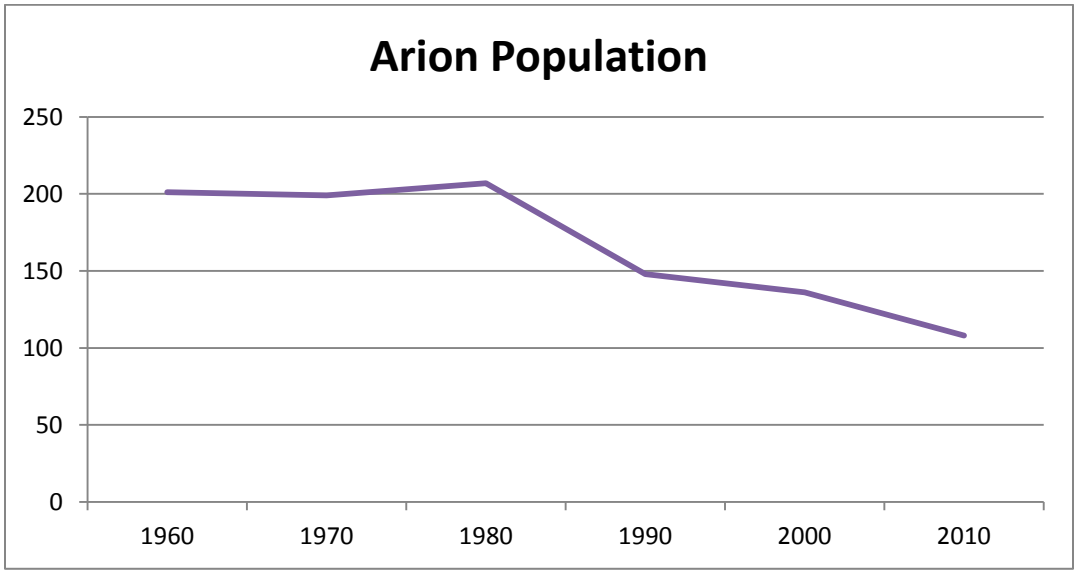
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Arion's population through the past, present and future trends of the region.

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 education 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 fifty years, the population of Arion has declined from 201 residents in 1960 to 108 residents in 2010, a loss of 93 individuals. The 1980 Census saw a small spike in population from 199 residents in 1970 to 207 residents. Figure 1 below displays the historic population trend for Arion.

Figure 1

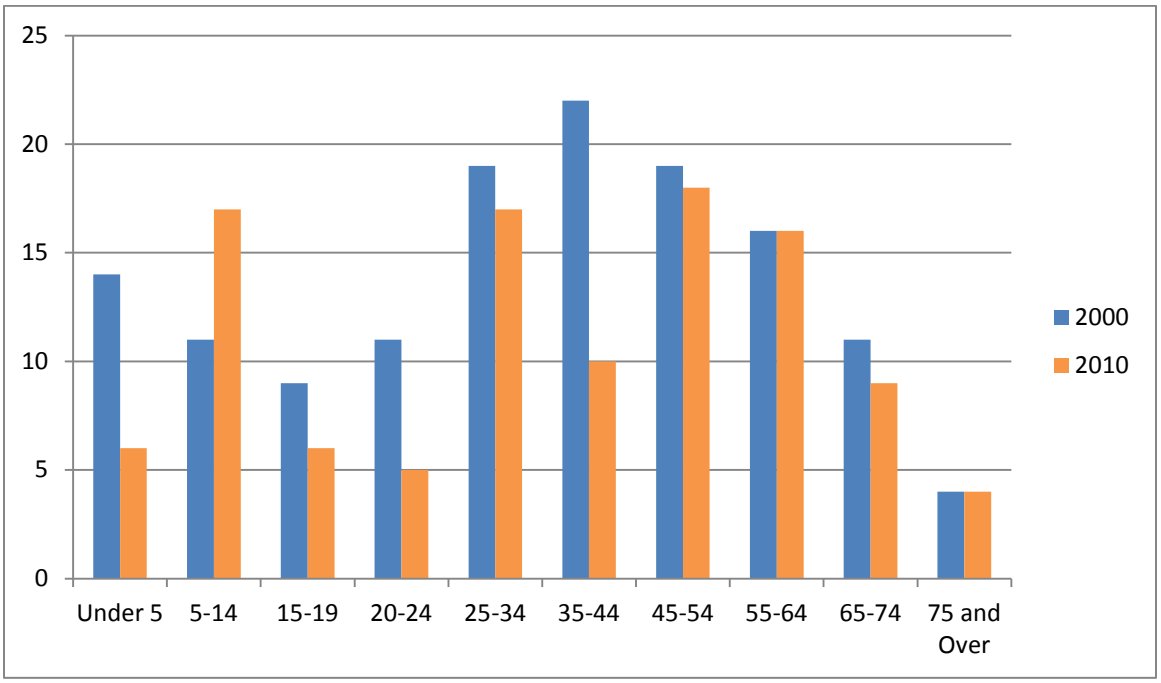


Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Arion from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 35-44 age cohort, which lost twelve individuals. Other significant losses came in the under 5 (-8) and 20-24 (-6) age groups. An increase in population was only seen in the 5-14 (6) age group.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 35-44 age cohort in 2000 would be in the 45-54 age cohort in 2010. Therefore, the 35-44 ago cohort from 2000 only lost four individuals, a much smaller total than in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as “brain drain.”

Figure 2
Arion Age Distribution, 2000 & 2010



Source: US Census Bureau

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.

The number of occupied housing units, along with the total number of housing units, decreased over the last ten years in Arion. The occupancy rate in 2010 decreased by slightly more than two percent from 2000. Historically, Arion has consisted of mostly owner-occupied housing units and this trend continued in 2010 as nearly 84 percent of occupied housing units were owner-occupied. The vacancy rate went from 8.2 percent in 2000 to 10.4 percent in 2010. Table 1 shows the housing trends for Arion from 2000 to 2010.

Table 1

Arion Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	56	91.8%	43	89.6%
Owner Occupied	47	83.9%	36	83.7%
Renter Occupied	9	16.1%	7	16.3%
Vacant Housing Units	5	8.2%	5	10.4%
Total Housing Units	61	100.0%	48	100.0%

Source: US Census Bureau

All of the housing units in Arion are valued at less than $50,000. The median value of owner-occupied units in Arion was $24,175 in 2012. These homes are likely to be aging and in need of revitalization. Due to this, these homes are susceptible to hazards such as fires, serious storms and other weather related hazards. Since the population has been declining, it will be important to invest in the rehabilitation of existing housing. This will improve the safety of homes and reduce their susceptibility to numerous hazards. Table 2 below displays the value of housing units in Arion in 2012.

Table 2

Value of Arion Housing Units, 2012

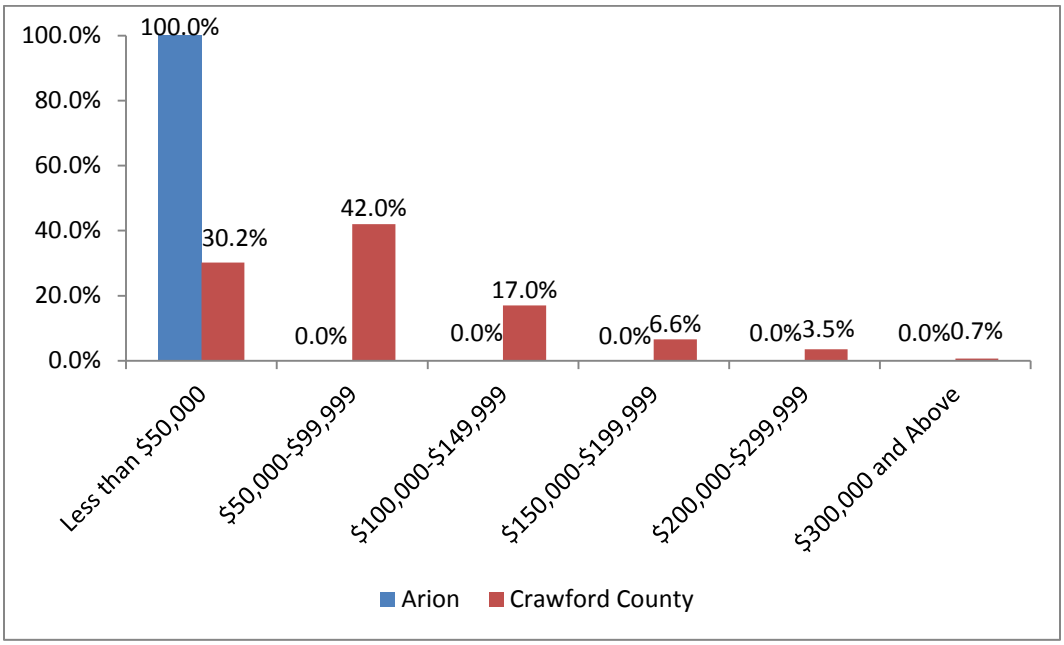
Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	46	100%
$50,000-$99,999	0	0.0%
$100,000-$149,999	0	0.0%
$150,000-$199,999	0	0.0%
$200,000-$299,999	0	0.0%
$300,000 and above	0	0.0%
Median Value	$24,175	-

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Arion to Crawford County. Figure 3 shows that Arion has a disproportionate percentage of housing units valued at less than $50,000, even when compared to Crawford County.

Figure 3

Value of Housing Units

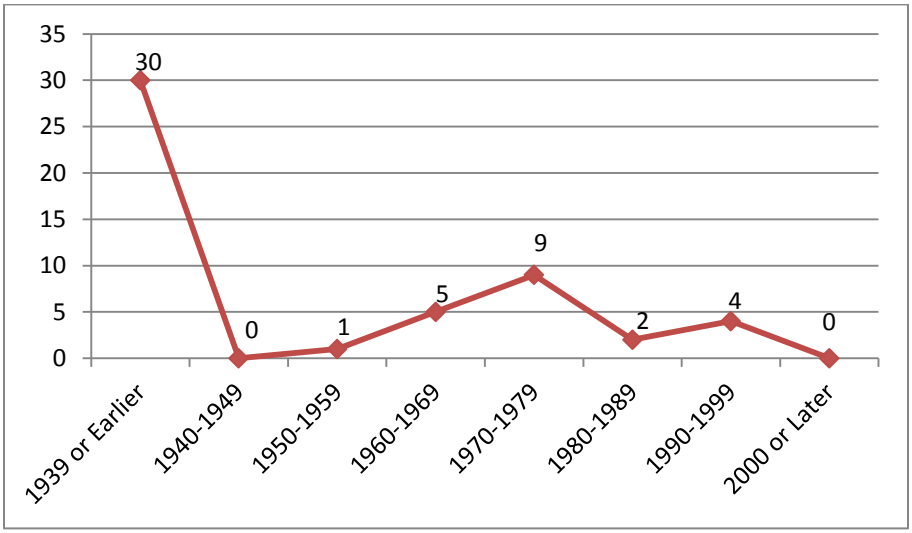


Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Nearly sixty percent of the current housing stock in Arion was constructed prior to 1940. Housing construction has slowed down considerably since then, but saw a significant increase between 1970 and 1979. Eight percent of homes have been constructed since 1990. Figure 4 shows the distribution of housing unit construction in Arion.

Figure 4

Year Housing Unit Constructed



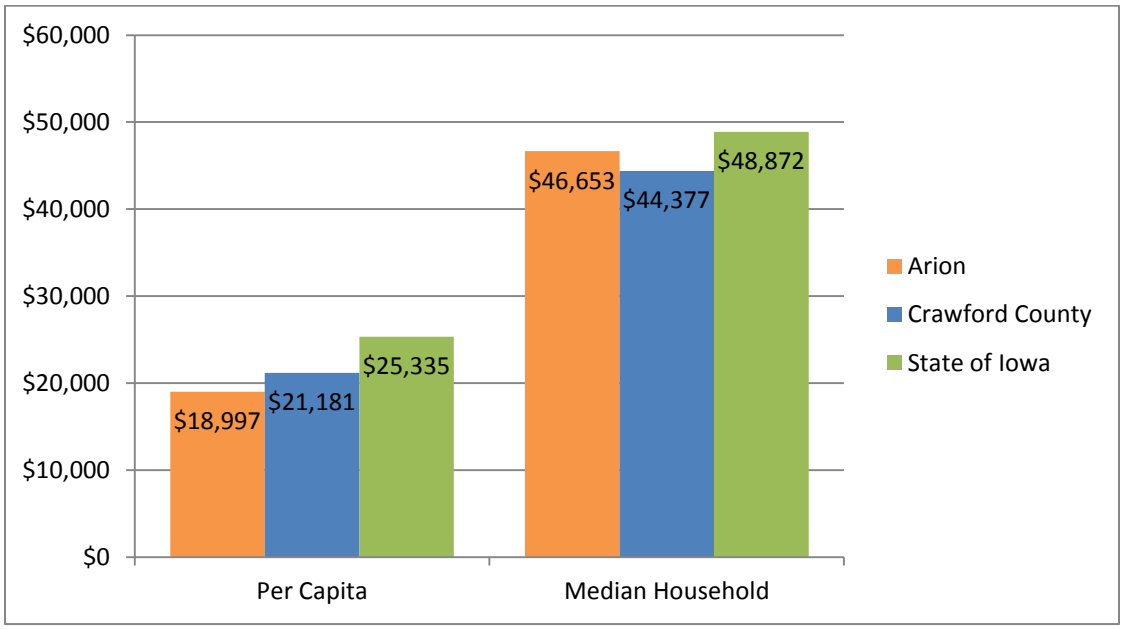
Source: Crawford County Housing Report, 2012

Economic

An important indicator of the economic base in Arion is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 below shows that the median household incomes of those living in Arion are higher than Crawford County's average but lower than the state average. The average median household income in Arion for the 2006-2010 American Community Survey 5-Year estimate was $2,276 greater per year than Crawford County's average and $2,219 less than the average for the State of Iowa. The per capita income in Arion for the same time period trailed that of Crawford County by $2,184 per year and the state by $6,338 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Arion.

Figure 5
Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Arion, according to the American Community Survey, included the $25,000-$34,999 (33.3%) and $50,000-$74,999 (33.3%) income groups. Twenty percent of households in Arion make less than $25,000 and ten percent of households have an income over $75,000. Table 3 on the following page shows a breakdown of household income in Arion.

Table 3

Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	0	0.0%
$10,000-$14,999	0	0.0%
$15,000-$24,999	6	20%
$25,000-$34,999	10	33.3%
$35,000-$49,999	1	3.3%
$50,000-$74,999	10	33.3%
$75,000-$99,999	0	0.0%
$100,000-$149,999	3	10.0%
$150,000-$199,999	0	0.0%
$200,000 or more	0	0.0%
Median Household Income	$31,250	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Arion is typical of many smaller rural Iowa cities due to its dependence on regional employment opportunities. Many residents are required to commute to surrounding communities such as Denison and Harlan. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Manufacturing (37.5%), Educational Services, and Health Care and Social Assistance (21.9%), and Arts, Entertainment, and Recreation, and Accommodation and Food Services (12.5%). These percentages are based on the total number of individuals 16 years and older that are from Arion and are employed.

Table 4

Employment by Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	0	0.0%
Construction	0	0.0%
Manufacturing	12	37.5%
Wholesale Trade	0	0.0%
Retail Trade	0	0.0%
Transportation and Warehousing, and Utilities	3	9.4%
Information	1	3.1%
Finance and Insurance, and Real Estates and Rental and Leasing	0	0.0%
Professional, Scientific, and Management, and Administrative and Waste Management Services	2	6.3%
Educational Services, and Health Care and Social Assistance	7	21.9%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	4	12.5%
Other Services, except Public Administration	3	9.4%
Public Administration	0	0.0%
Civilian Employed Population 16 years and over	32	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Arion.

Table 5

Current Planning and Regulatory Documents for the City of Arion

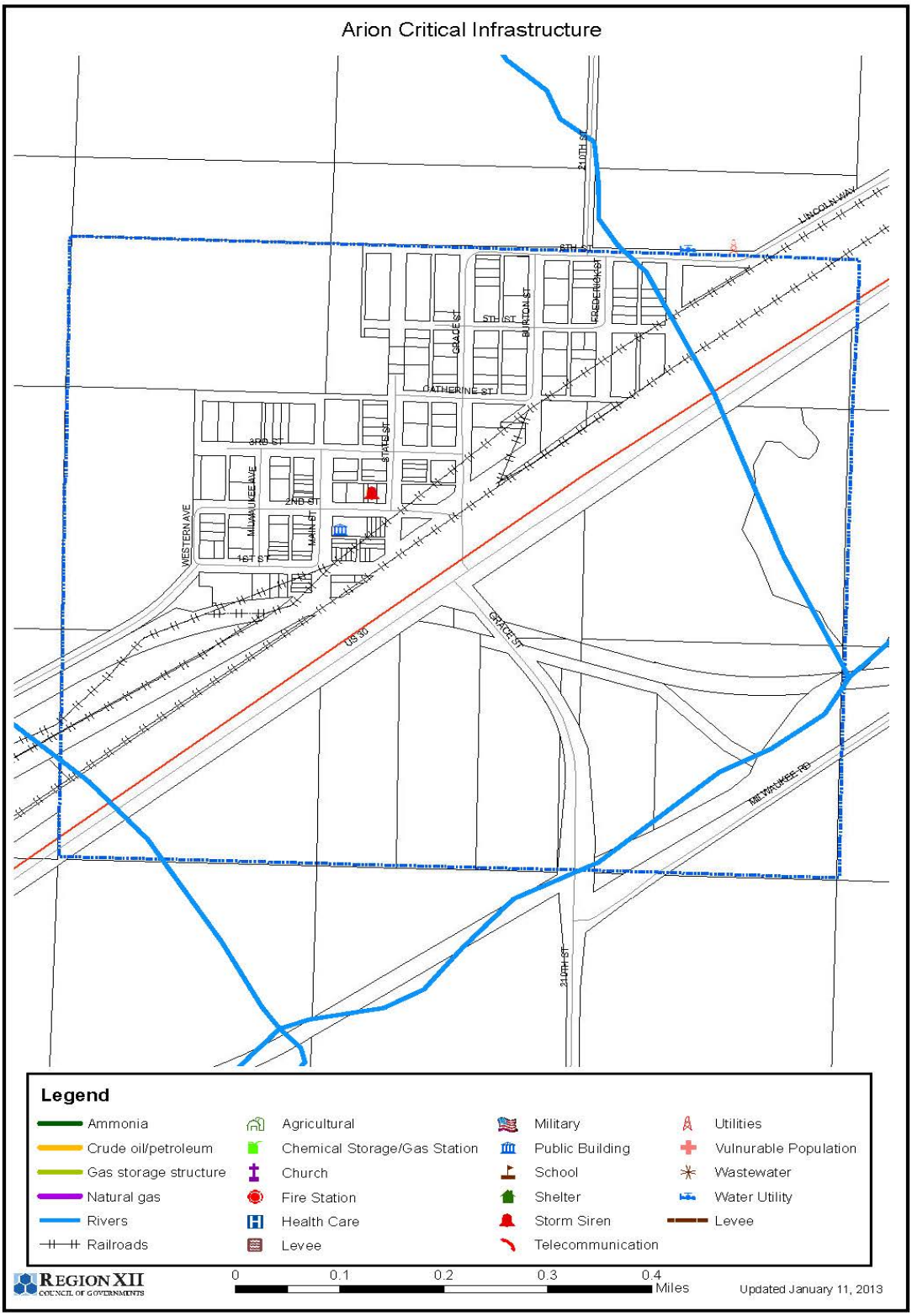
Document	Yes/No	Year
Previous HMP	No	-
Comprehensive Plan	No	-
Building Code	No	-
Zoning Ordinance	Yes	
Strategic Plan	No	-
Housing Assessment	Yes	1999
NFIP Participant	Yes	2011

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Arion. They are identified on Map 2

- City Hall
- Storm Siren
- Rural Water
- Natural Gas

Map 2


Arion Critical Infrastructure
LINCOLN HWY
5TH ST
GRADE ST
BURTON ST
FREDERICK ST
CATHERINE ST
3RD ST
STATE ST
2ND ST
MAIN ST
1ST ST
MILWAUKEE AVE
WESTERN AVE
US 30
GRADE ST
MILWAUKEE RD
210TH ST
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0
0.1
0.2
0.3
0.4
Miles
Updated January 11, 2013

Section 3: Risk Assessment

The following table lists the overall results of the Hazard Analysis that the committee member for Arion completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Arion Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Hazardous Material	N	Y	2	2	4	3	2.40
Radiological	N	Y	2	2	4	3	2.40
Thunderstorm and Lightning	Y	Y	3	1	4	1	2.35
Transportation Incident	N	Y	2	2	4	2	2.30
Windstorm	Y	Y	2	1	4	3	2.10
Animal/Plant/Crop Disease	N	Y	2	2	1	4	2.05
Severe Winter Storms	Y	Y	2	1	3	4	2.05
Drought	Y	Y	2	1	2	4	1.90
Hailstorm	Y	Y	2	1	4	1	1.90
Extreme Heat	Y	Y	2	1	2	3	1.80
Infrastructure Failure	N	Y	1	2	3	3	1.80
River Flooding	N	Y	1	1	4	4	1.75
Tornado	N	Y	1	2	4	1	1.75
Flash Flood	Y	Y	1	1	4	3	1.65
Human Disease	N	N	1	1	3	3	1.50
Dam and Levee Failure	N	N	1	1	4	1	1.45
Grass or Wild Land Fire	Y	Y	1	1	4	1	1.45
Terrorism	N	N	1	1	4	1	1.45

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Arion were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Arion.

Arion			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	54	$1,277,570	108
Commercial	7	$82,120	
Industrial	0	$0	
Agricultural Structures	1	$850	

The following hazards were determined to have a negligible impact on the City of Arion, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Dam and Levee Failure, Drought, Extreme Heat, Flash Flood, Grass or Wild Land Fire, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning, Windstorm, Human Disease, and Terrorism

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	5	$114,981	10
Commercial	1	$7,391	
Industrial	0	$0	
Agricultural Structures	0	$0	

The following hazards were determined to have a limited impact on the City of Arion, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Tornado, Animal/Plant/Crop Disease, Hazardous Material, Infrastructure Failure, Radiological and Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	14	$319,393	27
Commercial	2	$20,530	
Industrial	0	$0	
Agricultural Structures	0	$0	

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

Objective 1: Improve Safety

Action 1.1: Tree trimming

Action 1.2: Purchase a backup generator

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

Objective 2: Improve Public Warning Plan

Action 2.1: Educate people on warnings

Objective 3: Improve Warning Devices

Action 3.1: Purchase an additional siren

Goal: Maintain and support public safety facilities, including equipment and training

Objective 4: Increase Public Awareness

Action 4.1: Establish alert systems for people

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for the City of Arion. Table 9 displays the STAPLEE evaluation criteria.

Table 8

Arion STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Purchase an Additional Siren	Y	N	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N/A	N/A		Y	**15**
Purchase a Backup Generator	Y	N	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**
Establish Alert Systems for People	Y	N	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**
Tree Trimming	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	N	N	Y	Y	**11**
Educate People on Hazard Warnings	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	N/A	N/A	N/A	N/A	N/A	**10**

Table 9

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Arion outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 10 displays all of the mitigation actions for Arion with their implementation strategy.

Table 10

Arion Action Plan

Purchase an Additional Siren	
Hazards Addressed	Tornado
Priority	High
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Purchase a Backup Generator	
Hazards Addressed	Infrastructure Failure
Priority	High
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Establish Alert Systems for People	
Hazards Addressed	All
Priority	High
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Tree Trimming	
Hazards Addressed	Tornado, Windstorm, Severe Winter Storms, Thunderstorm and Lightning
Priority	High
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Educate People on Warnings	
Hazards Addressed	All
Priority	High
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Continue NFIP Participation and Follow NFIP Policies by Enforcing Floodplain Management Ordinance	
Hazards Addressed	Flash Flood, River Flooding
Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Resolution No. 28 A

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CITY OF ARION ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the City of Arion participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the City of Arion adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 6 **DAY OF** November **, 2013.**

Kenneth A Beem
Mayor

ATTEST:

Shirley J. Caldwell
City Clerk

Appendix C: City of Aspinwall

Section 1: Community Profile

City of Aspinwall History

While it is not known how Aspinwall received its name, there are several possible explanations. The first is that early settlers looked to the north and saw a mile long stretch of aspen trees and reflected a "wall" of aspen trees, thereby giving the settlers an idea to call the town Aspinwall. A second possibility is that the town was named in honor of a railroad official or local people working closely with the railroad companies. This was not an uncommon experience as many of the towns that sprang up with the arrival of the railroad were named after someone associated with the railroad.

Aspinwall was founded through the arrival of the Chicago, Milwaukee and St. Paul Railroad. Aspinwall was platted August 21, 1882 and within two years it was a thriving community of 300. There were at least eighteen businesses, which included a hotel and three general stores. By August of 1886, the list of businesses had grown to more than twenty; however, within the next year Aspinwall lost 75% of its businesses and the population began to decrease.

This history of Aspinwall was extracted from their centennial book *A Little Bit of Paradise. Aspinwall, Iowa;* published in 1992.

Geography and Environment

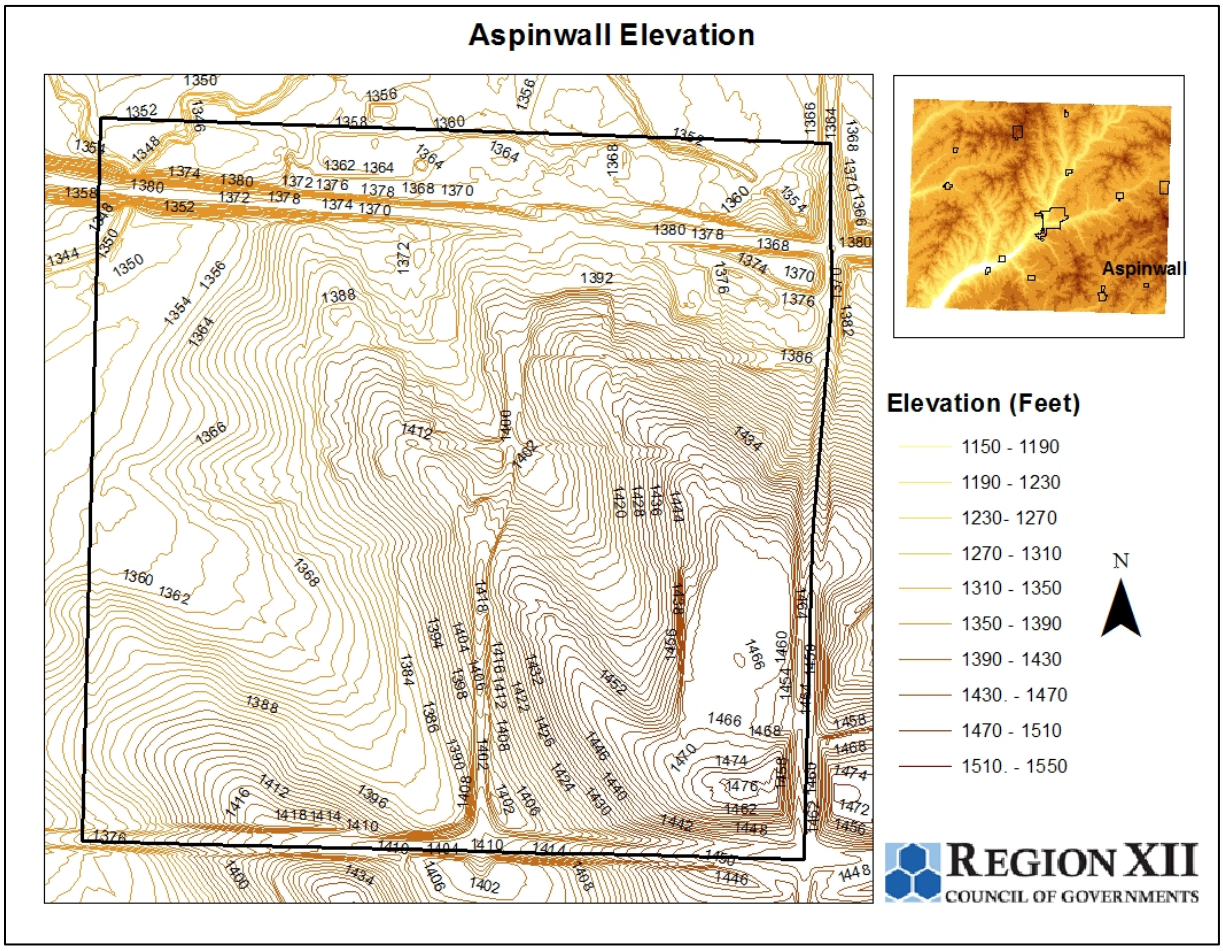
Location

Aspinwall is located in southeastern Crawford County. Highway 141 runs just south of Aspinwall. Aspinwall is located 20 miles southeast of Denison, 30 miles northeast from Harlan, 26 miles southwest from Carroll, and 87 miles northeast from Omaha.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The southeast corner of Aspinwall reaches 1,476 feet while the northwest corner is 1,348 feet above sea level. The following map shows the elevation of Aspinwall and its relation to the rest of Crawford County.

Map 1



Demographics

Population

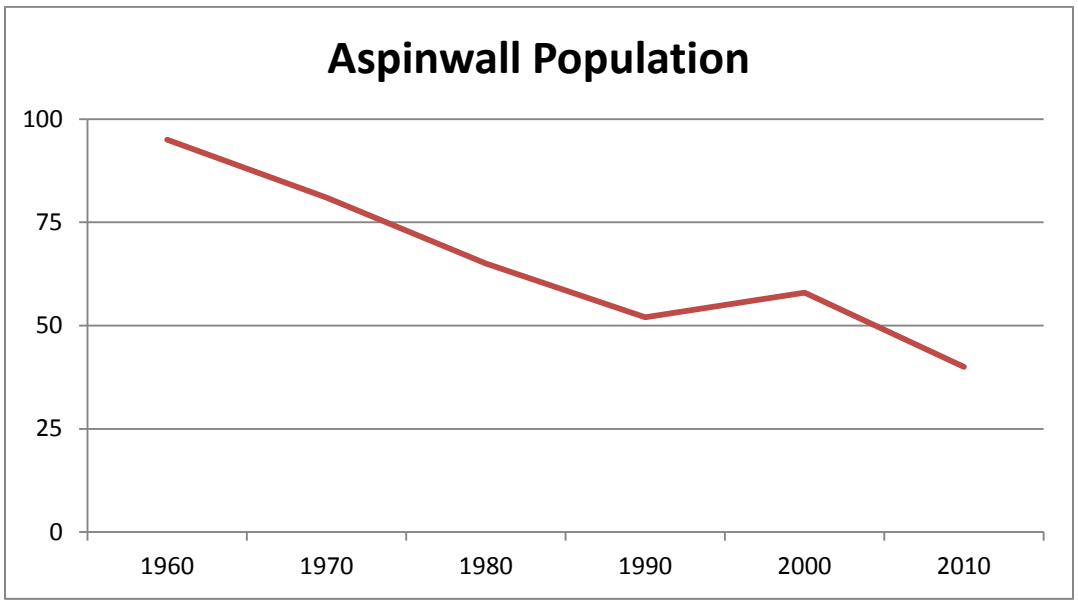
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Aspinwall's population through the past, present and future trends of the region.

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 education 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 fifty years, the population of Aspinwall has declined from 95 residents in 1960 to 40 residents in 2010. The 2000 Census saw a small spike in population from 52 residents in 1990 to 58 residents. Figure 1 below displays the historic population trend for Aspinwall.

Figure 1



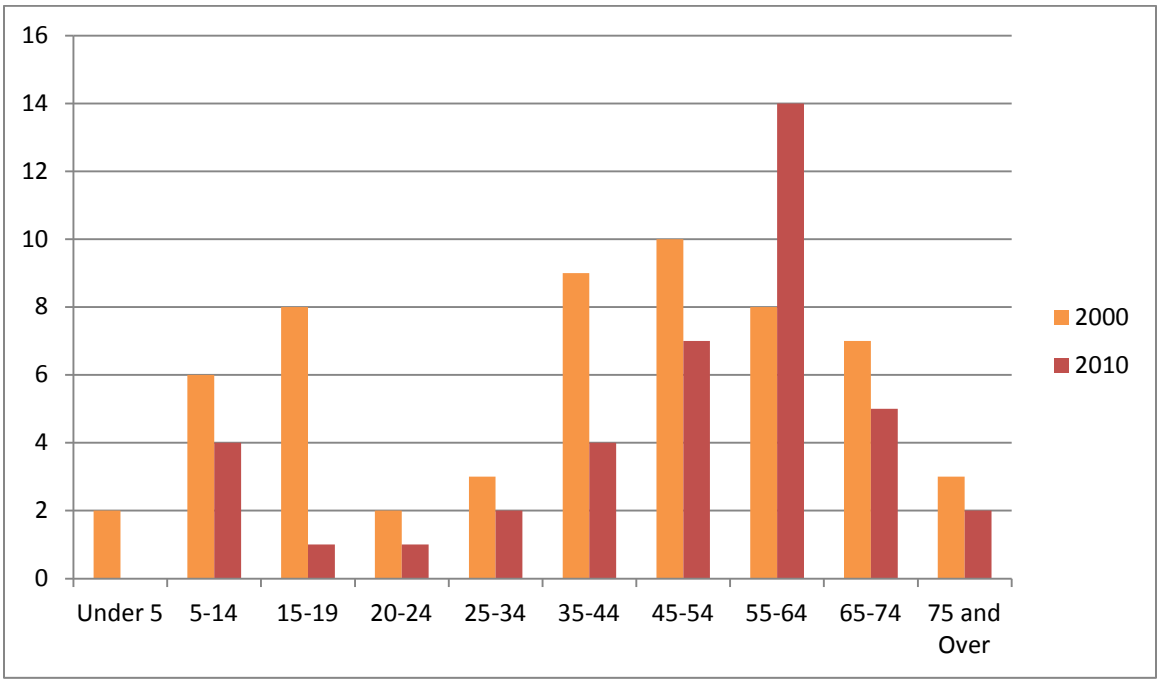
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Aspinwall from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 15-24 age cohort, which lost eight individuals. Another significant loss came in the 35-44 (-5) age group. An increase in population was only seen in the 55-64 (6) age group.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 45-54 age cohort in 2000 would be in the 55-64 age cohort in 2010. Therefore, the 45-54 ago cohort from 2000 actually gained four individuals instead of losing three individuals as seen in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as “brain drain.”

Figure 2

Aspinwall Age Distribution



Source: US Census Bureau

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.

The number of occupied housing units in Aspinwall decreased slightly over the last ten years, while the number of vacant housing units more than doubled. The percentage of owner-occupied housing units in 2010 decreased by nearly five percent from 2000. The vacancy rate went from 8 percent in 2000 to 18.5 percent in 2010. Table 1 shows the housing trends for Aspinwall from 2000 to 2010.

Table 1

Aspinwall Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	23	92.0%	22	81.5%
Owner Occupied	22	95.7%	20	90.9%
Renter Occupied	1	4.3%	2	9.1%
Vacant Housing Units	2	8.0%	5	18.5%
Total Housing Units	25	100.0%	27	100.0%

Source: US Census Bureau

Sixty percent of the housing units in Aspinwall are valued at less than $50,000. The remaining housing units are valued between $50,000 and $199,999. The median value of owner-occupied units in Aspinwall was $48,295 in 2012. Since the population has been declining, it will be important to invest in the rehabilitation of existing housing. This will improve the safety of homes and reduce their susceptibility to numerous hazards. Table 2 below displays the value of housing units in Aspinwall in 2012.

Table 2

Value of Aspinwall Housing Units, 2012

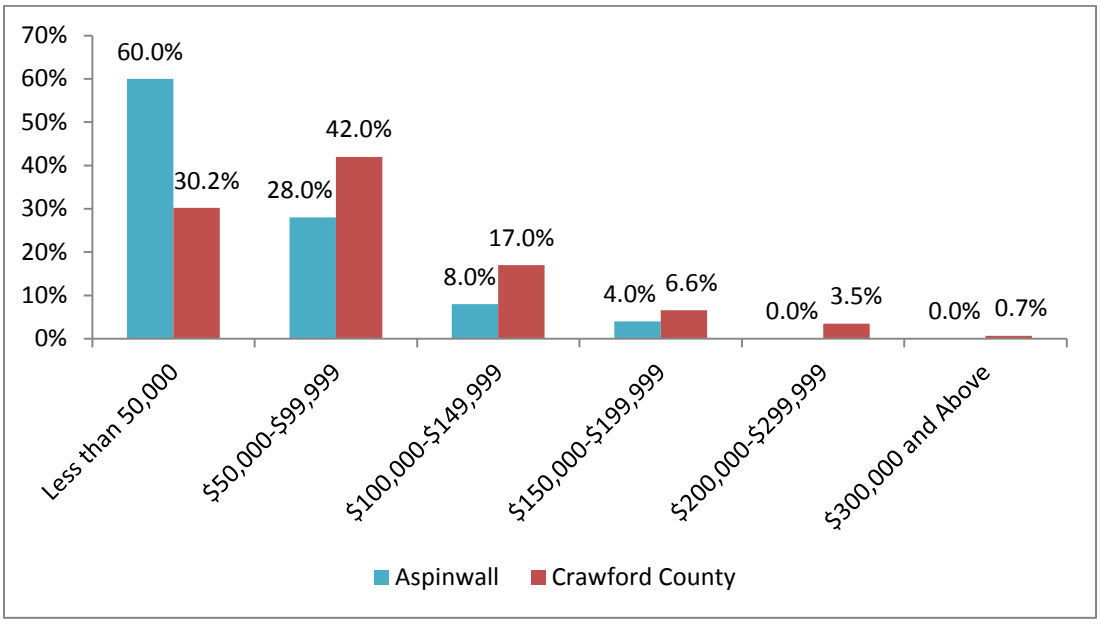
Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	15	60.0%
$50,000-$99,999	7	28.0%
$100,000-$149,999	2	8.0%
$150,000-$199,999	1	4.0%
$200,000-$299,999	0	0.0%
$300,000 and above	0	0.0%
Median Value	$48,295	-

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Aspinwall to Crawford County. Figure 3 shows that Aspinwall has a disproportionate percentage of housing units valued at less than $50,000, even when compared to Crawford County.

Figure 3

Value of Housing Units

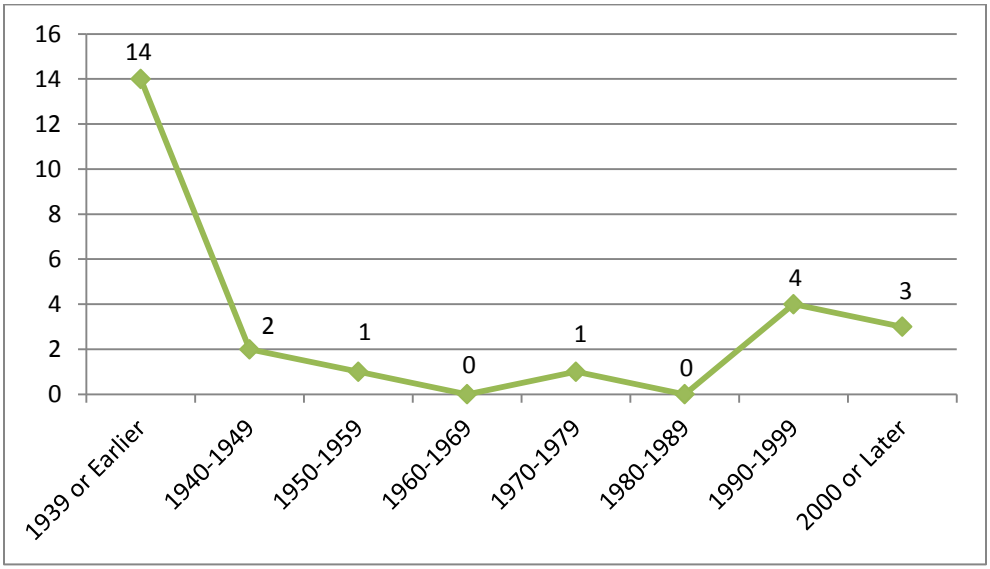


Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Nearly sixty percent of the current housing stock in Aspinwall was constructed prior to 1940. Housing construction has slowed down considerably since then, but saw an increase between 1990 and 1999. Twelve percent of homes have been constructed since 1990. Figure 4 shows the distribution of housing unit construction in Aspinwall.

Figure 4

Year Housing Unit Constructed



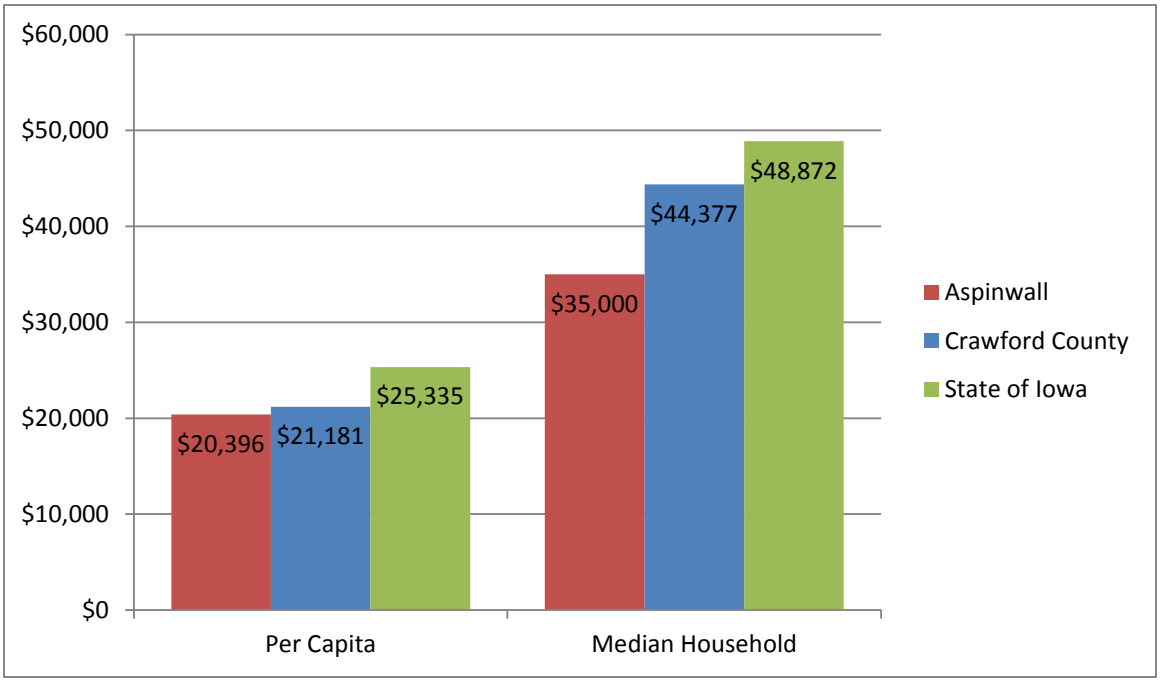
Source: Crawford County Housing Report, October 2012

Economic

An important indicator of the economic base in Aspinwall is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 below shows that incomes of those living in Aspinwall are lower than Crawford County and state averages. The average per capita personal income in Aspinwall for the 2006-2010 American Community Survey 5-Year estimate was $785 less per year than Crawford County's average and $4,939 less than the average for the State of Iowa. The median household income in Aspinwall for the same time period trailed that of Crawford County by $9,377 per year and the state by $13,872 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Aspinwall.

Figure 5
Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Aspinwall, according to the American Community Survey, included the $35,000-$49,999 (50%) income group. Over thirty-three percent of households in Aspinwall make less than $25,000, while no households make more than $50,000. Table 3 on the following page shows a breakdown of household income in Aspinwall.

Table 3

Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	4	22.2%
$10,000-$14,999	0	0.0%
$15,000-$24,999	2	11.1%
$25,000-$34,999	3	16.7%
$35,000-$49,999	9	50.0%
$50,000-$74,999	0	0.0%
$75,000-$99,999	0	0.0%
$100,000-$149,999	0	0.0%
$150,000-$199,999	0	0.0%
$200,000 or more	0	0.0%
Median Household Income	$35,000	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Aspinwall is typical of many smaller rural Iowa cities due to its dependence on regional employment opportunities. Many residents are required to commute to surrounding communities such as Denison and Harlan. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Manufacturing (37.5%), Transportation and Warehousing, and Utilities (18.8%) and Educational Services, and Health Care and Social Assistance (18.8%). These percentages are based on the total number of individuals 16 years and older that are from Aspinwall and are employed.

Table 4

Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	0	0.0%
Construction	1	6.3%
Manufacturing	6	37.5%
Wholesale Trade	0	0.0%
Retail Trade	0	0.0%
Transportation and Warehousing, and Utilities	3	18.8%
Information	0	0.0%
Finance and Insurance, and Real Estates 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	18.8%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	2	12.5%
Other Services, except Public Administration	1	6.3%
Public Administration	0	0.0%
Civilian Employed Population 16 years and over	16	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Changes in Development

Aspinwall has seen a small amount of residential development and industrial development since the last plan update. No future development is planned at this time.

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Aspinwall.

Table 5

Current Planning and Regulatory Documents for the City of Aspinwall

Document	Yes/No	Year
Previous HMP	Yes	2006
Comprehensive Plan	No	-
Building Code	No	-
Zoning Ordinance	No	-
Strategic Plan	No	-
Housing Assessment	Yes	1999
NFIP Participant	No	-

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Aspinwall. They are identified on Map 2

- Aspinwall Coop
- Fertilizer Plant
- Community Club
- Siren
- Water Tower
- Grain Elevator

Map 2


Aspinwall Critical Infrastructure
RAILROAD ST
1ST AVE
2ND AVE
MAIN ST
1ST ST
3RD AVE
4TH AVE
2ND ST
3RD ST
380TH ST
IOWA 141
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0
0.06
0.12
0.18
0.24
Miles
Updated January 11, 2013

Section 3: Risk Assessment

In addition to the four hazards omitted by the county-wide plan, the City of Aspinwall determined that dam and levee failure, flash flood, grass or wild land fire, and river flooding were not applicable or would have little effect on the community.

The following table lists the overall results of the Hazard Analysis that the committee member for Aspinwall completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Aspinwall Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Thunderstorm and Lightning	Y	Y	3	2	4	1	2.65
Infrastructure Failure	Y	Y	3	2	2	4	2.65
Hazardous Material	N	Y	3	2	3	2	2.60
Transportation Incident	N	Y	3	2	2	2	2.45
Extreme Heat	Y	Y	3	1	3	2	2.30
Hailstorm	Y	Y	2	2	4	1	2.20
Windstorm	Y	Y	2	1	4	1	1.90
Drought	Y	Y	2	1	3	2	1.85
Severe Winter Storms	Y	Y	2	1	3	2	1.85
Tornado	Y	Y	1	2	4	1	1.75
Radiological	N	N	1	1	3	4	1.60
Animal/Plant/Crop Disease	N	Y	1	1	3	3	1.50
Terrorism	N	N	1	1	3	2	1.40
Human Disease	N	N	1		3	1	1.30

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Aspinwall were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Aspinwall.

Aspinwall			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	25	$1,285,080	40
Commercial	6	$3,576,210	
Industrial	0	$0	
Agricultural Structures	-	$79,260	

The following hazards were determined to have a negligible impact on the City of Aspinwall, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Drought, Extreme Heat, Severe Winter Storms, Windstorm, Animal/Plant/Crop Disease, Human Disease, Radiological and Terrorism

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	2	$115,657	4
Commercial	1	$321,859	
Industrial	0	$0	
Agricultural Structures	-	$7,133	

*The number of agricultural structures could not be determined

The following hazards were determined to have a limited impact on the City of Aspinwall, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Hailstorm, Thunderstorm and Lightning, Tornado, Hazardous Material, Infrastructure Failure and Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	6	$321,270	10
Commercial	2	$894,053	
Industrial	0	$0	
Agricultural Structures	-	$19,815	

*The number of agricultural structures could not be determined

Section 5: Mitigation Strategy

<u>Mitigation Goals, Objectives and Actions</u>

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

Objective 1: Improve Public Infrastructure

Action 1.1: Adopt a tree trimming ordinance

Action 1.2: Upgrade Community Club building for a tornado shelter

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

Objective 2: Improve Warning Capabilities

Action 2.1: Update existing siren

Action 2.2: Ensure residence radios work

Objective 3: Protect Health and Safety

Action 3.1: Add backup generators as necessary

Action 3.2: Check each residence for fire extinguishers

The City of Aspinwall completed a previous hazard mitigation plan in 2006. Changes in development, progress in local mitigation efforts, and changes in priority have resulted in new goals, objectives and actions. The table below displays the status of the previous actions. Any action marked as ongoing or future was carried over to be included in this plan.

Table 8

Aspinwall Previous Mitigation Actions

Aspinwall	**Status**				
Previous Actions (2006)	**Complete**	**Underway**	**Ongoing**	**Future**	**Canceled**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills				X	
Educate citizens on NOAA weather radios		X			
Replace and maintain snow removal equipment as necessary	X				
Upgrade or add back-up generators as necessary			X		
Expand the usage of NOAA weather radios		X			
Educate residents on extreme heat and cold weather via the local media and/or utility billings				X	
Provide firefighters, law enforcement and EMS departments with adequate training /equipment					X*
Develop a city-wide evacuation plan				X	
Continue fire and emergency response training					X*
Initiate fire prevention program			X		
Continue NFIP participation and follow NFIP policies				X	
Attend training for terrorism when offered				X	
Post signs and increase police surveillance around critical facilities				X	
Evaluate city facilities and identify potential terrorist targets				X	

*Previous mitigation actions that have been cancelled due to the lack of relevance for the community.

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for the City of Aspinwall. Table 10 displays the STAPLEE evaluation criteria.

Table 9
Aspinwall STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ / Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Continue NFIP participation and follow NFIP policies	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	Y	M	N/A	Y	Y	**19**
Adopt a tree trimming ordinance	Y	N	Y	Y	N	N	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N	N/A	Y	Y	**16**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**16**
Educate residents on extreme heat and cold weather via the local media and/or utility billings	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**16**
Attend training for terrorism when offered	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**16**
Evaluate city facilities and identify potential terrorist targets	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**16**
Ensure residence radios work	Y	N	Y	Y	N	Y	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**14**

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Develop a city-wide evacuation plan	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**14**
Initiate fire prevention program	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**14**
Post signs and increase police surveillance around critical facilities	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**14**
Check each residence for fire extinguishers	Y	N	Y	Y	N	Y	N	N	Y	N	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**12**
Update existing siren	Y	N	Y	Y	N	N	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**10**
Add backup generators as necessary	Y	N	Y	Y	N	N	N	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**8**
Upgrade Community Club building for a tornado shelter	Y	N	Y	N	N	N	N	N	Y	N	Y	Y	Y	Y	Y	N	Y	Y	N/A	N/A	N/A	N/A	N/A	**0**

Table 10

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Aspinwall outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 11 displays all of the mitigation actions for Aspinwall with their implementation strategy.

Table 11

Aspinwall Action Plan

Adopt a Tree Trimming Ordinance	
Hazards Addressed	Tornado, Windstorm, Severe Winter Storms, Thunderstorm and Lightning
Priority	Low
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Short

Educate Citizens about Summer Storms via Public Information Announcements through the Local Media or by Notices on Utility Bills	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Thunderstorm and Lightning
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Educate Residents on Extreme Heat and Cold Weather via the Local Media and/or Utility Billings	
Hazards Addressed	Extreme Heat, Severe Winter Storms
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Attend Training for Terrorism When Offered	
Hazards Addressed	Terrorism
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Evaluate City Facilities and Identify Potential Terrorist Targets	
Hazards Addressed	Terrorism
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Prevention
Target Completion Date	Short

Ensure Residence NOAA Weather Radios Work	
Hazards Addressed	All
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Develop a City-Wide Evacuation Plan	
Hazards Addressed	Severe Winter Storms, Human Disease, Hazardous Material, Radiological
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Initiate Fire Prevention Program	
Hazards Addressed	Grass or Wild Land Fire, Infrastructure Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Post Signs and Increase Police Surveillance Around Critical Facilities	
Hazards Addressed	Hazardous Material, Terrorism, Radiological
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Prevention
Target Completion Date	Short

Check Each Residence for Fire Extinguishers	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Update Existing Siren	
Hazards Addressed	Tornado, Infrastructure Failure
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Add Backup Generators as Necessary	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Upgrade Community Club Building for a Tornado Shelter	
Hazards Addressed	Tornado
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Incorporation into Other Planning Mechanisms

Where possible, the City of Aspinwall 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:

- Aspinwall Code of Ordinances
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

Resolution No. 72

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CITY OF ASPINWALL ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the City of Aspinwall participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the City of Aspinwall adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 10th DAY OF November, 2014.

Thomas Irlbeck, Mayor

ATTEST:

Amy Osborne, City Clerk

Appendix D: City of Buck Grove

Section 1: Community Profile

City of Buck Grove History

The land around Buck Grove was used for farming and grazing. It was also good hunting ground due to the many deer. Because of this, the town was named Buck Grove. The town was located on the Sioux City branch of the Milwaukee Railroad. During the early settlement, there were approximately seventy-five people and twenty-two businesses. These businesses included two grocery stores, a hotel, two saloons, a dance hall, lumber yard, farm implement store, blacksmith shop, band, hardware store, two garages, two produce stations, two grain elevators, a stockyard, hog buying station, theater, drugstore and post office.

On August 22, 1887, Buck Grove was platted and consisted of six main blocks. By 1897, Buck Grove had grown to 125 people. In the early 1900s, Buck Grove grew into a market town for farmers to ship their goods to the larger cities by way of the Milwaukee Railroad. By 1913 Buck Grove had a road connecting them to the county seat. Fires in 1915 and 1916 destroyed many of the buildings in Buck Grove. The fire in 1915 destroyed the Buck Grove livery barn; killing five horses, a large amount of hay, grain and feed, and a building containing salt and feed. The following year, a fire destroyed the Asmus store, the Reiff-Hamer store, the pool hall, barber shop, and hotel.

Buck Grove was able to recover from the fires; however, it was not able to fully recover from the Great Depression. The banks in Buck Grove closed in 1932, followed the businesses. Soon all that was left was one gas station, a general store, a blacksmith's shop, the Golden Nugget Lounge and City Hall. The elevators and stock yards were either torn down or burned. The railroad ceased its service and the depot building was removed and remodeled into a home. The county school started to fade in 1956 because it was not able to meet newer standards of education. Children in Buck Grove started to attend school in Denison.

The period from 1866 to 1990 saw steady growth for the railroads. In 1881 a second railroad, the Milwaukee, reached Crawford County. However, by 1903 the station in Buck Grove was closed to freight and passengers, and by 1979 the Milwaukee Railroad decided to cease operation through Buck Grove. In December 1980, the railroad was officially abandoned through Buck Grove to Sioux City and the tracks were torn out.

The history of Buck Grove was extracted from their centennial book *Buck Grove, Iowa, Centennial and History Book* published in 1987.

Geography and Environment

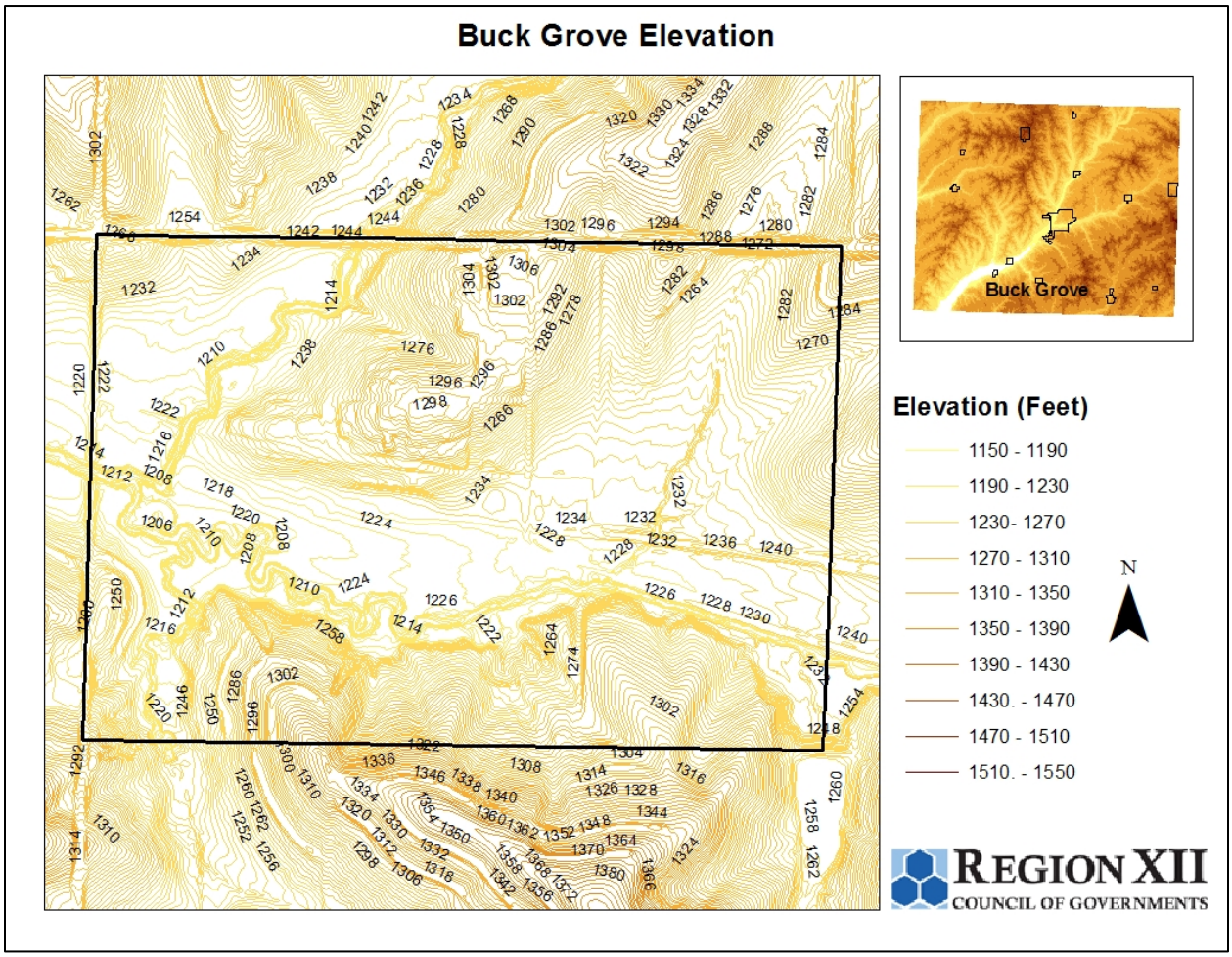
Location

Buck Grove is located in south central Crawford County. Highway 59 runs approximately two miles east of Buck Grove, with Highway 30 located roughly four miles north of Buck Grove. Buck Grove is 10.6 miles south of Denison, 22.3 miles northwest of Harlan, and 69.6 miles northeast of Omaha.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The north central area of Buck Grove reaches 1,306 feet, while the west central part of Buck Grove only reaches 1,206 feet. The following map shows the elevation of Buck Grove and its relation to the rest of Crawford County.

Map 1



Demographics

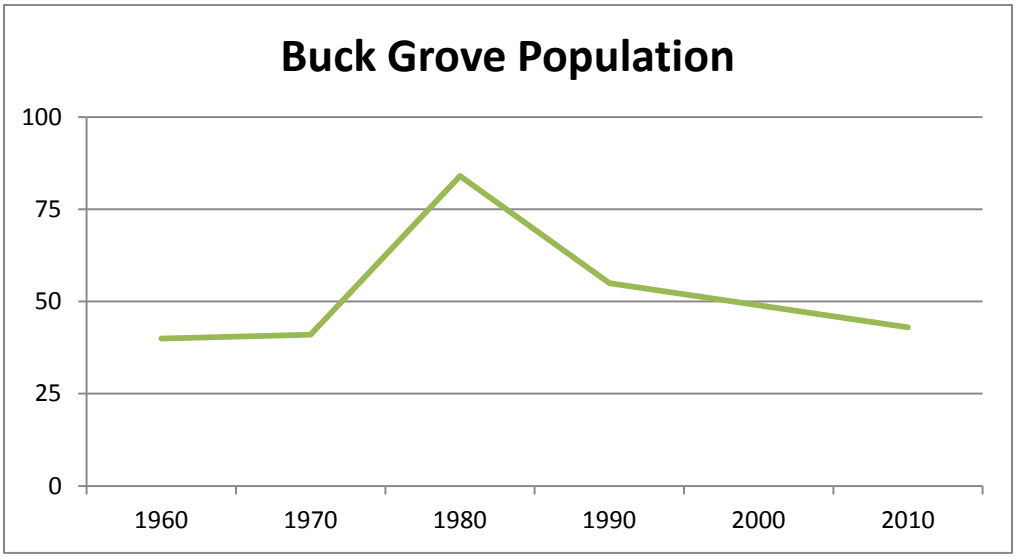
Population

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 Buck Grove's population through the 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 education 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.

Similar to other cities in the county, Buck Grove experienced a population growth from 1960 to 1980 and then a decline from 1990 through 2010. From 1960 to 1970 the population increased slightly, gaining only one person; however, from 1970 to 1980, the town saw an increase of forty-three residents for a total of eighty-four residents. From 1980 to 1990, the town experienced almost as great of a decline, from eighty-four residents to fifty-five residents. The population of Buck Grove as of the 2010 Census was forty-three residents. The historic population trend for Buck Grove is shown in Figure 1 on the following page.

Figure 1



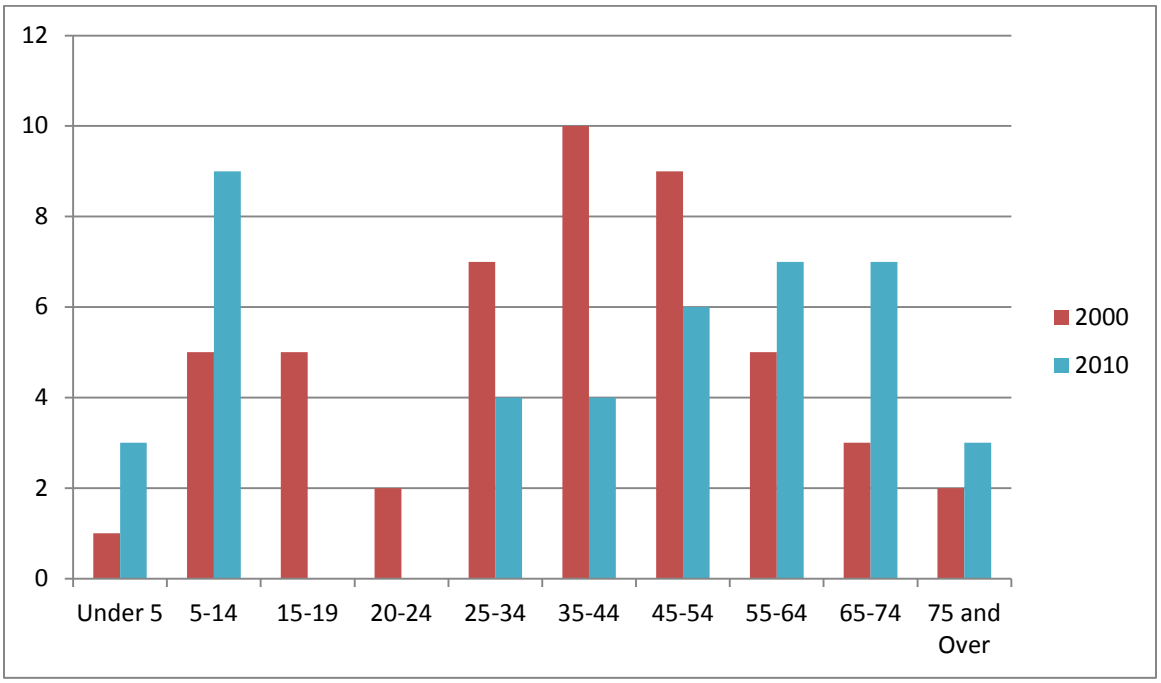
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Buck Grove from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 15-24 age cohort, which lost seven individuals. Another significant loss came in the 35-44 (-6) age group. Increases in population were seen in the 5-14 (4), and 65-74 (4) age groups.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 35-44 age cohort in 2000 would be in the 45-54 age cohort in 2010. Therefore, the 35-44 ago cohort from 2000 lost four individuals, a smaller number than in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as “brain drain.”

Figure 2

Buck Grove Age Distribution



Source: US Census Bureau

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.

The number of occupied housing units in Buck Grove decreased slightly over the last ten years. However, the percentage of owner-occupied housing units increased from 80 percent in 2000 to 100 percent in 2010. The number of vacant housing units remained the same at one. Table 1 shows the housing trends for Buck Grove from 2000 to 2010.

Table 1

Buck Grove Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	20	95.2%	18	94.7%
Owner Occupied	16	80.0%	18	100.0%
Renter Occupied	4	20.0%	0	0.0%
Vacant Housing Units	1	4.8%	1	5.3%
Total Housing Units	21	100.0%	19	100.0%

Source: US Census Bureau

All of the housing units in Buck Grove are valued at less than $100,000, with eighty-five percent of housing units valued below $50,000. These homes are likely to be aging and in need of revitalization. Due to this, these homes are susceptible to hazards such as fires, serious storms and other weather related hazards. Since the population has been declining, it will be important to invest in the rehabilitation of existing housing. This will improve the safety of homes and reduce their susceptibility to numerous hazards. Table 2 below displays the value of housing units in Buck Grove in 2012.

Table 2
Value of Buck Grove Housing Units, 2012

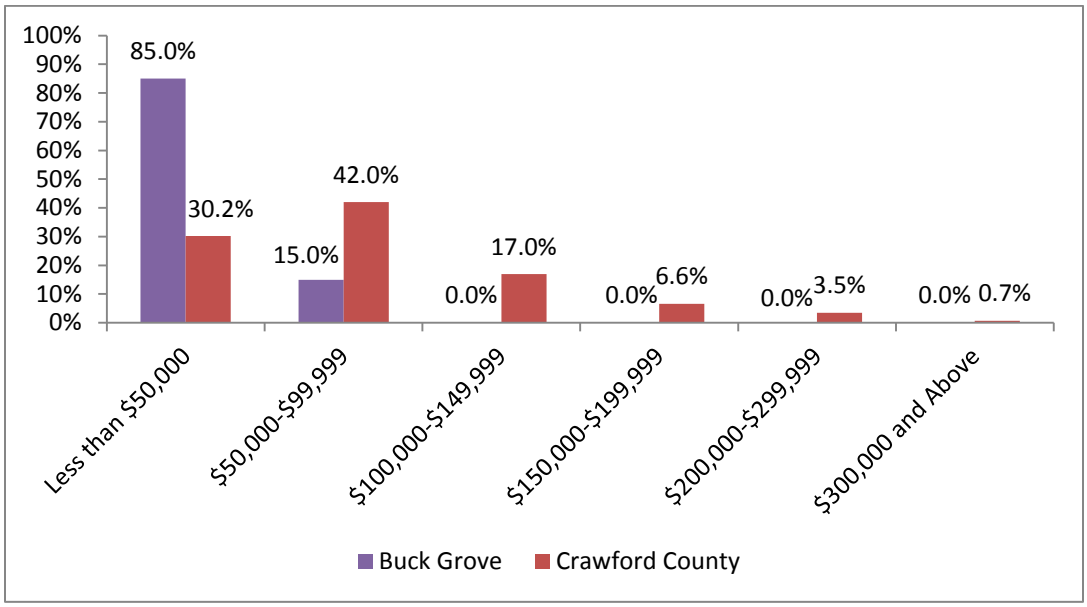
Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	17	85.0%
$50,000-$99,999	3	15.0%
$100,000-$149,999	0	0.0%
$150,000-$199,999	0	0.0%
$200,000-$299,999	0	0.0%
$300,000 and above	0	0.0%
Median Value	$34,355	-

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Buck Grove to Crawford County. Figure 3 shows that Buck Grove has a disproportionate percentage of housing units valued at less than $50,000, even when compared to Crawford County.

Figure 3

Value of Housing Units

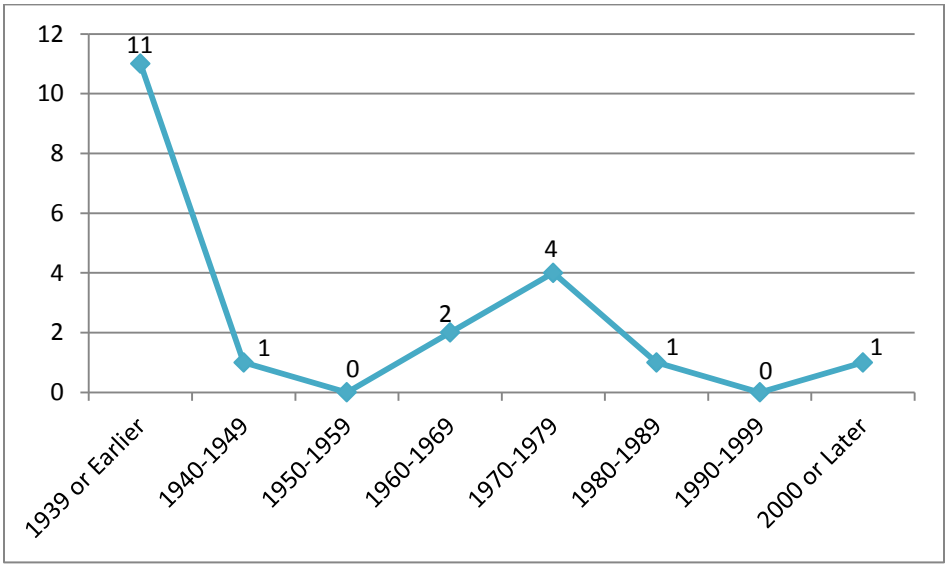


Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Over fifty percent of the current housing stock in Buck Grove was constructed prior to 1940. Housing construction has slowed down considerably since then, but saw an increase between 1970 and 1979. Five percent of homes have been constructed since 1990. Figure 4 shows the distribution of housing unit construction in Buck Grove.

Figure 4

Year Housing Unit Constructed



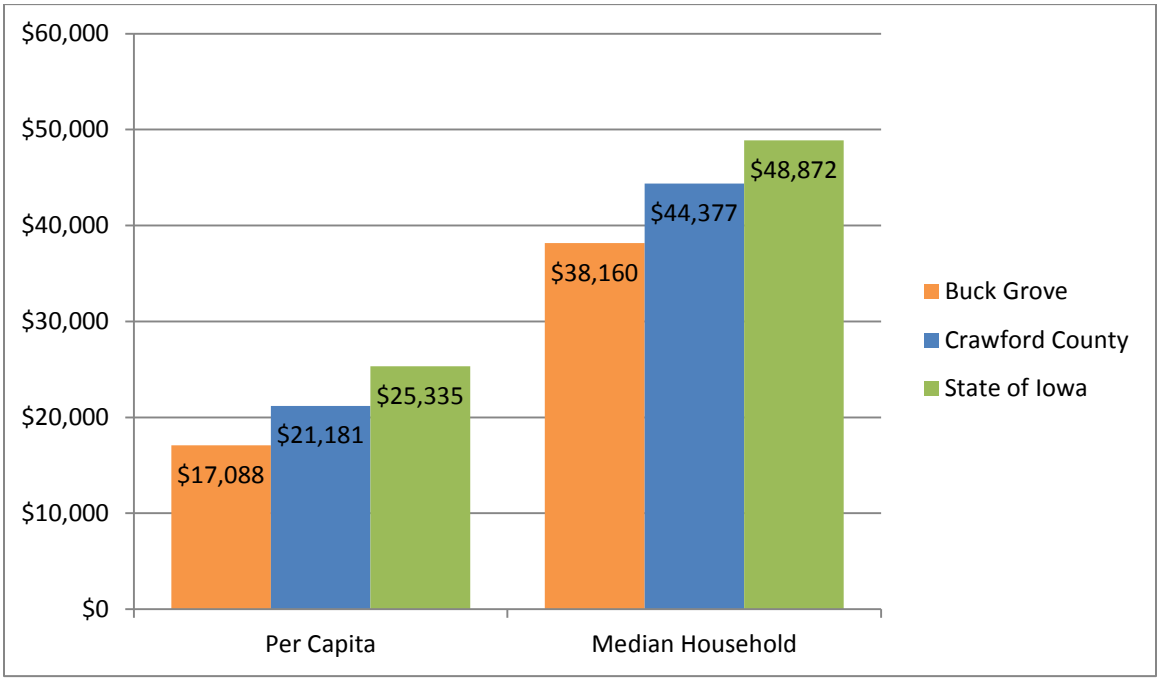
Source: Crawford County Housing Report, 2012

Economic

An important indicator of the economic base in Buck Grove is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 below shows that incomes of those living in Buck Grove are lower than Crawford County and state averages. The average per capita personal income in Buck Grove for the 2006-2010 American Community Survey 5-Year estimate was $4,093 less per year than Crawford County's average and $8,247 less than the average for the State of Iowa. The median household income in Buck Grove for the same time period trailed that of Crawford County by $6,217 per year and the state by $10,712 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Buck Grove.

Figure 5
Income



Source: Crawford County Housing Report, October 2012

The largest income group in Buck Grove, according to the American Community Survey, included the $15,000-$24,999 (40%) income group. Sixty-eight percent of households in Buck Grove make less than $50,000 and eight percent make $75,000 or more. Table 3 on the following page shows a breakdown of household income in Buck Grove.

Table 3

Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	2	8.0%
$10,000-$14,999	0	0.0%
$15,000-$24,999	10	40.0%
$25,000-$34,999	2	8.0%
$35,000-$49,999	3	12.0%
$50,000-$74,999	6	24.0%
$75,000-$99,999	2	8.0%
$100,000-$149,999	0	0.0%
$150,000-$199,999	0	0.0%
$200,000 or more	0	0.0%
Median Household Income	$28,125	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Buck Grove is typical of many smaller rural Iowa cities due to its dependence on regional employment opportunities. Many residents are required to commute to surrounding communities such as Denison and Harlan. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Educational Services, and Health Care and Social Assistance (35.5%), Manufacturing (16.1) and Retail Trade (16.1%). These percentages are based on the total number of individuals 16 years and older that are from Buck Grove and are employed.

Table 4

Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	0	0.0%
Construction	3	9.7%
Manufacturing	5	16.1%
Wholesale Trade	3	9.7%
Retail Trade	5	16.1%
Transportation and Warehousing, and Utilities	0	0.0%
Information	1	3.2%
Finance and Insurance, and Real Estates 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	11	35.5%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	3	9.7%
Other Services, except Public Administration	0	0.0%
Public Administration	0	0.0%
Civilian Employed Population 16 years and over	31	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Changes in Development

Buck Grove has not seen any development since the last plan update and no development is planned.

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Buck Grove.

Table 5

Current Planning and Regulatory Documents for the City of Buck Grove

Document	Yes/No	Year
Previous HMP	Yes	2006
Comprehensive Plan	No	-
Building Code	Yes	2009
Zoning Ordinance	Yes	2009
Strategic Plan	No	-
Housing Assessment	Yes	1999
NFIP Participant	Yes	2011

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Buck Grove. They are identified on Map 2

- City Hall
- Storm Siren
- County Shed

Map 2


Buck Grove Critical Infrastructure
U AVE
15TH ST
KANE ST
MAIN ST
3RD ST
RAILROAD ST
240th ST
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0
0.09
0.18
0.27
0.36
Miles
Updated January 11, 2013

Section 3: Risk Assessment

The following table lists the overall results of the Hazard Analysis that the committee member for Buck Grove completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Buck Grove Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Thunderstorm and Lightning	Y	Y	4	2	4	1	3.10
Tornado	Y	Y	3	3	3	1	2.80
Severe Winter Storms	Y	Y	3	2	3	3	2.70
Extreme Heat	Y	Y	3	2	2	3	2.55
Hailstorm	Y	Y	3	2	3	1	2.50
Windstorm	Y	Y	3	2	3	1	2.50
River Flooding	Y	Y	2	2	3	3	2.25
Grass or Wild Land Fire	N	Y	2	2	4	1	2.20
Drought	Y	Y	2	1	2	4	1.90
Hazardous Material	N	N	1	1	4	4	1.75
Human Disease	N	N	1	1	4	4	1.75
Infrastructure Failure	N	N	1	1	4	3	1.65
Radiological	N	N	1	1	4	3	1.65
Terrorism	N	N	1	1	4	3	1.65
Transportation Incident	N	N	1	1	4	2	1.55
Flash Flood	N	Y	1	1	3	3	1.50
Animal/Plant/Crop Disease	N	Y	1	1	2	4	1.45
Dam and Levee Failure	N	Y	1	1	3	1	1.30

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Buck Grove were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Buck Grove.

Buck Grove			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	22	$838,020	43
Commercial	2	$23,280	
Industrial	0	$0	
Agricultural Structures	-	$710	

The following hazards were determined to have a negligible impact on the City of Buck Grove, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Dam and Levee Failure, Drought, Flash Flood, Animal/Plant/Crop Disease, Hazardous Material, Human Disease, Infrastructure Failure, Radiological, Terrorism and Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	2	$75,422	4
Commercial	0	$2,095	
Industrial	0	$0	
Agricultural Structures	-	$64	

*The number of agricultural structures could not be determined

The following hazards were determined to have a limited impact on the City of Buck Grove, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Extreme Heat, Grass or Wild Land Fire, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning, and Windstorm

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	6	$209,505	11
Commercial	1	$5,820	
Industrial	0	$0	
Agricultural Structures	-	$178	

*The number of agricultural structures could not be determined

The following hazards were determined to have a critical impact on the City of Buck Grove, were they to occur. A shutdown of some facilities and services could last for at least two weeks and some injuries/illness will result in permanent disability. It is estimated that 50% of the city would be impacted.

Tornado

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	11	$419,010	22
Commercial	1	$11,640	
Industrial	0	$0	
Agricultural Structures	-	$355	

*The number of agricultural structures could not be determined

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

Objective 1: Protect Critical Systems and Assets

Action 1.1: Store legal paperwork, minutes, insurance policies, etc. in fire proof safe

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

Objective 2: Provide Education and Training

Action 2.1: Educate residents of where to go during a hazard event

Action 2.2: Ensure residents are aware of emergency plan

Goal: Improve coordination and communication with other relevant organizations and build support for hazard mitigation

Objective 3: Improve Public Warning Capabilities

Action 3.1: Work with area (Denison) on communications

Goal: Maintain and support public safety facilities, including equipment and training

Objective 4: Improve Public Infrastructure

Action 4.1: Hire contractor to evaluate city hall structure

The City of Buck Grove completed a previous hazard mitigation plan in 2006. The table on the following page displays the status of the previous actions. Any action marked as ongoing or future was carried over to be included in this plan.

Table 8

Buck Grove Previous Actions

Buck Grove	**Status**				
Previous Actions (2006)	**Complete**	**Underway**	**Ongoing**	**Future**	**Canceled**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills					X*
Maintain and test warning system			X		
Educate citizens about the threat of winter weather through media and public information					X*
Educate citizens on NOAA weather radios			X		
Educate residents on extreme heat and cold weather via the local media and/or utility billings					X*
Provide firefighters, law enforcements and EMS departments with adequate training and equipment					X*
Develop a city-wide evacuation plan	X				
Continue fire and emergency response training			X		
Initiate fire prevention program				X	
Continue NFIP participation and follow NFIP policies		X			
Attend training for terrorism when offered					X*
Post signs and increase police surveillance around critical facilities					X*
Evaluate city facilities and identify potential terrorist targets					X*

*Previous mitigation actions that have been cancelled due to the lack of relevance for the community.

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for the City of Buck Grove. Table 10 displays the STAPLEE evaluation criteria.

Table 9

Buck Grove STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Initiate fire prevention program	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	Y	N/A	N/A	Y	Y	**19**
Hire contractor to evaluate city hall structure	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**16**
Educate residents on where to go during a hazard event	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**15**
Ensure residents are aware of emergency plan	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**15**
Store legal paperwork, minutes, insurance policies, etc. in fire proof safe	Y	N	Y	Y	N	Y	Y	Y	Y	N	N/A	Y	Y	N	Y	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**14**
Work with area (Denison) on communications	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N/A	N/A	N	N/A	N/A	N/A	N/A	N/A	**14**
Educate citizens on NOAA weather radios	Y	N	Y	Y	N	Y	N/A	Y	Y	N	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**13**
Maintain and test warning system	Y	N	Y	Y	N	N/A	N/A	N/A	Y	N/A	Y	Y	Y	N	N/A	N/A	Y	N	N/A	N/A	N/A	N/A	N/A	**12**

Table 10

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Buck Grove outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 11 displays all of the mitigation actions for Buck Grove with their implementation strategy.

Table 11

Buck Grove Action Plan

Initiate Fire Prevention Program	
Hazards Addressed	Grass or Wild Land Fire, Infrastructure Failure
Priority	High
Previous Priority	High
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Mid

Hire Contractor to Evaluate City Hall Structure	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Short

Educate Residents of Where to go During a Hazard Event	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Ensure Residents are Aware of Emergency Plan	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Store Legal Paperwork, Minutes, Insurance Policies, etc. in Fire Proof Safe	
Hazards Addressed	Infrastructure Failure, Tornado
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Prevention
Target Completion Date	Short

Work with Area (Denison) on Communications	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Educate Citizens on NOAA Weather Radios	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Maintain and Test Warning System	
Hazards Addressed	Tornado
Priority	High
Previous Priority	High
Responsible Department	Crawford County Emergency Management
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Continue NFIP Participation and Follow NFIP Policies by Enforcing Floodplain Management Ordinance	
Hazards Addressed	Tornado
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Incorporation into Other Planning Mechanisms

Where possible, the City of Buck Grove 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:

- Buck Grove Comprehensive Plan
- Buck Grove City Code of Ordinances
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

Resolution No. 28A

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CITY OF BUCK GROVE ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the City of Buck Grove participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the City of Buck Grove adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 4 **DAY OF** November **, 2013.**

Karen Kalbn
Mayor

ATTEST:

Shirley J. Caldwell
City Clerk

Appendix E: City of Charter Oak

Section 1: Community Profile

City of Charter Oak History

Charter Oak received its name from the American Emigrant Company which was organized at Hartford, Connecticut. The story is told that, during the time the territory was being surveyed by that company, a sudden heavy cloudburst made it imperative for the surveyor to protect his maps and papers. He bundled them up and thrust them into a hollow spot of a large oak tree. The "Charter Oak" tree was located in the northwestern part of town.

By 1870, large numbers of immigrants came into Crawford County, and the reported population in the organized township of Charter Oak was 67. Since Charter Oak was a long way from a market, settlement was slow to take off. The post office was established on May 4, 1876. It was not until the Chicago, Milwaukee & St. Paul Railway was built from Manilla to Sioux City in 1887 that the present form of Charter Oak took form. By 1888, Charter Oak had a population of 400 and an independent school district was formed in 1889. Charter Oak became incorporated on February 14, 1891. By 1911, Charter Oak had four general merchandise establishments, one jewelry store, two hardware stores, two millineries, one shoe store, one furniture store, two banks, two drug stores, three cream stations, two barber shops, one meat market, one elevator, one flouring mill, two lumber yards, one livery, one cigar factory, one hotel, one restaurant, one newspaper, three physicians, two dentists, two blacksmith shops and one schoolhouse containing eight rooms.

The history of Charter Oak was abstracted from the 1991 Charter Oak centennial book.

Geography and Environment

Location

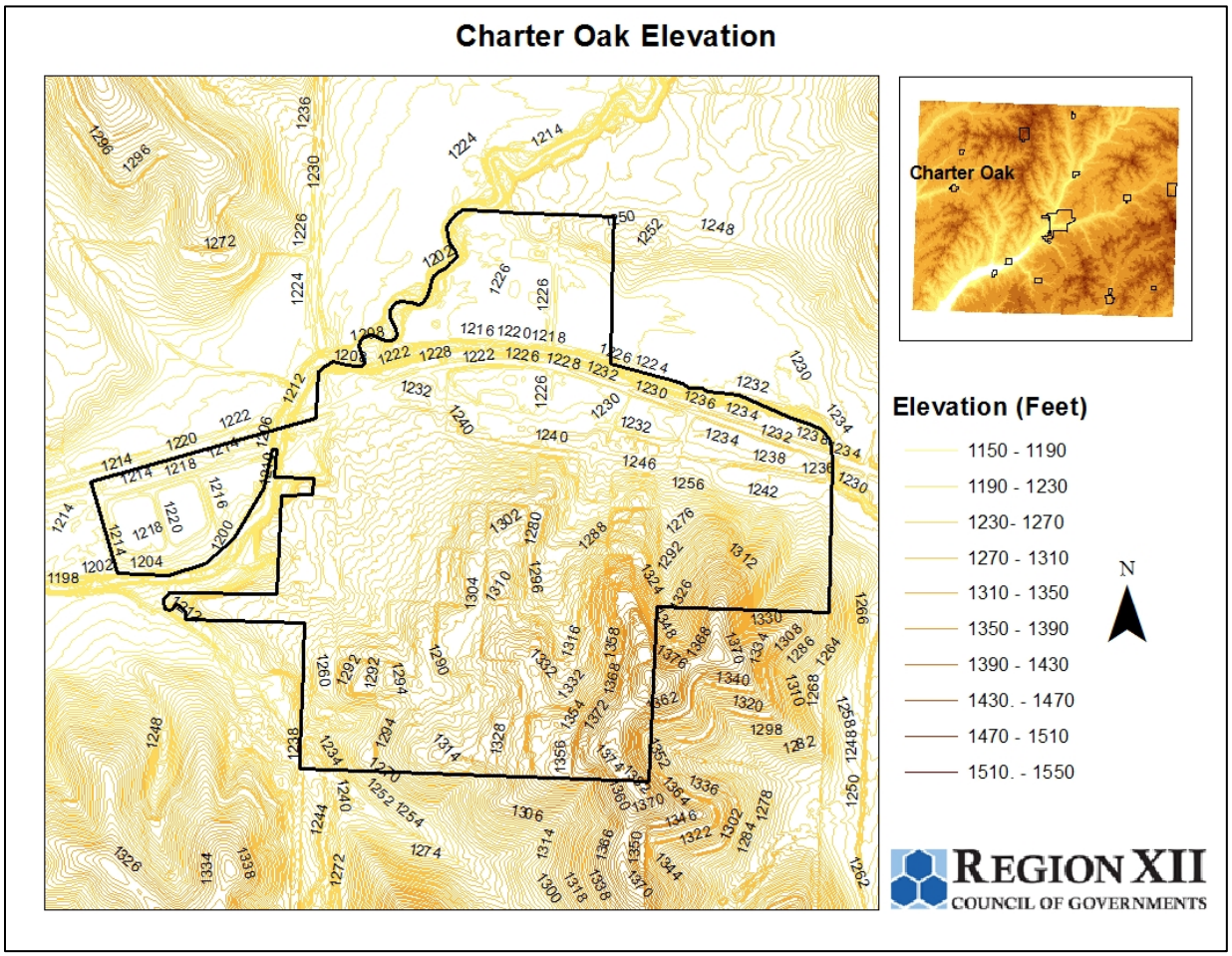
Charter Oak is located in northeastern Crawford County. Highway 141 runs through the northern portion of town. Charter Oak is located 13.7 miles northwest of Denison, 41 miles west of Carroll, and 72.5 miles northeast of Omaha.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The southeast corner of Charter Oak reaches 1,374, while west central Charter Oak hovers around 1,200 feet.

The following map shows the elevation of Charter Oak and its relation to the rest of Crawford County.

Map 1



Demographics

Population

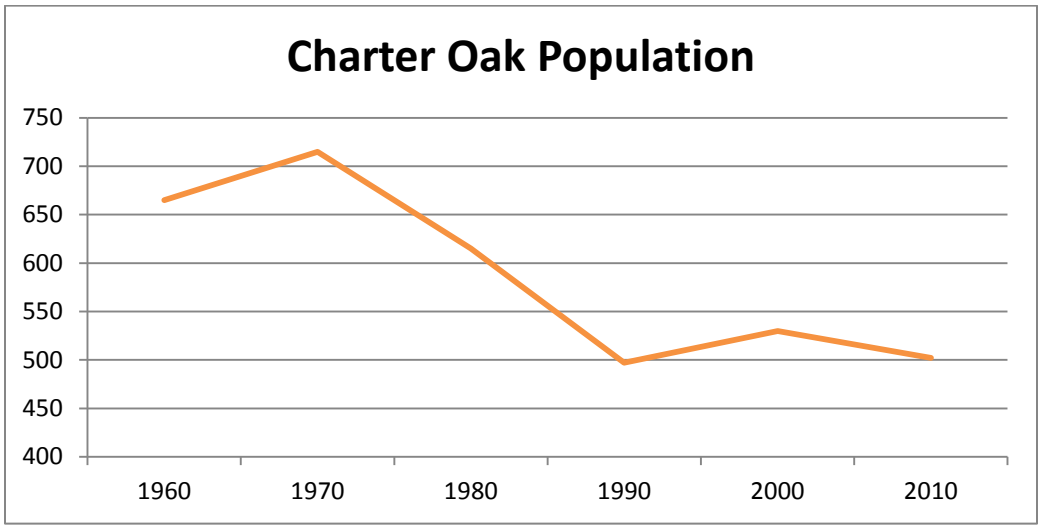
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Charter Oak's population through the past, present and future trends of the region.

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 education 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 fifty years, the population of Charter Oak has declined from a high of 715 residents in 1970 to 502 residents in 2010. The overall population numbers have been decreasing, with a few population spikes in 1970 and 2000. Figure 1 below displays the historic population trend for Charter Oak.

Figure 1



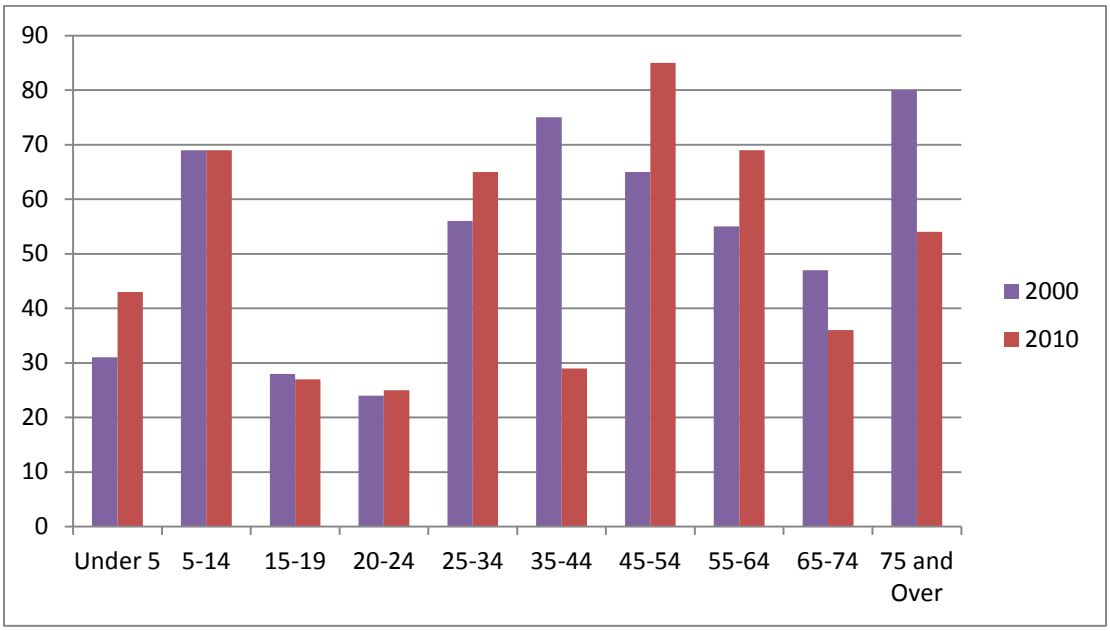
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Charter Oak from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 35-44 age cohort, which lost forty-six individuals. Other significant losses came in the 75 and over (-26) and 65-74 (-11) age groups. Significant increases in population were seen in the 45-54 (20), 55-64 (14) and under 5 (12) age groups.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 35-44 age cohort in 2000 would be in the 45-54 age cohort in 2010. Therefore, the 35-44 age cohort from 2000 actually gained ten individuals instead of losing forty-six individuals as seen in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as "brain drain."

Figure 2

Charter Oak Age Distribution



Source: US Census Bureau

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.

The number of occupied housing units, along with the total number of housing units, decreased over the last ten years in Charter Oak. The occupancy rate in 2010 decreased by nearly four percent from 2000. Historically, Charter Oak has consisted of mostly owner-occupied housing units, but the percentage decreased from 82 percent in 2000 to 76.4 percent in 2010. The vacancy rate went from 10.9 percent in 2000 to 14.6 percent in 2010. Table 1 shows the housing trends for Charter Oak from 2000 to 2010.

Table 1

Charter Oak Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	245	89.1%	229	85.4%
Owner Occupied	201	82.0%	175	76.4%
Renter Occupied	44	18.0%	54	23.6%
Vacant Housing Units	30	10.9%	39	14.6%
Total Housing Units	275	100.0%	268	100.0%

Source: US Census Bureau

Over sixty percent of housing units in Charter Oak are valued at less than $50,000. The median value of owner-occupied units in Charter Oak was $42,385 in 2012. Homes valued at less than $50,000 tend to be aging and in need of revitalization. Due to this, these homes are more susceptible to hazards such as fires, serious storms and other weather related hazards. Since the population has been declining, it will be important to invest in the rehabilitation of existing housing. This will improve the safety of homes and reduce their susceptibility to numerous hazards. Table 2 below displays the value of housing units in Charter Oak in 2012.

Table 2
Value of Charter Oak Housing Units, 2012

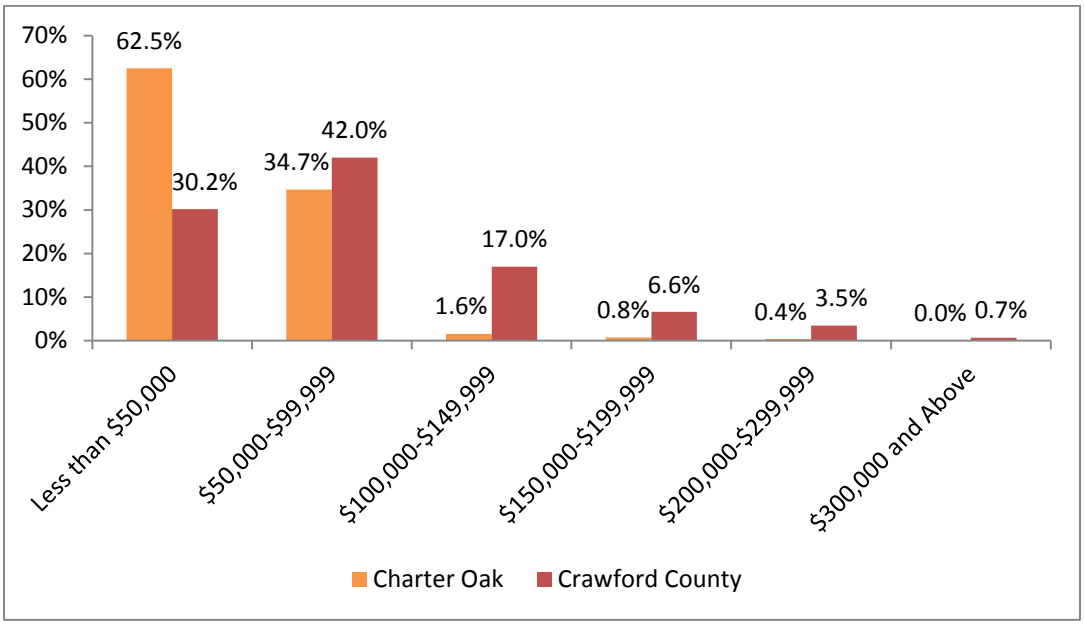
Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	157	62.5%
$50,000-$99,999	87	34.7%
$100,000-$149,999	4	1.6%
$150,000-$199,999	2	0.8%
$200,000-$299,999	1	0.4%
$300,000 and above	0	0.0%
Median Value	$42,385	-

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Charter Oak to Crawford County. Figure 3 shows that Charter Oak has a disproportionate percentage of housing units valued at less than $50,000, even when compared to Crawford County.

Figure 3

Value of Housing Units

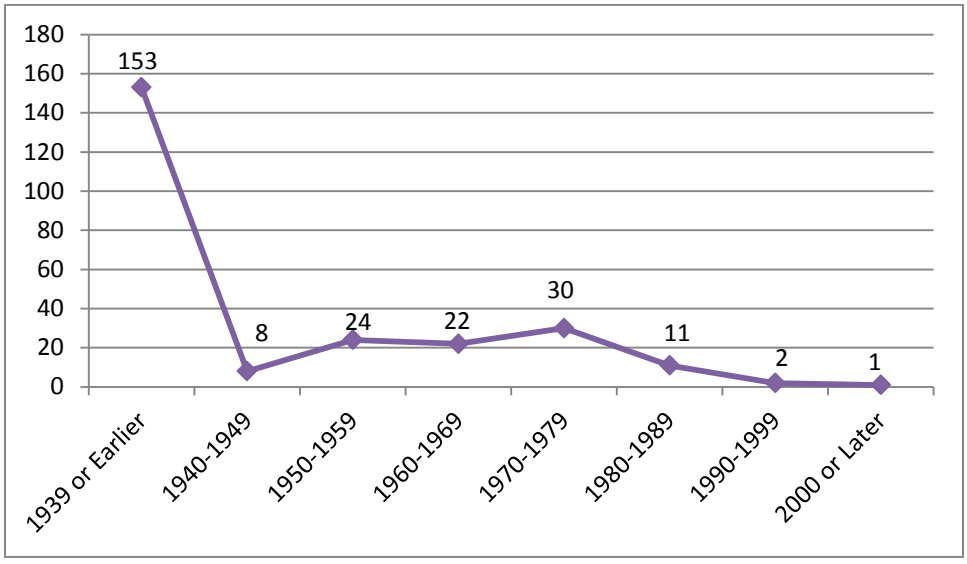


Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Over sixty percent of the current housing stock in Charter Oak was constructed prior to 1940. Housing construction has slowed down considerably since then, but saw an increase between 1970 and 1979. Only 1.2 percent of homes have been constructed since 1990. Figure 4 shows the distribution of housing unit construction in Charter Oak.

Figure 4

Year Housing Unit Constructed



Source: Crawford County Housing Report, October 2012

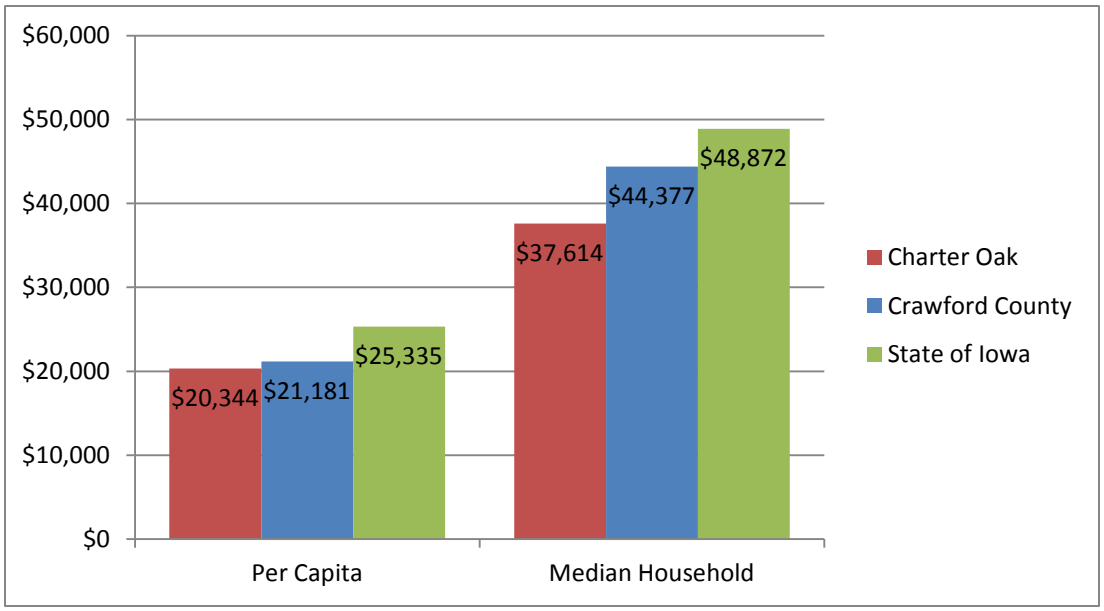
Economic

An important indicator of the economic base in Charter Oak is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 below shows that incomes of those living in Charter Oak are lower than Crawford County and state averages. The average per capita personal income in Charter Oak for the 2006-2010 American Community Survey 5-Year estimate was $837 less per year than Crawford County's average and $4,991 less than the average for the State of Iowa. The median household income in Charter Oak for the same time period trailed that of Crawford County by $6,763 per year and the state by $11,258 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Charter Oak.

Figure 5

Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Charter Oak, according to the American Community Survey, included the $35,000-$49,999 income group. Slightly over thirty-eight percent of households in Charter Oak make less than $25,000 and ten percent of households have an income over $100,000. Table 3 on the following page shows a breakdown of household income in Charter Oak.

Table 3

Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	20	9.6%
$10,000-$14,999	13	6.2%
$15,000-$24,999	47	22.5%
$25,000-$34,999	21	10.0%
$35,000-$49,999	55	26.3%
$50,000-$74,999	16	7.7%
$75,000-$99,999	16	7.7%
$100,000-$149,999	18	8.6%
$150,000-$199,999	3	1.4%
$200,000 or more	0	0.0%
Median Household Income	$37,614	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Charter Oak is typical of many smaller rural Iowa cities due to its dependence on regional employment opportunities. Many residents are required to commute to surrounding communities such as Denison and Harlan. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Educational Services, and Health Care and Social Assistance (29.5%), Manufacturing (14.5%) and Arts, Entertainment, and Recreation, and Accommodation and Food Services (10.1%). These percentages are based on the total number of individuals 16 years and older that are from Charter Oak and are employed.

Table 4

Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	13	6.3%
Construction	10	4.8%
Manufacturing	30	14.5%
Wholesale Trade	10	4.8%
Retail Trade	20	9.7%
Transportation and Warehousing, and Utilities	12	5.8%
Information	0	0.0%
Finance and Insurance, and Real Estates and Rental and Leasing	12	5.8%
Professional, Scientific, and Management, and Administrative and Waste Management Services	7	3.4%
Educational Services, and Health Care and Social Assistance	61	29.5%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	21	10.1%
Other Services, except Public Administration	8	3.9%
Public Administration	3	1.4%
Civilian Employed Population 16 years and over	207	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Changes in Development

Charter Oak has seen limited development since the last plan update.

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Charter Oak.

Table 5

Current Planning and Regulatory Documents for the City of Charter Oak

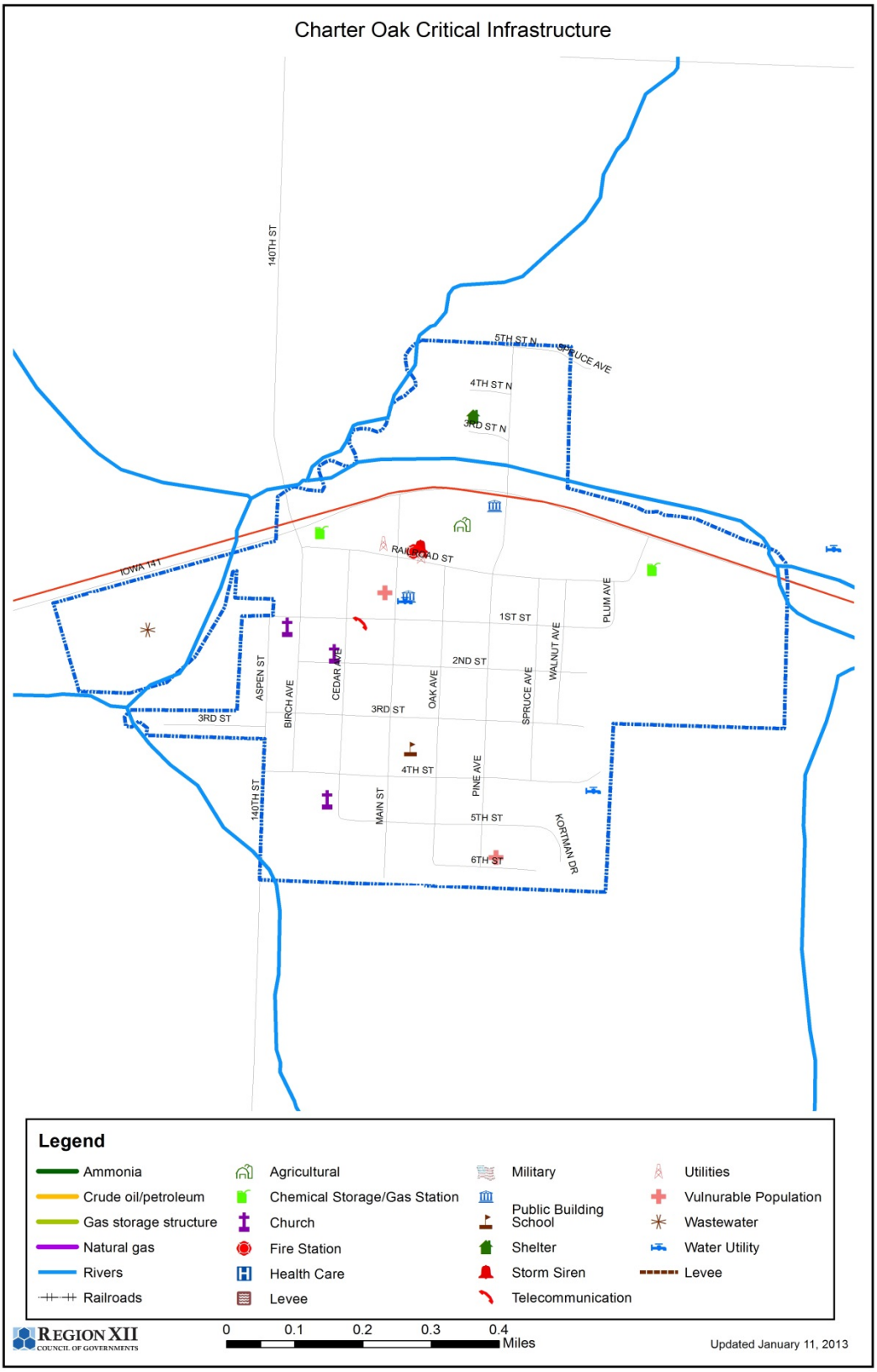
Document	Yes/No	Year
Previous HMP	Yes	2006
Comprehensive Plan	No	-
Building Code	Yes	1977
Zoning Ordinance	Yes	1977
Strategic Plan	No	-
Housing Assessment	Yes	1999
NFIP Participant	Yes	1986

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Charter Oak. They are identified on Map 2

- Fire Station, City Hall
- Warning Siren
- Backup Generator
- Charter Oak A.G.
- Charter Oak A.G. 52-1000 gallon nurse tanks
- Water Plant
- Water Storage
- Wastewater Lagoons
- Water Wells
- City Maintenance Shops
- Community Club
- Mid-American Energy
- Frontier Communication
- Radio Booster Tower
- Charter Oak-Ute School
- Charter Oak Senior Apartments
- Churches
- Park Shelter House, Ball Parks
- Congregate Meal Site
- Louie's Quik Shop

Map 2


Charter Oak Critical Infrastructure
140TH ST
5TH ST N
SPRUCE AVE
4TH ST N
3RD ST N
IOWA 141
RAILROAD ST
1ST ST
PLUM AVE
2ND ST
WALNUT AVE
ASPEN ST
BIRCH AVE
CEDAR AVE
OAK AVE
SPRUCE AVE
3RD ST
4TH ST
PINE AVE
MAIN ST
5TH ST
KORTMAN DR
6TH ST
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0 0.1 0.2 0.3 0.4
Miles
Updated January 11, 2013

Section 3: Risk Assessment

The following table lists the overall results of the Hazard Analysis that the committee member for Charter Oak completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Charter Oak Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Severe Winter Storms	Y	Y	3	2	4	3	2.85
Drought	N	Y	2	2	4	4	2.50
Windstorm	Y	Y	3	1	4	2	2.45
Infrastructure Failure	Y	Y	3	2	1	3	2.40
Hailstorm	Y	Y	3	1	4	1	2.35
Thunderstorm and Lightning	Y	Y	3	1	4	1	2.35
Tornado	N	Y	2	2	4	1	2.20
River Flooding	Y	Y	2	1	4	2	2.00
Radiological	N	N	1	1	4	4	1.75
Hazardous Material	N	N	1	1	4	3	1.65
Human Disease	N	N	1	1	4	3	1.65
Dam and Levee Failure	N	N	1	1	4	2	1.55
Flash Flood	Y	N	1	1	4	2	1.55
Extreme Heat	N	Y	1	1	3	3	1.50
Grass or Wild Land Fire	N	N	1	1	4	1	1.45
Terrorism	N	N	1	1	4	1	1.45
Transportation Incident	N	N	1	1	4	1	1.45
Animal/Plant/Crop Disease	N	N	1	1	1	4	1.30

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Charter Oak were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Charter Oak.

Charter Oak			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	253	$10,299,840	502
Commercial	33	$1,864,600	
Industrial	0	$0	
Agricultural Structures	$0	$0	

The following hazards were determined to have a negligible impact on the City of Charter Oak, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Dam and Levee Failure, Drought, Flash Flood, Animal/Plant/Crop Disease, Hazardous Material, Human Disease, Infrastructure Failure, Radiological, Terrorism and Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	23	$926,986	45
Commercial	3	$167,814	
Industrial	0	$0	
Agricultural Structures	0	$0	

The following hazards were determined to have a limited impact on the City of Charter Oak, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Extreme Heat, Grass or Wild Land Fire, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning, and Windstorm

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	63	$2,574,960	126
Commercial	8	$466,150	
Industrial	0	$0	
Agricultural Structures	0	$0	

The following hazards were determined to have a critical impact on the City of Charter Oak, were they to occur. A shutdown of some facilities and services could last for at least two weeks and some injuries/illness will result in permanent disability. It is estimated that 50% of the city would be impacted.

Tornado

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	127	$5,149,920	251
Commercial	17	$932,300	
Industrial	0	$0	
Agricultural Structures	0	$0	

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

Objective 1: Keep Damages to a Minimum

Action 1.1: Educate city employees about procedures in case of hazard event

Action 1.2: Hold training about chain of command during hazard event

Action 1.3: Conduct safety inspections

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

Objective 2: Improve Warning Capabilities

Action 2.1: Promote NOAA weather radios to residents and businesses

Action 2.2: Connect siren to Denison Communication Center, if possible

Action 2.3: Send out hazard informational flier

Action 2.4: Build a community safe room

Action 2.5: Develop a shelter location plan

Action 2.6: Purchase backup generator for school

Goal: Improve coordination and communication with other relevant organizations and build support for hazard mitigation

Objective 3: An Acceptable Quick Response System in Place between All Safety Groups

Action 3.1: Attend all scheduled meetings

Action 3.2: Liaise regularly with Emergency Management and County Board

Goal: Maintain and support public safety facilities, including equipment and training

Objective 4: All Facilities and Equipment in Peak Condition

Action 4.1: Regularly inspect and receive immediate attention

The City of Charter Oak completed a previous hazard mitigation plan in 2006. The table on the following page displays the status of the previous actions. Any action marked as ongoing or future was carried over to be included in this plan.

Table 8

Charter Oak Previous Mitigation Actions

Charter Oak	Status				
Previous Actions (2006)	**Complete**	**Underway**	**Ongoing**	**Future**	**Canceled**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills			X		
Educate citizens on NOAA weather radios		X			
Expand usage of NOAA weather radios		X			
Replace and maintain snow removal equipment as necessary	X				
Upgrade or add backup generators as necessary			X		
Provide firefighters, law enforcements and EMS departments with adequate training and equipment			X		
Develop a city-wide evacuation plan				X	
Continue fire and emergency response training			X		
Initiate fire prevention program			X		
Continue NFIP participation and follow NFIP policies			X		
Attend training for terrorism when offered			X		
Post signs and increase police surveillance around critical facilities			X		
Evaluate city facilities and identify potential terrorist targets				X	

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for the City of Charter Oak. Table 10 displays the STAPLEE evaluation criteria.

Table 9

Charter Oak STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E				
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Educate city employees about Procedures in Case of Hazard Event	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**15**
Hold training about chain of command during a hazard event	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**15**
Conduct Safety Inspections	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**15**
Promote NOAA weather radios to residents and businesses	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**15**
Send out hazard informational flier	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**15**
Build a community safe room	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N/A	N	N	N/A	N/A	Y	Y	**15**
Develop a shelter location plan	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**15**
Attend all schedules safety group meetings	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**15**
Liaise regularly with Emergency Management and County Board	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**15**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**15**
Develop a city-wide evacuation plan	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Continue fire and emergency response training	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**
Initiate fire prevention program	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**
Continue NFIP participation and follow NFIP policies	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**
Attend training for terrorism when offered	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**
Post signs around critical facilities	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**
Evaluate city facilities and identify potential terrorist targets	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**
Purchase backup generator for school	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**13**
Provide firefighters, law enforcement and EMS departments with adequate training and equipment	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	N/A	N/A	N/A	N/A	N/A	**12**
Connect siren to Denison Communication Center, if possible	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	N/A	Y	N/A	N/A	N/A	N/A	N/A	**11**
Regularly inspect public safety facilities and receive immediate attention	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N/A	Y	N/A	N/A	N/A	N/A	N/A	**11**
Upgrade or add backup generators as necessary	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	N/A	N/A	N/A	N/A	N/A	**11**

Table 10

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Charter Oak outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 11 displays all of the mitigation actions for Charter Oak with their implementation strategy.

Table 11

Charter Oak Action Plan

Educate City Employees about Procedures in Case of a Hazard Event	
Hazards Addressed	Hazardous Material, Structural Failure
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Hold Training about Chain of Command during a Hazard Event	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Conduct Safety Inspections	
Hazards Addressed	Infrastructure Failure
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection, Emergency Services
Target Completion Date	Ongoing

Promote NOAA Weather Radios to Residents and Businesses	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Connect Siren to Denison Communication Center, if possible	
Hazards Addressed	Tornado
Priority	Low
Previous Priority	Not Previously Identified
Responsible Department	City Council, Fire Department
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Send Out Hazard Informational Flier	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	Low
Previous Priority	Low
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Build a Community Safe Room	
Hazards Addressed	Tornado, Windstorm, Severe Winter Storms, Terrorism, Hazardous Material
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Council and Charter Oak Ute School
Estimated Cost	High
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Structural Project
Target Completion Date	Long

Develop a Shelter Location Plan	
Hazards Addressed	Severe Winter Storms, Flash Flood, River Flooding, Terrorism, Hazardous Material
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Council, Fire Department, Charter Oak Ute School
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Purchase Backup Generator for School	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council, Charter Oak Ute School
Estimated Cost	Moderate
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Attend All Scheduled Safety Group Meetings	
Hazards Addressed	All
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	Emergency Services, Police Department, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Mid

Liaise Regularly with Emergency Management and County Board	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Regularly Inspect Public Safety Facilities and Receive Immediate Attention	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection, Emergency Services
Target Completion Date	Ongoing

Educate Citizens about Summer Storms via Public Information Announcements through the Local Media or by Notices on Utility Bills	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Thunderstorm and Lightning
Priority	Medium
Previous Priority	Medium
Responsible Department	City Clerk, City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Upgrade or Add Backup Generators as necessary	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	City Clerk, City Council
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Provide Firefighters, Law Enforcement and EMS Departments with Adequate Training and Equipment	
Hazards Addressed	All
Priority	Medium
Previous Priority	Medium
Responsible Department	City Clerk, City Council
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Develop a City-Wide Evacuation Plan	
Hazards Addressed	Flash Flood, Grass or Wild Land Fire, River Flooding, Dam and Levee Failure, Human Disease, Hazardous Material, Radiological
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Continue Fire and Emergency Response Training	
Hazards Addressed	All
Priority	Medium
Previous Priority	Medium
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Initiate Fire Prevention Program	
Hazards Addressed	Grass and Wild Land Fire, Infrastructure Failure
Priority	High
Previous Priority	High
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Continue NFIP Participation and Follow NFIP Policies by Enforcing Floodplain Management Ordinance	
Hazards Addressed	River Flooding
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Attend Training for Terrorism when offered	
Hazards Addressed	Terrorism
Priority	Low
Previous Priority	Low
Responsible Department	Police Department, Mayor
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Post Signs and Increase Police Surveillance Around Critical Facilities	
Hazards Addressed	Hazardous Material
Priority	Low
Previous Priority	Low
Responsible Department	City Council, Maintenance Department
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Mid

Evaluate City Facilities and Identify Potential Terrorist Targets	
Hazards Addressed	Terrorism
Priority	Low
Previous Priority	Low
Responsible Department	Police Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Incorporation into Other Planning Mechanisms

Where possible, the City of Charter Oak 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:

- Charter Oak Comprehensive Plan
- Charter Oak City Code of Ordinances
- Charter Oak Zoning Ordinance
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

Resolution No. 11-04-2013A

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CITY OF CHARTER OAK ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the City of Charter Oak participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the City of Charter Oak adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 4 **DAY OF** November**, 2013.**

Mayor

ATTEST:

Pamela S. Tripp
City Clerk

Motion by Ronald Schau, seconded by Blaine Schwingdorf.
Vote: Ayes - Dwayne Bolton, Blaine Schwingdorf, Ronald Schau
Absent: Randy Steffen, Randy Weed

Resolution No. _____

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CHARTER OAK-UTE COMMUNITY SCHOOL DISTRICT ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the Charter Oak - Ute Schools participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the Charter Oak - Ute School District adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 17th **DAY OF** November **, 2014.**

Dean Gifford
Chair

ATTEST:
Cathy Carstens
Secretary

Appendix F: City of Deloit

Section 1: Community Profile

City of Deloit History

Jesse Mason was one of the first of many Mormons who settled in Crawford County. Mason's Grove was named after him. Mason Grove eventually became known as Deloit. Deloit was not first choice for the town's name, in fact the town did not even have it listed as an option. When the post office was established, it became necessary to select a town name. It was initially named Boyer Valley and then Bloomington, but there were too many Bloomingtons in the United States, so another name had to be chosen. Mason, Mason Grove and Mason City were suggested, but the name Beloit was chosen. Once again it was decided that there were already too many Beloits, so rather than start the process over, the "B" was changed to a "D" and the town's name was coined. Deloit is the oldest town in Crawford County, having first appeared in the US Census in 1870.

Deloit grew very slowly, but remained a good trading point for local farmers. The first school house in Crawford County was opened in 1856 at Mason's Grove, one-half mile outside present-day Deloit. By the 1860s there were nearly a hundred Mormons in and around Deloit.

The history of Deloit was extracted from *100 years Progress Edition of the Denison Review and Bulletin 1851-1952,* and *Roots of the Reorganized Latter Day Saints in Southern Iowa* by Pearl Wilcox.

Geography and Environment

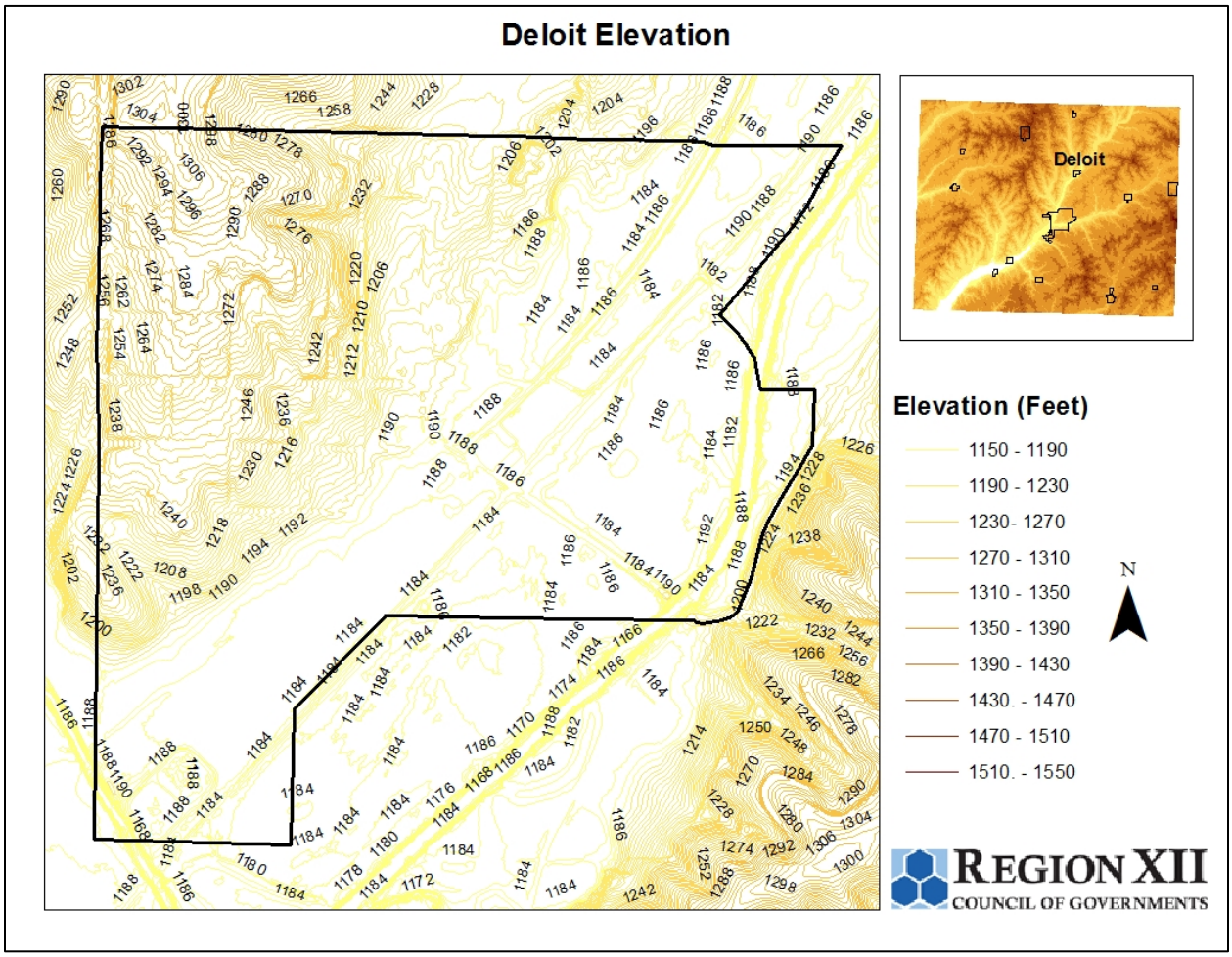
Location

Deloit is located in north central Crawford County. Highway 39 runs through the western edge of Deloit, with Highway 59 running approximately six miles west of Deloit. Deloit is located 7 miles northeast of Denison, 34.7 miles northwest of Carroll, and 80 miles northeast of Omaha.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The northwest corner of Deloit reaches 1,306 while the northeastern corner is as low as 1,182 feet. The following map shows the elevation of Deloit and its relation to the rest of Crawford County.

Map 1



Demographics

Population

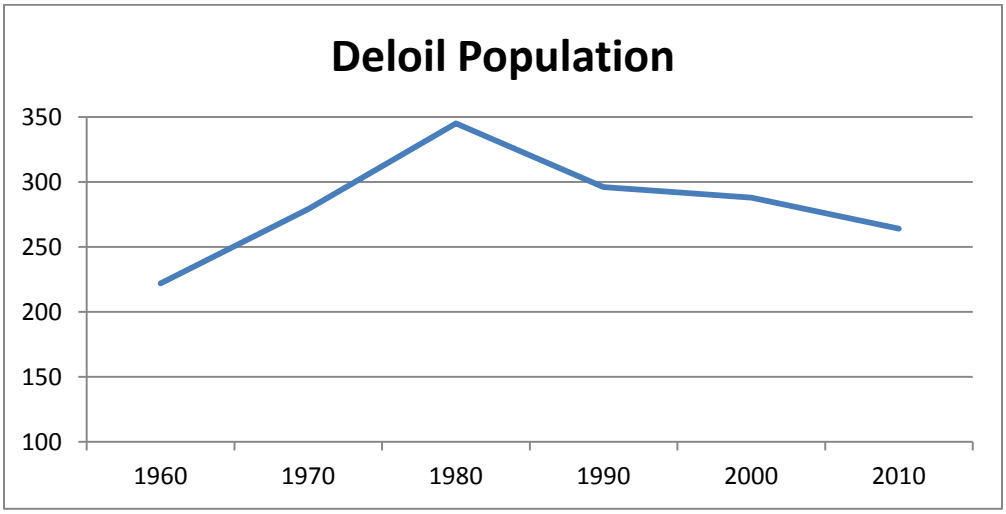
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Deloit's population through the past, present and future trends of the region.

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 education 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.

From 1960 to 1980 the population of Deloit grew from 222 residents to 345 residents. Since 1980, the population of Deloit has continued to decline. The most recent Census stated that Deloit's population was 264 residents. Figure 1 below displays the historic population trend for Deloit.

Figure 1



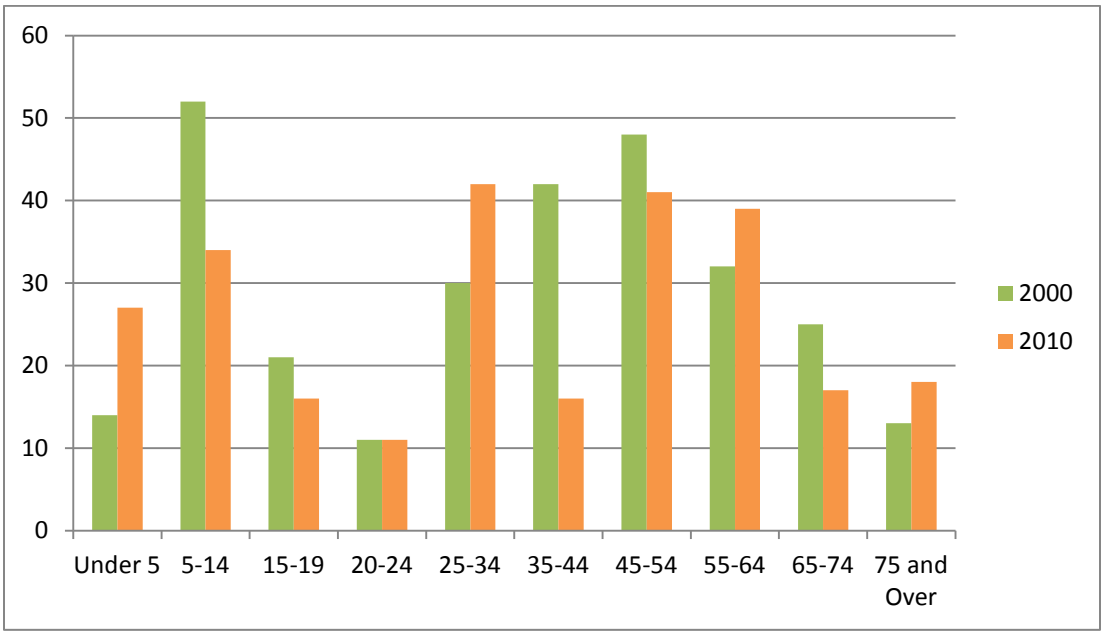
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Deloit from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 35-44 age cohort, which lost twenty-six individuals. Another significant loss came in the 5-14 (-26) age group. Significant increases in population were seen in the under 5 (13), 25-34 (12), 55-64 (7) and 75 and over (5) age groups.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 35-44 age cohort in 2000 would be in the 45-54 age cohort in 2010. Therefore, the 35-44 age cohort from 2000 only lost one individual instead of losing twenty-six individuals as seen in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as "brain drain."

Figure 2

Deloit Age Distribution



Source: US Census Bureau

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.

The number of occupied housing units, along with the percentage of owner-occupied housing units, decreased over the last ten years in Deloit. The occupancy rate in 2010 decreased by slightly over four percent from 2000. Historically, Deloit has consisted of mostly owner-occupied housing units, but the percentage decreased from 82.5 percent in 2000 to 72.5 percent in 2010. The vacancy rate went from 7.3 percent in 2000 to 11.4 percent in 2010. Table 1 shows the housing trends for Deloit from 2000 to 2010.

Table 1

Deloit Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	114	92.7%	109	88.6%
Owner Occupied	94	82.5%	79	72.5%
Renter Occupied	20	17.5%	30	27.5%
Vacant Housing Units	9	7.3%	14	11.4%
Total Housing Units	123	100.0%	123	100.0%

Source: US Census Bureau

Over half of the housing units in Deloit are valued at less than $50,000. The median value of owner-occupied units in Deloit was $44,565 in 2012. Housing units with lower values are more likely to be aging and in need of revitalization. Due to this, these homes are susceptible to hazards such as fires, serious storms and other weather related hazards. Since the population has been declining, it will be important to invest in the rehabilitation of existing housing. This will improve the safety of homes and reduce their susceptibility to numerous hazards. Table 2 below displays the value of housing units in Deloit in 2012.

Table 2
Value of Deloit Housing Units, 2012

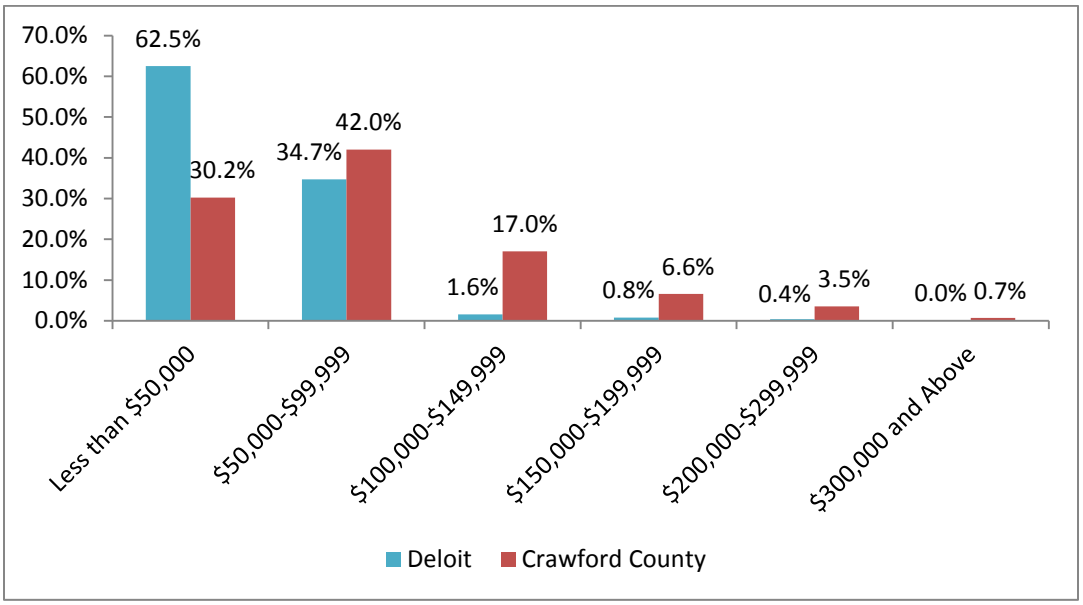
Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	66	56.4%
$50,000-$99,999	45	38.5%
$100,000-$149,999	6	5.1%
$150,000-$199,999	0	0.0%
$200,000-$299,999	0	0.0%
$300,000 and above	0	0.0%
Median Value	$44,565	-

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Deloit to Crawford County. Figure 3 shows that Deloit has a disproportionate percentage of housing units valued at less than $50,000, even when compared to Crawford County.

Figure 3

Value of Housing Units

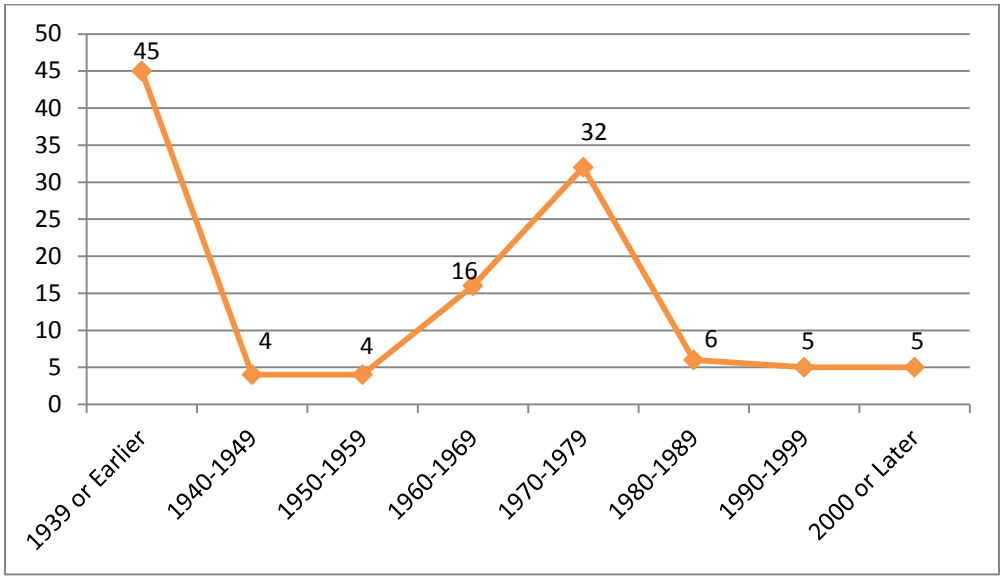


Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Nearly forty percent of the current housing stock in Deloit was constructed prior to 1940. Housing construction has slowed down considerably since then, but saw an increase between 1970 and 1979. Under nine percent of homes have been constructed since 1990. Figure 4 shows the distribution of housing unit construction in Deloit.

Figure 4

Year Housing Unit Constructed



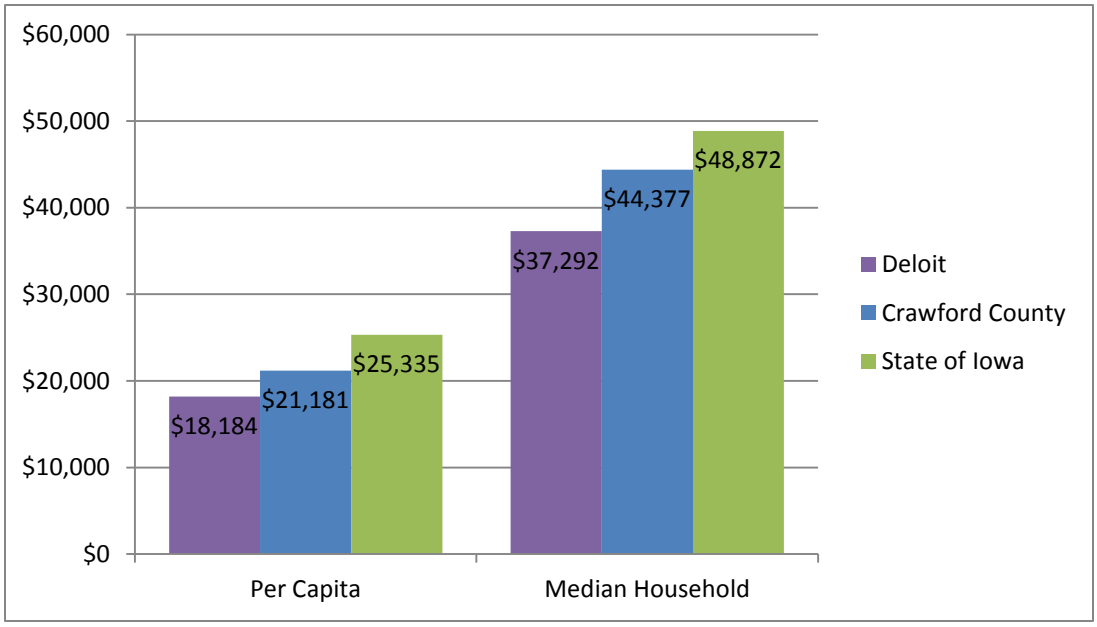
Source: Crawford County Housing Report, October 2012

Economic

An important indicator of the economic base in Deloit is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 below shows that incomes of those living in Deloit are lower than Crawford County and state averages. The average per capita personal income in Deloit for the 2006-2010 American Community Survey 5-Year estimate was $5,830 less per year than Crawford County's average and $9,984 less than the average for the State of Iowa. The median household income in Deloit for the same time period trailed that of Crawford County by $10,716 per year and the state by $15,211 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Dow City.

Figure 5
Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Deloit, according to the American Community Survey, included the $50,000-$74,999 (20.5%) followed closely by the $35,000-$49,999 (19.7%) income group. Over thirty percent of households in Deloit make less than $25,000 and 14.5 percent of households have an income of $75,000 or greater. Table 3 on the following page shows a breakdown of household income in Deloit.

Table 3

Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	10	8.6%
$10,000-$14,999	15	12.8%
$15,000-$24,999	13	11.1%
$25,000-$34,999	15	12.8%
$35,000-$49,999	23	19.7%
$50,000-$74,999	24	20.5%
$75,000-$99,999	15	12.8%
$100,000-$149,999	2	1.7%
$150,000-$199,999	0	0.0%
$200,000 or more	0	0.0%
Median Household Income	$37,292	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Deloit is typical of many smaller rural Iowa cities due to its dependence on regional employment opportunities. Many residents are required to commute to surrounding communities such as Denison and Harlan. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Educational Services, and Health Care and Social Assistance (29.5%), Manufacturing (21.2%) and Retail Trade (14.4%). These percentages are based on the total number of individuals 16 years and older that are from Deloit and are employed.

Table 4
Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	0	0.0%
Construction	17	11.6%
Manufacturing	31	21.2%
Wholesale Trade	2	1.4%
Retail Trade	21	14.4%
Transportation and Warehousing, and Utilities	8	5.5%
Information	3	2.1%
Finance and Insurance, and Real Estates and Rental and Leasing	0	0.0%
Professional, Scientific, and Management, and Administrative and Waste Management Services	2	1.4%
Educational Services, and Health Care and Social Assistance	43	29.5%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	16	10.9%
Other Services, except Public Administration	3	2.1%
Public Administration	0	0.0%
Civilian Employed Population 16 years and over	146	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Changes in Development

The City of Deloit has not seen any major development since the last plan update. There are no plans for development in the near future.

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Deloit.

Current Planning and Regulatory Documents for the City of Deloit

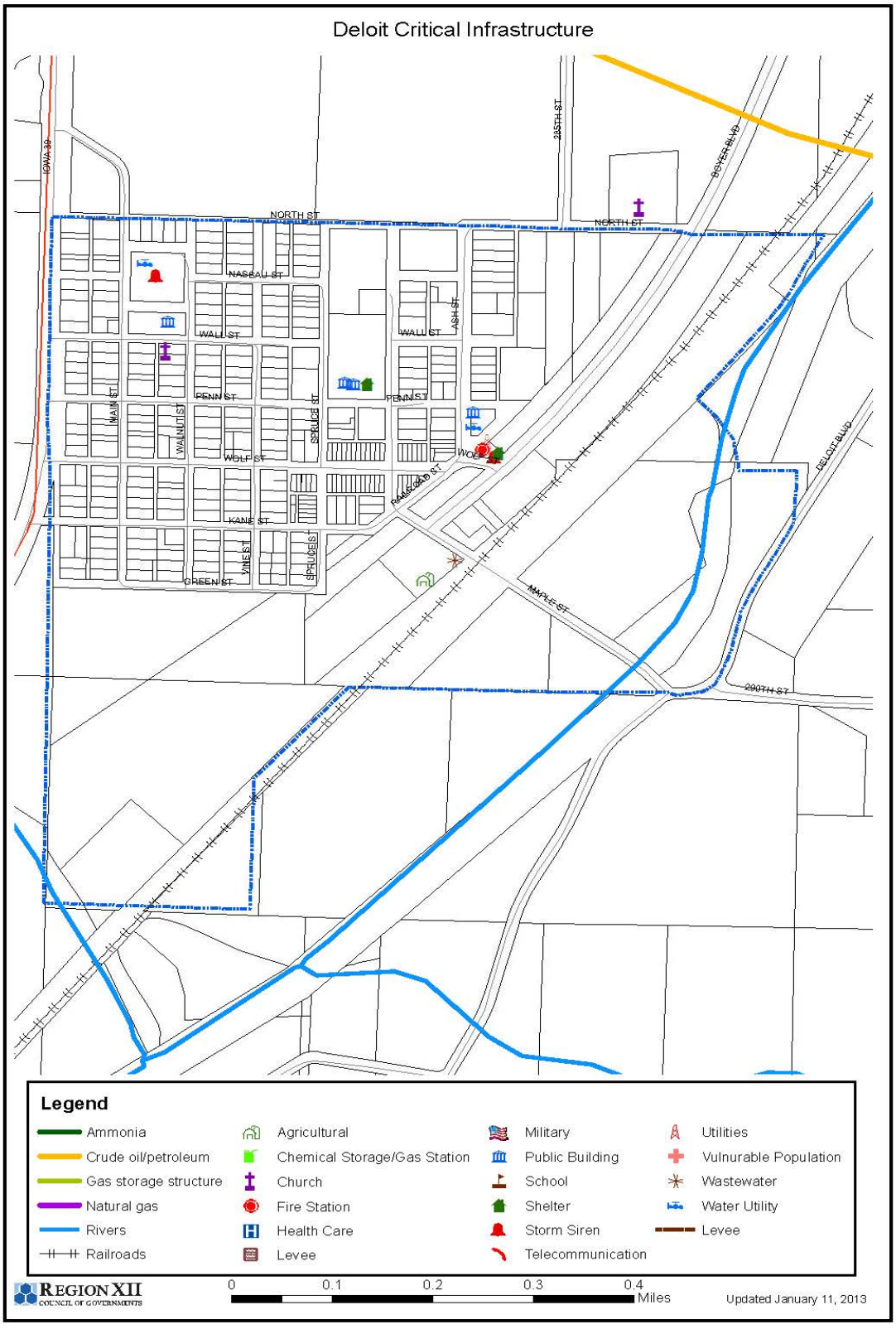
Document	Yes/No	Year
Previous HMP	Yes	2006
Comprehensive Plan	No	-
Building Code	Yes	1985
Zoning Ordinance	No	-
Strategic Plan	No	-
Housing Assessment	Yes	1999
NFIP Participant	Yes	

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Deloit. They are identified on Map 2

- Fire Station
- Pump Station
- Lift Station, Wastewater
- Water Tower
- Storm Siren
- Tin Buildings
- Tin and Wood Buildings
- Church
- Grain Bins
- Wells

Map 2


Deloit Critical Infrastructure
IOWA 39
285TH ST
BEAVER BLVD
NORTH ST
NASSAU ST
WALL ST
ASH ST
PENN ST
MAIN ST
WALNUT ST
SPRUCE ST
WOLF ST
RAILROAD ST
KANE ST
VINE ST
GREEN ST
MAPLE ST
DELOIT BLVD
290TH ST
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0
0.1
0.2
0.3
0.4
Miles
Updated January 11, 2013

Section 3: Risk Assessment

In addition to the four hazards omitted by the county-wide plan, the City of Deloit determined that dam and levee failure was not applicable or would have little effect on the community as there is no dam or levee immediately upstream that would impact Deloit if it should fail.

The following table lists the overall results of the Hazard Analysis that the committee member for Deloit completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Deloit Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Thunderstorm and Lightning	Y	Y	4	1	4	2	2.90
Hailstorm	Y	Y	4	1	4	1	2.80
Windstorm	Y	Y	4	1	4	1	2.80
Transportation Incident	Y	Y	2	3	4	2	2.60
Severe Winter Storms	Y	Y	3	2	2	3	2.55
River Flooding	Y	Y	3	1	3	3	2.40
Infrastructure Failure	Y	Y	2	2	4	3	2.40
Extreme Heat	Y	Y	3	1	2	3	2.25
Hazardous Material	N	Y	1	2	4	3	1.95
Radiological	N	N	1	2	4	2	1.85
Drought	Y	Y	2	1	1	4	1.75
Terrorism	N	N	1	2	4	2	1.75
Human Disease	Y	Y	1	2	1	4	1.60
Flash Flood	Y	Y	1	1	4	2	1.55
Grass or Wild Land Fire	N	N	1	1	4	2	1.55
Tornado	Y	Y	1	1	4	1	1.45
Animal/Plant/Crop Disease	Y	Y	1	1	1	3	1.20

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Deloit were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Deloit.

Deloit			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	120	$5,650,900	264
Commercial	7	$249,630	
Industrial	0	$0	
Agricultural Structures	$0	$0	

The following hazards were determined to have a negligible impact on the City of Deloit, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Drought, Extreme Heat, Flash Flood, Grass or Wild Land Fire, Hailstorm, River Flooding, Thunderstorm and Lightning, Windstorm, Animal/Plant/Crop Disease and Terrorism

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	11	$508,581	24
Commercial	1	$22,467	
Industrial	0	$0	
Agricultural Structures	0	$0	

The following hazards were determined to have a limited impact on the City of Deloit, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Severe Winter Storms, Tornado, Hazardous Material, Human Disease, Infrastructure Failure and Radiological

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	30	$1,412,725	132
Commercial	2	$62,408	
Industrial	0	$0	
Agricultural Structures	0	$0	

The following hazards were determined to have a critical impact on the City of Deloit, were they to occur. A shutdown of some facilities and services could last for at least two weeks and some injuries/illness will result in permanent disability. It is estimated that 50% of the city would be impacted.

Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	60	$2,825,450	132
Commercial	4	$124,815	
Industrial	0	$0	
Agricultural Structures	0	$0	

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

- Objective 1: Minimize Impact of Flooding
  - Action 1.1: Improve drainage
  - Action 1.2: Construct flood gates

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

- Objective 2: Improve Public Warning Capabilities
  - Action 2.1: Siren drills
  - Action 2.2: Promote NOAA weather radios
  - Action 2.3: Develop plan for housebound folks

Goal: Maintain and support public safety facilities, including equipment and training

- Objective 3: Siren Maintenance
  - Action 3.1: 911 siren and fire department siren check
- Objective 4: Protect Health and Safety
  - Action 4.1: Install generator in community center

The City of Deloit completed a previous hazard mitigation plan in 2006. The table on the following page displays the status of the previous actions. Any action marked as ongoing or future was carried over to be included in this plan.

Table 8

Deloit Previous Actions

Deloit	**Status**				
Previous Actions (2006)	**Complete**	**Underway**	**Ongoing**	**Future**	**Canceled**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills			X		
Purchase a generator to operate water and sewer pumps during power outage	X				
Replace and maintain snow removal equipment as necessary	X				
Upgrade or add back-up generators as necessary	X				
Educate residents on extreme heat and cold weather via the local media and/or utility billings			X		
Provide firefighters, law enforcements and EMS departments with adequate training and equipment		X			
Develop a city-wide evacuation plan		X			
Continue fire and emergency response training		X			
Initiate fire prevention program		X			
Reduce water usage			X		
Construct new water tower	X				
Develop a contingency plan if water supply is diminished or contaminated				X	
Continue NFIP participation and follow NFIP policies			X		
Attend training for terrorism when offered				X	
Post signs and increase police surveillance around critical facilities		X			
Evaluate city facilities and identify potential terrorist targets			X		

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for the City of Deloit. Table 10 displays the STAPLEE evaluation criteria.

Table 9

Deloit STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Install generator in community center	Y	N	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**
Improve drainage	Y	N	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y	**13**
Construct flood gates	Y	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	**13**
Reduce water usage	Y	N	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	N	N	Y	N	Y	Y	Y	**13**
Siren drills	Y	N	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**12**
911 siren and fire department siren check	Y	N	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**12**
Develop contingency plan if water supply is diminished or contaminated	Y	N	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	N	N	Y	N/A	Y	Y	Y	**12**
Attend training for terrorism when offered	Y	N	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**12**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**10**
Educate residents on extreme heat and cold weather via the local media and/or utility billings	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**10**
Continue NFIP participation and follow NFIP policies	Y	N	Y	Y	N	N	N	N	N	Y	N	Y	Y	N	Y	Y	N	N	Y	M	Y	Y	Y	**10**

STAPLEE Criteria	S		T			A			P			L			E				E				
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Evaluate city facilities and identify potential terrorist targets	Y	N	Y	N	N	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**10**
Promote NOAA weather radios	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	N	N	N/A	N/A	N/A	N/A	N/A	**8**
Develop plan for housebound folks	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	N	Y	N/A	N/A	N/A	N/A	N/A	**6**

Table 10

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Deloit outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 11 displays all of the mitigation actions for Deloit with their implementation strategy.

Table 11

Deloit Action Plan

Install Generator in Community Center	
Hazards Addressed	Infrastructure Failure
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Improve Drainage	
Hazards Addressed	Flash Flood, River Flooding, Thunderstorm and Lightning
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Moderate
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Structural Project
Target Completion Date	Mid

Reduce Water Usage	
Hazards Addressed	Drought
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Prevention
Target Completion Date	Mid

Siren Drills	
Hazards Addressed	Tornado
Priority	High
Previous Priority	High
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

911 Siren and Fire Department Siren Check	
Hazards Addressed	Tornado
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Develop a Contingency Plan if Water Supply is Diminished or Contaminated	
Hazards Addressed	Drought, Hazardous Material, Radiological, Infrastructure Failure
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Prevention
Target Completion Date	

Attend Training for Terrorism when offered	
Hazards Addressed	Terrorism
Priority	High
Previous Priority	High
Responsible Department	City Council and Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Educate Citizens about Summer Storms via Public Information Announcements through the Local Media or by Notices on Utility Bills	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Thunderstorm and Lightning
Priority	High
Previous Priority	High
Responsible Department	City Council and Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Educate Residents on Extreme Heat and Cold Weather via the Local Media and/or Utility Billings	
Hazards Addressed	Extreme Heat, Severe Winter Storms
Priority	High
Previous Priority	High
Responsible Department	City Council and Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Continue NFIP Participation and Follow NFIP Policies by Enforcing Floodplain Management Ordinance	
Hazards Addressed	River Flooding
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Evaluate City Facilities and Identify Potential Terrorist Targets	
Hazards Addressed	Terrorism
Priority	High
Previous Priority	High
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Promote NOAA Weather Radios	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	High
Previous Priority	High
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Develop Plan for Housebound Folks	
Hazards Addressed	Tornado, Extreme Heat, River Flooding, Severe Winter Storms, Terrorism, Radiological
Priority	High
Previous Priority	High
Responsible Department	City Council and Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Incorporation into Other Planning Mechanisms

Where possible, the City of Deloit 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:

- Deloit City Code of Ordinances
- Deloit Comprehensive Plan
- Deloit Zoning Ordinance
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

COPY

Resolution No. 003-2013

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CITY OF DELOIT ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the City of Deloit participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the City of Deloit adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 12th **DAY OF** November, **2013.**

Mayor

ATTEST:

City Clerk

Appendix G: City of Denison

Section 1: Community Profile

City of Denison History

The City of Denison was named by the Reverend J.W. Denison, a Baptist preacher who organized the Providence Western Land Company and platted the town in 1856. Denison was incorporated on August 10, 1875 and is the county seat.

Geography and Environment

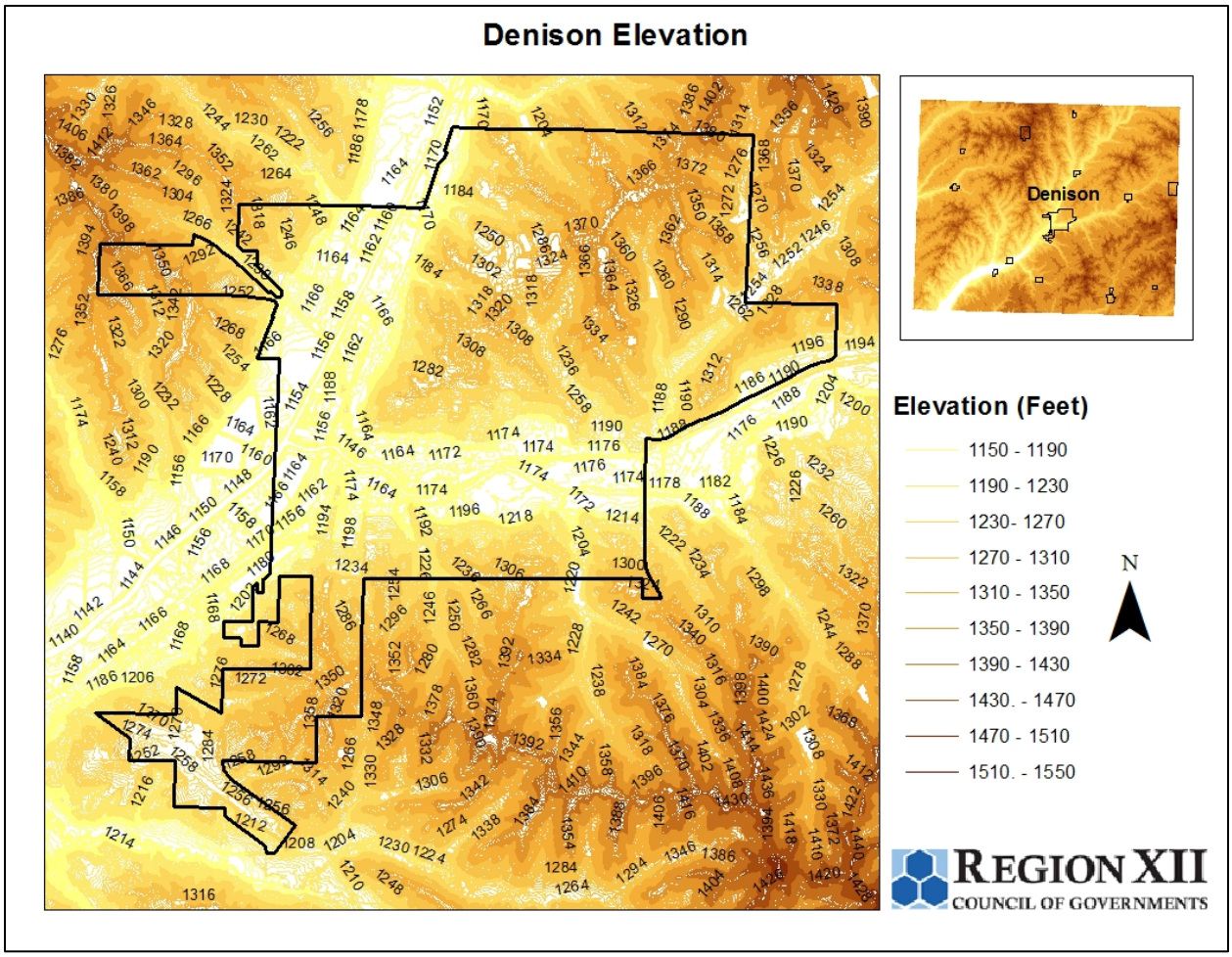
Location

Denison is located in west central Iowa at the junction of the Boyer and East Boyer Rivers in the center of Crawford County. Situated in the rolling hills of western Iowa, Denison is approximately 77 miles southeast of Sioux City, 114 miles northwest of Des Moines, and 70 miles northeast of Omaha, Nebraska.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The northeast corner of Denison reaches 1,372 feet, while west central Denison is as low as 1,154 feet. The following map shows the elevation of Denison and its relation to the rest of Crawford County.

Map 1



Demographics

Population

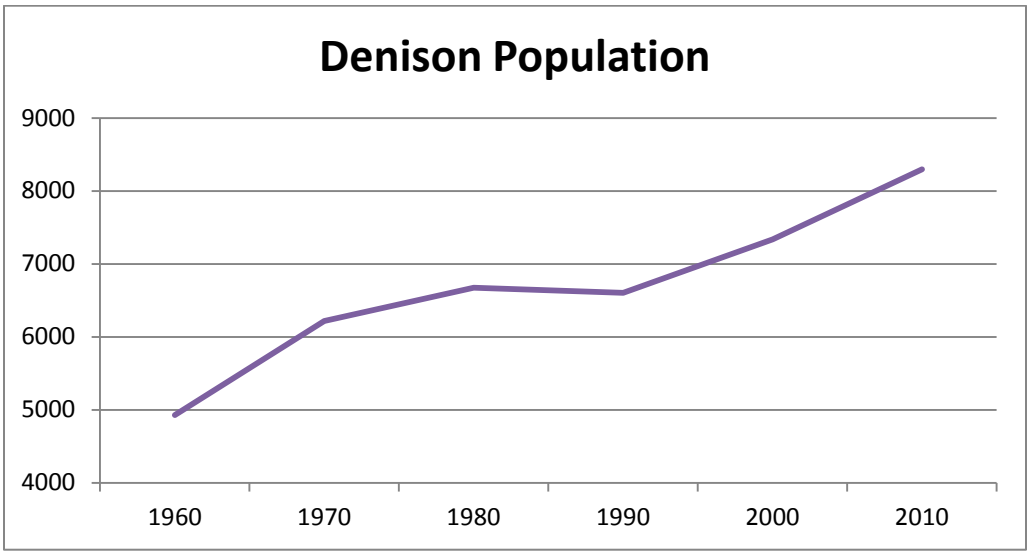
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Denison's population through the past, present and future trends of the region.

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 education 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.

Denison's population has been continually increasing over the past 50 years, except for a minor decrease between 1980 and 1990. Denison's population in 1960 was 4,930 residents; by 2010 it had grown to 8,298 residents. Denison's only decrease in population came between 1980 and 1990. In 1980, Denison had a population of 6,675; by 1990 it slipped to 6,604. Figure 1 below displays the historic population trend for Denison.

Figure 1



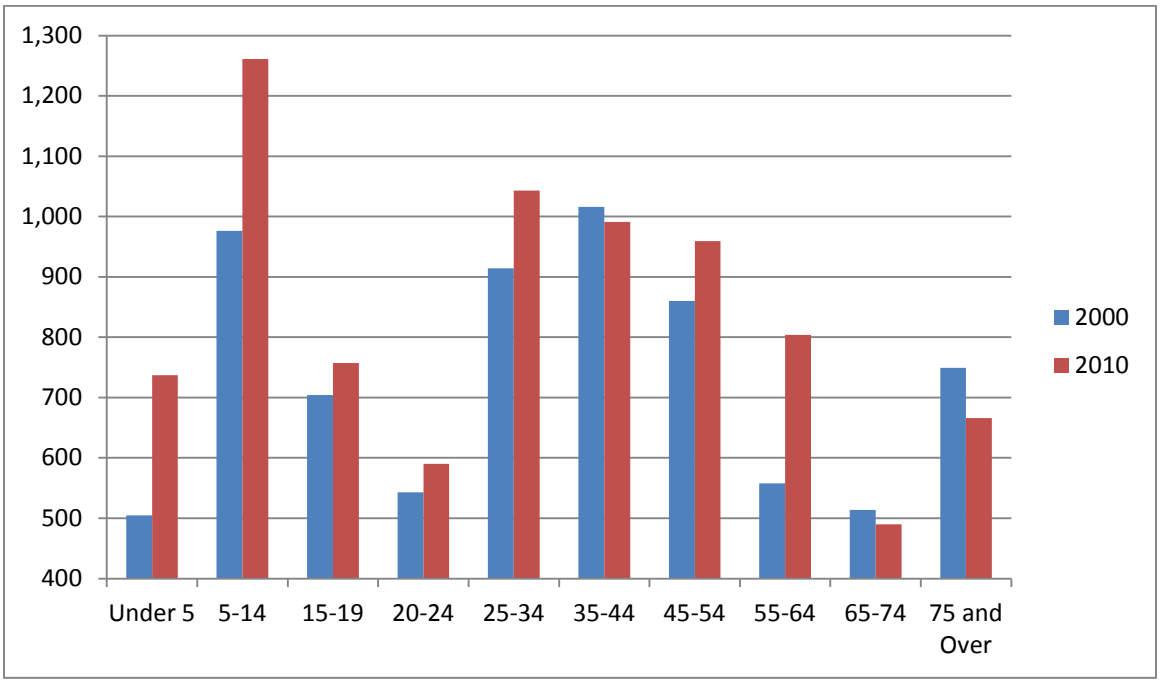
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Denison from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 75 and over age cohort, which lost eighty-three individuals. Other significant losses came in the 35-44 (-25) and 65-74 (-24) age groups. Significant increases in population were seen in the 5-14 (285), 55-64 (246), 55-64 (7) and under 5 (232) age groups.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 35-44 age cohort in 2000 would be in the 45-54 age cohort in 2010. Therefore, the 35-44 age cohort from 2000 lost fifty-seven individuals instead of twenty-six individuals as seen in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as "brain drain."

Figure 2

Denison Age Distribution



Source: US Census Bureau

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.

Unlike most communities in the area, the number of occupied housing units, along with the total number of housing units, increased over the last ten years in Denison. The occupancy rate in 2010 increased by half a percent from 2000. The percentage of owner-occupied housing units decreased slightly from 65 percent in 2000 to 63.7 percent in 2010. The vacancy rate went from 5.7 percent in 2000 to 5.1 percent in 2010. Table 1 shows the housing trends for Denison from 2000 to 2010.

Table 1

Denison Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	2,674	94.3%	2,816	94.9%
Owner Occupied	1,739	65.0%	1,794	63.7%
Renter Occupied	935	35.0%	1,022	36.3%
Vacant Housing Units	163	5.7%	152	5.1%
Total Housing Units	2,837	100.0%	2,968	100.0%

Source: US Census Bureau

Only fifteen percent of housing units in Denison are valued at less than $50,000. This is a smaller percentage than seen in surrounding communities. The median value of owner-occupied units in Denison was $83,330 in 2012. Table 2 below displays the value of housing units in Denison in 2012.

Table 2

Value of Denison Housing Units, 2012

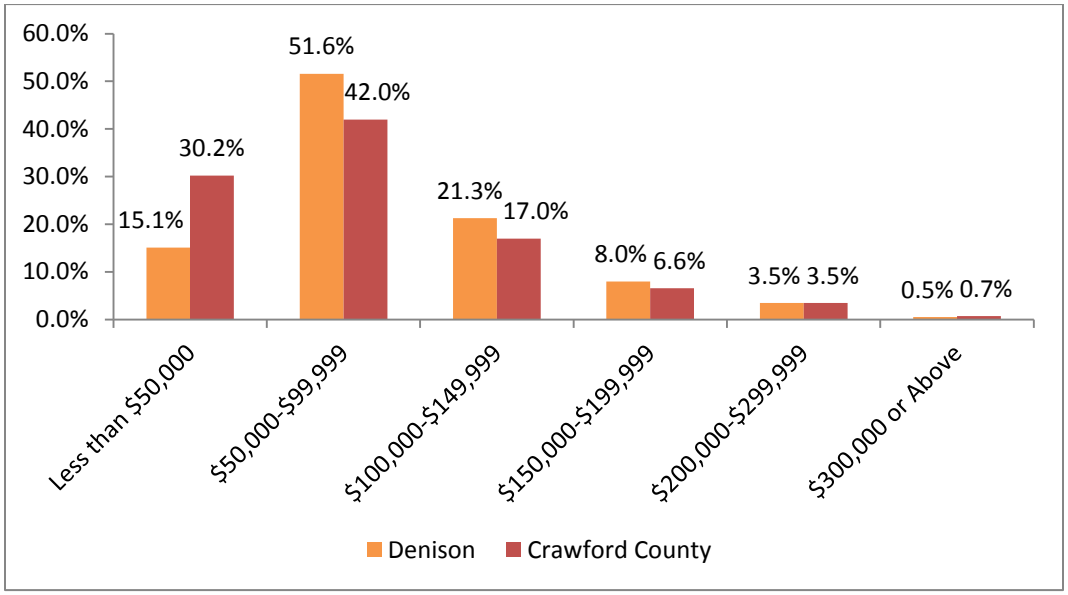
Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	323	15.1%
$50,000-$99,999	1,103	51.6%
$100,000-$149,999	454	21.3%
$150,000-$199,999	171	8.0%
$200,000-$299,999	75	3.5%
$300,000 and above	11	0.5%
Median Value	$83,330	-

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Denison to Crawford County. Figure 3 shows that Denison has fewer housing units valued at less than $50,000 than Crawford County's average.

Figure 3

Value of Housing Units

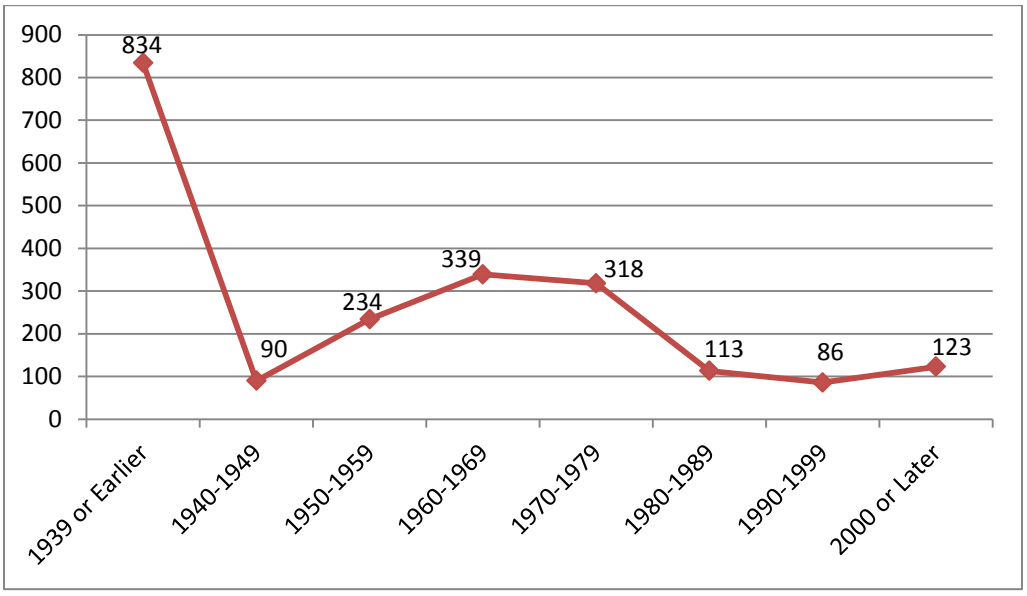


Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Nearly forty percent of the current housing stock in Denison was constructed prior to 1940. Housing construction saw a large increase between 1960 and 1979. Nearly ten percent of homes have been constructed since 1990. Figure 4 shows the distribution of housing unit construction in Denison.

Figure 4

Year Housing Unit Constructed



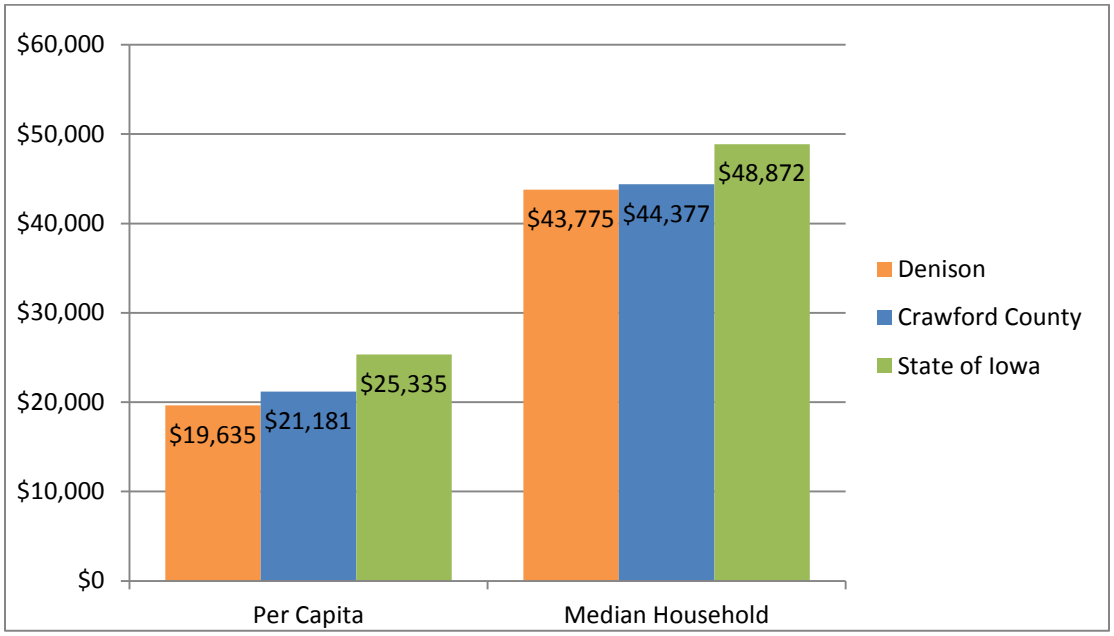
Source: Crawford County Housing Report, October 2012

Economic

An important indicator of the economic base in Denison is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 below shows that incomes of those living in Denison are lower than Crawford County and state averages. The average per capita personal income in Denison for the 2006-2010 American Community Survey 5-Year estimate was $1,546 less per year than Crawford County's average and $5,700 less than the average for the State of Iowa. The median household income in Dension for the same time period trailed that of Crawford County by $602 per year and the state by $5,097 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Denison.

Figure 5
Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Denison, according to the American Community Survey, included the $35,000-$49,999 (21.7%), followed closely by the $50,000-$74,999 (20.6%) income group. Nearly twenty-five percent of households in Denison make less than $25,000 and nine percent of households have an income of $100,000 or more. Table 3 on the following page shows a breakdown of household income in Denison.

Table 3

Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	179	6.3%
$10,000-$14,999	173	6.1%
$15,000-$24,999	356	12.5%
$25,000-$34,999	414	14.6%
$35,000-$49,999	615	21.7%
$50,000-$74,999	584	20.6%
$75,000-$99,999	260	9.1%
$100,000-$149,999	162	5.7%
$150,000-$199,999	32	1.1%
$200,000 or more	65	2.3%
Median Household Income	$43,775	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97% of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Denison is by far the leading employment provider in Crawford County and has a strong economic base. The employment by industry statistics are shown in Table 4. The leading industries in employment were Manufacturing (40.2%) and Educational Services, and Health Care and Social Assistance (16.2%). Taking advantage of regional strengths and industries will increase revenue generated in the community, resulting in increased income levels and housing values. These percentages are based on the total number of individuals 16 years and older that are from Denison and are employed.

Table 4

Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	132	3.6%
Construction	357	9.9%
Manufacturing	1,449	40.2%
Wholesale Trade	0	0.0%
Retail Trade	238	6.6%
Transportation and Warehousing, and Utilities	121	3.4%
Information	21	0.6%
Finance and Insurance, and Real Estates and Rental and Leasing	135	3.7%
Professional, Scientific, and Management, and Administrative and Waste Management Services	84	2.3%
Educational Services, and Health Care and Social Assistance	583	16.2%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	330	9.1%
Other Services, except Public Administration	84	2.3%
Public Administration	74	2.1%
Civilian Employed Population 16 years and over	3,608	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Changes in Development

Denison has seen major development since the last plan update. Much of this development has occurred on the north and west portions of the community. These developments have included both residential and commercial developments including the Crawford County Memorial Hospital.

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Denison.

Table 5
Current Planning and Regulatory Documents for the City of Denison

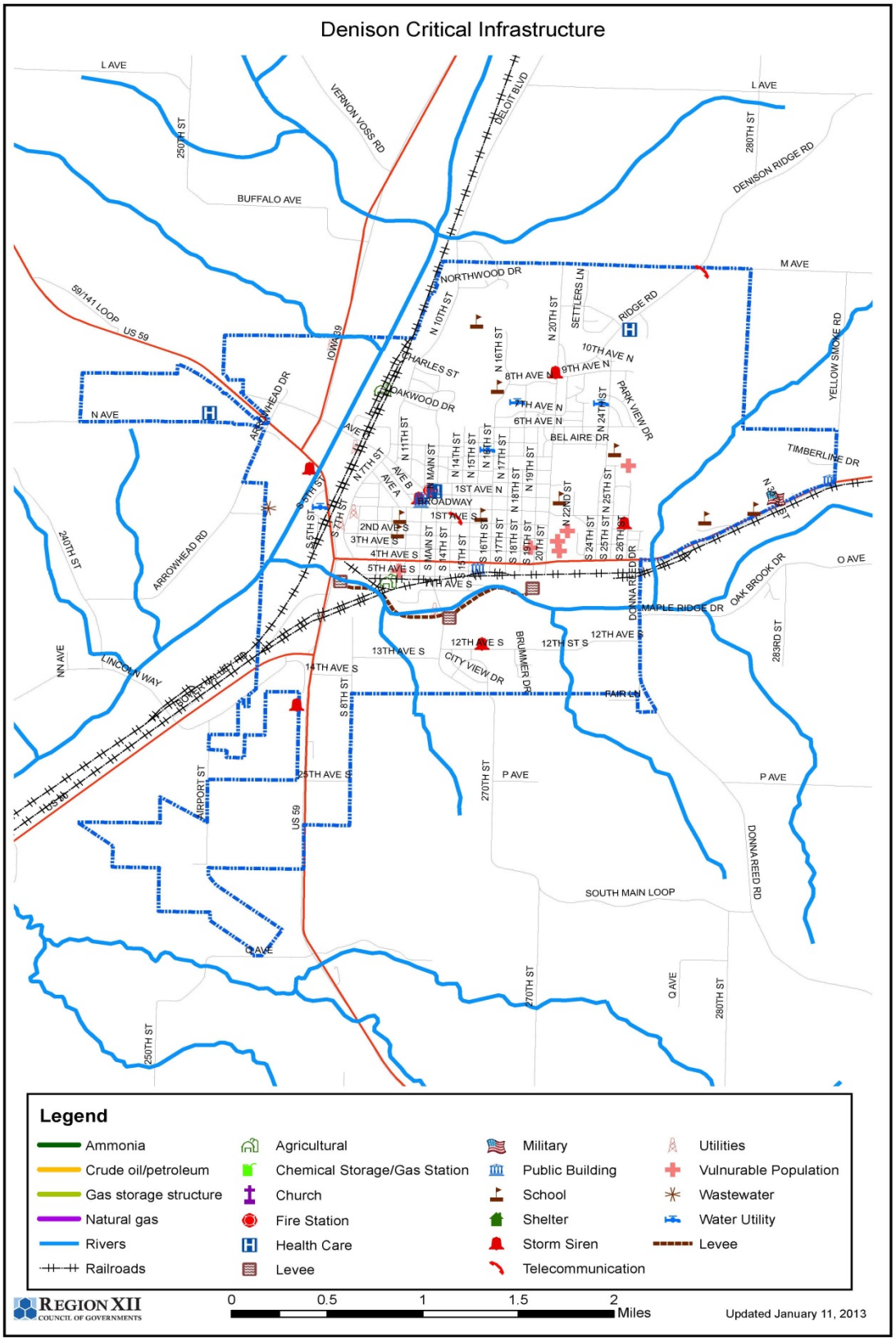
Document	Yes/No	Year
Previous HMP	Yes	2010
Comprehensive Plan	No	-
Building Code	Yes	2011
Zoning Ordinance	Yes	2013
Strategic Plan	Yes	1997
Housing Assessment	Yes	1999
NFIP Participant	Yes	1982

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Denison and the Denison Community Schools. They are identified on Map 2

- Denison K-3 Elementary School
- Denison 6-8 Middle School
- Denison 9-12 High School
- St. Rose PK-5 School
- Zion PK-8
- Broadway Elementary School 4-5
- Imagination Station
- Open Arms Pre-School
- Bus Barn
- Job Corp
- WIT
- Public Works
- Police Department
- Fire Station
- Armory
- City Hall
- Denison Municipal Utilities
- Water Treatment
- Wastewater
- Water Towers
- Ave C Substation
- South Main Substation
- Black Hills Energy
- WIPCO
- Frontier
- KDSN Radio
- Crawford Co. Hospital
- Crawford Co. Public Health
- Crawford Co. Courthouse
- Crawford Co. Maintenance Shop
- Reed House
- Denison Care
- Evantide
- Wesco
- Airport
- Storm Sirens
- State Patrol
- Farmers Co Op
- Farm Land
- Crawford Co. Foods
- Appa Fine Foods
- City Levees

Map 2


Denison Critical Infrastructure
L AVE
VERNON VOSS RD
DELOIT BLVD
250TH ST
BUFFALO AVE
280TH ST
DENISON RIDGE RD
M AVE
NORTHWOOD DR
59/141 LOOP
US 59
IOWA 89
N 10TH ST
N 20TH ST
SETTLERS LN
RIDGE RD
CHARLES ST
N 16TH ST
10TH AVE N
9TH AVE N
8TH AVE N
7TH AVE N
6TH AVE N
OAKWOOD DR
N 24TH ST
PARK VIEW DR
YELLOW SMOKE RD
N AVE
ARROWHEAD DR
BEL AIRE DR
TIMBERLINE DR
N 11TH ST
N 14TH ST
N 15TH ST
N 17TH ST
N 19TH ST
MAIN ST
AVE B
AVE A
1ST AVE N
BROADWAY
1ST AVE S
2ND AVE S
3TH AVE S
4TH AVE S
5TH AVE S
6TH AVE S
N 22ND ST
S 24TH ST
S 25TH ST
S 26TH ST
240TH ST
ARROWHEAD RD
O AVE
OAK BROOK DR
MAPLE RIDGE DR
DONNA REED DR
283RD ST
12TH AVE S
12TH ST S
12TH AVE
13TH AVE S
14TH AVE S
CITY VIEW DR
BRUNER DR
FAIR LN
LINCOLN WAY
S 8TH ST
25TH AVE S
AIRPORT ST
270TH ST
P AVE
US 59
SOUTH MAIN LOOP
DONNA REED RD
Q AVE
280TH ST
250TH ST
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0
0.5
1
1.5
2
Miles
Updated January 11, 2013

Section 3: Risk Assessment

The following table lists the overall results of the Hazard Analysis that the committee members for Denison completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Denison Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Hailstorm	Y	Y	4	2	4	1	3.10
Windstorm	Y	Y	4	2	3	2	3.05
Extreme Heat	Y	Y	4	2	1	3	2.85
Grass or Wild Land Fire	Y	Y	4	1	4	1	2.80
Flash Flood	Y	Y	3	2	4	2	2.75
Thunderstorm and Lightning	Y	Y	4	1	3	2	2.75
Hazardous Material	Y	Y	3	2	4	2	2.75
Transportation Incident	Y	Y	3	2	4	2	2.75
Tornado	Y	Y	3	2	4	1	2.65
Infrastructure Failure	N	N	1	3	4	4	2.35
River Flooding	Y	Y	2	2	3	3	2.25
Human Disease	N	N	1	3	3	4	2.20
Severe Winter Storms	Y	Y	3	1	2	2	2.15
Dam and Levee Failure	N	N	1	3	3	3	2.10
Terrorism	N	N	1	2	4	3	1.95
Animal/Plant/Crop Disease	N	N	1	3	1	4	1.90
Radiological	N	N	1	1	2	4	1.45
Drought	Y	N	1	1	1	4	1.30

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Denison and the Denison Community Schools were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Denison.

Denison			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	2,119	$175,015,840	8,298
Commercial	300	$71,343,930	
Industrial	16	$16,760,690	
Agricultural Structures	8	$855,940	

The following hazards were determined to have a negligible impact on the City of Denison and the Denison Community Schools, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Drought, Grass or Wild Land Fire, Severe Winter Storms and Thunderstorm and Lightning

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	191	$15,751,426	747
Commercial	27	$6,420,954	
Industrial	1	$1,508,462	
Agricultural Structures	1	$77,035	

The following hazards were determined to have a limited impact on the City of Denison and the Denison Community Schools, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Extreme Heat, Flash Flood, Hailstorm, River Flooding, Tornado, Windstorm, Hazardous Material, Terrorism and Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	530	$43,753,960	2,075
Commercial	75	$17,835,983	
Industrial	4	$4,190,173	
Agricultural Structures	2	$213,985	

The following hazards were determined to have a critical impact on the City of Denison and the Denison Community Schools, were they to occur. A shutdown of some facilities and services could last for at least two weeks and some injuries/illness will result in permanent disability. It is estimated that 50% of the city would be impacted. It should be noted that no school facilities are located in the special flood hazard area.

Dam and Levee Failure, Animal/Plant/Crop Disease, Human Disease, Infrastructure Failure

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	1,060	$87,507,920	4,149
Commercial	150	$35,671,965	
Industrial	8	$8,380,345	
Agricultural Structures	4	$427,970	

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

Objective 1: Maintain Ring Levees

Action 1.1: Periodic/Routine inspection and maintenance of levees

Objective 2: Operation Plans between Critical Agencies

Action 2.1: Planning and development of redundancy plans for equipment, communications and records

Objective 3: Improve Public Infrastructure and Critical Assets in Hazard Impact Areas

Action 3.1: Purchase backup generator for critical city facilities

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

Objective 4: Establish a Public Information Officer Position for the City

Action 4.1: Identify potential candidates and provide necessary training

Goal: Improve coordination and communication with other relevant organizations and build support for hazard mitigation

Objective 5: Plan and Provide Additional Multi-Organizational Training Opportunities and Functional Drills

Action 5.1: 911 Schedule drills and training opportunities

The City of Denison completed a previous hazard mitigation plan in 2010. The table below displays the status of the previous actions. Any action marked as ongoing or future was carried over to be included in this plan.

Table 8

Denison Previous Mitigation Actions

Denison	**Status**				
Previous Actions (2006)	**Complete**	**Underway**	**Ongoing**	**Future**	**Canceled**
Identify potential storm shelters throughout Denison to serve as designated storm shelters and construct a new storm shelter as necessary	X				
Evaluate, upgrade and expand warning sirens into public areas not already covered	X				
Educate residents about NOAA radios			X		
Install the remaining electric overhead facilities underground			X		

Previous Actions (2006)	Complete	Underway	Ongoing	Future	Canceled
Secure funding for an electric overhead facilities underground, apply for grants			X		
Adopt and enforce uniform building code		X			
Acquire a generator to back up the Community Center				X	
Secure funding for a generator, apply for grants				X	
Replace and maintain snow removal equipment as necessary			X		
Maintain and improve snow emergency route and evacuation plan			X		
Complete grade control structure upstream from the Union Pacific Railroad Bridge	X				
Rehabilitate concrete weir structure between the South Main Street Bridge and the Donna Reed Bridge	X				
Continue and complete storm sewer system upgrades			X		
Secure funding for storm sewer upgrades, apply for grants			X		
Repair/replace all existing wastewater/sewer lines			X		
Secure funding for wastewater lines and pumps, apply for grants			X		
Continue participation in NFIP			X		
Continue to train local volunteers as much as feasibly possible			X		
Seek funding for hazard mitigation training			X		
Attend training for terrorism when offered			X		
Post signs and increase police surveillance around critical facilities			X		
Annually review the hazard mitigation plan			X		
Revise and upgrade the communication equipment			X		

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table below shows the STAPLEE analysis for the City of Denison. Table 10 displays the STAPLEE evaluation criteria.

Table 9

Denison STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Purchase backup generator for critical city facilities	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N/A	Y	Y	Y	**22**
Periodic/routine inspection and maintenance of levees	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N/A	Y	Y	**20**
Planning and development of redundancy plans for equipment, records and communications	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N/A	Y	Y	**20**
Acquire a generator to back up the community center	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Replace and maintain snow removal equipment as necessary	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Maintain and improve snow emergency route and evacuation plan	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Continue and complete storm sewer system upgrades	Y	N	Y	M	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N/A	N/A	Y	Y	**18**
Continue participation in NFIP	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	M	Y	M	Y	M	N	Y	Y	**18**
Install the remaining electric overhead facilities underground	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N	Y	Y	**17**

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Identify potential candidates for Public Information Officer and provide necessary training	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Schedule drills and training opportunities	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Educate residents about NOAA radios	Y	N	Y	M	N	Y	M	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**16**
Repair/replace all existing wastewater/sewer lines	Y	N	Y	M	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	Y	Y	**16**
Secure funding for wastewater lines and pumps, apply for grants	M	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	Y	Y	**16**
Continue to train local volunteers as much as feasibly possible	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Seek funding for hazard mitigation training	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Attend training for terrorism when offered	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Annually review the hazard mitigation plan	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Revise and upgrade the communication equipment	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Post signs and increase police surveillance around critical facilities	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**

Table 10

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Denison outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 11 displays all of the mitigation actions for Denison with their implementation strategy.

Table 11

Denison Action Plan

Purchase Backup Generator for Critical City Facilities	
Hazards Addressed	Human Disease
Priority	High
Previous Priority	High
Responsible Department	Denison Municipal Utilities
Estimated Cost	Moderate
Potential Funding Source	Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Periodic/Routine Inspection and Maintenance of Levees	
Hazards Addressed	Dam and Levee Failure
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	Flood Officer
Estimated Cost	Low
Potential Funding Source	Federal
Mitigation Measure Category	Prevention
Target Completion Date	Ongoing

Planning and Development of Redundancy Plans for Equipment, Communications and Records	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council, Public Works, Fire Department, Police Department, Public Health, First Responders
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Acquire a Generator to Back Up Community Center	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	City Manager
Estimated Cost	Low
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Replace and Maintain Snow Removal Equipment as necessary	
Hazards Addressed	Severe Winter Storms
Priority	Medium
Previous Priority	Medium
Responsible Department	Public Works
Estimated Cost	Moderate
Potential Funding Source	State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Maintain and Improve Snow Emergency Route and Evacuation Plan	
Hazards Addressed	Severe Winter Storms
Priority	Medium
Previous Priority	Medium
Responsible Department	Police Department, Public Works
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Continue and Complete Storm Sewer System Upgrades	
Hazards Addressed	Flash Flood, River Flooding
Priority	High
Previous Priority	High
Responsible Department	City Council and Denison Municipal Utilities
Estimated Cost	High
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Structural Project
Target Completion Date	Mid

Continue NFIP Participation and Follow NFIP Policies by Enforcing Floodplain Management Ordinance	
Hazards Addressed	River Flooding
Priority	High
Previous Priority	High
Responsible Department	Flood Officer
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Install the Remaining Electric Overhead Facilities Underground	
Hazards Addressed	Tornado, Windstorm, Hailstorm, Severe Winter Storms, Thunderstorm and Lightning
Priority	High
Previous Priority	High
Responsible Department	Denison Municipal Utilities
Estimated Cost	High
Potential Funding Source	Local
Mitigation Measure Category	Prevention
Target Completion Date	Mid

Identify Potential Candidates for Public Information Officer and Provide Necessary Training	
Hazards Addressed	All
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	EMA
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Long

Schedule Drills and Training Opportunities	
Hazards Addressed	All
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	Denison School Board and Fire Department
Estimated Cost	Moderate
Potential Funding Source	Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Educate Residents about NOAA Radios	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	Medium
Previous Priority	Medium
Responsible Department	EMA
Estimated Cost	Minimal
Potential Funding Source	State
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Repair/Replace All Existing Wastewater/Sewer Lines	
Hazards Addressed	Infrastructure Failure
Priority	High
Previous Priority	High
Responsible Department	Denison Municipal Utilities
Estimated Cost	High
Potential Funding Source	Local, State
Mitigation Measure Category	Structural Project
Target Completion Date	Long

Secure Funding for Wastewater Lines and Pumps, apply for grants	
Hazards Addressed	Infrastructure Failure
Priority	High
Previous Priority	High
Responsible Department	Denison Municipal Utilities
Estimated Cost	High
Potential Funding Source	Local, State
Mitigation Measure Category	Structural Project
Target Completion Date	Long

Continue to Train Local Volunteers as much as Feasibly Possible	
Hazards Addressed	All
Priority	High
Previous Priority	High
Responsible Department	Fire Department, Public Health
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Seek Funding for Hazard Mitigation Training	
Hazards Addressed	All
Priority	Medium
Previous Priority	Medium
Responsible Department	City Manager
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Attend Training for Terrorism when offered	
Hazards Addressed	Terrorism
Priority	Low
Previous Priority	Low
Responsible Department	Fire Department, Police Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Annually Review the Hazard Mitigation Plan	
Hazards Addressed	All
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Revise and Upgrade the Communication Equipment	
Hazards Addressed	All
Priority	High
Previous Priority	High
Responsible Department	EMA
Estimated Cost	Moderate
Potential Funding Source	Local, Federal
Mitigation Measure Category	Prevention
Target Completion Date	Mid

Post Signs and Increase Police Surveillance around Critical Facilities	
Hazards Addressed	Terrorism
Priority	Medium
Previous Priority	Medium
Responsible Department	Police Department, City Council
Estimated Cost	Moderate
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Long

Incorporation into Other Planning Mechanisms

Where possible, the City of Denison 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
- Denison Comprehensive Plan
- Denison County Code of Ordinances
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

RESOLUTION NO. 2013-42

RESOLUTION ADOPTING MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR THE CITY OF DENISON, IOWA

WHEREAS, the Board of Supervisors of Crawford County, Iowa, has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

WHEREAS, the City of Denison, Iowa participated in the planning process for the Crawford County Multi-Jurisdictional Hazard Mitigation Plan and said plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 as provided by the Iowa Homeland Security and Emergency Management Division; and

WHEREAS, said Crawford County Multi-Jurisdictional Hazard Mitigation Plan has been presented to the City Council for approval, and

NOW, THEREFORE, IT IS HEREBY RESOLVED BY THE CITY COUNCIL OF THE CITY OF DENISON, IOWA THAT:

The City of Denison, Crawford County, Iowa, hereby adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan as adopted by the Crawford County Board of Supervisors on July 16, 2013.

Passed and approved this 5th day of November, 2013.

Dennis Fineran

Dennis Fineran, Mayor

ATTEST:

Lisa K Koch

Lisa K. Koch, City Clerk

It was moved by Council member Mahrt and seconded by Council member Rodriguez that the foregoing Resolution be adopted. The motion was duly put to vote of the Council, the ayes and nays were called and the vote thereon was as follows:

AYES: Mahrt, Rodriguez, Hough, Leinen

NAYS: None

ABSENT: Ahart

Whereupon the Mayor declared the motion duly carried and the Resolution duly adopted.

CERTIFICATE

I, Lisa K. Koch, City Clerk of the City of Denison, Iowa, hereby certify that the foregoing is a true copy of a Resolution adopted by the City Council of the City of Denison, Iowa, at a regular meeting of the City Council held on the 5th day of November, 2013, and the vote thereon as recorded in the records of the City now in my custody.

Dated this 5th day of November, 2013.

Lisa K Koch

Lisa K. Koch, City Clerk

(CITY SEAL)

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE DENISON COMMUNITY SCHOOL DISTRICT ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the Denison Community Schools participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the Denison Community Schools adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 18 **DAY OF** August **, 2014.**

Chair

ATTEST:

Secretary

Appendix H: City of Dow City

Section 1: Community Profile

City of Dow City History

Initially Dow City was named Crawford, one of the earliest towns to be settled in Crawford County. The town was renamed Dowville, in honor of Mr. and Mrs. Simeon E. Dow, a prominent man in the town. The first school in the township was taught in the summer of 1858. The Northwestern Railroad was built in 1866 with a stagecoach line from the end of the railroad route to Council Bluffs along with a telegraph line, bringing Dowville in touch with the rest of the region. On July 21 1868, the first post office was established in Dowville. In 1873, there were seven houses in Dowville. By 1876, Dowville had one schoolhouse, one hotel, one flouring mille, one elevator, an agricultural warehouse, a cheese factory, a lumberyard, three dry goods stores, a drugstore, and a harness shop. In 1879, the name of the town was changed from Dowville to Dow City.

Several factors contributed to Dow City's slow growth. The establishment of Arion decreased Dow City's growth potential; the firm of Dow and Graves, which was important during Dow City's first few decades, closed; a fire in 1891 destroyed the flour house; another fire in 1895 destroyed the furniture store, twice; and in 1904 the Exchange Bank closed resulting in huge losses to depositors.

Geography and Environment

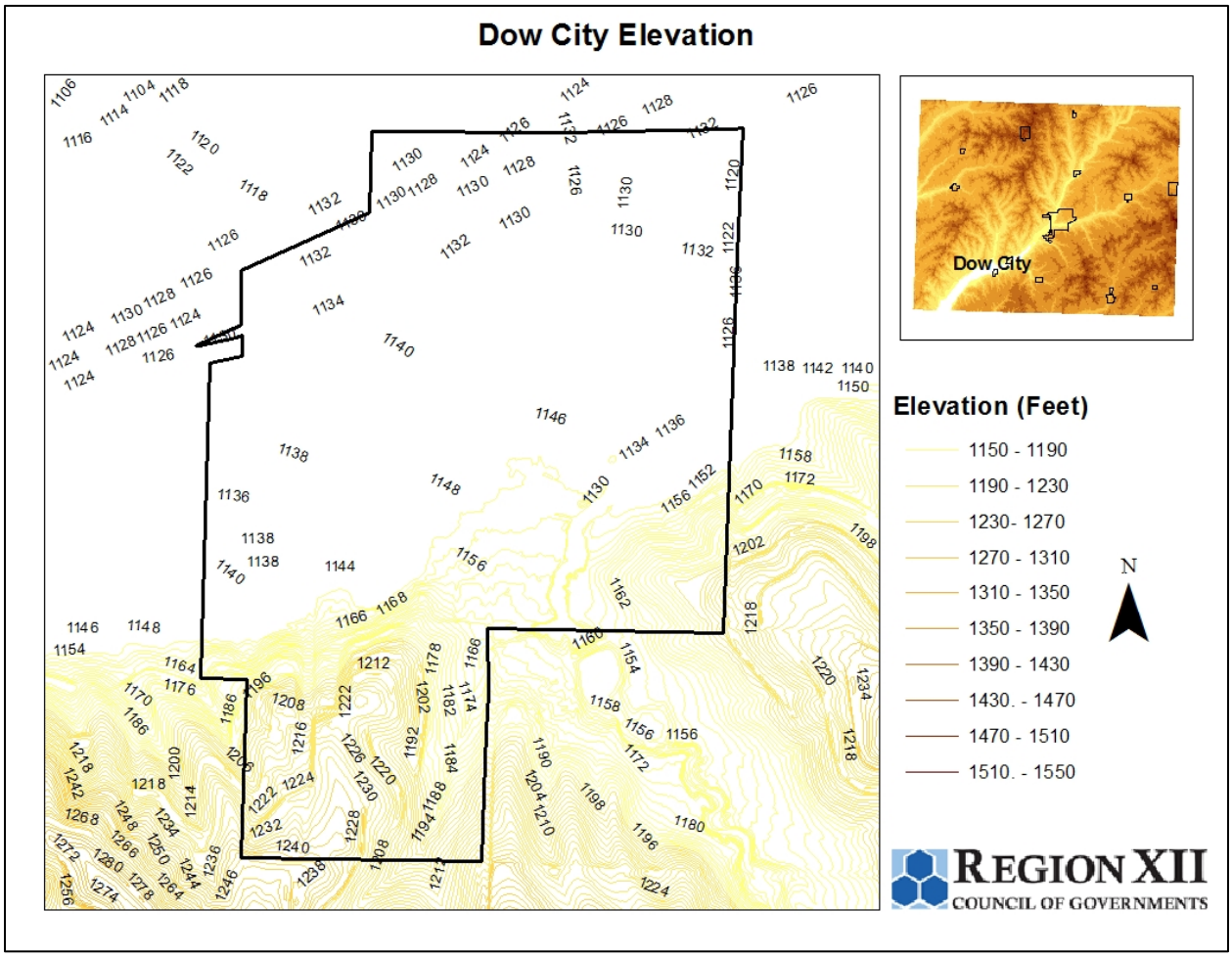
Location

Dow City is located in southwestern Crawford County. Highway 30 runs through the northern portion of town. Dow City is located 10.2 miles southwest of Denison, 27.5 miles northwest of Harlan, and 64 miles northeast of Omaha.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The southern portion of Dow City reaches 1,240 feet and the elevation decreases the further north one travels. The following map shows the elevation of Dow City and its relation to the rest of Crawford County.

Map 1



Demographics

Population

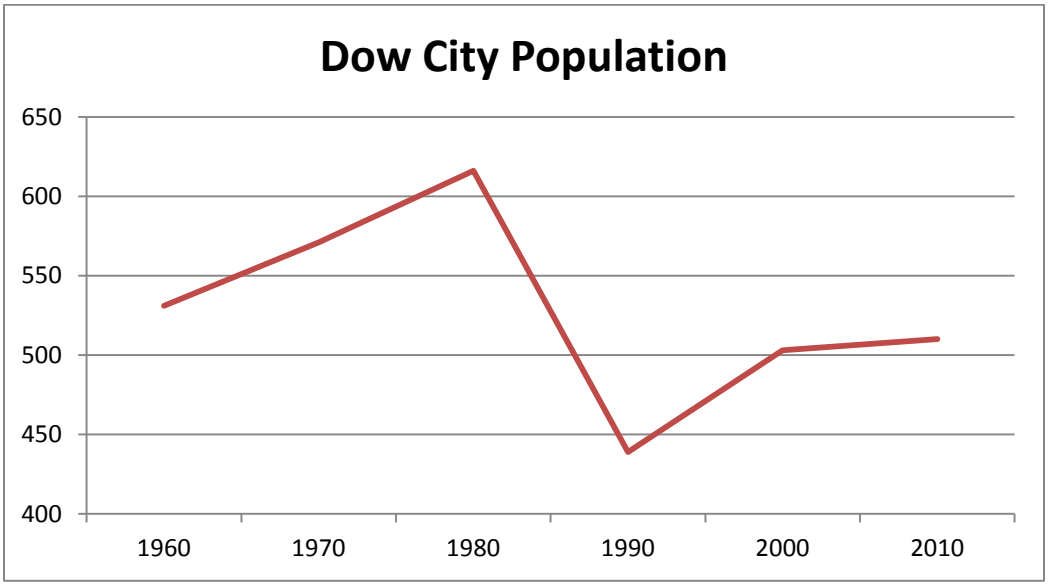
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Dow City's population through the past, present and future trends of the region.

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 education 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.

From 1960 to 1980 the population of Dow City grew from 531 residents to 616 residents. 1990 saw a sharp decline in residents from 616 to 439. Since 1990, Dow City has experienced growth, although 2000 to 2010 was limited, and 2010 numbers are still below the 1960 population numbers. Figure 1 below displays the historic population trend for Dow City.

Figure 1



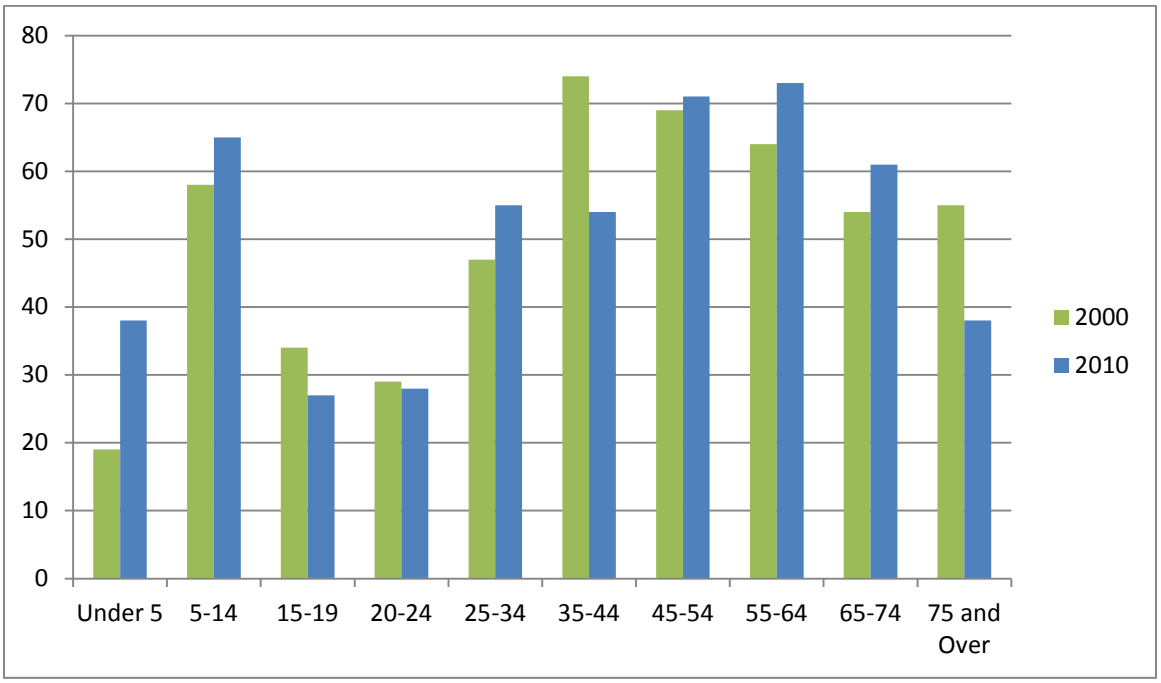
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Dow City from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 35-44 age cohort, which lost twenty individuals. Another significant loss came in the 75 and over (-17) age group. Significant increases in population were seen in the under 5 (19), 55-64 (9), and 25-34 (8) age groups.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 35-44 age cohort in 2000 would be in the 45-54 age cohort in 2010. Therefore, the 35-44 age cohort from 2000 only lost three individuals, a smaller total than in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as “brain drain.”

Figure 2

Dow City Age Distribution



Source: US Census Bureau

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.

The percentage of occupied housing units in Dow City decreased over the last ten years. The occupancy rate in 2010 decreased by one percent from 2000. Owner-occupied housing units and vacant housing units remained similar from 2000 to 2010. Owner-occupied housing units increased by 1.8 percent and vacant housing units increased by one percent. Table 1 shows the housing trends for Dow City from 2000 to 2010.

Table 1

Dow City Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	227	91.5%	219	90.5%
Owner Occupied	164	72.2%	162	74.0%
Renter Occupied	63	27.8%	57	26.0%
Vacant Housing Units	21	8.5%	23	9.5%
Total Housing Units	248	100.0%	242	100.0%

Source: US Census Bureau

Over sixty percent of the housing units in Dow City are valued at less than $50,000. Housing units with lower values are more likely to be aging and in need of revitalization. Due to this, these homes are susceptible to hazards such as fires, serious storms and other weather related hazards. Since the population has been declining, it will be important to invest in the rehabilitation of existing housing. This will improve the safety of homes and reduce their susceptibility to numerous hazards. Table 2 below displays the value of housing units in Dow City in 2012.

Table 2
Value of Dow City Housing Units, 2012

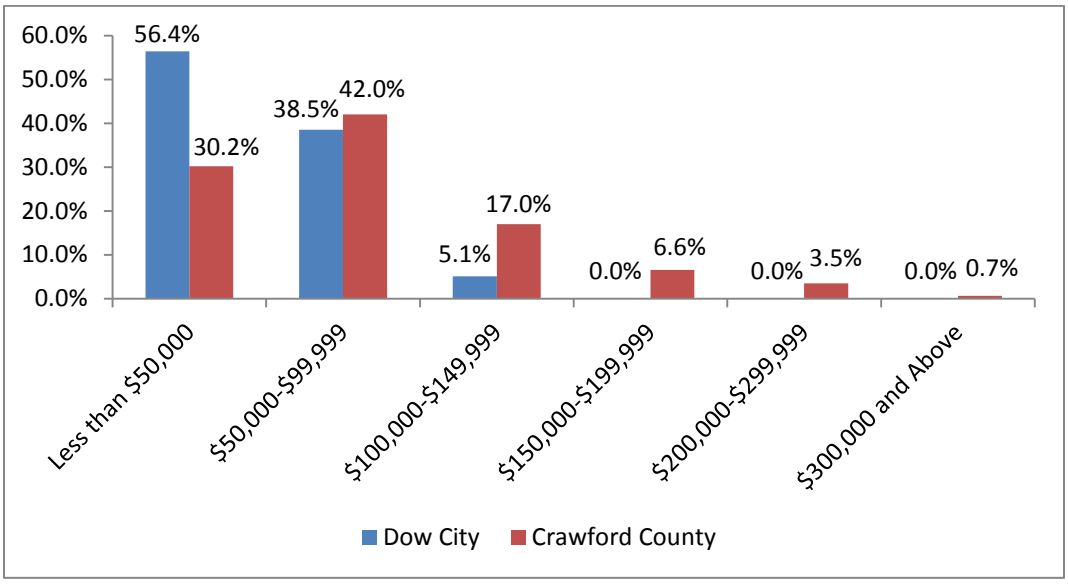
Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	129	63.2%
$50,000-$99,999	68	33.3%
$100,000-$149,999	6	3.0%
$150,000-$199,999	1	0.5%
$200,000-$299,999	0	0.0%
$300,000 and above	0	0.0%
Median Value	$60,400	-

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Dow City to Crawford County. Figure 3 shows that Dow City has a disproportionate percentage of housing units valued at less than $50,000, even when compared to Crawford County.

Figure 3

Value of Housing Units

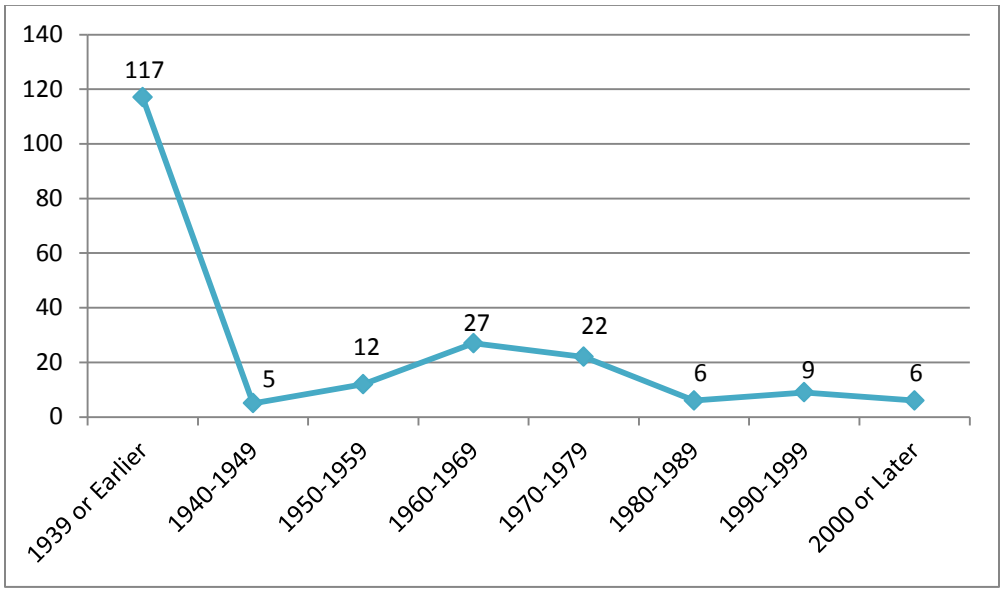


Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Nearly sixty percent of the current housing stock in Dow City was constructed prior to 1940. Housing construction has slowed down considerably since then, but saw an increase between 1960 and 1979. Slightly over seven percent of homes have been constructed since 1990. Figure 4 shows the distribution of housing unit construction in Dow City.

Figure 4

Year Housing Unit Constructed



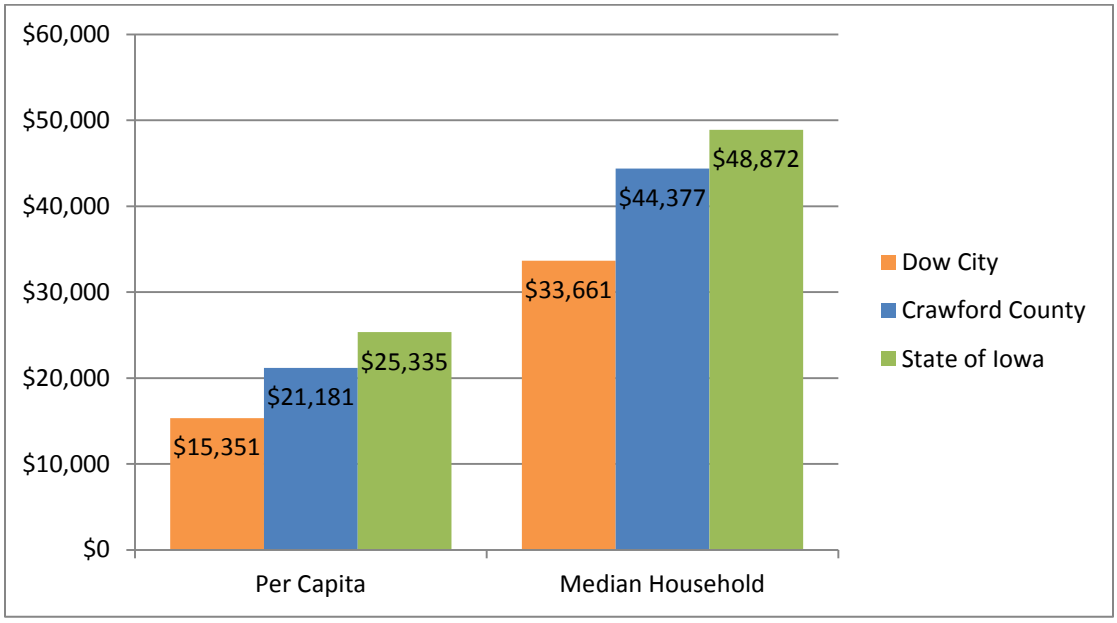
Source: Crawford County Housing Report, October 2012

Economic

An important indicator of the economic base in Dow City is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 below shows that incomes of those living in Dow City are lower than Crawford County and state averages. The average per capita personal income in Dow City for the 2006-2010 American Community Survey 5-Year estimate was $2,997 less per year than Crawford County's average and $7,151 less than the average for the State of Iowa. The median household income in Dow City for the same time period trailed that of Crawford County by $7,085 per year and the state by $11,580 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Dow City.

Figure 5
Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Dow City, according to the American Community Survey, included the $25,000-$34,999 (18.8%), followed closely by less than $10,000 (17.7%) and $50,000-$74,999 (17.3%) income groups. Nearly thirty-seven percent of households in Dow City make less than $25,000 and twelve percent of households have an income of $75,000 or more. Table 3 on the following page shows a breakdown of household income in Dow City.

Table 3

Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	47	17.7%
$10,000-$14,999	9	3.4%
$15,000-$24,999	42	15.8%
$25,000-$34,999	50	18.8%
$35,000-$49,999	40	15.0%
$50,000-$74,999	46	17.3%
$75,000-$99,999	18	6.8%
$100,000-$149,999	14	5.2%
$150,000-$199,999	0	0.0%
$200,000 or more	0	0.0%
Median Household Income	$33,661	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Dow City is typical of many smaller rural Iowa cities due to its dependence on regional employment opportunities. Many residents are required to commute to surrounding communities such as Denison and Harlan. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Manufacturing (34.7%), Educational Services, and Health Care and Social Assistance (13.0%), and Transportation and Warehousing, and Utilities (11.7%). These percentages are based on the total number of individuals 16 years and older that are from Dow City and are employed.

Table 4

Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	32	10.7%
Construction	13	4.3%
Manufacturing	104	34.7%
Wholesale Trade	12	4.0%
Retail Trade	30	10.0%
Transportation and Warehousing, and Utilities	35	11.7%
Information	3	1.0%
Finance and Insurance, and Real Estates and Rental and Leasing	3	1.0%
Professional, Scientific, and Management, and Administrative and Waste Management Services	3	1.0%
Educational Services, and Health Care and Social Assistance	39	13.0%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	12	4.0%
Other Services, except Public Administration	1	0.3%
Public Administration	13	4.3%
Civilian Employed Population 16 years and over	300	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Dow City.

Table 5

Current Planning and Regulatory Documents for the City of Dow City

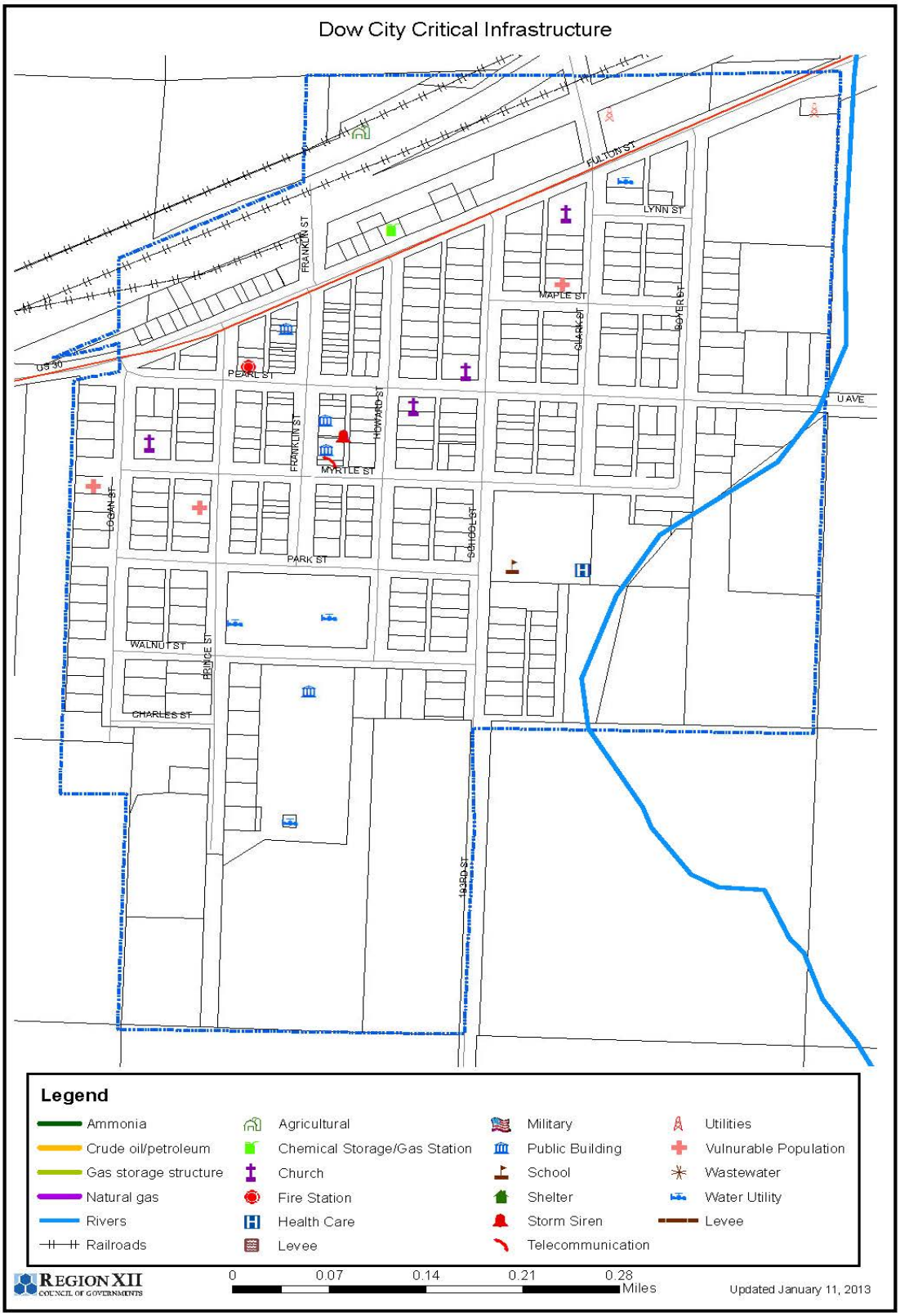
Document	Yes/No	Year
Previous HMP	No	-
Comprehensive Plan	Yes	2012
Building Code	No	-
Zoning Ordinance	Yes	2012
Strategic Plan	No	-
Housing Assessment	Yes	1999
NFIP Participant	Yes	1986

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Dow City and the Boyer Valley Schools. They are identified on Map 2

- Senior Complex (Maple)
- Senior Complex (Prince)
- Senior Complex
- City Maintenance
- Cogdill Farm Supply
- Conoco Gas Station
- Gas Station (temporarily closed)
- Water Connections
- Water Tower
- Well Water House
- Lagoon, Sewer Lift Station
- St. Mary Catholic Church
- Bethlehem Lutheran Church
- United Methodist Church
- Community of Christ
- Community Center
- City Hall
- Fire Department
- Storm Siren
- Boyer Valley School
- Electric Substation
- Helicopter Pad
- Natural Gas

Map 2


Dow City Critical Infrastructure
FULTON ST
LYNN ST
MAPLE ST
FRANKLIN ST
CLARK ST
BEAVER ST
US 30
PEARL ST
HOWARD ST
MYRTLE ST
U AVE
LOGAN ST
PARK ST
WALNUT ST
BRIDGE ST
CHARLES ST
183RD ST
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0
0.07
0.14
0.21
0.28
Miles
Updated January 11, 2013

Section 3: Risk Assessment

The following table lists the overall results of the Hazard Analysis that the committee member for Dow City completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Dow City Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
River Flooding	Y	Y	3	2	3	4	2.80
Thunderstorm and Lightning	Y	Y	4	1	4	1	2.80
Severe Winter Storms	Y	Y	3	2	3	3	2.70
Flash Flood	Y	Y	2	2	4	4	2.50
Hazardous Material	N	N	2	3	4	1	2.50
Human Disease	N	N	1	3	4	4	2.35
Transportation Incident	N	Y	2	2	4	2	2.30
Dam and Levee Failure	Y	Y	2	2	4	1	2.20
Extreme Heat	Y	Y	3	1	1	4	2.20
Drought	Y	Y	2	2	1	4	2.05
Windstorm	Y	Y	3	1	2	1	2.05
Infrastructure Failure	N	N	1	2	4	3	1.95
Grass or Wild Land Fire	Y	Y	2	1	4	1	1.90
Hailstorm	Y	Y	2	1	4	1	1.90
Tornado	N	Y	1	2	4	1	1.75
Terrorism	N	N	1	2	4	1	1.75
Radiological	N	N	1	1	4	3	1.65
Animal/Plant/Crop Disease	N	N	1	1	1	4	1.30

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Dow City and the Boyer Valley Schools were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Dow City.

Dow City			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	205	$9,153,890	510
Commercial	26	$1,567,970	
Industrial	0	$0	
Agricultural Structures	-	$11,040	

The following hazards were determined to have a negligible impact on the City of Dow City and the Boyer Valley Schools, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Extreme Heat, Grass or Wild Land Fire, Hailstorm, Thunderstorm and Lightning, Windstorm, Animal/Plant/Crop Disease and Radiological

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	18	$823,850	46
Commercial	2	$141,117	
Industrial	0	$0	
Agricultural Structures	0	$0	

The following hazards were determined to have a limited impact on the City of Dow City and the Boyer Valley Schools, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Dam and Levee Failure, Drought, Flash Flood, River Flooding, Severe Winter Storms, Tornado, Infrastructure Failure, Terrorism and Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	51	$2,288,473	128
Commercial	7	$391,993	
Industrial	0	$0	
Agricultural Structures	0	$0	

The following hazards were determined to have a critical impact on the City of Dow City and the Boyer Valley Schools, were they to occur. A shutdown of some facilities and services could last for at least two weeks and some injuries/illness will result in permanent disability. It is estimated that 50% of the city would be impacted. There are no school facilities in the special flood hazard area.

Hazardous Material and Human Disease

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	103	$4,576,945	255
Commercial	13	$783,985	
Industrial	0	$0	
Agricultural Structures	0	$0	

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

Objective 1: Develop Plans to Become Less Vulnerable to Hazards

Action 1.1: Develop a water protection plan

Action 1.2: Assure local plans are current

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

Objective 2: Account for vulnerable populations

Action 2.1: Develop a plan to get to homebound people during severe weather

Objective 3: Improve Safety

Action 3.1: Purchase a generator for city hall

Goal: Improve coordination and communication with other relevant organizations and build support for hazard mitigation

Objective 4: Provide Education and Training

Action 4.1: Educate public on communications failure

Action 4.2: Develop a business and residential preparedness program

Action 4.3: Develop a plan and educate residents on tornado shelters

Action 4.4: Develop a resource directory

Goal: Maintain and support public safety facilities, including equipment and training

Objective 5: Upgrade Alarm System

Action 4.1: Upgrade public notification to new alarm

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for the City of Dow City and the Boyer Valley Schools. Table 9 displays the STAPLEE evaluation criteria.

Table 9

Dow City STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Assure local plans are current	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Educate public on communications failure	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y	N	N/A	N/A	N/A	N/A	N/A	**14**
Develop a water protection plan	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	Y	Y	**13**
Develop a plan and educate residents on tornado shelters	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N	N/A	N	N/A	N/A	N/A	N/A	N/A	**12**
Develop a resource directory	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N/A	N/A	N/A	N/A	N/A	**12**
Purchase a generator for city hall	Y	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**12**
Develop a plan to get to homebound people during severe weather	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	N/A	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**12**
Upgrade public notification to new alarm	Y	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	N	Y	Y	N	Y	N/A	N/A	N/A	N/A	N/A	**10**

Develop a business and residential preparedness program	Y	N	Y	Y	N	Y	N	M	Y	N	Y	Y	Y	N	Y	Y	N	Y	N/A	N/A	N/A	N/A	N/A	**9**

Table 9

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Dow City and the Boyer Valley Schools outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 10 displays all of the mitigation actions for Dow City with their implementation strategy.

Table 10

Dow City Action Plan

Assure Local Plans are Current	
Hazards Addressed	All
Priority	Medium
Responsible Department	City Clerk
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Educate Public on Communications Failure	
Hazards Addressed	Infrastructure Failure
Priority	Low
Responsible Department	Fire Department, Police Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Develop a Water Protection Plan	
Hazards Addressed	Infrastructure Failure, Drought
Priority	Medium
Responsible Department	Public Works
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Natural Resource Protection
Target Completion Date	Short

Develop a Plan and Educate Residents on Tornado Shelters	
Hazards Addressed	Tornado
Priority	Low
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Develop a Resource Directory	
Hazards Addressed	Flash Flood, Tornado, River Flooding, Severe Winter Storms, Hazardous Material, Infrastructure Failure
Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal

Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Purchase a Generator for City Hall	
Hazards Addressed	Severe Winter Storms, Infrastructure Failure
Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Develop a Plan to Get to Homebound People during Severe Weather	
Hazards Addressed	Infrastructure Failure, Tornado, Severe Winter Storms, River Flooding, Hazardous Material
Priority	High
Responsible Department	Fire Department, Police Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Upgrade Public Notification to New Alarm	
Hazards Addressed	Tornado, Windstorm
Priority	High
Responsible Department	City Council, First Responders, Fire Department
Estimated Cost	Minimal
Potential Funding Source	State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Continue Flood Plain Management through Zoning and Code Enforcement	
Hazards Addressed	Flooding
Priority	High
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Construct a Tornado Shelter	
Hazards Addressed	Tornado
Priority	Low
Responsible Department	Boyer Valley School Board
Estimated Cost	Minimal
Potential Funding Source	Local, State and Federal
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

RESOLUTION NO. 2013-29

(Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan)

A RESOLUTION OF THE CITY OF DOW CITY ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

WHEREAS, The City of Dow City participated in the multi-jurisdictional hazard mitigation planning process; and,

WHEREAS, The Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

BE IT RESOLVED by the DOW CITY COUNCIL that:

1. The City of Dow City adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

It was moved by Council member Ettleman and seconded by Council member Cullen that Resolution No. 2013-29 be adopted. The motion being duly put to vote of the Council, and ayes and nays were called, and the vote thereon was as follows:

Ayes: _____

_____

_____

Nays: _____

Abstain: _____

WHEREUPON, the Mayor declared the motion duly carried and Resolution No. 2013-29 duly passed. PASSED AND ADOPTED this 5th day of November 2013.

Cody Steinkuehler, Mayor

Attest: Debra Garrett, City Clerk

(CITY SEAL)

Resolution No. _____

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE BOYER VALLEY COMMUNITY SCHOOL DISTRICT ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the Boyer Valley Schools participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the Boyer Valley School District adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 18th **DAY OF** August **, 2014.**

Ken [illegible]
Chair

ATTEST:

Sharon A Lee
Secretary

E-mailed
11/18/14
Greg Miller
mi

Appendix I: City of Kiron

Section 1: Community Profile

City of Kiron History

Kiron was named by Andrew Norelius, who had an interest in the place from Kiron in Manchuria, China.

Geography and Environment

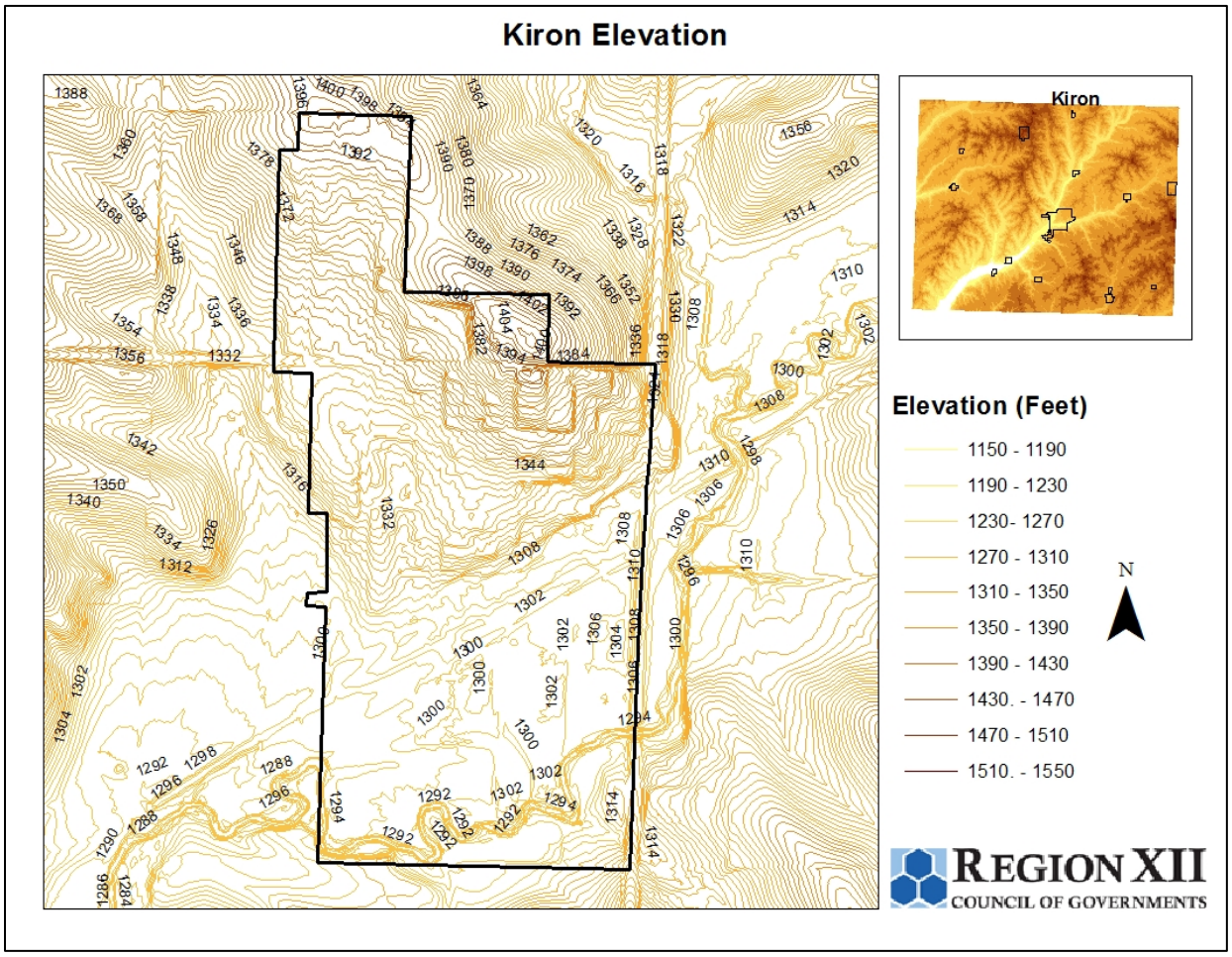
Location

Kiron is located in north central Crawford County. Highway 39 runs along the far eastern edge of the town. Kiron is 13.5 miles north of Denison, 32.4 miles northwest of Carroll, and 72.4 miles southeast of Sioux City.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The northern portion of Kiron reaches 1,404 feet and the elevation decreases the further south one travels. The following map shows the elevation of Kiron and its relation to the rest of Crawford County.

Map 1



Demographics

Population

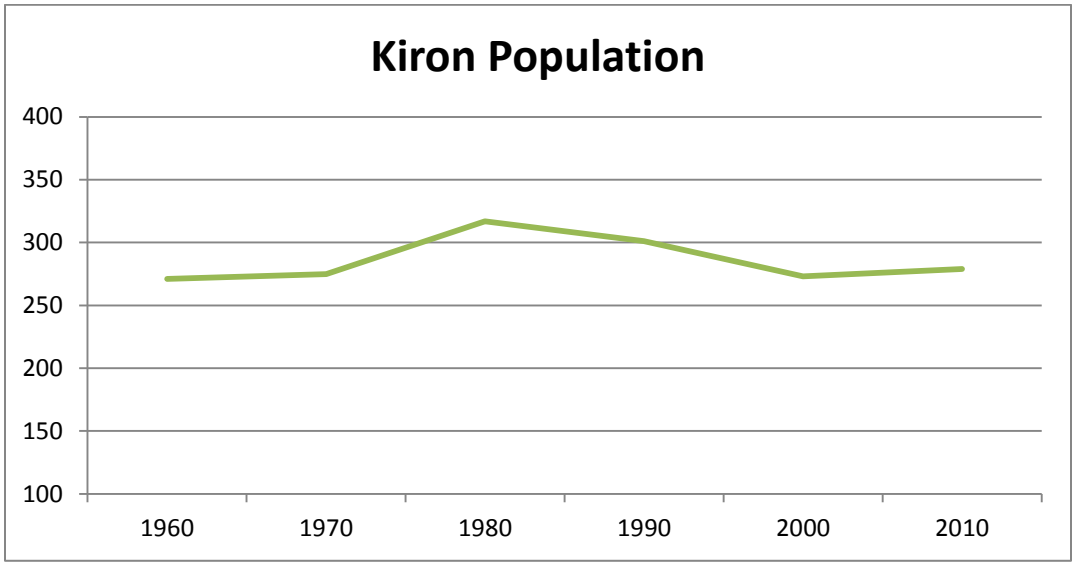
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Kiron's population through the past, present and future trends of the region.

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 education 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.

Kiron has maintained a somewhat stable population since 1960, never fluctuating by more than 42 residents. Kiron's population slowly rose from 1960 to 1980, decreased in 1990 and 2000, and then increased slightly in 2010. The historic population trend for Kiron is shown in Figure 1 below.

Figure 1



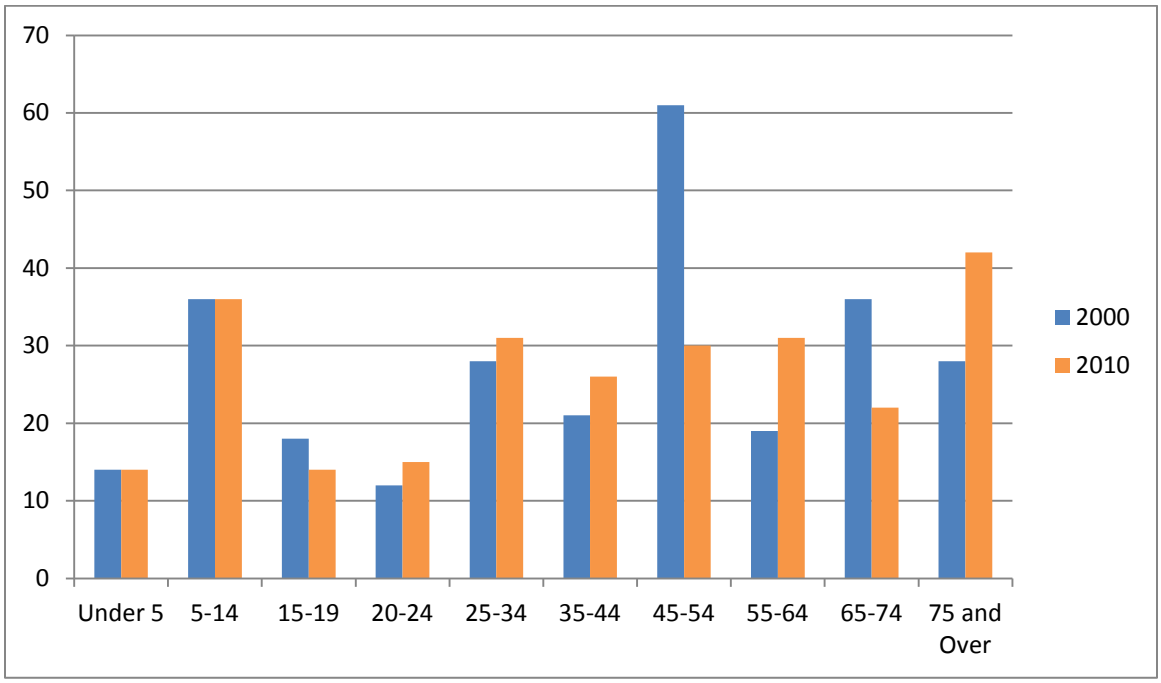
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Kiron from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 45-54 age cohort, which lost thirty-one individuals. Another significant loss came in the 65-74 (-14) age group. Significant increases in population were seen in the 75 and over (14), and 55-64 (12) age groups.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 55-64 age cohort in 2000 would be in the 65-74 age cohort in 2010. Therefore, the 55-64 age cohort from 2000 only gained three individuals, a smaller total than in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as "brain drain."

Figure 2

Kiron Age Distribution



Source: US Census Bureau

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.

The number of occupied housing units, along with the percentage of owner-occupied housing units, decreased over the last ten years in Kiron. The occupancy rate in 2010 decreased by 2.3 percent from 2000. The vacancy rate went from 7.4 percent in 2000 to 9.7 percent in 2010. Table 1 shows the housing trends for Kiron from 2000 to 2010.

Table 1

Kiron Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	126	92.6%	121	90.3%
Owner Occupied	101	80.2%	96	79.3%
Renter Occupied	25	19.8%	25	20.7%
Vacant Housing Units	10	7.4%	13	9.7%
Total Housing Units	136	100.0%	134	100.0%

Source: US Census Bureau

Over sixty percent of the housing units in Kiron are valued at less than $50,000. Housing units with lower values are more likely to be aging and in need of revitalization. Due to this, these homes are susceptible to hazards such as fires, serious storms and other weather related hazards. Table 2 below displays the value of housing units in Kiron in 2012.

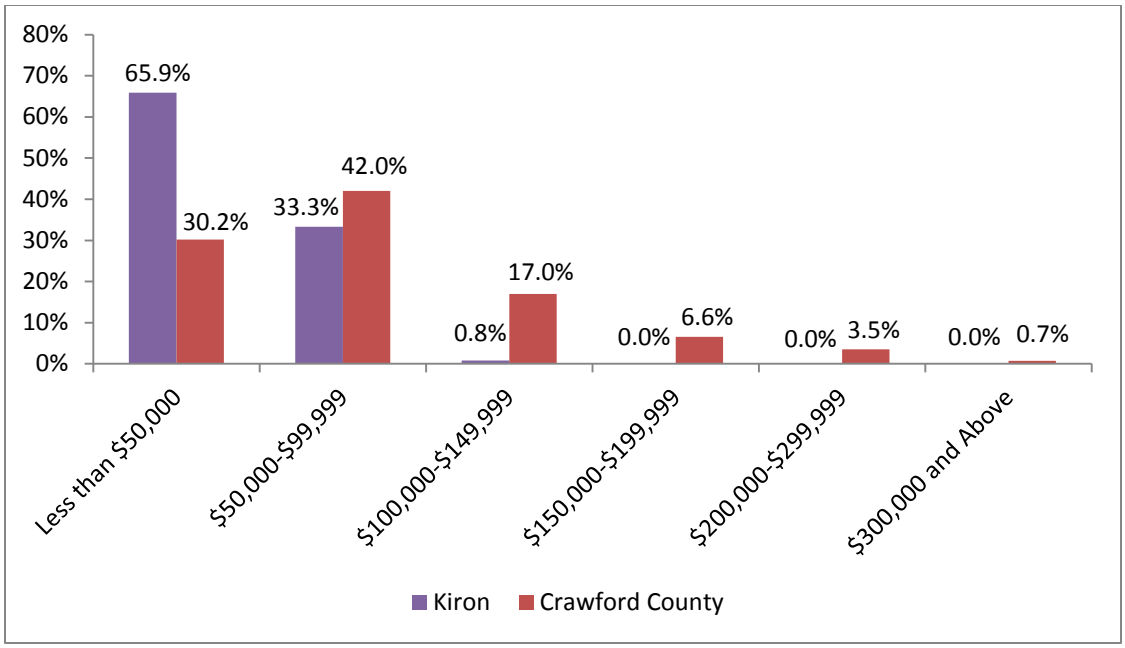
Table 2
Value of Kiron Housing Units, 2012

Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	83	65.9%
$50,000-$99,999	42	33.3%
$100,000-$149,999	1	0.8%
$150,000-$199,999	0	0.0%
$200,000-$299,999	0	0.0%
$300,000 and above	0	0.0%
Median Value	$38,115	-

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Kiron to Crawford County. Figure 3 shows that Kiron has a disproportionate percentage of housing units valued at less than $50,000, even when compared to Crawford County.

Figure 3
Value of Housing Units

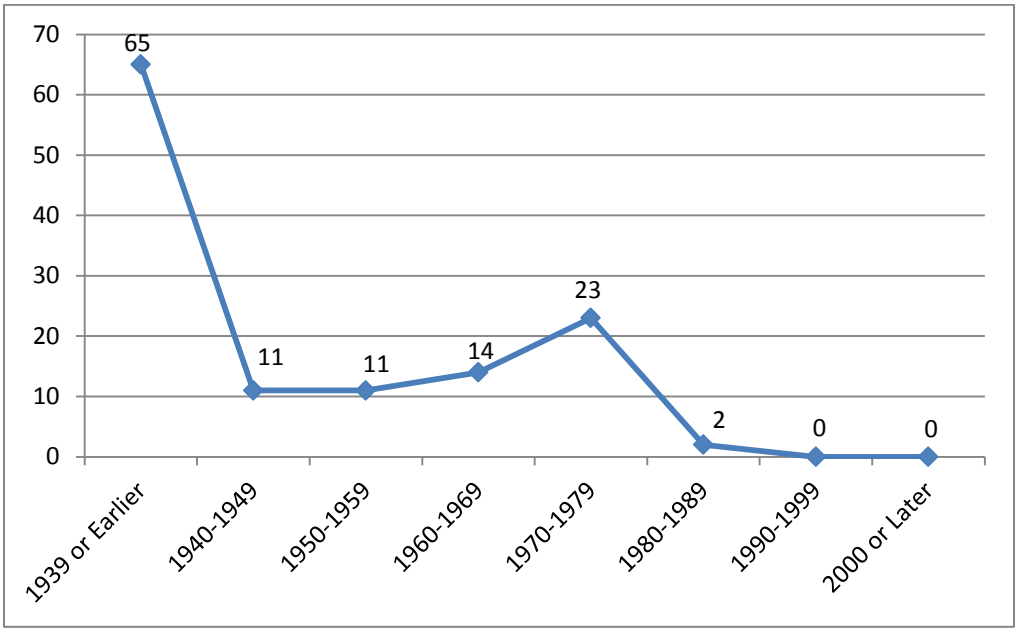


Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Over fifty percent of the current housing stock in Kiron was constructed prior to 1940. Housing construction has slowed down considerably since then, but saw an increase between 1970 and 1979. No housing units have been constructed since 1990; with only 1.6 percent of homes constructed since 1980. Figure 4 shows the distribution of housing unit construction in Kiron.

Figure 4

Year Housing Unit Constructed



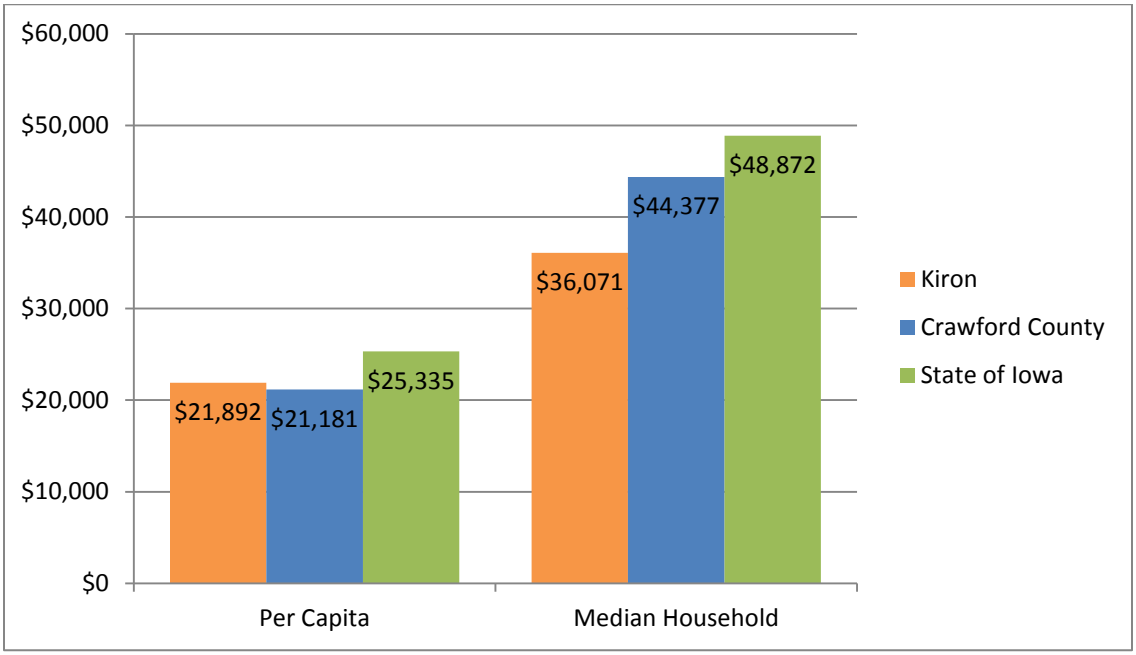
Source: Crawford County Housing Report, October 2012

Economic

An important indicator of the economic base in Kiron is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 shows that the per capita incomes of those living in Kiron are higher than Crawford County's average, but lower than the state average. The average per capita personal income in Kiron from 2006-2010 American Community Survey 5-year estimate was $711 greater per year than Crawford County's average and $3,443 less per year than the average in the State of Iowa. The median household income in Kiron for the same time period trailed that of Crawford County by $8,306 and the state by $12,801 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 below shows the household income distribution for Kiron.

Figure 5
Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Kiron, according to the American Community Survey, included the $15,000-$24,999 (22.3%), followed closely by the $75,000-$99,999 (20.8%) income group. Nearly thirty percent of households in Kiron make less than $25,000 and 28.5 percent of households have an income of $75,000 or more. Table 3 on the following page shows a breakdown of household income in Kiron.

Table 3
Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	6	4.6%
$10,000-$14,999	3	2.3%
$15,000-$24,999	29	22.3%
$25,000-$34,999	24	18.5%
$35,000-$49,999	19	14.6%
$50,000-$74,999	12	9.2%
$75,000-$99,999	27	20.8%
$100,000-$149,999	9	6.9%
$150,000-$199,999	1	0.8%
$200,000 or more	0	0.0%
Median Household Income	$36,071	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Kiron is typical of many smaller rural Iowa cities due to its dependence on regional employment opportunities. Many residents are required to commute to surrounding

communities such as Denison and Carroll. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Educational Services, and Health Care and Social Assistance (16.3%), Construction (15%), and Manufacturing (15%). These percentages are based on the total number of individuals 16 years and older that are from Kiron and are employed.

Table 4
Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	9	5.9%
Construction	23	15.0%
Manufacturing	23	15.0%
Wholesale Trade	0	0.0%
Retail Trade	18	11.8%
Transportation and Warehousing, and Utilities	10	6.5%
Information	3	2.0%
Finance and Insurance, and Real Estates and Rental and Leasing	6	3.9%
Professional, Scientific, and Management, and Administrative and Waste Management Services	9	5.9%
Educational Services, and Health Care and Social Assistance	25	16.3%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	6	3.9%
Other Services, except Public Administration	14	9.2%
Public Administration	7	4.6%
Civilian Employed Population 16 years and over	153	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Changes in Development

Kiron has not seen any development since the last plan update. No future development is planned.

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Kiron.

Table 5
Current Planning and Regulatory Documents for the City of Kiron

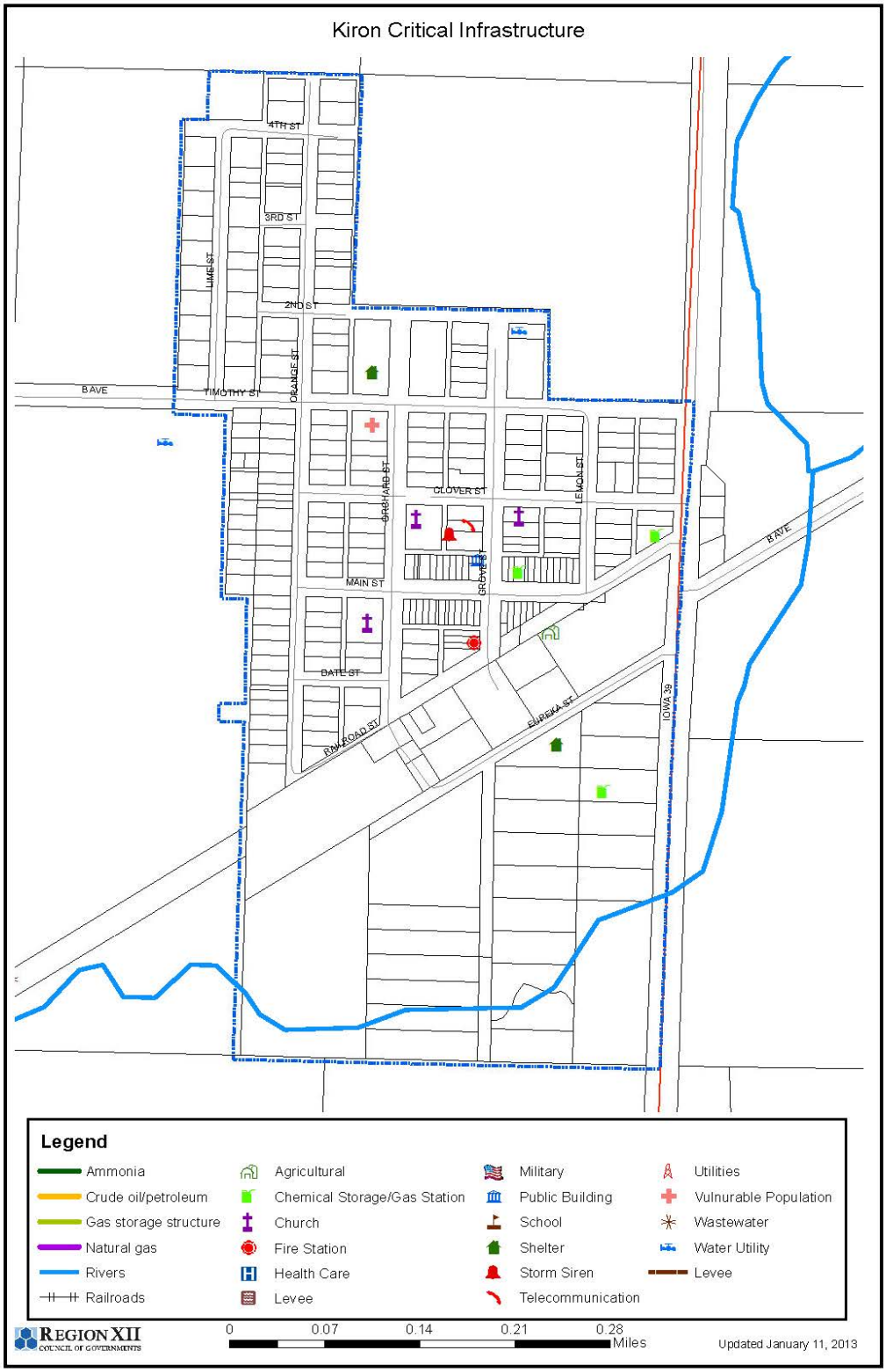
Document	Yes/No	Year
Previous HMP	Yes	2006
Comprehensive Plan	No	-
Building Code	Yes	1967
Zoning Ordinance	Yes	1967
Strategic Plan	No	-
Housing Assessment	Yes	1999
NFIP Participant	Yes	1986

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Kiron. They are identified on Map 2

- Fire Station
- City Hall
- Storm Siren
- Water Tower
- Waste Water Treatment Plant
- Water
- Lindstrom Ag Chemical Storage
- Bethel Lutheran Church
- Baptist Church
- St. Johns Church
- Telephone Office
- Agriculture
- KELM Apartments
- Lumber Yard
- Quick Mart
- Living Memorial Park
- North City Park

Map 2


Kiron Critical Infrastructure
4TH ST
3RD ST
2ND ST
LIME ST
ORANGE ST
TIMOTHY ST
B AVE
GRAPE ST
CLOVER ST
LEMON ST
MAIN ST
DATE ST
RAILROAD ST
EUREKA ST
IOWA 39
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0
0.07
0.14
0.21
0.28
Miles
Updated January 11, 2013

Section 3: Risk Assessment

In addition to the four hazards omitted by the county-wide plan, the City of Kiron determined that dam and levee failure, flash flood, and river flooding were not applicable or would have little effect on the community. These hazards were not addressed as there is no river, dam or levee in or around Kiron that could impact the community.

The following table lists the overall results of the Hazard Analysis that the committee member for Kiron completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Kiron Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Tornado	Y	Y	4	3	4	1	3.70
Extreme Heat	Y	Y	4	2	4	4	3.40
Hailstorm	Y	Y	4	2	4	1	3.40
Severe Winter Storms	Y	Y	4	3	2	4	3.40
Thunderstorm and Lightning	Y	Y	4	2	4	3	3.40
Windstorm	Y	Y	4	2	4	4	3.40
Grass or Wild Land Fire	Y	Y	4	2	4	3	3.30
Hazardous Material	Y	Y	3	3	4	3	3.15
Transportation Incident	Y	Y	3	2	4	2	2.75
Drought	Y	Y	3	2	1	4	2.50
Human Disease	Y	Y	2	3	2	4	2.50
Infrastructure Failure	Y	Y	2	2	4	3	2.40
Animal/Plant/Crop Disease	Y	Y	1	3	2	4	2.05
Terrorism	Y	Y	1	2	4	3	1.95
Radiological	Y	Y	1	1	4	3	1.65

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Kiron were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Kiron.

Kiron			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	125	$4,151,100	279
Commercial	25	$851,250	
Industrial	0	$0	
Agricultural Structures	1	$51,530	

The following hazards were determined to have a negligible impact on the City of Kiron, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Radiological

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	11	$373,599	25
Commercial	2	$76,613	
Industrial	0	$0	
Agricultural Structures	0	$4,638	

The following hazards were determined to have a limited impact on the City of Kiron, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Drought, Extreme Heat, Grass or Wild Land Fire, Hailstorm, Thunderstorm and Lightning, Windstorm, Infrastructure Failure, Terrorism and Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	31	$1,037,775	70
Commercial	6	$212,813	
Industrial	0	$0	
Agricultural Structures	0	$12,883	

The following hazards were determined to have a critical impact on the City of Kiron, were they to occur. A shutdown of some facilities and services could last for at least two weeks and some injuries/illness will result in permanent disability. It is estimated that 50% of the city would be impacted.

Severe Winter Storms, Tornado, Animal/Plant/Crop Disease, Hazardous Material and Human Disease

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	63	$2,075,550	140
Commercial	13	$425,625	
Industrial	0	$0	
Agricultural Structures	1	$25,765	

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

Objective 1: Improve First Responder Resources and Capabilities

Action 1.1: Update, Repair, Training, Maintain

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

Objective 2: Improve Public Infrastructure and Warnings

Action 2.1: Increase education, communication

Action 2.2: Early warning system

Action 2.3: Purchase Backup power unit

Action 2.4: Provide safe room for hazards

Goal: Improve coordination and communication with other relevant organizations and build support for hazard mitigation

Objective 3: Improve communications

Action 3.1: More or better communication between agencies

Goal: Maintain and support public safety facilities, including equipment and training

Objective 4: Improve first responder resources and capabilities

Action 4.1: Improvements and updating, training and equipment

Action 4.2: Provide backup power unit

The City of Kiron completed a previous hazard mitigation plan in 2006. The table on the following page displays the status of the previous actions. Any action marked as ongoing or future was carried over to be included in this plan.

Table 8

Kiron Previous Mitigation Actions

Kiron	Status				
Previous Actions (2006)	**Complete**	**Underway**	**Ongoing**	**Future**	**Canceled**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills		X			
Educate citizens on NOAA weather radios			X		
Increase usage of NOAA weather radios			X		
Replace and maintain snow removal equipment as necessary	X				
Upgrade or add backup generators as necessary			X		
Educate residents on extreme heat and cold weather via the local media and/or utility billings		X			
Provide firefighters, law enforcements and EMS departments with adequate training and equipment		X			
Develop a city-wide evacuation plan			X		
Continue fire and emergency response training			X		
Initiate fire prevention program			X		
Continue NFIP participation and follow NFIP policies				X	
Attend training for terrorism when offered				X	
Post signs and increase police surveillance around critical facilities				X	
Evaluate city facilities and identify potential terrorist targets				X	

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for the City of Kiron. Table 10 displays the STAPLEE evaluation criteria.

Table 9

Kiron STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Education, communication	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	Y	N/A	Y	Y	**19**
More or better communication between agencies	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Improvements and updating, training and equipment	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	M	N	Y	N	Y	Y	Y	Y	Y	Y	Y	**18**
Provide shelters for hazards	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	M	N/A	Y	Y	Y	**17**
Upgrade or add backup generators as necessary	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	N	N/A	Y	Y	Y	**17**
Early warning system	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Initiate fire prevention program	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	M	Y	Y	N/A	N/A	N/A	N/A	N/A	**15**
Update, repair, training, maintain	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	M	M	N/A	Y	Y	**14**
Educate citizens on NOAA weather radios	Y	N	Y	Y	N	Y	M	N	Y	Y	Y	Y	Y	N	Y	M	Y	N	N/A	N/A	N/A	N/A	N/A	**14**
Continue fire and emergency response training	Y	N	Y	Y	N	Y	M	Y	Y	Y	Y	Y	Y	N	Y	M	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**
Continue NFIP participation and follow NFIP policies	Y	N	Y	M	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	M	Y	Y	Y	N/A	N	Y	Y	**14**

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Increase usage of NOAA weather radios	Y	N	Y	Y	N	Y	M	M	Y	Y	Y	Y	Y	N	Y	M	Y	Y	N/A	N/A	N/A	N/A	N/A	**13**
Develop a city-wide evacuation plan	Y	N	Y	Y	N	Y	N/A	Y	Y	Y	Y	Y	Y	N	Y	M	Y	Y	N/A	N/A	N/A	N/A	N/A	**13**
Attend training for terrorism when offered	Y	N	Y	Y	N	M	M	M	Y	Y	Y	Y	Y	N	Y	M	Y	Y	N/A	N/A	N/A	N/A	N/A	**12**
Post signs and increase police surveillance around critical facilities	Y	N	Y	M	N	M	M	M	Y	Y	Y	Y	Y	N	Y	M	Y	Y	N	N/A	N/A	Y	Y	**12**
Evaluate city facilities and identify potential terrorist targets	Y	N	Y	M	N	M	M	M	Y	Y	Y	Y	Y	N	Y	M	Y	Y	N/A	N/A	N/A	N/A	N/A	**11**

Table 10

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Kiron outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 11 displays all of the mitigation actions for Kiron with their implementation strategy.

Table 11

Kiron Action Plan

Educate and Communicate Information to the Public about summer storms, extreme heat and cold and winter storms	
Hazards Addressed	All
Priority	High
Previous Priority	High
Responsible Department	Fire Department, First Responders
Estimated Cost	High
Potential Funding Source	State, Federal
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Mid

More or Better Communication between Agencies	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council, Emergency Services
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Improvements and Updating, Training and Equipment for Fire Department and First Responders	
Hazards Addressed	All
Priority	High
Previous Priority	
Responsible Department	Fire Department, City
Estimated Cost	Low
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Provide Shelters for Hazards	
Hazards Addressed	Tornado, Windstorm
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Upgrade or Add Backup Generators as necessary	
Hazards Addressed	Tornado, Severe Winter Storms
Priority	High
Previous Priority	High
Responsible Department	Fire Department, City
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Early Warning System	
Hazards Addressed	Tornado, Severe Winter Storms, Radiological, Hazardous Material
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	Fire Department, City
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Initiate Fire Prevention Program	
Hazards Addressed	Grass or Wild Land Fire, Infrastructure Failure
Priority	High
Previous Priority	High
Responsible Department	City, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Educate Citizens on NOAA Weather Radios	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	Medium
Previous Priority	Medium
Responsible Department	City, Fire Department
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Continue Fire and Emergency Response Training	
Hazards Addressed	All
Priority	High
Previous Priority	High
Responsible Department	City, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Continue NFIP Participation and Follow NFIP Policies by Enforcing Floodplain Management Ordinance	
Hazards Addressed	River Flooding
Priority	High
Previous Priority	High
Responsible Department	City, Fire Department
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Increase Usage of NOAA Weather Radios	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	High
Previous Priority	High
Responsible Department	City, Fire Department
Estimated Cost	Low
Potential Funding Source	Local, State, Federal

Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Develop a City-Wide Evacuation Plan	
Hazards Addressed	Grass or Wild Land Fire, Hazardous Material, Terrorism, Radiological
Priority	High
Previous Priority	High
Responsible Department	City, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Attend Training for Terrorism when offered	
Hazards Addressed	Terrorism
Priority	Medium
Previous Priority	Medium
Responsible Department	City, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Post Signs and Increase Police Surveillance around Critical Facilities	
Hazards Addressed	Terrorism
Priority	Low
Previous Priority	Low
Responsible Department	City, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Property Protection
Target Completion Date	Mid

Evaluate City Facilities and Identify Potential Terrorist Targets	
Hazards Addressed	Terrorism
Priority	Low
Previous Priority	Low
Responsible Department	City, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Property Protection
Target Completion Date	Mid

Incorporation into Other Planning Mechanisms

Where possible, the City of Kiron 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:

- Kiron City Code of Ordinances
- Kiron Comprehensive Plan
- Kiron Zoning Ordinance
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

Resolution No. 2014-10

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CITY OF KIRON ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the City of Kiron participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the City of Kiron adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 11 **DAY OF** August **, 2014.**

Mayor

ATTEST:

City Clerk

Appendix J: City of Manilla

Section 1: Community Profile

City of Manilla History

Many of the early residents of Manilla came from a town two miles west called Astor. In 1885, railroad officials surveyed the area for a short cut for the Chicago, Milwaukee and St. Paul Railroad to Sioux City. They decided to build the line two miles east of Astor, through W.L. Paup's farm. By December, many of the townsmen of Astor uprooted their homes and businesses and moved two miles east to the new rail line. The new town did not yet have an official name. In 1885, Astor celebrated the Fourth of July with a tug-of-war contest. It was decided that the winner of the tug-of-war contest would have the right to name the town. On one side were those who thought the town should be named Paupville after Les Paup, the man who sold the railroad his land. On the other side were those who thought the town should be name Manilla after a new twine called Manila Binder Twine made with the newly invented self-binder that was used for the tug-of-war contest. This contest gave birth to Manilla's slogan, "The Town People Pull For."

The post office at Manilla was established in 1885. By May of 1887, 200 buildings had been built in Manilla, with another dozen still under construction. Just one year earlier this site was a corn field. The Manilla National Bank was organized in 1887 and a city hall was erected in 1894. In 1889, two school districts were combined to form and independent school district. A new school house was built that contained four classrooms.

Geography and Environment

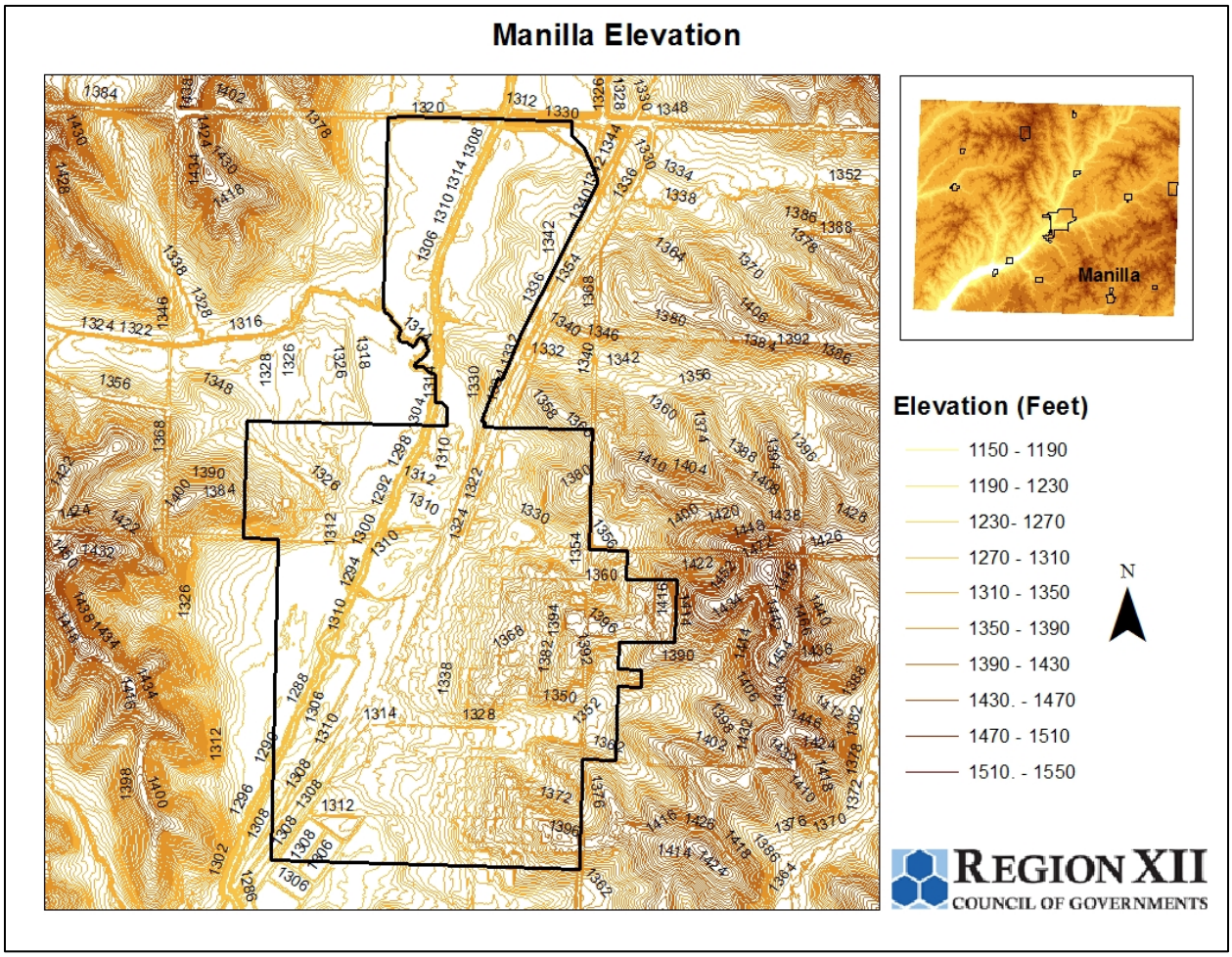
Location

Manilla is located southeastern Crawford County. Highway 45 splits off from Highway 141 and runs south to Manilla. Manilla is 16.2 miles southeast of Denison, 25.9 miles northeast of Harlan, 31.5 miles southwest of Carroll, and 78.7 miles northeast of Omaha.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The eastern portion of Manilla reaches 1,416 feet and the elevation decreases the further west one travels. The following map shows the elevation of Manilla and its relation to the rest of Crawford County.

Map 1



Demographics

Population

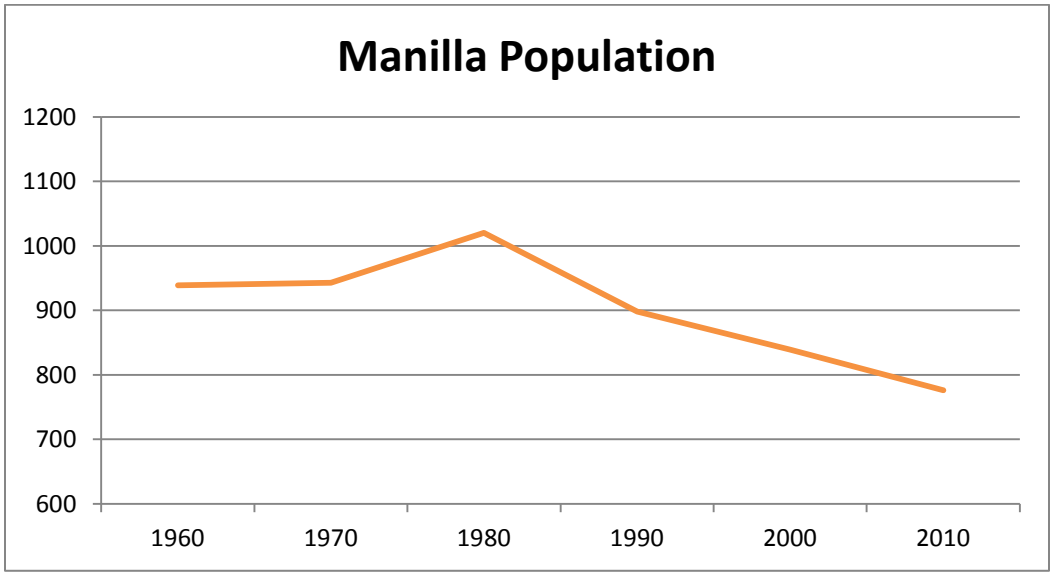
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Manilla's population through the past, present and future trends of the region.

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 education 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.

Much like other cities in the county, Manilla experienced a population growth from 1960 to 1980 and then a decline from 1980 through 2010. The greatest population shift during this time period occurred from 1980 to 1990 when the population declined from 1,020 residents to 898 residents. Figure 1 below displays the historic population trend for Manilla.

Figure 1



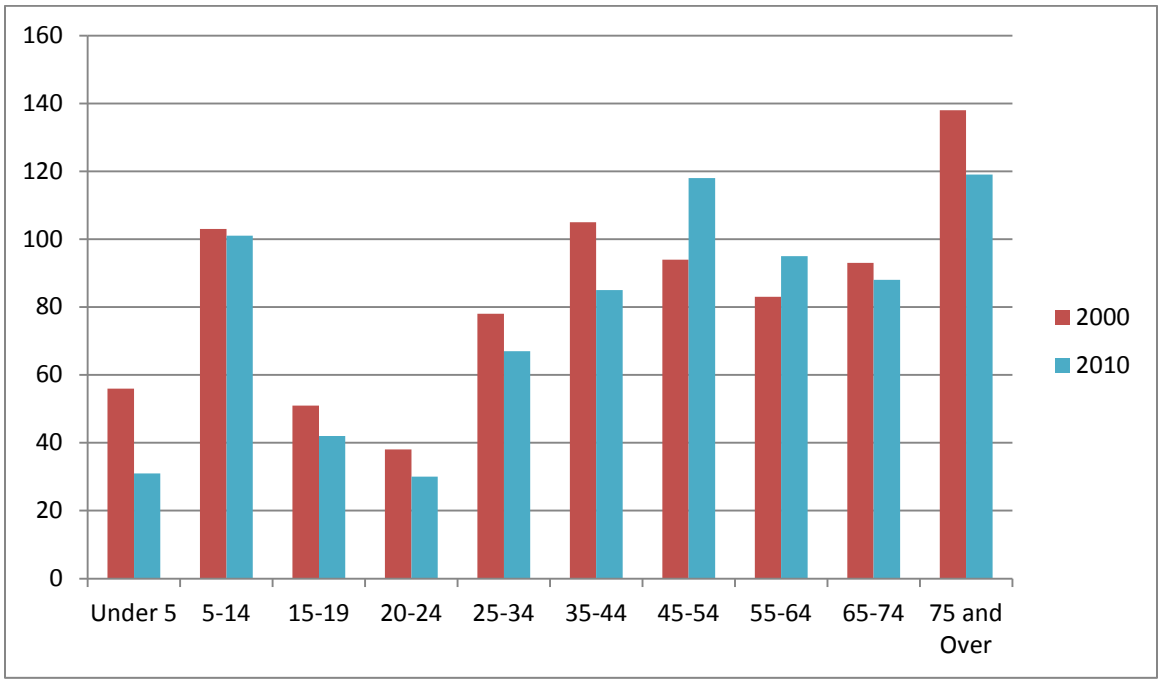
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Manilla from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the under 5 age cohort, which lost twenty-five individuals. Other significant losses came in the 35-44 (-20), 75 and over (-19) and 25-34 (-11) age groups. Increases in population were only seen in the 45-54 (24), and 55-64 (12) age groups.

A second way to interpret this figure is to identify the change of one age cohort as they more into the following age cohort. For example, individuals in the 35-44 age cohort in 2000 would be in the 45-54 age cohort in 2010. Therefore, the 35-44 age cohort from 2000 actually gained thirteen individuals instead of losing twenty individuals as seen in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as “brain drain.”

Figure 2

Manilla Age Distribution



Source: US Census Bureau

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.

Unlike most communities in the area, the percentage of occupied housing units in Manilla remained the same over the last ten years. The percentage of owner-occupied housing units in 2010 decreased by 5.7 percent from 2000. Table 1 shows the housing trends for Manilla from 2000 to 2010.

Table 1

Manilla Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	337	91.3%	337	91.3%
Owner Occupied	283	84.0%	264	78.3%
Renter Occupied	54	16.0%	73	21.7%
Vacant Housing Units	32	8.7%	32	8.7%
Total Housing Units	369	100.0%	369	100.0%

Source: US Census Bureau

Over sixty percent of the housing units in Manilla are valued at less than $50,000. Housing units with lower values are more likely to be aging and in need of revitalization. Due to this, these homes are susceptible to hazards such as fires, serious storms and other weather related hazards. Since the population has been declining, it will be important to invest in the rehabilitation of existing housing. This will improve the safety of homes and reduce their susceptibility to numerous hazards. Table 2 below displays the value of housing units in Manilla in 2012.

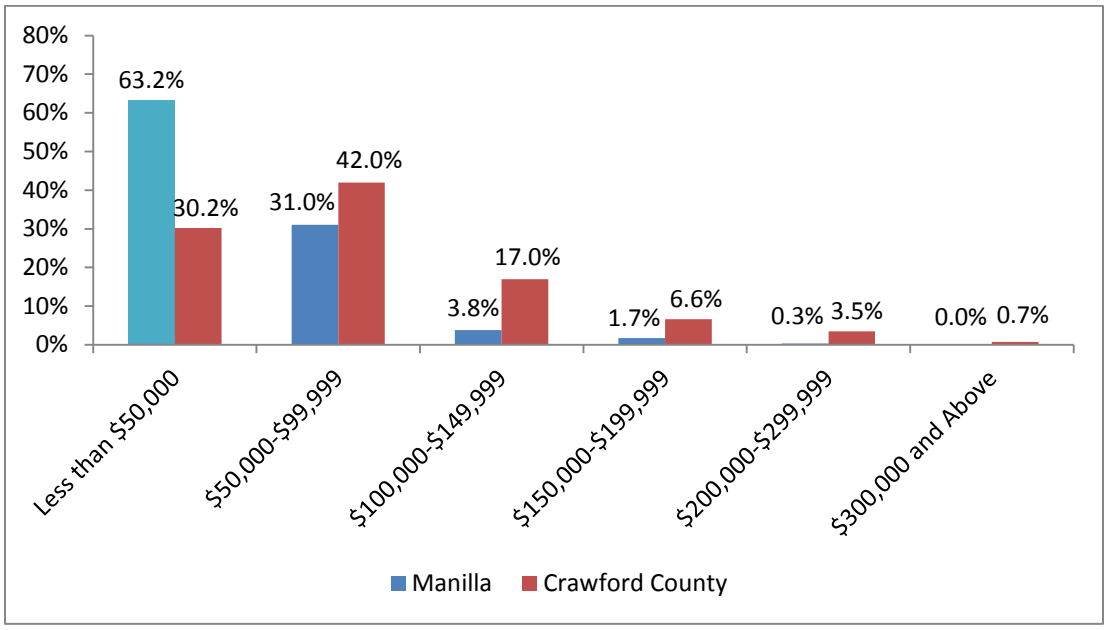
Table 2
Value of Manilla Housing Units, 2012

Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	218	63.2%
$50,000-$99,999	107	31.0%
$100,000-$149,999	13	3.8%
$150,000-$199,999	6	1.7%
$200,000-$299,999	1	0.3%
$300,000 and above	0	0.0%
Median Value	$44,120	-

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Manilla to Crawford County. Figure 3 shows that Manilla has a disproportionate percentage of housing units valued at less than $50,000, even when compared to Crawford County.

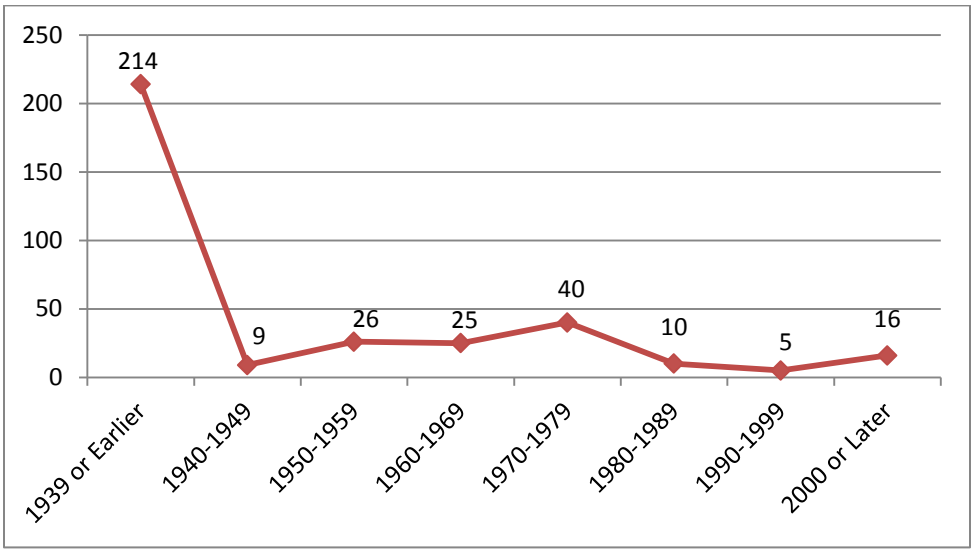
Figure 3
Value of Housing Units



Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Over sixty percent of the current housing stock in Manilla was constructed prior to 1940. Housing construction has slowed down considerably since then, but saw an increase between 1970 and 1979. Six percent of homes have been constructed since 1990. Figure 4 shows the distribution of housing unit construction in Manilla.

Figure 4
Year Housing Unit Constructed



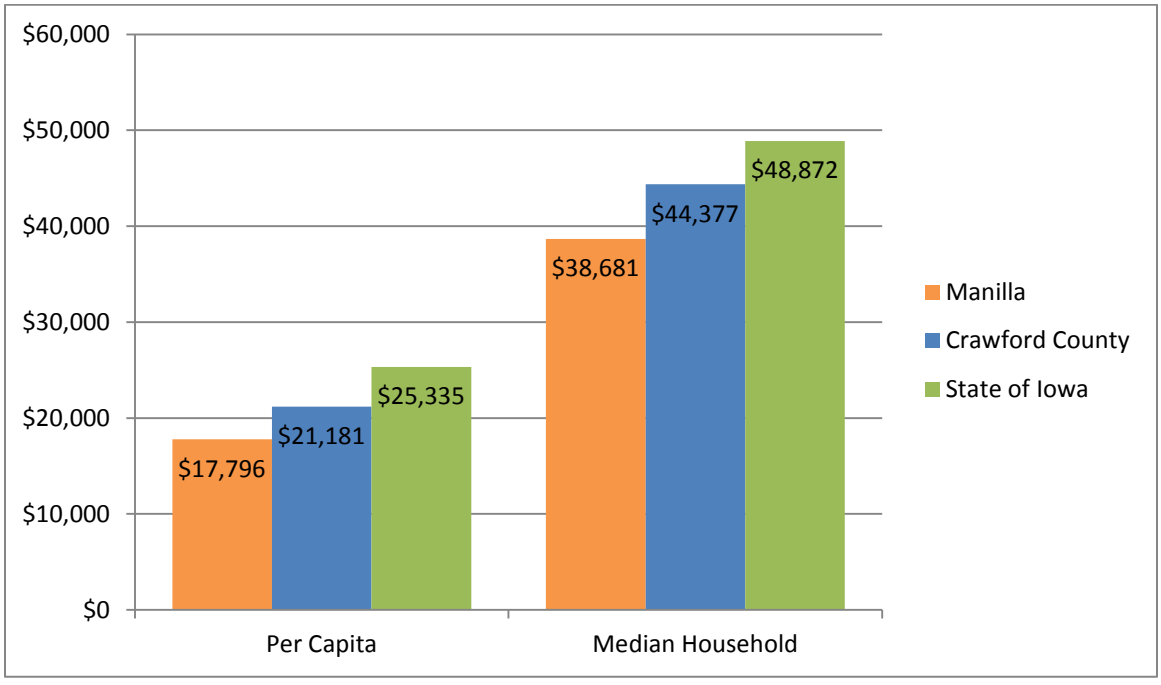
Source: 2006-2010 American Community Survey 5-Year Estimates

Economic

An important indicator of the economic base in Manilla is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 below shows that incomes of those living in Manilla are lower than Crawford County and state averages. The average per capita personal income in Manilla for the 2006-2010 American Community Survey 5-Year estimate was $3,385 less per year than Crawford County's average and $7,539 less than the average for the State of Iowa. The median household income in Manilla for the same time period trailed that of Crawford County by $5,696 per year and the state by $10,191 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Manilla.

Figure 5
Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Manilla, according to the American Community Survey, included the $50,000-$74,999 (27.3%) income group. Twenty-seven percent of households in Manilla make less than $25,000 and just over eleven percent of households have an income of $75,000 or more. Table 3 on the following page shows a breakdown of household income in Manilla.

Table 3

Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	12	3.3%
$10,000-$14,999	28	7.7%
$15,000-$24,999	58	16.0%
$25,000-$34,999	60	16.5%
$35,000-$49,999	65	17.9%
$50,000-$74,999	99	27.3%
$75,000-$99,999	25	6.9%
$100,000-$149,999	13	3.6%
$150,000-$199,999	0	0.0%
$200,000 or more	3	0.8%
Median Household Income	$38,681	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Manilla is typical of many smaller rural Iowa cities due to its dependence on regional employment opportunities. Many residents are required to commute to surrounding communities such as Denison and Harlan. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Educational Services, and Health Care and Social Assistance (27.1%), Retail Trade (13.4%), and Manufacturing (10.5%). These percentages are based on the total number of individuals 16 years and older that are from Manilla and are employed.

Table 4

Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	9	2.2%
Construction	30	7.2%
Manufacturing	44	10.5%
Wholesale Trade	31	7.4%
Retail Trade	56	13.4%
Transportation and Warehousing, and Utilities	33	7.9%
Information	5	1.2%
Finance and Insurance, and Real Estates and Rental and Leasing	12	2.9%
Professional, Scientific, and Management, and Administrative and Waste Management Services	14	3.4%
Educational Services, and Health Care and Social Assistance	113	27.1%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	26	6.2%
Other Services, except Public Administration	32	7.7%
Public Administration	12	2.9%
Civilian Employed Population 16 years and over	417	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Changes in Development

Manilla has seen growth in residential development on the northeast part of the city. Other limit commercial and industrial development has also occurred.

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Manilla.

Table 5

Current Planning and Regulatory Documents for the City of Manilla

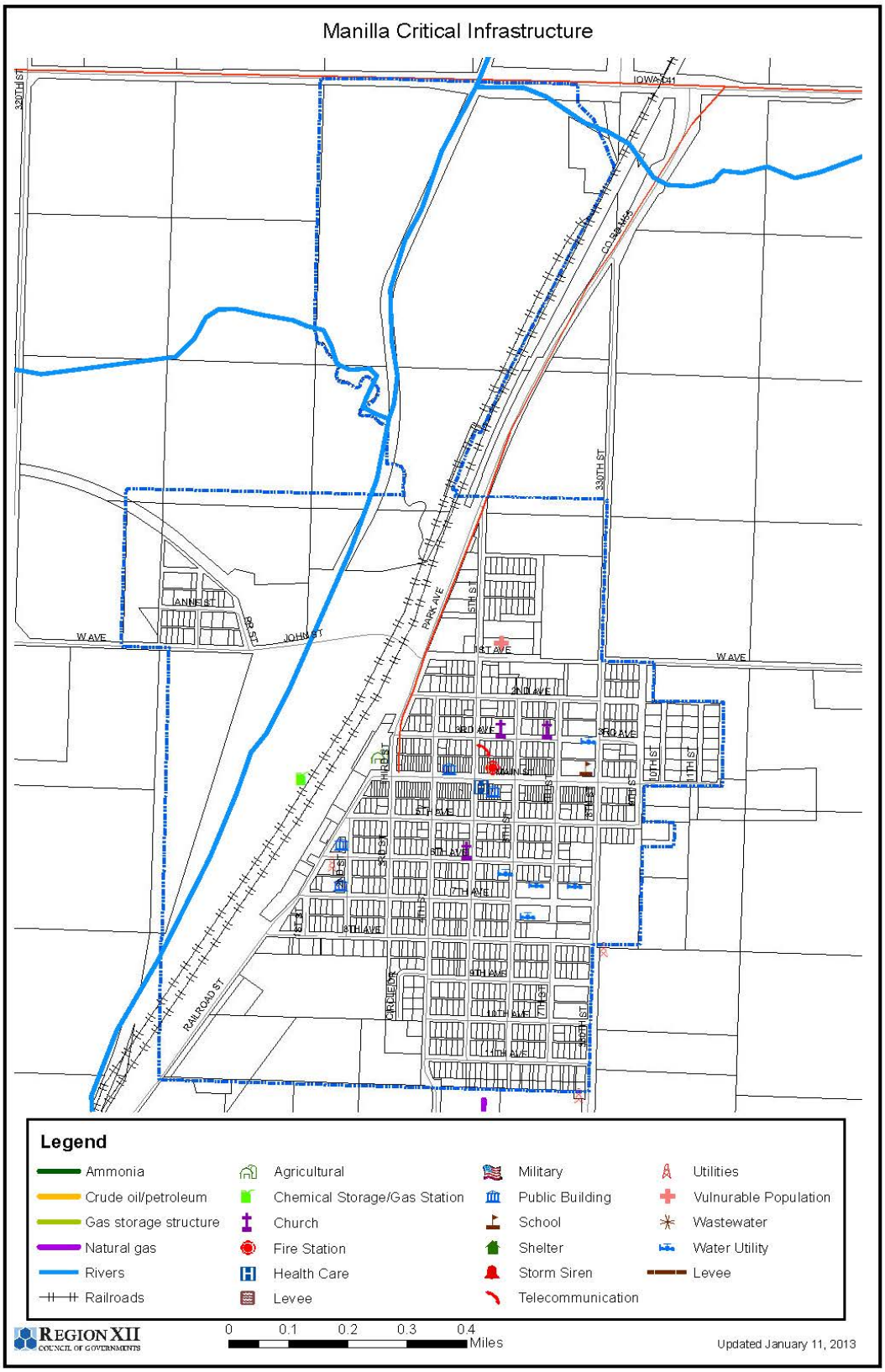
Document	Yes/No	Year
Previous HMP	Yes	2006
Comprehensive Plan	No	-
Building Code	Yes	1999
Zoning Ordinance	Yes	1999
Strategic Plan	Yes	1997
Housing Assessment	Yes	1999
NFIP Participant	Yes	1986

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Manilla and the IKM-Manning School District. They are identified on Map 2

- IKM-Manning School
- Nursing Home
- Fire Station
- Memorial Hall
- City Hall
- Water Treatment
- Water Tower
- Well Field
- Telephone Office
- Electric Utilities
- Catholic Church
- Lutheran Church
- Methodist Church
- Doctor Office
- Fertilizer Storage
- Natural Gas Border Station
- Main Transmission Power Lines
- ADM Grain Elevator
- City Shed
- County Shed

Map 2


Manilla Critical Infrastructure
320TH ST
IOWA 141
CO RD K45
330TH ST
ANNE ST
BB ST
JOHN ST
W AVE
PARK AVE
1ST AVE
2ND AVE
3RD AVE
4TH AVE
5TH AVE
6TH AVE
7TH AVE
8TH AVE
9TH AVE
10TH AVE
11TH AVE
1ST ST
2ND ST
3RD ST
4TH ST
5TH ST
6TH ST
7TH ST
8TH ST
9TH ST
10TH ST
11TH ST
MAIN ST
ORDWAY ST
RAILROAD ST
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0 0.1 0.2 0.3 0.4
Miles
Updated January 11, 2013

Section 3: Risk Assessment

The following table lists the overall results of the Hazard Analysis that the committee member for Manilla completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Manilla Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Tornado	Y	Y	4	3	4	1	3.40
Flash Flood	Y	Y	4	2	4	2	3.20
Thunderstorm and Lightning	Y	Y	4	1	4	2	2.90
Windstorm	Y	Y	3	2	4	1	2.65
Hailstorm	Y	Y	3	2	4	1	2.65
Infrastructure Failure	Y	Y	2	2	4	4	2.50
Human Disease	N	N	2	3	1	4	2.35
Grass or Wild Land Fire	Y	Y	2	2	4	2	2.30
Severe Winter Storms	Y	Y	2	2	2	3	2.10
Radiological	N	N	1	2	4	4	2.05
Hazardous Material	N	Y	1	2	4	2	1.85
Transportation Incident	N	Y	1	2	4	2	1.85
Terrorism	N	N	1	1	4	4	1.75
Extreme Heat	Y	Y	2	1	1	3	1.65
Dam and Levee Failure	N	Y	1	1	4	2	1.55
River Flooding	Y	Y	1	1	4	2	1.55
Drought	Y	Y	1	1	1	4	1.30
Animal/Plant/Crop Disease	N	N	1	1	1	4	1.30

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Manilla and the IKM-Manning School District were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Manilla.

Manilla			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	353	$15,852,690	776
Commercial	40	$3,960,240	
Industrial	2	$47,830	
Agricultural Structures	3	$215,210	

The following hazards were determined to have a negligible impact on the City of Manilla and the IKM-Manning School District, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Dam and Levee Failure, Drought, Extreme Heat, River Flooding, Animal/Plant/Crop Disease and Terrorism

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	32	$1,426,742	70
Commercial	4	$356,422	
Industrial	0	$0	
Agricultural Structures	0	$0	

The following hazards were determined to have a limited impact on the City of Manilla, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Flash Flood, Grass or Wild Land Fire, Hailstorm, Thunder Storms and Lighting, Severe Winter Storms, Windstorm, Hazardous Material, Infrastructure Failure, Radiological and Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	88	$3,963,173	194
Commercial	10	$990,060	
Industrial	1	$11,958	
Agricultural Structures	1	$53,803	

The following hazards were determined to have a critical impact on the City of Manilla and the IKM-Manning School District, were they to occur. A shutdown of some facilities and services could last for at least two weeks and some injuries/illness will result in permanent disability. It is estimated that 50% of the city would be impacted. No school facilities are located in the special flood hazard areas.

Tornado and Human Disease

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	177	$7,926,345	388
Commercial	20	$1,980,120	
Industrial	1	$23,915	
Agricultural Structures	2	$107,605	

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

Objective 1: Improve Public Infrastructure and Critical Assets

Action 1.1: Tree trimming

Action 1.2: Bury overhead lines

Action 1.3: Dry hydrants

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

Objective 2: Improve Public Safety

Action 2.1: Promote NOAA weather radios

Action 2.2: Siren testing

Action 2.3: Maintain water protection plan

Action 2.4: Purchase generator for school

Goal: Improve coordination and communication with other relevant organizations and build support for hazard mitigation

Objective 3: Improve Communication

Action 3.1: Upgrade Electronics

Action 3.2: Purchase NOAA weather radios

Goal: Maintain and support public safety facilities, including equipment and training

Objective 4: Improve Public Safety

Action 4.1: Purchase generators for public facilities

Objective 5: Improve First Responder Resources and Capabilities

Action 5.1: Improve rural firefighting equipment

Objective 6: Improve Public Infrastructure

Action 6.1: Improve water supply equipment

The City of Manilla and the IKM-Manning School District completed a previous hazard mitigation plan in 2006. The table below displays the status of the previous actions. Any action marked as ongoing or future was carried over to be included in this plan.

Table 8
Manilla Previous Mitigation Actions

Manilla	**Status**				
Previous Actions (2006)	**Complete**	**Underway**	**Ongoing**	**Future**	**Canceled**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills			X		
Educate citizens on NOAA weather radios	X				
Expand usage of NOAA weather radios				X	
Replace and maintain snow removal equipment as necessary			X		
Upgrade or add backup generators as necessary			X		
Apply for grant funds to construct adequate storm sewer system				X	
Construct storm sewer				X	
Continue NFIP participation and follow NFIP policies				X	
Provide firefighters, law enforcements and EMS departments with adequate training and equipment			X		
Develop a city-wide evacuation plan			X		
Continue fire and emergency response training			X		
Initiate fire prevention program				X	
Attend training for terrorism when offered				X	
Post signs and increase police surveillance around critical facilities				X	
Evaluate city facilities and identify potential terrorist targets			X		

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for the City of Manilla. Table 10 displays the STAPLEE evaluation criteria.

Table 9

Manilla STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Tree trimming	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	N/A	Y	Y	**20**
Bury overhead lines	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	N/A	Y	Y	**20**
Maintain water protection plan	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	N	N/A	Y	Y	**18**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Replace and maintain snow removal equipment as necessary	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	M	N/A	N/A	N/A	N/A	N/A	**17**
Improve water supply equipment	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N/A	N/A	Y	Y	**16**
Continue fire and emergency response training	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Initiate fire prevention program	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**

Attend training for terrorism when offered	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Post signs and increase police surveillance around critical facilities	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Provide firefighters, law enforcements and EMS departments with adequate training and equipment	Y	N	Y	Y	N	Y	M	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**15**
STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Develop a city-wide evacuation plan	Y	N	Y	Y	N	Y	N	Y	M	Y	M	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**15**
Promote NOAA weather radios	Y	N	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**14**
Improve rural firefighting equipment	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	N/A	Y	Y	**14**
Evaluate city facilities and identify potential terrorist targets	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**
Dry hydrants	Y	N	Y	Y	N	N	N	M	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	N	N/A	Y	Y	**13**
Siren testing	Y	N	Y	Y	N	Y	N	N	Y	Y	N	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**12**
Purchase NOAA weather radios	Y	N	Y	Y	N	N/A	N	N/A	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**12**
Purchase generator for school	Y	N	Y	Y	N	N/A	N	N/A	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**12**
Purchase generators for public facilities	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**10**

Continue NFIP participation and follow NFIP policies	Y	N	Y	Y	N	N	N	M	M	N	M	Y	Y	N	Y	Y	Y	Y	Y	M	N/A	Y	Y	**10**
Upgrade electronics	Y	N	Y	Y	N	N	N	N	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	N	N/A	Y	Y	**8**
Construct storm sewer	M	N	Y	Y	N	N	N	Y	M	N	M	Y	M	M	Y	Y	Y	Y	Y	N/A	N/A	Y	Y	**8**

Table 10

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Manilla outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 11 displays all of the mitigation actions for Manilla with their implementation strategy.

Table 11

Manilla Action Plan

Tree Trimming	
Hazards Addressed	Tornado, Windstorm, Severe Winter Storms
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	Public Works
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Prevention
Target Completion Date	Ongoing

Bury Overhead Lines	
Hazards Addressed	Tornado, Windstorm, Severe Winter Storms
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	Public Works
Estimated Cost	Moderate
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Long

Maintain Water Protection Plan	
Hazards Addressed	Infrastructure Failure
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	Public Works
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Prevention
Target Completion Date	Ongoing

Educate Citizens about Summer Storms via Public Information Announcements through the Local Media or by Notices on Utility Bills	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Thunderstorm and Lightning
Priority	Medium
Previous Priority	
Responsible Department	Public Works
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Replace and Maintain Snow Equipment as necessary	
Hazards Addressed	Severe Winter Storm
Priority	Medium
Previous Priority	
Responsible Department	Public Works
Estimated Cost	Moderate
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Improve Water Supply Equipment	
Hazards Addressed	Grass or Wild Land Fire, Infrastructure Failure
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	Fire Department
Estimated Cost	Moderate
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Continue Fire and Emergency Response Training	
Hazards Addressed	All
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Initiate Fire Prevention Program	
Hazards Addressed	Grass or Wild Land Fire, Infrastructure Failure
Priority	High
Previous Priority	High
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Attend Training for Terrorism when offered	
Hazards Addressed	Terrorism
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Post Signs and Increase Police Surveillance around Critical Facilities	
Hazards Addressed	Hazardous Material, Terrorism
Priority	Low
Previous Priority	Low
Responsible Department	Police Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Provide Firefighters, Law Enforcement and EMS Departments with Adequate Training and Equipment	
Hazards Addressed	All
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Moderate
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Develop a City-Wide Evacuation Plan	
Hazards Addressed	Grass or Wild Land Fire, River Flooding, Dam and Levee Failure, Hazardous Material, Radiological
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Promote NOAA Weather Radios	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	High
Previous Priority	High
Responsible Department	City Council, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Improve Rural Firefighting Equipment	
Hazards Addressed	Grass or Wild Land Fire, Infrastructure Failure
Priority	High
Previous Priority	High
Responsible Department	Fire Department
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Evaluate City Facilities and Identify Potential Terrorist Targets	
Hazards Addressed	Terrorism
Priority	Medium
Previous Priority	Medium
Responsible Department	Public Works
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Short

Install Dry Hydrants	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	Fire Department, County Emergency Management
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Long

Siren Testing	
Hazards Addressed	Tornado
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	Public Works
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Purchase NOAA Weather Radios	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Long

Purchase Generator for IKM Manning School	
Hazards Addressed	Infrastructure Failure
Priority	High
Previous Priority	High
Responsible Department	IKM Manning School District
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Long

Purchase Generators for Public Facilities	
Hazards Addressed	Infrastructure Failure
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Moderate
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Long

Continue NFIP Participation and Follow NFIP Policies by Enforcing Floodplain Management Ordinance	
Hazards Addressed	River Flooding
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

\Upgrade Electronics for City Equipment	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Construct Storm Sewer	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	Public Works
Estimated Cost	High
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Structural Project
Target Completion Date	Long

Incorporation into Other Planning Mechanisms

Where possible, the City of Manilla 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:

- Manilla City Code of Ordinances
- Manilla Comprehensive Plan
- Manilla Zoning Ordinance
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

Resolution No. 678

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CITY OF MANILLA ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the City of Manilla participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the City of Manilla adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 1 **DAY OF** December, 2014.

Pat Westerwald
Mayor

ATTEST:

Laura Jahn
City Clerk

Resolution No. _____

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE IKM-MANNING SCHOOL DISTRICT ADOPTING THE CARROLL COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, Carroll County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the IKM-Manning School District participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Carroll County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the IKM-Manning School Board adopts the Carroll County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 11th DAY OF October, 2013.

Board Chair

David Keller

ATTEST:

Beth Dickson

Secretary

Appendix K: City of Ricketts

Section 1: Community Profile

City of Ricketts History

The town of Ricketts would spring up in southeast corner of Soldier Township as a consequence of a new railroad that was built by the Boyer Valley Railroad Company, beginning in 1899. The town is believed to get its name from an early settler named Ricks.

The German Savings Bank of Ricketts was organized in 1901. In 1907 a fire consumed most of the business section in Ricketts. Prior to 1913, children attended one of nine county schools in Soldier Township. In May 1913, lots were purchased in town in order for Ricketts to have a school within the town limits. By fall of 1913 a one-room school house was built.

Geography and Environment

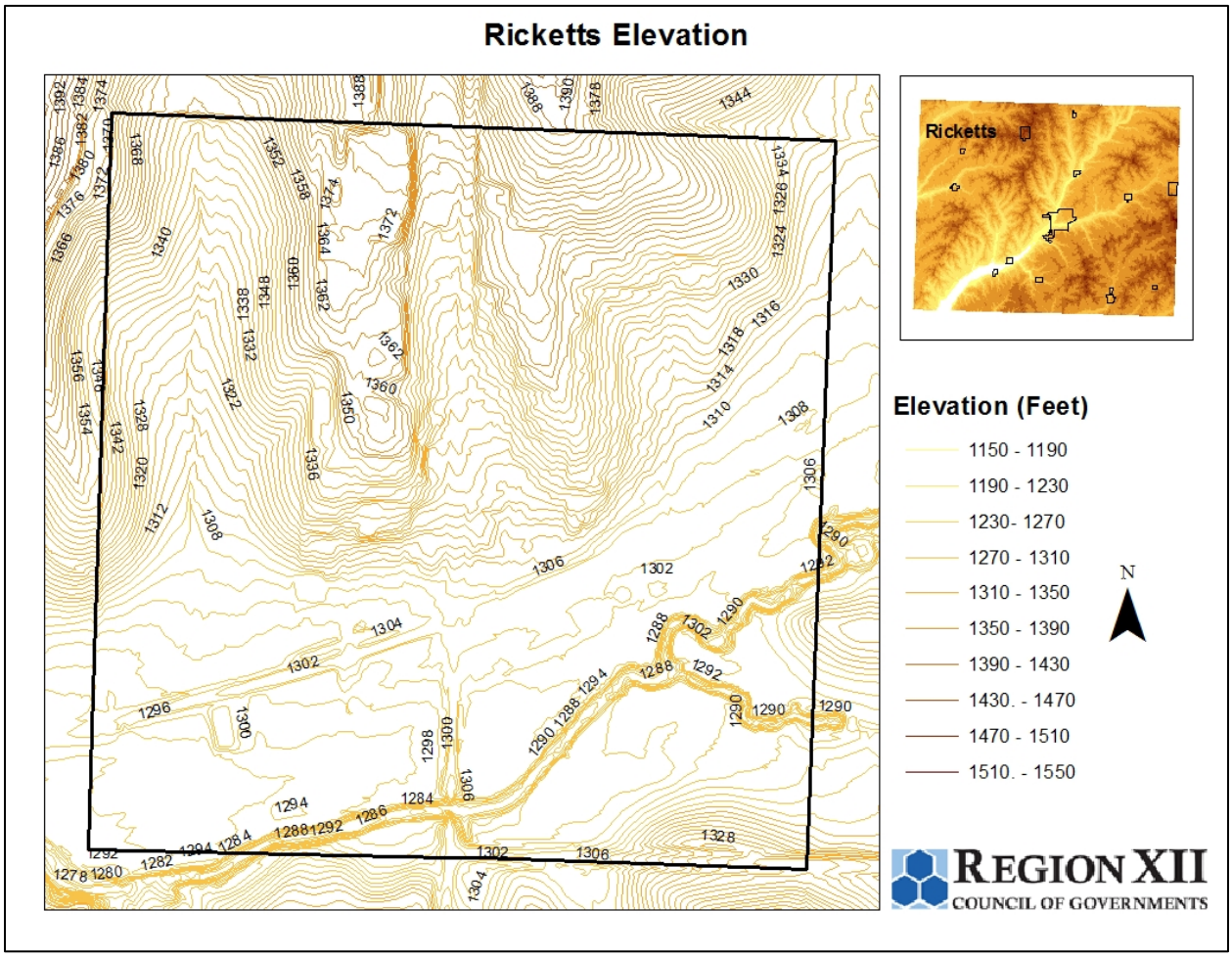
Location

Ricketts is located in northwestern Crawford County. Ricketts is situated between Highway 141 and Highway 59. Highway 141 is seven miles west of Ricketts while Highway 59 is seven miles east of Ricketts. Ricketts is located 5 miles north of Charter Oak, 16.7 miles northwest of Denison, 60.1 miles southeast of Sioux City, and 80.8 miles northeast of Omaha.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The northern portion of Ricketts reaches 1,372 feet while the southwest corner has a low of 1,284 feet. The following map shows the elevation of Ricketts and its relation to the rest of Crawford County.

Map 1



Demographics

Population

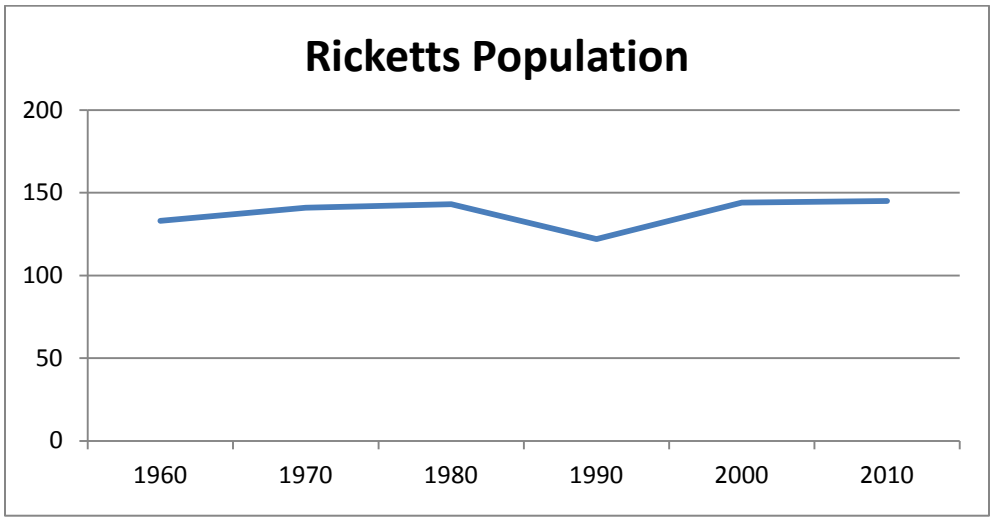
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Ricketts's population through the past, present and future trends of the region.

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 education 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.

Ricketts has maintained a stable population since 1960, never fluctuating by more than 22 residents. The greatest population shift during this time period occurred from 1980 to 2000 when the population declined by 21 residents from 1980 to 1990 and then increased by 22 residents from 1990 to 2000. Ricketts 2010 population is the largest over the past 50 years at 145 residents. The historic population trend for Ricketts is shown in Figure 1 below.

Figure 1



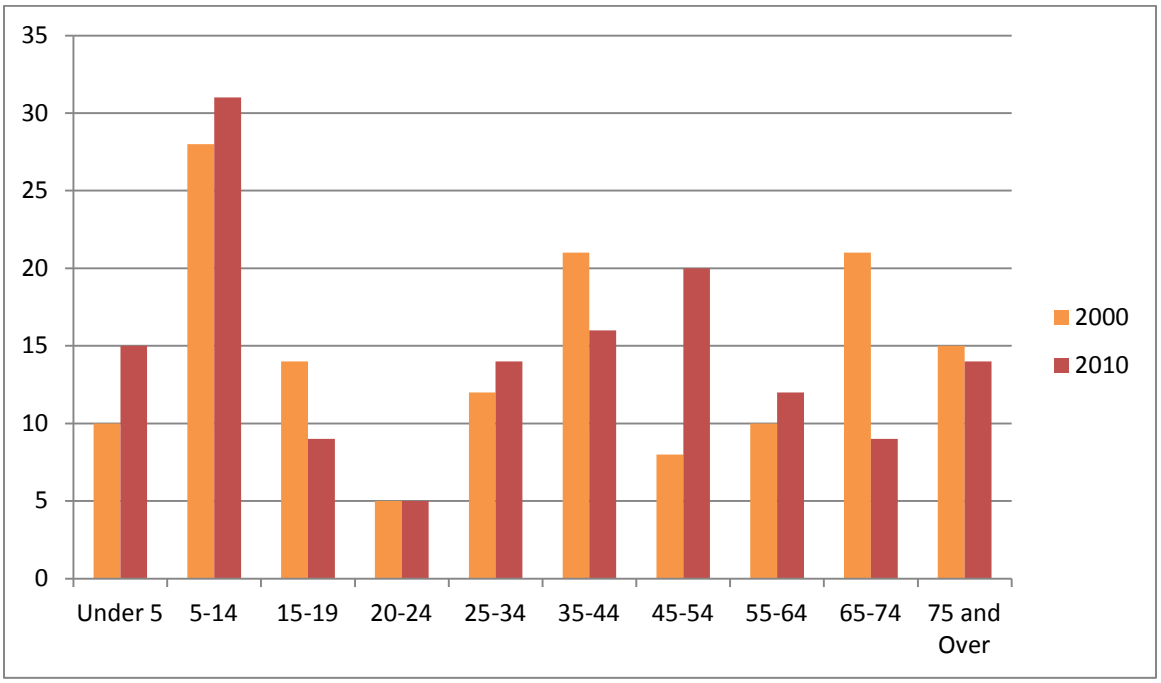
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Ricketts from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 65-74 age cohort, which lost twelve individuals. Other losses came in the 15-19 (-5) and 35-44 age groups. A significant increase in population was seen in the 45-54 (12) age group.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 45-54 age cohort in 2000 would be in the 55-64 age cohort in 2010. Therefore, the 45-54 age cohort from 2000 only gained four individuals, a smaller total than in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as “brain drain.”

Figure 2

Ricketts Age Distribution



Source: US Census Bureau

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.

The number of occupied housing units, along with the total number of housing units, decreased over the last ten years in Ricketts. The occupancy rate in 2010 decreased by 4.5 percent from 2000. Owner-occupied housing units actually increased by 6.3% over the ten year period and vacant housing units increased by 4.5 percent. Table 1 shows the housing trends for Ricketts from 2000 to 2010.

Table 1

Manilla Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	56	91.8%	48	87.3%
Owner Occupied	42	75.0%	39	81.3%
Renter Occupied	14	25.0%	9	18.7%
Vacant Housing Units	5	8.2%	7	12.7%
Total Housing Units	61	100.0%	55	100.0%

Source: US Census Bureau

Nearly ninety percent of the housing units in Ricketts are valued at less than $50,000. Housing units with lower values are more likely to be aging and in need of revitalization. Due to this, these homes are susceptible to hazards such as fires, serious storms and other weather related hazards. Table 2 below displays the value of housing units in Ricketts in 2012.

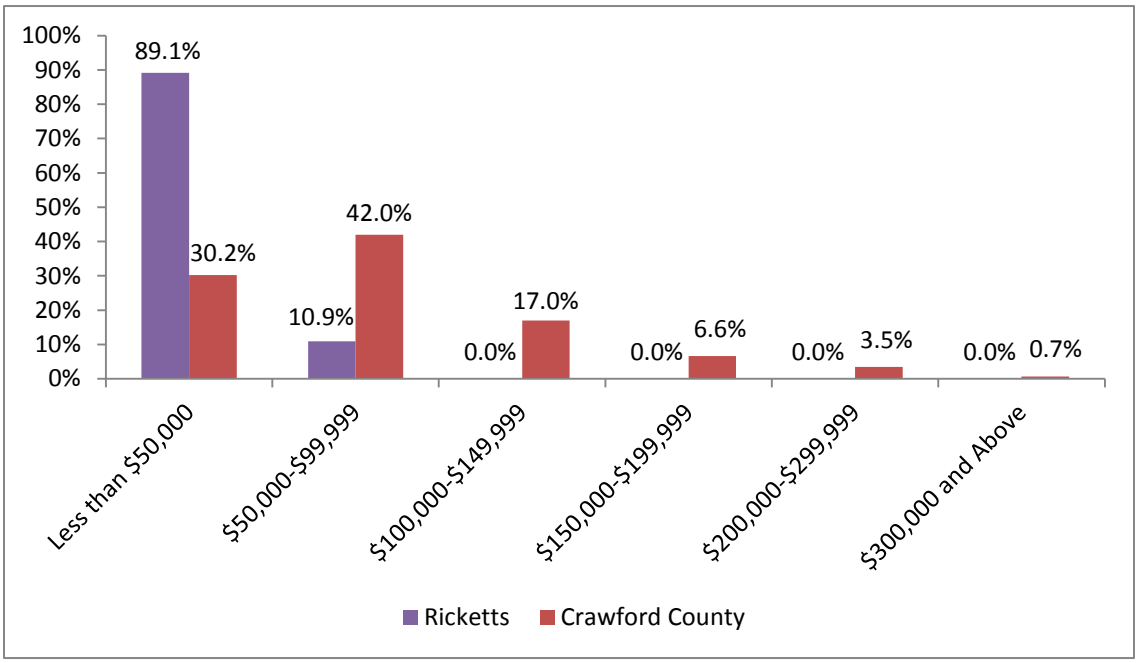
Table 2
Value of Ricketts Housing Units, 2012

Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	49	89.1%
$50,000-$99,999	6	10.9%
$100,000-$149,999	0	0.0%
$150,000-$199,999	0	0.0%
$200,000-$299,999	0	0.0%
$300,000 and above	0	0.0%
Median Value	$25,855	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Ricketts to Crawford County. Figure 3 shows that Ricketts has a disproportionate percentage of housing units valued at less than $50,000, even when compared to Crawford County.

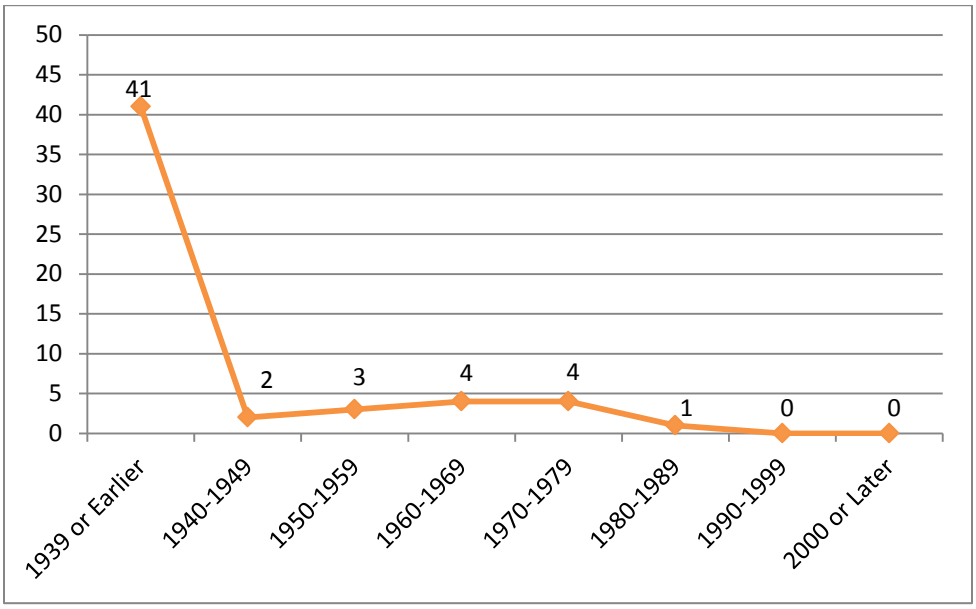
Figure 3
Value of Housing Units



Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Nearly seventy-five percent of the current housing stock in Ricketts was constructed prior to 1940. Only one housing unit has been constructed since 1980. Figure 4 shows the distribution of housing unit construction in Ricketts.

Figure 4
Year Housing Unit Constructed



Source: 2006-2010 American Community Survey 5-Year Estimates

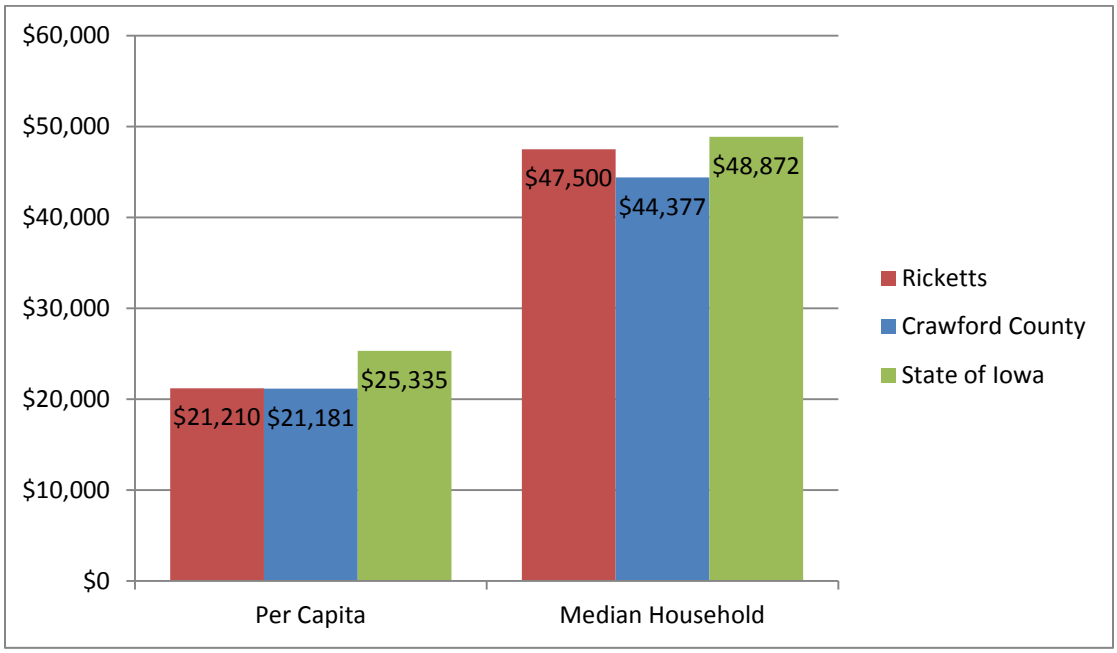
Economic

An important indicator of the economic base in Ricketts is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 on the following page shows that the per capita and median household incomes of those living in Ricketts are higher than Crawford County's average, but lower than the state average. The average per capita personal income in Ricketts from 2006-2010 American Community Survey 5-year estimate was $29 greater per year than Crawford County's average and $4,125 less per year than the average in the State of Iowa. The median household income in Ricketts for the same time was $3,123 more than Crawford County and trailed the state by $1,372 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Ricketts.

Figure 5

Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Ricketts, according to the American Community Survey, included the $50,000-$74,999 (39.5%) income group. Over thirty-five percent of households in Ricketts make less than $25,000 and 10.5 percent of households have an income of $75,000 or more. Table 3 below shows a breakdown of household income in Ricketts.

Table 3

Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	10	20.8%
$10,000-$14,999	2	4.2%
$15,000-$24,999	5	10.4%
$25,000-$34,999	4	8.3%
$35,000-$49,999	3	6.3%
$50,000-$74,999	19	39.5%
$75,000-$99,999	2	4.2%
$100,000-$149,999	3	6.3%
$150,000-$199,999	0	0.0%
$200,000 or more	0	0.0%
Median Household Income	$47,500	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Ricketts is typical of many smaller rural Iowa cities due to its dependence on regional employment opportunities. Many residents are required to commute to surrounding communities such as Denison and Harlan. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Manufacturing (32.7%), Construction (21.2%), and Educational Services, and Health Care and Social Assistance (19.2%). These percentages are based on the total number of individuals 16 years and older that are from Dow City and are employed.

Table 4

Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	0	0.0%
Construction	11	21.2%
Manufacturing	17	32.7%
Wholesale Trade	0	0.0%
Retail Trade	5	9.6%
Transportation and Warehousing, and Utilities	6	11.5%
Information	0	0.0%
Finance and Insurance, and Real Estates 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	10	19.2%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	0	0.0%
Other Services, except Public Administration	3	5.8%
Public Administration	0	0.0%
Civilian Employed Population 16 years and over	52	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Changes in Development

The City of Ricketts has not seen any development since the last plan update. Plans are being developed to upgrade the city's wastewater treatment system.

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Ricketts.

Table 5
Current Planning and Regulatory Documents for the City of Ricketts

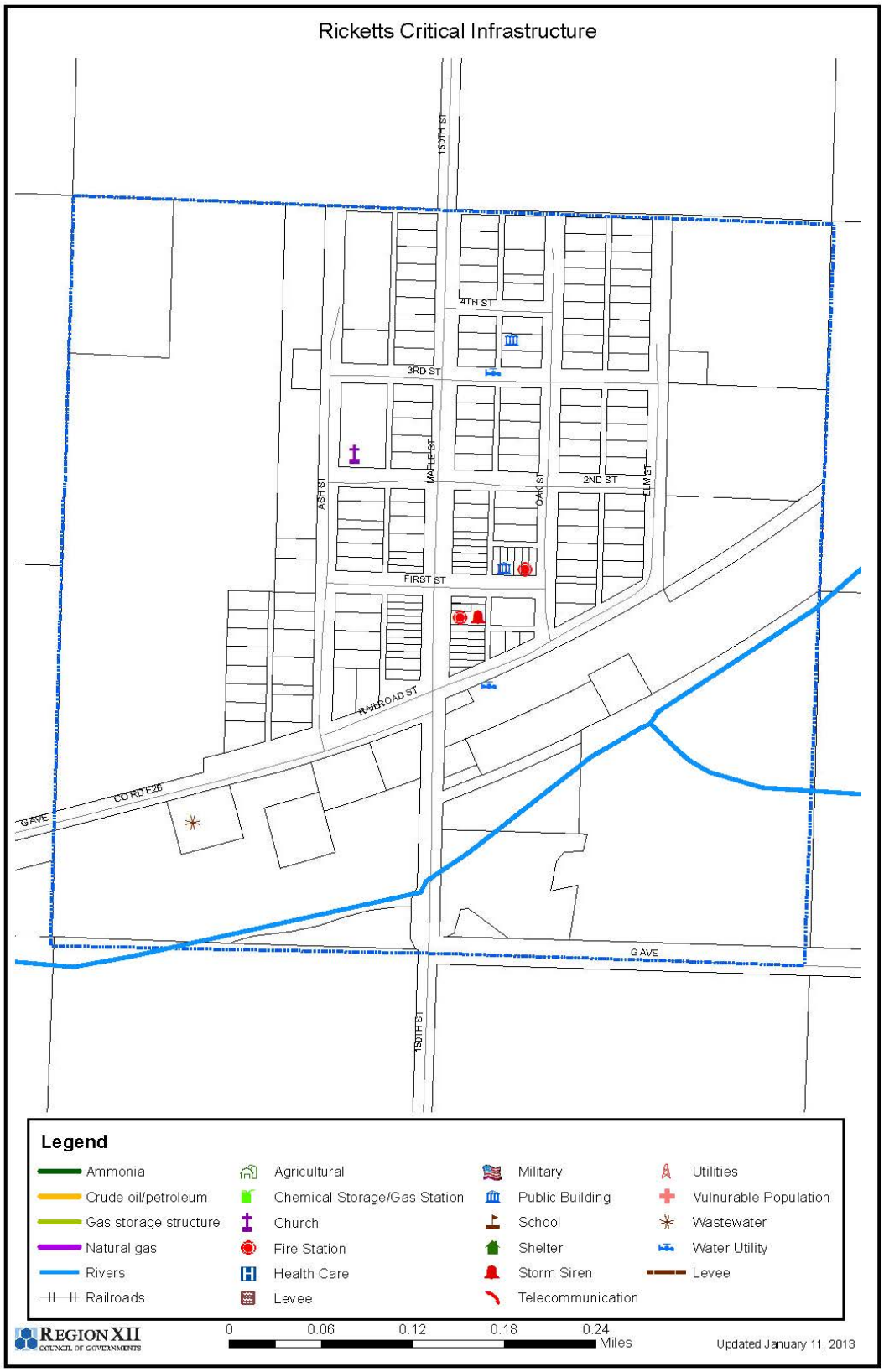
Document	Yes/No	Year
Previous HMP	Yes	2006
Comprehensive Plan	No	-
Building Code	Yes	2004
Zoning Ordinance	Yes	2004
Strategic Plan	Yes	1997
Housing Assessment	Yes	1999
NFIP Participant	Yes	1989

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Ricketts. They are identified on Map 2

- City Hall
- Library
- Fire Station
- Siren
- Rural Water
- Water Tower
- Wastewater
- City Maintenance Building
- Small Fire Station
- Ricketts Community Center
- St. Luke Church

Map 2


Ricketts Critical Infrastructure
150TH ST
4TH ST
3RD ST
MAPLE ST
ASH ST
OAK ST
2ND ST
ELM ST
FIRST ST
RAILROAD ST
CO RD E26
G AVE
G AVE
150TH ST
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0
0.06
0.12
0.18
0.24
Miles
Updated January 11, 2013

Section 3: Risk Assessment

The following table lists the overall results of the Hazard Analysis that the committee member for Ricketts completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Ricketts Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Tornado	Y	Y	3	3	4	1	2.95
Thunderstorm and Lightning	Y	Y	4	1	4	1	2.80
Windstorm	Y	Y	3	2	4	2	2.75
Hailstorm	Y	Y	3	2	4	1	2.65
Severe Winter Storms	Y	N	3	1	3	3	2.40
Extreme Heat	Y	Y	3	1	2	3	2.25
Grass or Wild Land Fire	Y	Y	2	2	4	1	2.20
Drought	Y	N	2	1	2	4	1.90
Hazardous Material	N	N	1	1	4	4	1.75
Human Disease	N	N	1	1	4	4	1.75
Infrastructure Failure	N	N	1	1	4	4	1.75
Radiological	N	N	1	1	4	4	1.75
River Flooding	Y	N	1	1	4	3	1.65
Terrorism	N	N	1	1	4	3	1.65
Dam and Levee Failure	N	Y	1	1	4	2	1.55
Flash Flood	Y	Y	1	1	4	2	1.55
Transportation Incident	N	N	1	1	4	2	1.55
Animal/Plant/Crop Disease	N	N	1	1	1	4	1.30

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Ricketts were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Ricketts.

Ricketts			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	57	$1,490,840	145
Commercial	7	$36,820	
Industrial	0	$0	
Agricultural Structures	0	$0	

The following hazards were determined to have a negligible impact on the City of Ricketts, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Dam and Levee Failure, Drought, Extreme Heat, Flash Flood, River Flooding, Severe Winter Storms, Thunderstorm and Lightning, Animal/Plant/Crop Disease, Hazardous Material, Human Disease, Infrastructure Failure, Radiological, Terrorism and Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	5	$134,176	13
Commercial	1	$3,314	
Industrial	0	$0	
Agricultural Structures	0	$0	

The following hazards were determined to have a limited impact on the City of Ricketts, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Grass or Wild Land Fire, Hailstorm, and Windstorm

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	14	$372,710	36
Commercial	2	$9,205	
Industrial	0	$0	
Agricultural Structures	0	$0	

The following hazards were determined to have a critical impact on the City of Ricketts, were they to occur. A shutdown of some facilities and services could last for at least two weeks and some injuries/illness will result in permanent disability. It is estimated that 50% of the city would be impacted.

Tornado

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	29	$745,420	73
Commercial	4	$18,410	
Industrial	0	$0	
Agricultural Structures	0	$0	

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

Objective 1: Improve Warning Capabilities

Action 1.1: Update city siren, connect to Crawford County Communications Center

Objective 2: Provide Back-Up Systems for All Critical Systems and Assets

Action 2.1: Ensure additional maps are put in safe places

Action 2.2: Purchase generator for city hall

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

Objective 3: Work Towards Zero Fatalities and Injuries

Action 3.1: Increase first responder training

Action 3.2: Promote weather radios

Action 2.3: Propane tank shut-off during hazard event

Goal: Improve coordination and communication with other relevant organizations and build support for hazard mitigation

Objective 4: Improve Communication between City Officials, Fire, Police, and Utilities

Action 4.1: Have the line of command listed and everyone aware of it

Action 4.2: Electrical company communication for disconnect if major damage

Goal: Maintain and support public safety facilities, including equipment and training

Objective 5: Quality Equipment

Action 5.1: Ensure all equipment is serviced regularly

Objective 6: Improve First Responder Resources and Capabilities

Action 6.1: Keep fire department up-to-date on trainings

The City of Ricketts completed a previous hazard mitigation plan in 2006. The table on the following page displays the status of the previous actions. Any action marked as ongoing or future was carried over to be included in this plan.

Table 8

Ricketts Previous Mitigation Actions

Ricketts	**Status**				
Previous Actions (2006)	**Complete**	**Underway**	**Ongoing**	**Future**	**Canceled**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills			X		
Improve the storm warning siren to be activated by the Crawford County Communications Center			X		
Educate citizens on NOAA weather radios		X			
Expand usage of NOAA weather radios		X			
Replace and maintain snow removal equipment as necessary			X		
Upgrade or add backup generators as necessary		X			
Apply for grant funds to construct adequate storm sewer system				X	
Construct storm sewer				X	
Continue NFIP participation and follow NFIP policies			X		
Provide firefighters, law enforcements and EMS departments with adequate training and equipment		X			
Develop a city-wide evacuation plan			X		
Continue fire and emergency response training			X		
Initiate fire prevention program			X		
Attend training for terrorism when offered			X		
Post signs and increase police surveillance around critical facilities				X	
Evaluate city facilities and identify potential terrorist targets			X		

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for the City of Ricketts. Table 10 displays the STAPLEE evaluation criteria.

Table 9

Ricketts STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Ensure additional maps are put in safe places	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N/A	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**17**
Increase first responder training	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**16**
Electrical company communication for disconnect if major damage	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N/A	Y	N/A	N	N/A	N/A	N/A	N/A	N/A	**16**
Ensure all equipment is serviced regularly	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**16**
Propane tank shut-off during hazard event	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N/A	Y	N	N	N/A	N/A	N/A	N/A	N/A	**15**
Have the line of command listed and everyone aware of it	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N/A	Y	N	N	N/A	N/A	N/A	N/A	N/A	**15**
Continue NFIP participation and follow NFIP policies	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y	N/A	N/A	Y	Y	**15**
Update city siren, connect to Crawford County Communications Center	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**
Purchase generator for city hall	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**
Keep fire department up-to-date on trainings	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**14**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Continue fire and emergency response training	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**
Initiate fire prevention program	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**
Post signs and increase police surveillance around critical facilities	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**
Promote weather radios	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	N/A	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**13**
Construct storm sewer	Y	N	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	N/A	N/A	Y	Y	**13**
Replace and maintain snow removal equipment as necessary	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N/A	N/A	N/A	N/A	N/A	**12**
Evaluate city facilities and identify potential terrorist targets	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**12**
Develop a city-wide evacuation plan	Y	N	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**10**
Attend training for terrorism when offered	Y	N	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	N/A	N/A	N/A	N/A	N/A	**8**

Table 10

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Ricketts outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 11 displays all of the mitigation actions for Ricketts with their implementation strategy.

Table 11

Ricketts Action Plan

Ensure Additional Maps are Put in Safe Places	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Clerk
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Short

Increase First Responder Training	
Hazards Addressed	All
Priority	Medium
Previous Priority	Medium
Responsible Department	Fire Department, Emergency Services
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Electrical Company Communication for Disconnect if Major Damage	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Clerk
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Ensure All Equipment is Serviced Regularly	
Hazards Addressed	All
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Prevention
Target Completion Date	Ongoing

Propane Tank Shut-Off during Hazard Event	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Have the Line of Command Listed and Everyone Aware of It	
Hazards Addressed	All
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Continue NFIP Participation and Follow NFIP Policies by Enforcing Floodplain Management Ordinance	
Hazards Addressed	Flash Flood, River Flooding
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Update City Siren, Connect to Crawford County Communications Center	
Hazards Addressed	Tornado, Windstorm
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Purchase Generator for City Hall	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Educate Citizens about Summer Storms via Public Information Announcements through the Local Media or by Notices on Utility Bills	
Hazards Addressed	Tornado
Priority	Medium
Previous Priority	Medium
Responsible Department	Fire Department, City Clerk
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Fire and Emergency Response Training	
Hazards Addressed	All
Priority	Medium
Previous Priority	Medium
Responsible Department	Fire Department, Emergency Services, First Responders
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Initiate Fire Prevention Program	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Post Signs and Increase Police Surveillance around Critical Facilities	
Hazards Addressed	Terrorism
Priority	Medium
Previous Priority	Medium
Responsible Department	Police Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Promote Weather Radios	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	Low
Previous Priority	Low
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Construct Storm Sewer	
Hazards Addressed	Flash Flood
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Moderate
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Structural Project
Target Completion Date	Long

Replace and Maintain Snow Removal Equipment as necessary	
Hazards Addressed	Severe Winter Storms
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Evaluate City Facilities and Identify Potential Terrorist Targets	
Hazards Addressed	Terrorism
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council, City Clerk
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Prevention
Target Completion Date	Ongoing

Develop a City-Wide Evacuation Plan	
Hazards Addressed	Grass or Wild Land Fire, River Flooding, Dam and Levee Failure, Hazardous Material, Radiological
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Prevention
Target Completion Date	Short

Attend Training for Terrorism when offered	
Hazards Addressed	Terrorism
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Incorporation into Other Planning Mechanisms

Where possible, the City of Ricketts 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:

- Ricketts City Code of Ordinances
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

Resolution No. 11-15-2013A

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CITY OF RICKETTS ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the City of Ricketts participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the City of Ricketts adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 15 **DAY OF** November**, 2013.**

James C Gress
Mayor

ATTEST:

Pamela S. Tupp
City Clerk

Appendix L: City of Schleswig

Section 1: Community Profile

City of Schleswig History

Schleswig was named for the province in Germany, former homeland of many settlers. The new town of Schleswig was incorporated in early 1900. The post office was established on November 16, 1899. In the spring of 1901 and independent school district was organized and the newly-formed district opened in November 1901.

Geography and Environment

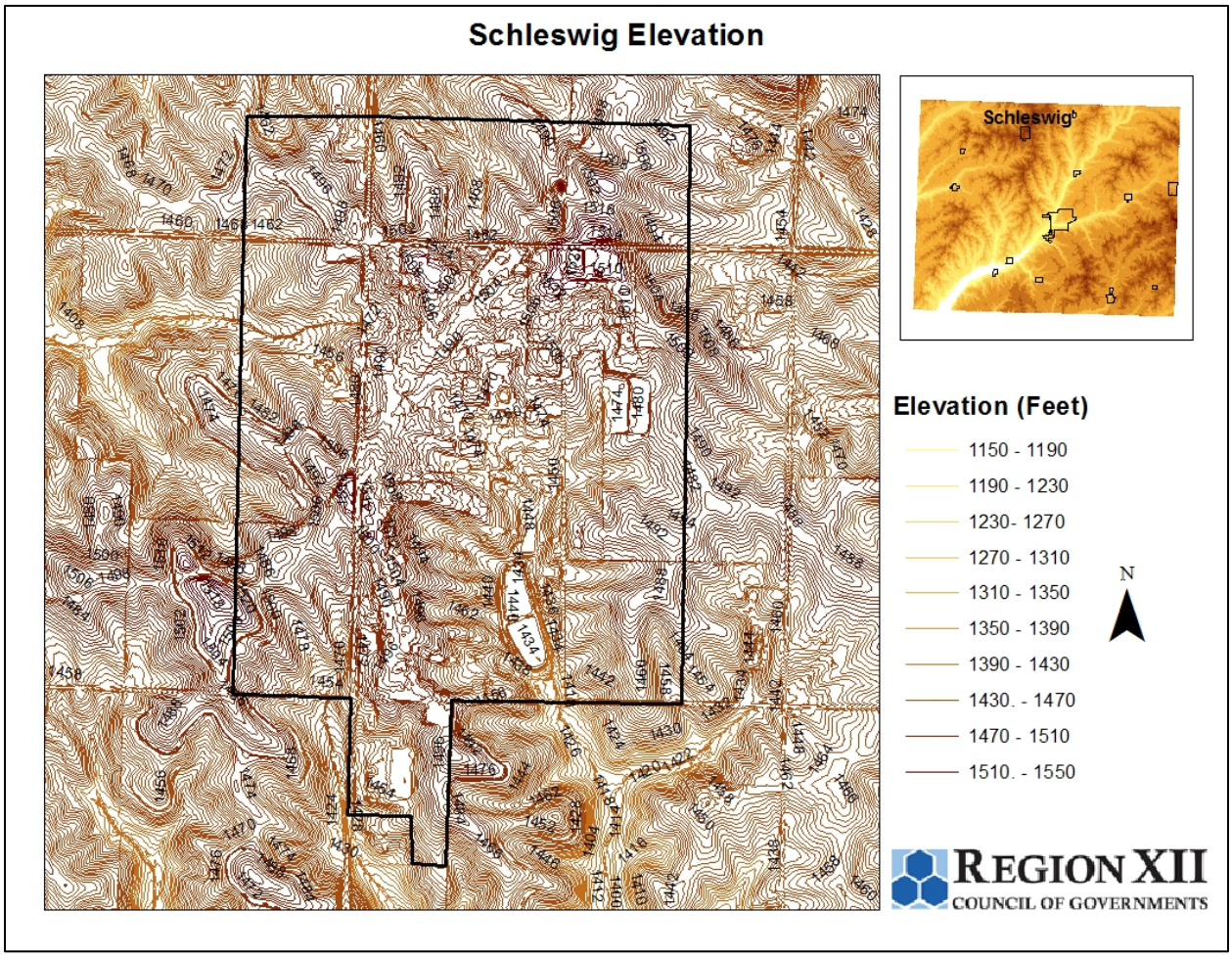
Location

Schleswig is located in north central Crawford County. Highway 59 runs through the western edge of the town. Schleswig is located 12.6 miles northwest of Denison, 64.5 miles southeast of Sioux City, and 85.2 miles northeast of Omaha.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The east central portion of Schleswig reaches 1,480 feet. The following map shows the elevation of Schleswig and its relation to the rest of Crawford County.

Map 1



Demographics

Population

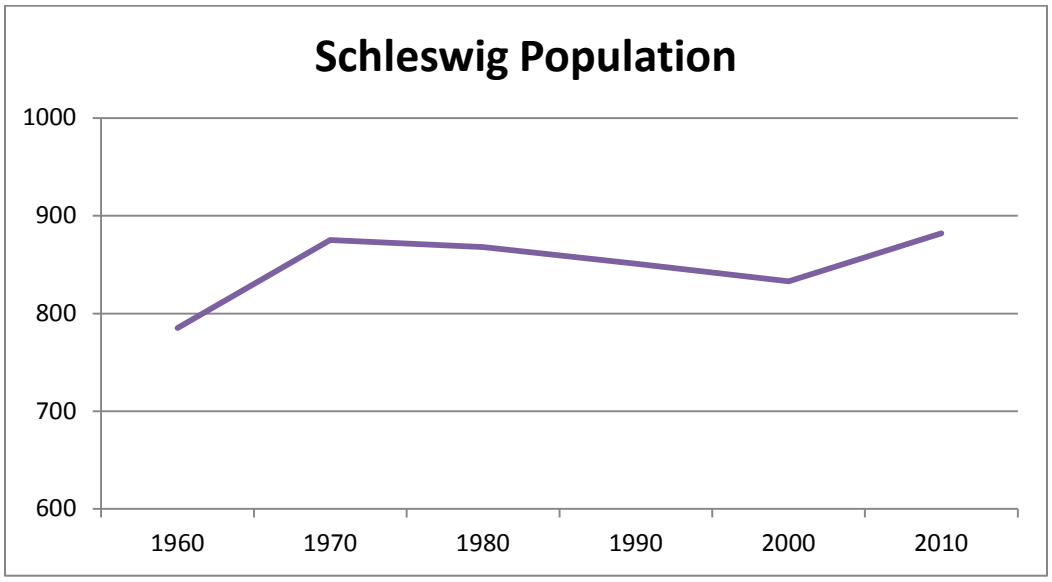
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Schleswig's population through the past, present and future trends of the region.

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 education 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.

Schleswig has experienced increases and decreases in population over the last 50 years. The greatest population shift during this time period occurred from 1960 to 1970 when the population increased from 785 residents to 875 residents. Schleswig's 2010 population is the largest over the past 50 years at 882 residents. The historic population trend for Schleswig is shown in Figure 1 below.

Figure 1



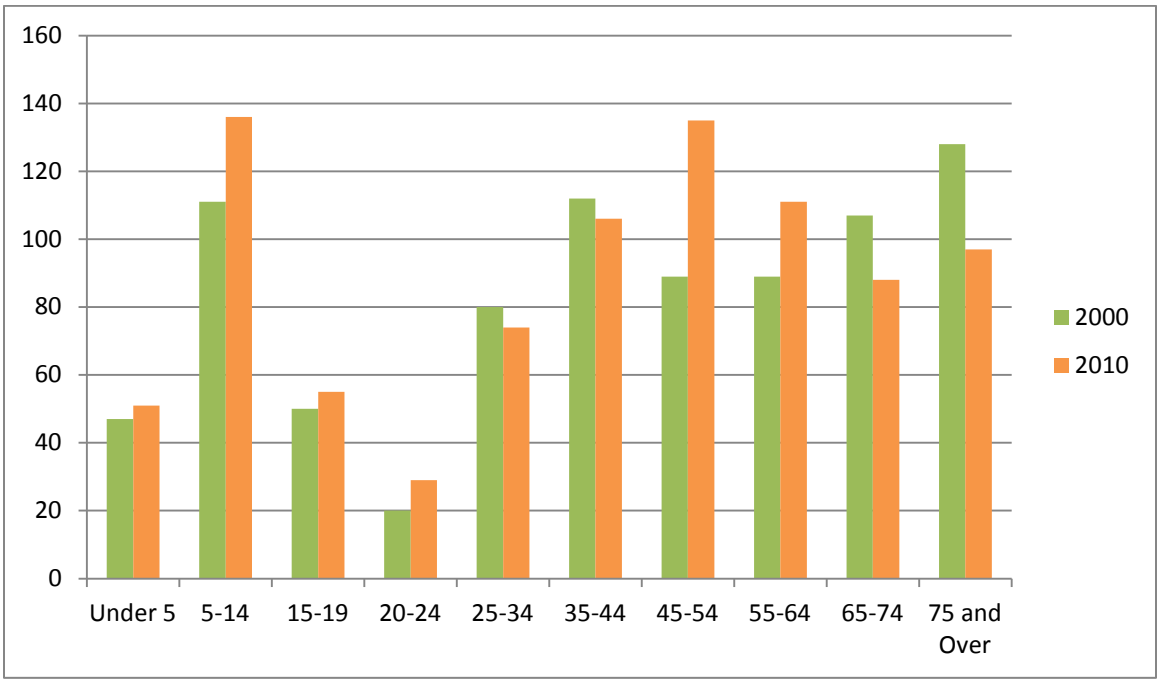
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Schleswig from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 75 and over age cohort, which lost thirty-one individuals. Another significant loss came in the 65-74 (-19) age group. Significant increases in population were seen in the 45-54 (46), 5-14 (25), and 55-64 (22) age groups.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 35-44 age cohort in 2000 would be in the 45-54 age cohort in 2010. Therefore, the 35-44 age cohort from 2000 actually gained twenty-three individuals instead of losing six individuals as seen in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as "brain drain."

Figure 2

Schleswig Age Distribution



Source: US Census Bureau

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.

The number of occupied housing units, along with the percentage of owner-occupied housing units, increased over the last ten years in Schleswig. The occupancy rate in 2010 increased by half a percent from 2000. Owner-occupied housing units decreased from 82.1 percent in 2000 to 79.6 percent in 2010. The vacancy rate decreased from 10.5 percent in 2000 to 10.0 percent in 2010. Table 1 shows the housing trends for Schleswig from 2000 to 2010.

Table 1

Schleswig Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	368	89.5%	377	90.0%
Owner Occupied	302	82.1%	300	79.6%
Renter Occupied	66	17.9%	77	20.4%
Vacant Housing Units	43	10.5%	42	10.0%
Total Housing Units	411	100.0%	419	100.0%

Source: US Census Bureau

Forty percent of the housing units in Schleswig are valued at less than $50,000. The median value of owner-occupied units in Schleswig was $66,865 in 2012. Housing units with lower values are more likely to be aging and in need of revitalization. Due to this, these homes are susceptible to hazards such as fires, serious storms and other weather related hazards. Table 2 below displays the value of housing units in Schleswig in 2012.

Table 2

Value of Schleswig Housing Units, 2012

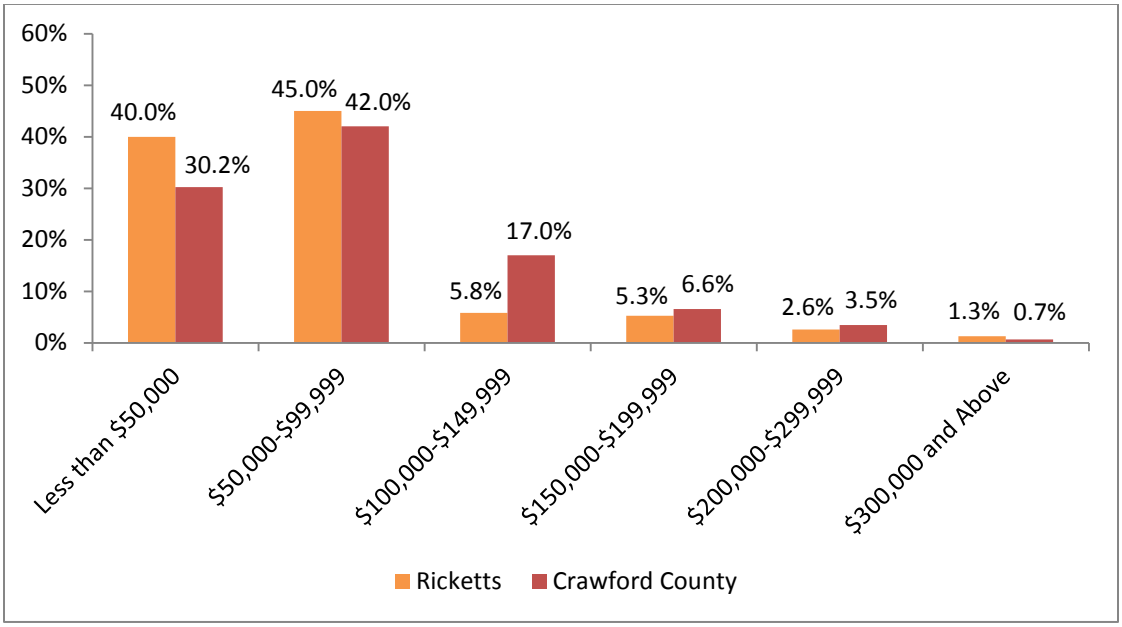
Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	152	40.0%
$50,000-$99,999	171	45.0%
$100,000-$149,999	22	5.8%
$150,000-$199,999	20	5.3%
$200,000-$299,999	10	2.6%
$300,000 and above	5	1.3%
Median Value	$66,865	-

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Schleswig to Crawford County. Figure 3 shows that Schleswig has a higher percentage of housing units valued at less than $50,000 when compared to Crawford County.

Figure 3

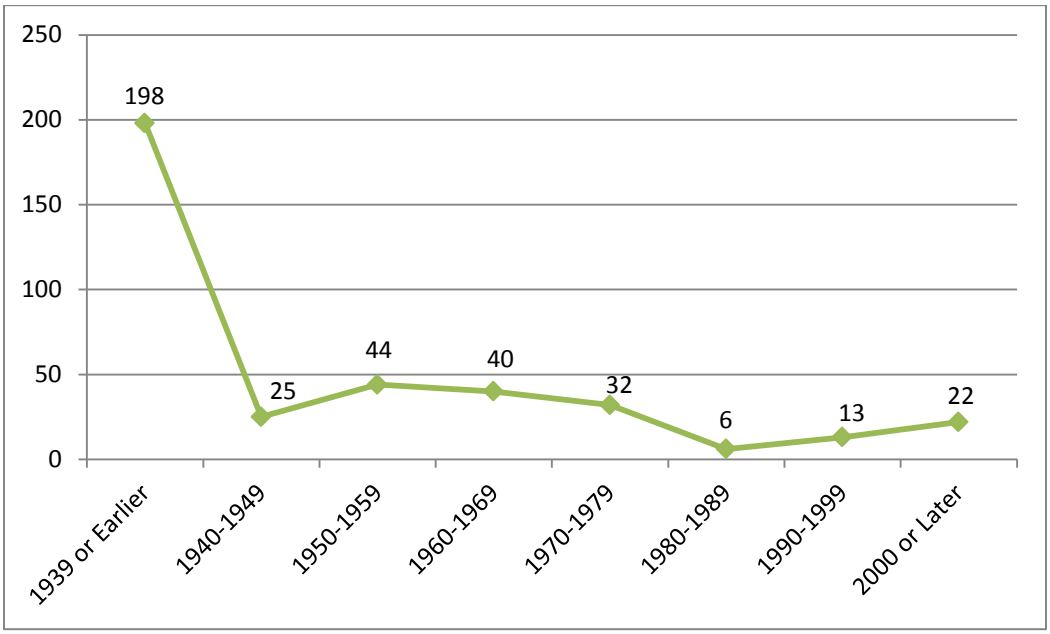
Value of Housing Units



Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Over half of the current housing stock in Schleswig was constructed prior to 1940. Slightly over nine percent of homes have been constructed since 1990. Figure 4 shows the distribution of housing unit construction in Schleswig.

Figure 4
Year Housing Unit Constructed



Source: 2006-2010 American Community Survey 5-Year Estimates

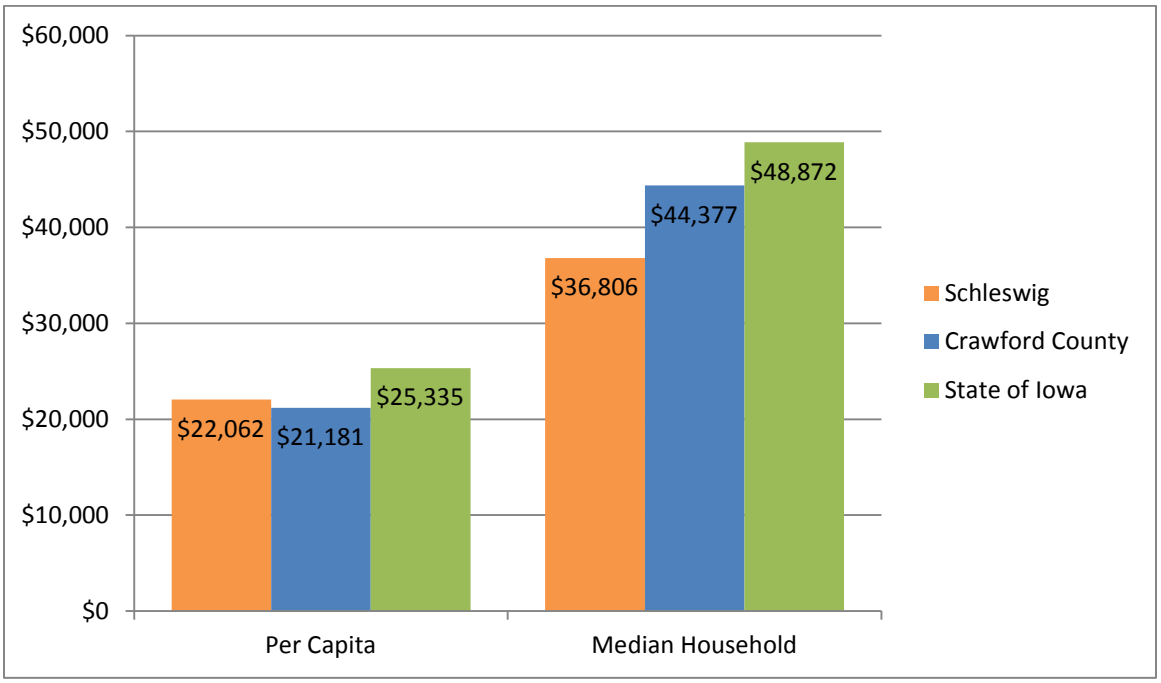
Economic

An important indicator of the economic base in Schleswig is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 shows that the per capita incomes of those living in Schleswig are higher than Crawford County's average, but lower than the state average. The average per capita personal income in Schleswig from 2006-2010 American Community Survey 5-year estimate was $881 greater per year than Crawford County's average and $3,273 less per year than the average in the State of Iowa. The median household income in Schleswig for the same time period trailed that of Crawford County by $7,571 and the state by $12,066 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Schleswig.

Figure 5

Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Schleswig, according to the American Community Survey, included the $35,000-$49,999 (19.4%) followed closely by the $50,000-$74,999 (16.3%) income group. Nearly thirty-one percent of households in Schleswig make less than $25,000 and ten percent of households have an income of $100,000 or greater. Table 3 below shows a breakdown of household income in Schleswig.

Table 3

Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	53	13.9%
$10,000-$14,999	16	4.2%
$15,000-$24,999	48	12.6%
$25,000-$34,999	54	14.2%
$35,000-$49,999	74	19.4%
$50,000-$74,999	62	16.3%
$75,000-$99,999	36	9.4%
$100,000-$149,999	23	6.0%
$150,000-$199,999	12	3.2%
$200,000 or more	3	0.8%
Median Household Income	$38,806	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Schleswig is typical of many smaller rural Iowa cities due to its dependence on regional employment opportunities. Many residents are required to commute to surrounding communities such as Denison and Harlan. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Manufacturing (18.8%), Educational Services, and Health Care and Social Assistance (18.6%), Finance and Insurance, and Real Estates and Rental and Leasing (11.8%) and Retail Trade (10.9%). These percentages are based on the total number of individuals 16 years and older that are from Schleswig and are employed.

Table 4
Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	34	8.2%
Construction	17	4.1%
Manufacturing	78	18.8%
Wholesale Trade	18	4.4%
Retail Trade	45	10.9%
Transportation and Warehousing, and Utilities	28	6.8%
Information	7	1.7%
Finance and Insurance, and Real Estates and Rental and Leasing	49	11.8%
Professional, Scientific, and Management, and Administrative and Waste Management Services	15	3.6%
Educational Services, and Health Care and Social Assistance	77	18.6%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	17	4.1%
Other Services, except Public Administration	20	4.8%
Public Administration	9	2.2%
Civilian Employed Population 16 years and over	414	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Changes in Development

Schleswig has seen some housing growth since the last plan update.

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Schleswig.

Table 5
Current Planning and Regulatory Documents for the City of Schleswig

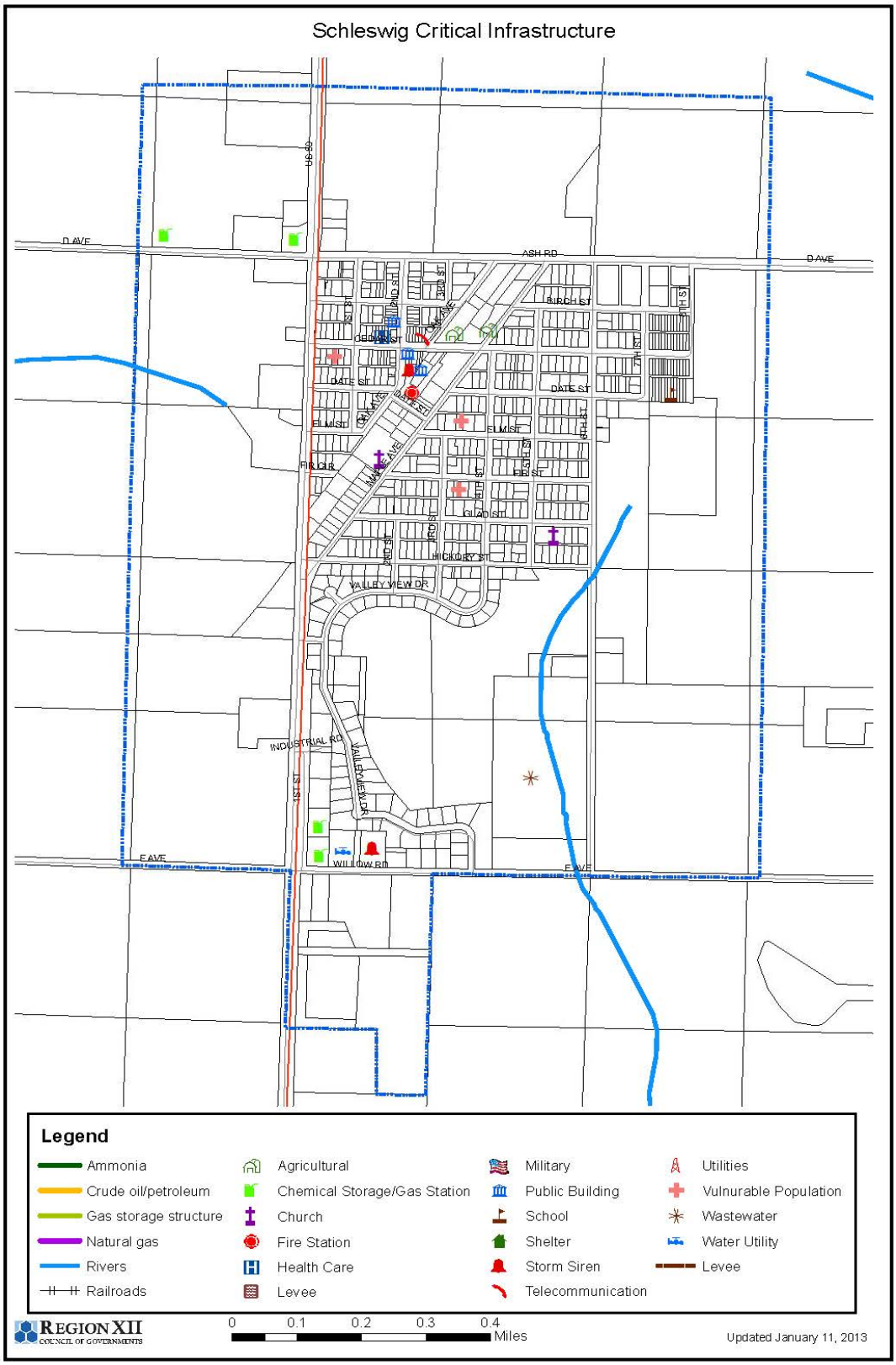
Document	Yes/No	Year
Previous HMP	Yes	2006
Comprehensive Plan	Yes	1991
Building Code	No	-
Zoning Ordinance	Yes	1967
Strategic Plan	Yes	1997
Housing Assessment	Yes	1999
NFIP Participant	No	-

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Schleswig. They are identified on Map 2

- Schleswig Elementary School
- Schleswig Middle School
- Fire Station
- City Hall
- Community Building
- CCMH Medical Clinic
- Daycare Centers
- Lutheran Church
- Church of Christ
- Farmer Co-Ops
- Windstream Cable
- City Maintenance Shop
- City Lagoons
- Water Tower
- Warning Sirens
- Johnson Propane & Star Energy

Map 2


Schleswig Critical Infrastructure
D AVE
ASH RD
BIRCH ST
DATE ST
ELM ST
FIR CIR
GLADIOLA AVE
HICKORY ST
VALLEY VIEW DR
INDUSTRIAL RD
1ST ST
F AVE
WILLOW RD
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0 0.1 0.2 0.3 0.4
Miles
Updated January 11, 2013

Section 3: Risk Assessment

The following table lists the overall results of the Hazard Analysis that the committee member for Schleswig completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Schleswig Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Severe Winter Storms	Y	Y	4	2	3	3	3.15
Extreme Heat	Y	Y	4	2	1	4	2.95
Tornado	Y	Y	3	3	4	1	2.95
Thunderstorm and Lightning	Y	Y	4	1	4	1	2.80
Flash Flood	Y	Y	3	1	4	2	2.45
Hailstorm	Y	Y	3	1	4	1	2.35
Hazardous Material	N	N	1	3	4	4	2.35
Human Disease	N	N	1	3	4	4	2.35
Infrastructure Failure	N	N	1	3	4	4	2.35
Radiological	N	N	1	3	4	4	2.35
Terrorism	N	N	1	3	4	3	2.35
Drought	Y	Y	3	1	1	4	2.20
Transportation Incident	N	N	1	3	4	1	2.05
Animal/Plant/Crop Disease	N	N	1	3	1	4	1.90
Windstorm	Y	Y	2	1	4	1	1.90
Dam and Levee Failure	N	N	1	1	4	1	1.45
Grass or Wild Land Fire	Y	N	1	1	4	1	1.45
River Flooding	N	N	1	1	2	1	1.15

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Schleswig were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Schleswig and the Schleswig School District.

Schleswig			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	378	$26,456,090	882
Commercial	50	$6,411,120	
Industrial	3	$1,167,280	
Agricultural Structures	-	$40,890	

The following hazards were determined to have a negligible impact on the City of Schleswig and the Schleswig Schools, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Dam and Levee Failure, Drought, Flash Flood, Grass or Wild Land Fire, River Flooding, Thunderstorm and Lightning and Windstorm

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	34	$2,381,048	79
Commercial	5	$577,001	
Industrial	0	$0	
Agricultural Structures	-	$3,680	

*The number of agricultural structures could not be determined

The following hazards were determined to have a limited impact on the City of Schleswig and the Schleswig Schools, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted. There are no school facilities located in the special flood hazard area.

Extreme Heat and Severe Winter Storms

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	95	$6,614,023	221
Commercial	13	$1,602,780	
Industrial	1	$291,820	
Agricultural Structures	-	$10,223	

*The number of agricultural structures could not be determined

The following hazards were determined to have a critical impact on the City of Schleswig and the Schleswig Schools, were they to occur. A shutdown of some facilities and services could last for at least two weeks and some injuries/illness will result in permanent disability. It is estimated that 50% of the city would be impacted.

Tornado, Animal/Plant/Crop Disease, Hazardous Material, Human Disease, Infrastructure Failure, Radiological, Terrorism and Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	189	$13,228,045	441
Commercial	25	$3,205,560	
Industrial	2	$583,640	
Agricultural Structures	-	$20,445	

*The number of agricultural structures could not be determined

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

- Objective 1: Improve First Responder Resources and Capabilities
  - Action 1.1: Update Fire/EMT/Police Training
  - Action 1.2: Maintain Reverse E911
- Objective 2: Improve Public Warning Capabilities
  - Action 2.1: Maintain county-wide siren alerts
  - Action 2.2: Disaster drills/community education

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

- Objective 3: Improve Public Awareness through Education and Training
  - Action 3.1: Create a community evacuation plan
  - Action 3.2: Inform public of disaster shelter location(s)
  - Action 3.3: Weather radio program for community
  - Action 3.4: Develop a backup generator plan

Goal: Improve coordination and communication with other relevant organizations and build support for hazard mitigation

- Objective 4: Improve Communication with the Public
  - Action 4.1: Create a community communication system
  - Action 4.2: Upgrade to a citywide mass communication notification (text, call, email)
- Objective 5: Increase Public Coordination
  - Action 5.1: Create citizen advisory committee for disaster input

Goal: Maintain and support public safety facilities, including equipment and training

- Objective 6: Protect Health and Safety
  - Action 6.1: Have backup generators available for emergency shelters
  - Action 6.2: Identify and communicate storm/emergency shelter(s)
  - Action 6.3: Provide training for all community hazards
- Objective 7: Backup Critical Systems and Assets
  - Action 7.1: Install/Update software back-ups and anti-virus software
- Objective 8: Improve First Responder Resources and Capabilities
  - Action 8.1: Continue fire and EMT trainings

The City of Schleswig completed a previous hazard mitigation plan in 2006. The table on the following page displays the status of the previous actions. Any action marked as ongoing or future was carried over to be included in this plan.

Table 8

Schleswig Previous Mitigation Actions

Schleswig	**Status**				
Previous Actions (2006)	**Complete**	**Underway**	**Ongoing**	**Future**	**Canceled**
Educate citizens about summer storms via public information announcements through the local media or by notices on utility bills		X			
Educate citizens on NOAA weather radios				X	
Expand usage of NOAA weather radios				X	
Replace and maintain snow removal equipment as necessary			X		
Upgrade or add backup generators as necessary			X		
Educate residents on extreme heat and cold weather via the local media and/or utility billings			X		
Provide firefighters, law enforcements and EMS departments with adequate training and equipment		X			
Develop a city-wide evacuation plan				X	
Continue fire and emergency response training		X			
Initiate fire prevention program			X		
Continue NFIP participation and follow NFIP policies				X	
Attend training for terrorism when offered				X	
Post signs and increase police surveillance around critical facilities				X	
Evaluate city facilities and identify potential terrorist targets				X	

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for the City of Schleswig. Table 10 displays the STAPLEE evaluation criteria.

Table 9

Schleswig STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ / Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Join NFIP	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	M	N	Y	Y	**20**
Install/Update software back-ups and anti-virus software	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Continue fire and EMT trainings	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Initiate fire prevention program	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Attend training for terrorism when offered	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Post signs and increase police surveillance around critical facilities	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Evaluate city facilities and identify potential terrorist targets	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**18**
Maintain Reverse E911	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	N/A	N/A	N/A	N/A	N/A	**16**
Maintain county-wide siren alerts	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Create citizen advisory committee for disaster input	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**16**
Replace and maintain snow removal equipment as necessary	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**16**
Update fire/EMT/police training	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Create a community communication system	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	N/A	N/A	N/A	N/A	N/A	**14**
Upgrade to a citywide mass communication notification (text, call, email)	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**
Identify and communicate storm/emergency shelter(s)	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**
Have backup generators available for emergency shelters	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**
Disaster drills/community education	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	N/A	N/A	N/A	N/A	N/A	**12**
Develop a backup generator plan	Y	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**12**
Create a community evacuation plan	Y	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	N	Y	N	Y	Y	N/A	N/A	N/A	N/A	N/A	**10**
Inform public of disaster shelter location(s)	Y	N	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**10**
Weather radio program for community	Y	N	Y	Y	N	N	N	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**10**
Provide training for all community hazards	Y	N	Y	Y	N	N	N	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**10**

Table 10

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Schleswig outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 11 displays all of the mitigation actions for Schleswig with their implementation strategy.

Table 11

Schleswig Action Plan

Join NFIP	
Hazards Addressed	River Flooding
Priority	Low
Previous Priority	Low
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Short

Install/Update Software Back-Ups and Anti-Virus Software	
Hazards Addressed	Infrastructure Failure, Terrorism
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Clerk
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Continue Fire and EMT Trainings	
Hazards Addressed	All
Priority	High
Previous Priority	High
Responsible Department	Fire Department and Emergency Management
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Initiate Fire Prevention Program	
Hazards Addressed	Infrastructure Failure, Grass and Wild Land Fire
Priority	Low
Previous Priority	Low
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Short

Attend Training for Terrorism when offered	
Hazards Addressed	Terrorism
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Post Signs and Increase Police Surveillance around Critical Facilities	
Hazards Addressed	Hazardous Material, Terrorism
Priority	Low
Previous Priority	Low
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Mid

Evaluate City Facilities and Identify Potential Terrorist Targets	
Hazards Addressed	Terrorism
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Maintain Reverse E911	
Hazards Addressed	Tornado, Windstorm, River Flooding, Dam and Levee Failure, Hazardous Material, Terrorism, Transportation Incident, Radiological, Infrastructure Failure
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	E911 Board
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Maintain County-Wide Siren Alerts	
Hazards Addressed	Tornado
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council and Emergency Management
Estimated Cost	Low
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Create Citizen Advisory Committee for Disaster Input	
Hazards Addressed	All
Priority	Low
Previous Priority	Not Previously Identified
Responsible Department	City Council and Schleswig Schools
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Prevention
Target Completion Date	Long

Replace and Maintain Snow Removal Equipment as necessary	
Hazards Addressed	Severe Winter Storms
Priority	Low
Previous Priority	Low
Responsible Department	City Council
Estimated Cost	Moderate
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Update Fire/EMT/Police Training	
Hazards Addressed	All
Priority	High
Previous Priority	High
Responsible Department	Fire Department, First Responders, Police Department
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Create a Community Communication System	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Grass or Wild Land Fire, River Flooding, Severe Winter Storms, Thunderstorm and Lightning, Dam and Levee Failure, Hazardous Material, Terrorism, Radiological
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Upgrade to a Citywide Mass Communication Notification (text, call, email)	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Grass or Wild Land Fire, River Flooding, Severe Winter Storms, Thunderstorm and Lightning, Dam and Levee Failure, Hazardous Material, Terrorism, Radiological
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	City Council and Schleswig Schools
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Identify and Communicate Storm/Emergency Shelter(s)	
Hazards Addressed	Tornado, Windstorm, Severe Winter Storms
Priority	Low
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Have Backup Generators Available for Emergency Shelters	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council, Schleswig School District, Fire Department
Estimated Cost	Low
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Disaster Drills/Community Education	
Hazards Addressed	All
Priority	High
Previous Priority	Not Previously Identified
Responsible Department	Fire Department
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Develop a Backup Generator Plan	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	City Council
Estimated Cost	Low
Potential Funding Source	Local, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Create a Community Evacuation Plan	
Hazards Addressed	Grass or Wild Land Fire, River Flooding, Dam and Levee Failure, Hazardous Material, Terrorism, Radiological
Priority	Medium
Previous Priority	Medium
Responsible Department	City, County, Fire Department
Estimated Cost	Low
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Weather Radio Program for Community	
Hazards Addressed	Tornado, Windstorm, Hailstorm
Priority	Low
Previous Priority	Low
Responsible Department	City
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Provide Training for All Community Hazards	
Hazards Addressed	All
Priority	Medium
Previous Priority	Not Previously Identified
Responsible Department	Fire Department, City
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Incorporation into Other Planning Mechanisms

Where possible, the City of Schleswig 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:

- Schleswig City Code
- Schleswig Comprehensive Plan
- Schleswig Zoning Ordinance
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

Resolution No. 13-11-11B

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CITY OF SCHLESWIG ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the City of Schleswig participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the City of Schleswig adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 11th DAY OF November, 2013.

Mayor

ATTEST:

City Clerk

Resolution No. 0818-2014

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE SCHLESWIG SCHOOL DISTRICT ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the Schleswig School District participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the Schleswig School District adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 18th **DAY OF** August **, 2014.**

Chair

ATTEST:

Secretary

Appendix M: City of Vail

Section 1: Community Profile

City of Vail History

It was not until 1867 that the first settlers arrived at what was to become the town of Vail. Thomas Ryan, an employee of the Northwestern Railroad, arrived that year. Vail was incorporated in 1875, the first town in Crawford County to do so. By 1900, census figures show there were 578 residents in the town of Vail. The first school in Vail was opened in the fall of 1871.

Geography and Environment

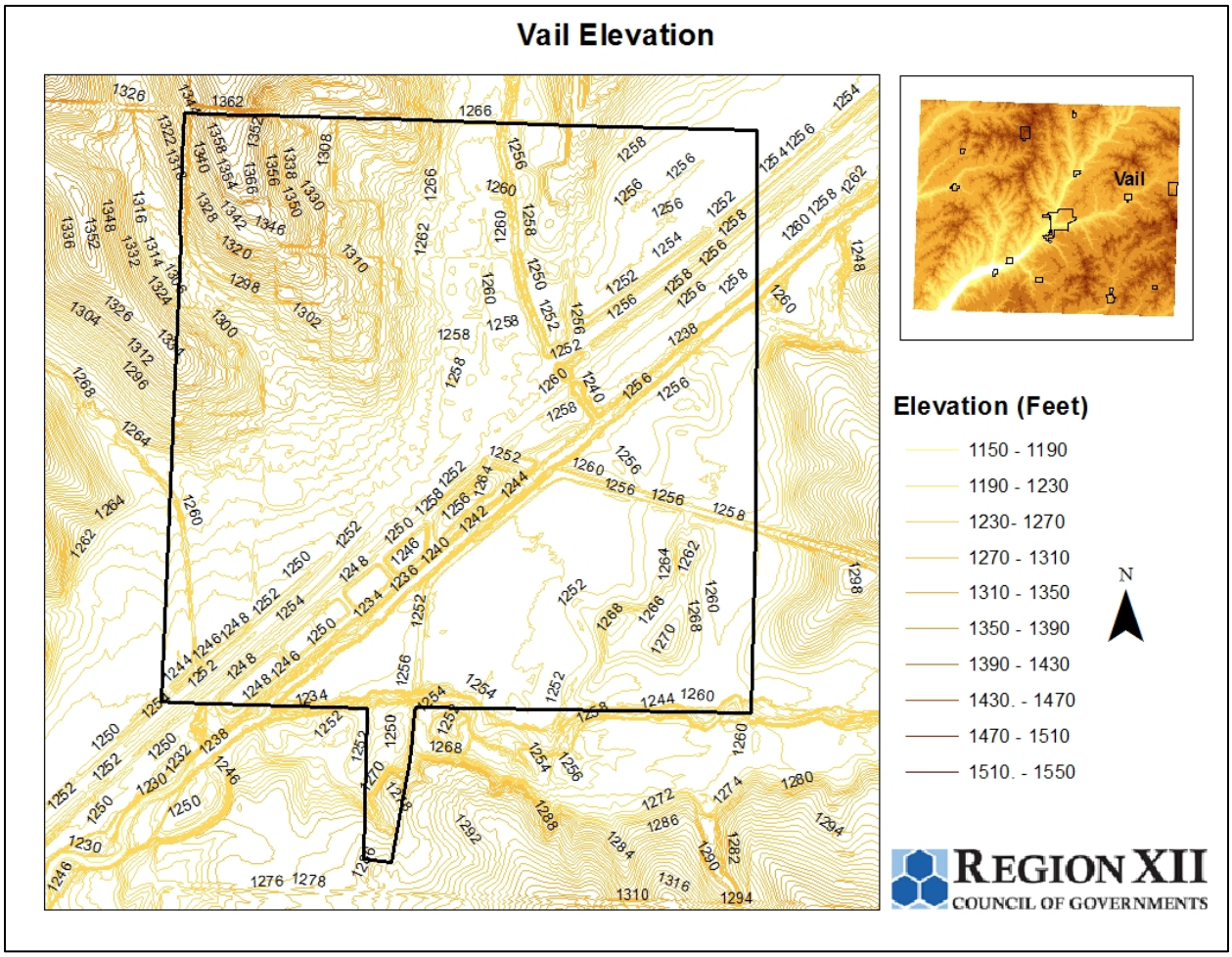
Location

Vail is located in east central Crawford County. Highway 30 dissects the town from the northeast corner to the southwest corner. Vail is located 10.3 miles northeast from Denison, 18.1 miles west of Carroll, and 82.2 miles northeast of Omaha.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The northwest corner of Vail reaches 1,366 feet while the rest of the community hovers around 1,250 feet. The following map shows the elevation of Vail and its relation to the rest of Crawford County.

Map 1



Demographics

Population

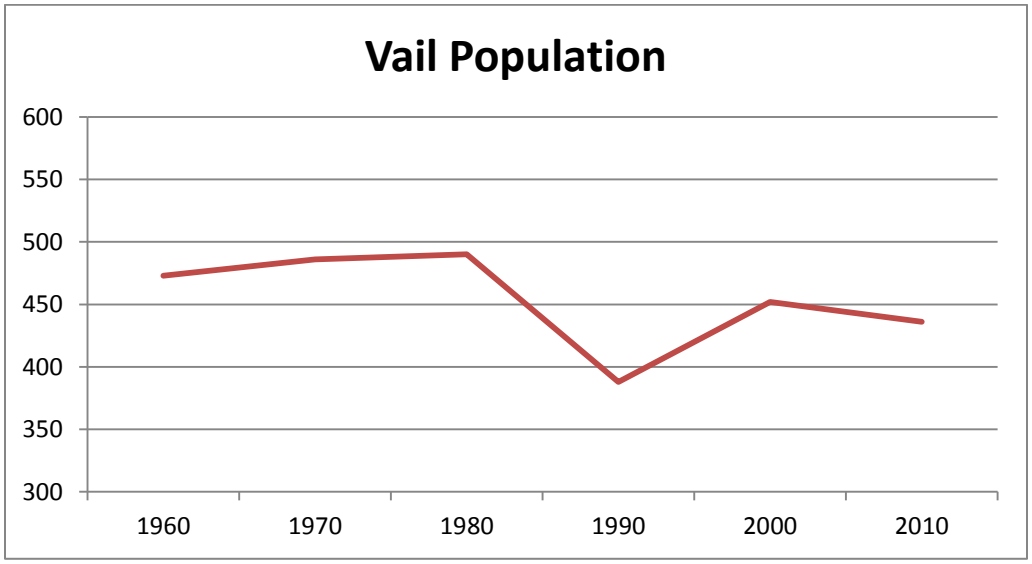
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Vail's population through the past, present and future trends of the region.

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 education 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.

Vail experienced population growth from 1960 to 1980, and again from 1990 to 2000. The greatest population shift during this time period occurred from 1980 to 1990 when the population declined from 490 residents to 388 residents. The historic population trend for Vail is shown in Figure 1 below.

Figure 1



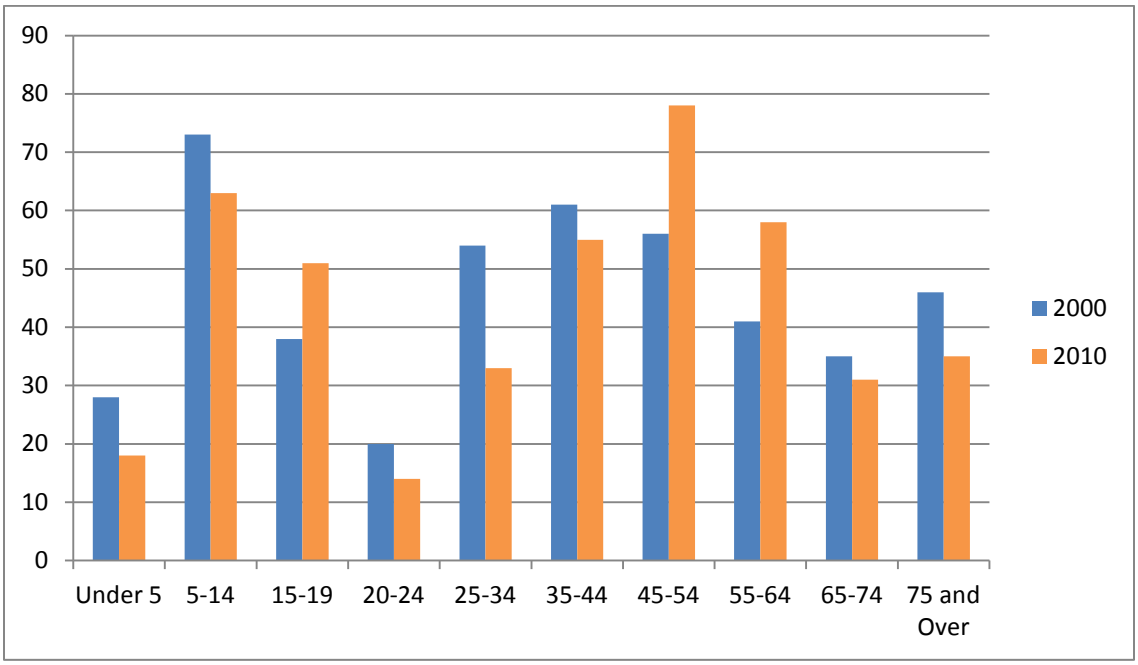
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Vail from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 25-34 age cohort, which lost twenty-one individuals. Other significant losses came in the 75 and over (-11), under 5 (-10) and 5-14 (-10) age groups. Significant increases in population were seen in the 45-54 (22), 15-24 (17), and 55-64 (17) age groups.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 25-34 age cohort in 2000 would be in the 35-44 age cohort in 2010. Therefore, the 25-34 age cohort from 2000 actually gained one individual, rather than losing twenty-one individuals as seen in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as “brain drain.”

Figure 2

Vail Age Distribution



Source: US Census Bureau

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.

The number of occupied housing units, along with the total number of housing units, decreased over the last ten years in Vail. The occupancy rate in 2010 decreased by 2.3 percent from 2000. Owner-occupied housing units actually increased by 6.1% over the ten year period and vacant housing units increased by 2.3 percent. Table 1 shows the housing trends for Vail from 2000 to 2010.

Table 1

Vail Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	185	94.4%	174	92.1%
Owner Occupied	145	78.4%	147	84.5%
Renter Occupied	40	21.6%	27	15.5%
Vacant Housing Units	11	5.6%	15	7.9%
Total Housing Units	196	100.0%	189	100.0%

Source: US Census Bureau

Over sixty percent of the housing units in Vail are valued at less than $50,000. These homes are likely to be aging and in need of revitalization. Due to this, these homes are susceptible to hazards such as fires, serious storms and other weather related hazards. Since the population has been declining, it will be important to invest in the rehabilitation of existing housing. This will improve the safety of homes and reduce their susceptibility to numerous hazards. Table 2 below displays the value of housing units in Vail in 2012.

Table 2

Value of Vail Housing Units, 2012

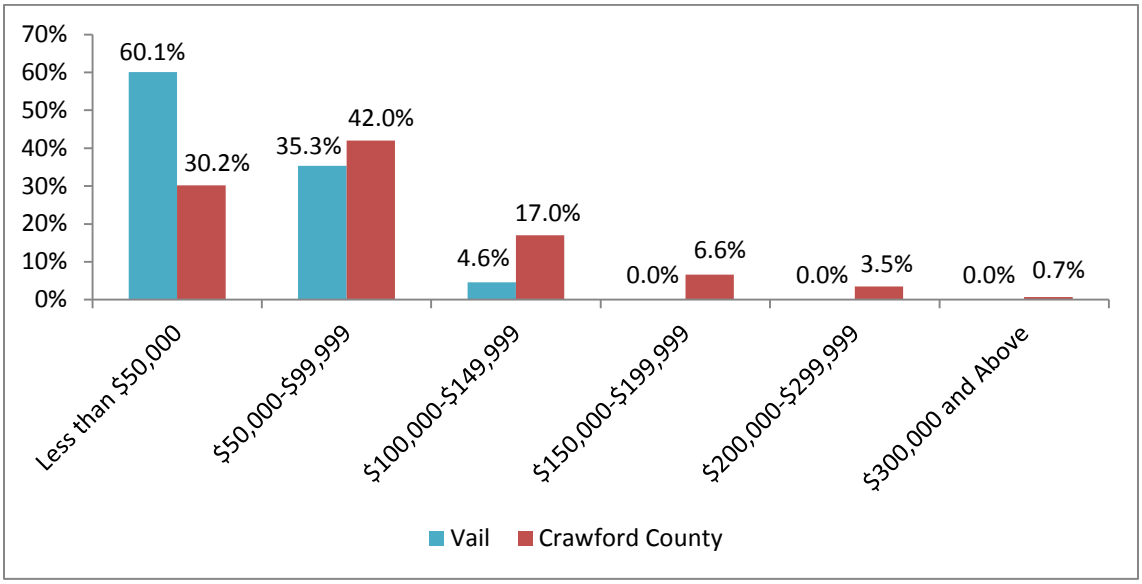
Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	104	60.1%
$50,000-$99,999	61	35.3%
$100,000-$149,999	8	4.6%
$150,000-$199,999	0	0.0%
$200,000-$299,999	0	0.0%
$300,000 and above	0	0.0%
Median Value	$45,455	-

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Vail to Crawford County. Figure 3 shows that Vail has a disproportionate percentage of housing units valued at less than $50,000, even when compared to Crawford County.

Figure 3

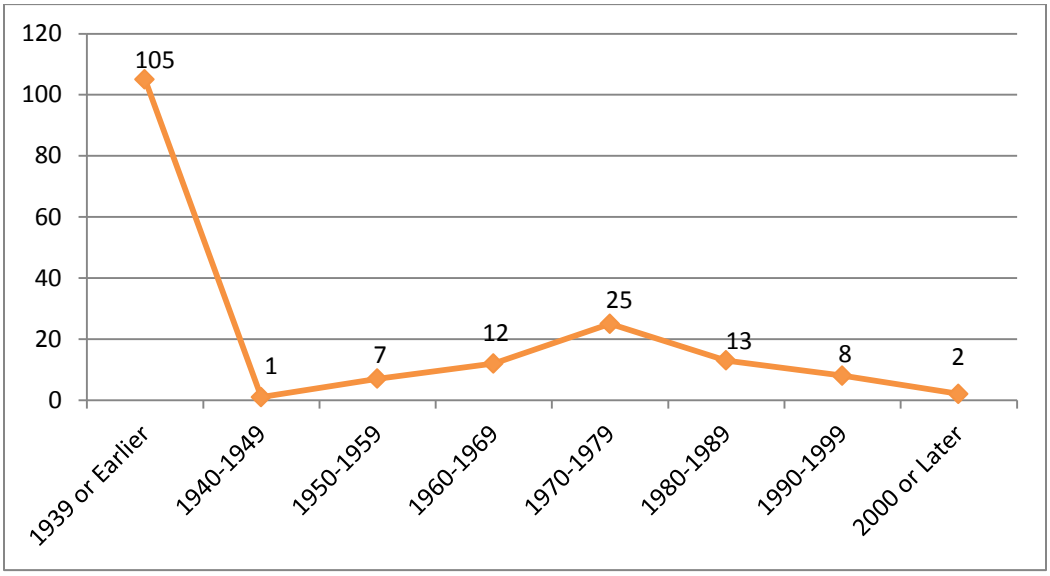
Value of Housing Units



Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Over sixty percent of the current housing stock in Vail was constructed prior to 1940. Housing construction slowed down considerably since then, but saw a significant increase between 1970 and 1979. Less than six percent of homes have been constructed since 1990. Figure 4 shows the distribution of housing unit construction in Vail.

Figure 4
Year Housing Unit Constructed



Source: Crawford County Housing Report, October 2012

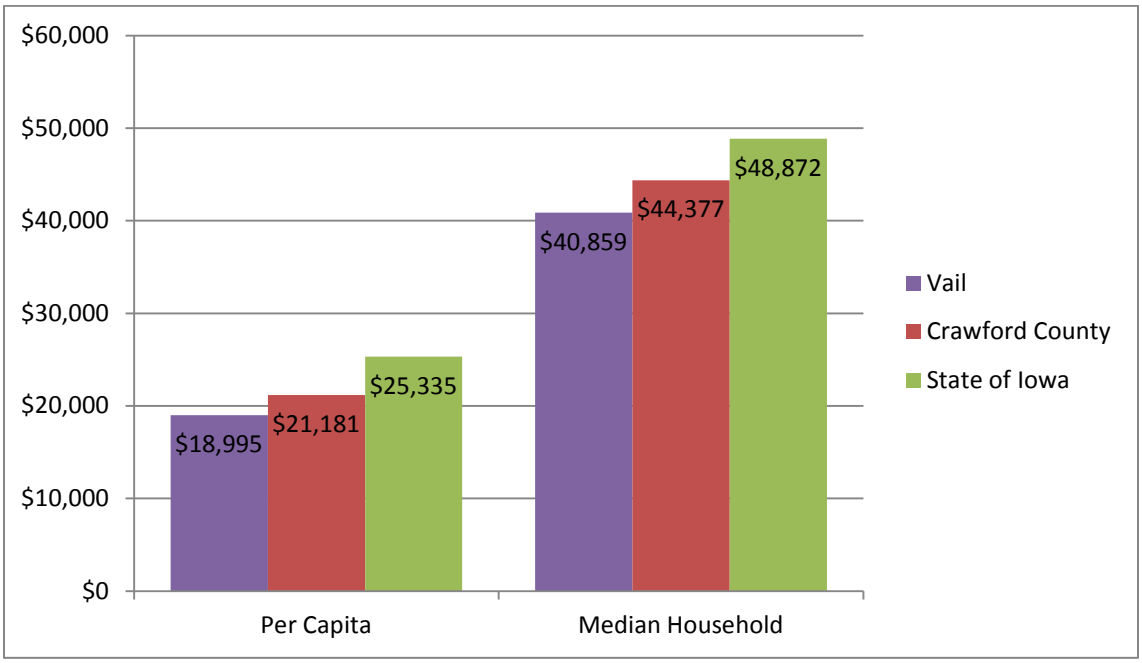
Economic

An important indicator of the economic base in Vail is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 on the following page shows that incomes of those living in Vail are lower than Crawford County and state averages. The average per capita personal income in Vail for the 2006-2010 American Community Survey 5-Year estimate was $2,186 less per year than Crawford County's average and $6,340 less than the average for the State of Iowa. The median household income in Vail for the same time period trailed that of Crawford County by $3,518 per year and the state by $8,013 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Vail.

Figure 5

Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Vail, according to the American Community Survey, included the $50,000-$74,999 (27.3%) followed closely by the $35,000-$49,999 (23.6%) and $15,000-$24,999 (18.8%) income groups. Nearly eleven percent of households in Vail make less than $25,000 and just over twelve percent of households have an income of $75,000 or more. Table 3 below shows a breakdown of household income in Vail.

Table 3

Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	14	8.5%
$10,000-$14,999	4	2.4%
$15,000-$24,999	31	18.8%
$25,000-$34,999	12	7.3%
$35,000-$49,999	39	23.6%
$50,000-$74,999	45	27.3%
$75,000-$99,999	16	9.7%
$100,000-$149,999	4	2.4%
$150,000-$199,999	0	0.0%
$200,000 or more	0	0.0%
Median Household Income	$40,859	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Vail is typical of many smaller rural Iowa cities due to its dependence on regional employment opportunities. Many residents are required to commute to surrounding communities such as Denison and Carroll. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Manufacturing (30.3%), Educational Services, and Health Care and Social Assistance (22.4%), and Arts, Entertainment, and Recreation, and Accommodation and Food Services (14.9%). These percentages are based on the total number of individuals 16 years and older that are from Vail and are employed.

Table 4
Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	12	5.3%
Construction	15	6.5%
Manufacturing	69	30.3%
Wholesale Trade	2	0.9%
Retail Trade	14	6.1%
Transportation and Warehousing, and Utilities	8	3.5%
Information	0	0.0%
Finance and Insurance, and Real Estates and Rental and Leasing	7	3.1%
Professional, Scientific, and Management, and Administrative and Waste Management Services	0	0.0%
Educational Services, and Health Care and Social Assistance	51	22.4%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	34	14.9%
Other Services, except Public Administration	12	5.3%
Public Administration	4	1.7%
Civilian Employed Population 16 years and over	228	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Changes in Development

The City of Vail has seen limited growth since the last plan update. Some commercial development has occurred along U.S. Highway 30.

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Vail.

Table 5
Current Planning and Regulatory Documents for the City of Vail

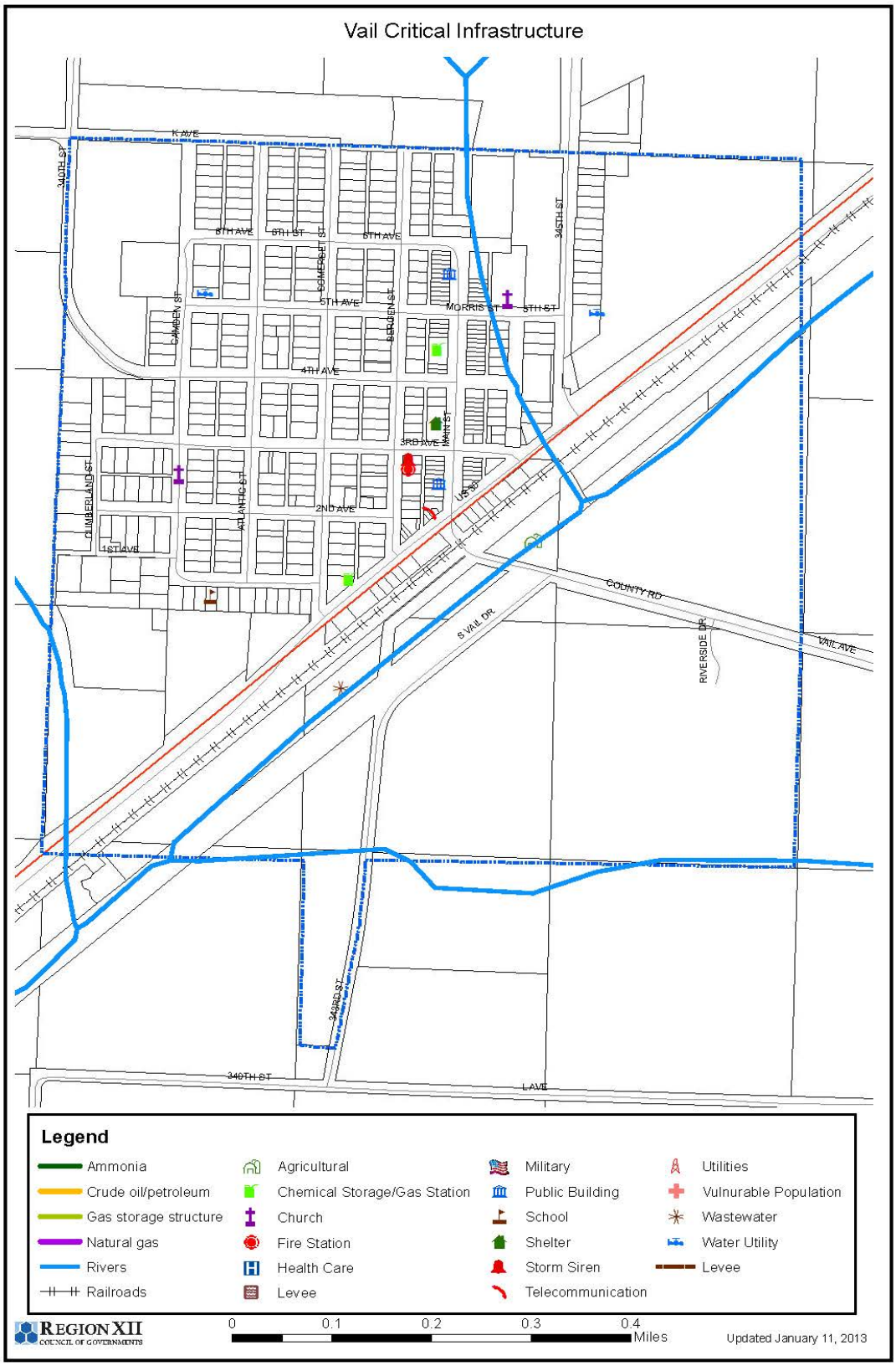
Document	Yes/No	Year
Previous HMP	No	-
Comprehensive Plan	No	-
Building Code	Yes	1977
Zoning Ordinance	Yes	1977
Strategic Plan	Yes	1999
Housing Assessment	Yes	1999
NFIP Participant	Yes	1986

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Vail. They are identified on Map 2

- Water Tower
- Lagoon
- Storm Sewer
- Rural Water Hookup
- Siren
- Grain Elevator
- Jeff's Ag Service
- AR-WE-VA, Vail Elementary
- Presbyterian Church
- Catholic Church
- Community Center
- City Hall
- Fire Station
- City Maintenance Shed
- Telephone Substation Building
- Sparky's One Stop

Map 2


Vail Critical Infrastructure
K AVE
340TH ST
6TH AVE
6TH ST
5TH AVE
EMMERET ST
CAMDEN ST
BERGEN ST
MORRIS ST
5TH ST
345TH ST
4TH AVE
3RD AVE
MAIN ST
CUMBERLAND ST
ATLANTIC ST
2ND AVE
1ST AVE
US 50
COUNTY RD
S VAIL DR
RIVERSIDE DR
VAIL AVE
349RD ST
340TH ST
L AVE
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0
0.1
0.2
0.3
0.4
Miles
Updated January 11, 2013

Section 3: Risk Assessment

The following table lists the overall results of the Hazard Analysis that the committee member for Vail completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Vail Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Severe Winter Storms	Y	Y	4	3	2	2	3.20
Hailstorm	Y	Y	4	2	4	1	3.10
Thunderstorm and Lightning	Y	Y	4	2	4	1	3.10
Windstorm	Y	Y	4	2	2	3	3.00
River Flooding	Y	Y	3	3	2	2	2.75
Flash Flood	Y	Y	3	2	2	3	2.55
Transportation Incident	Y	Y	2	3	4	1	2.50
Tornado	N	Y	1	3	4	1	2.05
Radiological	N	Y	1	3	4	1	2.05
Terrorism	N	N	1	3	4	1	2.05
Hazardous Material	N	Y	2	2	3	1	2.05
Infrastructure Failure	Y	Y	2	1	4	2	2.00
Animal/Plant/Crop Disease	N	Y	1	2	4	3	1.95
Extreme Heat	Y	Y	1	3	1	4	1.90
Grass or Wild Land Fire	N	Y	1	2	4	1	1.75
Human Disease	N	Y	1	2	3	2	1.70
Dam and Levee Failure	N	N	1	1	4	1	1.45
Drought	Y	Y	1	1	1	4	1.30

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Vail were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Vail.

Vail			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	169	$8,584,690	436
Commercial	29	$1,271,340	
Industrial	1	$223,350	
Agricultural Structures	3	$305,130	

The following hazards were determined to have a negligible impact on the City of Vail, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Dam and Levee Failure, Drought and Infrastructure Failure

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	15	$772,622	39
Commercial	3	$114,421	
Industrial	0	$20,102	
Agricultural Structures	0	$27,462	

The following hazards were determined to have a limited impact on the City of Vail, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Flash Flood, Grass or Wild Land Fire, Hailstorm, Thunderstorm and Lightning, Windstorm, Animal/Plant/Crop Disease, Hazardous Material and Human Disease

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	42	$2,146,173	109
Commercial	7	$317,835	
Industrial	0	$55,838	
Agricultural Structures	1	$76,283	

The following hazards were determined to have a critical impact on the City of Vail, were they to occur. A shutdown of some facilities and services could last for at least two weeks and some injuries/illness will result in permanent disability. It is estimated that 50% of the city would be impacted.

Extreme Heat, River Flooding, Severe Winter Storms, Tornado, Radiological, Terrorism and Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	85	$4,292,345	218
Commercial	15	$635,670	
Industrial	1	$111,675	
Agricultural Structures	2	$152,565	

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

- Objective 1: Provide Backup Systems for Critical Facilities
  - Action 1.1: Purchase a new backup generator for the Community Club (shelter)
  - Action 1.2: Purchase backup generator for city shed
- Objective 2: Improve Public Warning Capabilities
  - Action 2.1: More weather radios
- Objective 3: Improve Public Infrastructure
  - Action 3.1: Implement a culvert cleaning program
  - Action 3.2: Sandbag station

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

- Objective 4: Improve Public Awareness
  - Action 4.1: Warning of electrical power disaster
  - Action 4.2: Warning of water contamination

Goal: Improve coordination and communication with other relevant organizations and build support for hazard mitigation

- Objective 5: Increase Coordination between City and Emergency Services
  - Action 5.1: Coordinate with fire department on drills
  - Action 5.2: Hold drills for disasters
- Objective 6: Develop Plans to Become Less Vulnerable to Hazards
  - Action 6.1: Develop an evacuation plan
  - Action 6.2: Develop a water protection plan
- Objective 7: Account for Vulnerable Populations
  - Action 7.1: Establish a calling tree for shelter
  - Action 7.2: Establish a calling tree for special needs persons

Goal: Maintain and support public safety facilities, including equipment and training

- Objective 8: Protect Health and Safety
  - Action 8.1: Keep appliances in community shelter in working order
  - Action 8.2: Keep volunteers training in maintenance and procedures

The City of Vail completed a previous hazard mitigation plan in 2006. The table on the following page displays the status of the previous actions. Any action marked as ongoing or future was carried over to be included in this plan.

Table 8

Vail Previous Mitigation Actions

Vail	Status				
Previous Actions (2006)	**Complete**	**Underway**	**Ongoing**	**Future**	**Canceled**
Make the public aware that a list of special needs residents is available		X			
Gather names and information of special needs residents		X			
Assign emergency staff to each special needs resident to ensure each is accounted for in a hazard event		X			
Continue training emergency responders			X		
Look into applying for grants for updating equipment/training			X		
Assign people to research potential supply needs for shelter		X			
Develop plan to obtain necessary supplies in emergency event		X			
Equip city facilities with weather radios		X			
Ensure that generators are operational		X			
Ensure critical facilities are equipped with generators		X			
Work with MidAmerican Energy to ensure power outages are addressed quickly	X				
Maintain current warning sirens	X				
Promote NOAA weather radios to residents and businesses	X				
Continue participation in National Flood Insurance Program		X			

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for the City of Vail. Table 10 displays the STAPLEE evaluation criteria.

Table 9

Vail STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ / Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Continue participation in National Flood Insurance Program	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	Y	N/A	N/A		Y	**19**
Develop a water protection plan	Y	N	Y	Y	N	Y	Y	Y	Y	M	Y	Y	Y	N	N	Y	N	N	Y	Y	Y	Y	Y	**18**
Coordinate with fire department on drills	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**16**
Warn public of water contamination	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**14**
Keep appliances in community shelter in working order	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**
Keep volunteers trained in maintenance and procedures	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**
Continue training emergency responders	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**14**
Implement a culvert cleaning program	Y	N	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	N	Y	Y	N/A	N/A	Y	Y	**13**
Establish a calling tree for shelter	Y	N	Y	Y	N	Y	Y	Y	Y	M	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**13**
Hold drills for disasters	Y	N	Y	Y	N	Y	Y	Y	Y	M	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**13**
Develop an evacuation plan	Y	N	Y	Y	N	Y	Y	Y	Y	M	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**13**
Establish a calling tree for special needs persons	Y	N	Y	Y	M	Y	Y	Y	Y	M	Y	Y	Y	N	N	Y	N	N	N/A	N/A	N/A	N/A	N/A	**12**

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Apply for grants for updating equipment/ training	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**12**
Sandbag station	N	N	Y	Y	N	N	Y	Y	Y	Y	Y	Y	M	M	N	M	Y	Y	Y	M	N	Y	Y	**9**
More weather radios	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N/A	N	Y	N/A	Y	N/A	N/A	N/A	N/A	N/A	**8**
Purchase a new backup generator for the Community Club (shelter)	Y	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	N/A	N/A	N/A	N/A	N/A	**6**
Purchase a generator for city shed	Y	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	N/A	N/A	N/A	N/A	N/A	**6**
Warn public of electrical power disaster	Y	N	Y	Y	N	N	N	M	Y	M	Y	Y	Y	N	N	Y	N	Y	N/A	N/A	N/A	N/A	N/A	**6**

Table 10

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Vail outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 11 displays all of the mitigation actions for Vail with their implementation strategy.

Table 11

Vail Action Plan

Continue NFIP Participation and Follow NFIP Policies by Enforcing Floodplain Management Ordinance	
Hazards Addressed	River Flooding
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Prevention
Target Completion Date	Ongoing

Develop a Water Protection Plan	
Hazards Addressed	Drought
Priority	Medium
Previous Priority	Not Identified Previously
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Coordinate with Fire Department on Drills	
Hazards Addressed	Tornado, Windstorm, Severe Winter Storms
Priority	High
Previous Priority	Not Identified Previously
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Warn Public of Water Contamination	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Not Identified Previously
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Keep Appliances in Community Shelter in Working Order	
Hazards Addressed	Tornado, Extreme Heat, Windstorm
Priority	High
Previous Priority	Not Identified Previously
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Keep Volunteers Trained in Maintenance and Procedures	
Hazards Addressed	All
Priority	Medium
Previous Priority	Medium
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Continue Training for Fire Department and Emergency Responders	
Hazards Addressed	All
Priority	High
Previous Priority	High
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Implement a Culvert Cleaning Program	
Hazards Addressed	Flash Flood
Priority	Medium
Previous Priority	Not Identified Previously
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Short

Establish a Calling Tree for Shelter	
Hazards Addressed	Tornado, Extreme Heat, Windstorm
Priority	High
Previous Priority	Not Identified Previously
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Hold Drills for Disasters	
Hazards Addressed	Tornado, River Flooding, Windstorm, Severe Winter Storms
Priority	High
Previous Priority	Not Identified Previously
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Develop an Evacuation Plan	
Hazards Addressed	River Flooding, Hazardous Material, Transportation Incident
Priority	Medium
Previous Priority	Not Identified Previously
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Ongoing

Establish a Calling Tree for Special Needs Persons	
Hazards Addressed	River Flooding, Severe Winter Storms
Priority	High
Previous Priority	High
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Apply for Grants for Updating Equipment/Training	
Hazards Addressed	All
Priority	Medium
Previous Priority	Medium
Responsible Department	City Council, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Sandbag Station	
Hazards Addressed	River Flooding
Priority	Low
Previous Priority	Not Identified Previously
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Mid

More Weather Radios	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	Medium
Previous Priority	Medium
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local, State
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Purchase a New Backup Generator for the Community Club (shelter)	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	Fire Department
Estimated Cost	Low
Potential Funding Source	State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Purchase Backup Generator for City Shed	
Hazards Addressed	Infrastructure Failure
Priority	Low
Previous Priority	Low
Responsible Department	City Council
Estimated Cost	Minimal
Potential Funding Source	Local, State, Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Warn Public of Electrical Power Disaster	
Hazards Addressed	Infrastructure Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Mid

Incorporation into Other Planning Mechanisms

Where possible, the City of Vail 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:

- Vail City Code of Ordinances
- Vail Comprehensive Plan
- Vail Zoning Ordinance
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

Resolution No. 8-11-14B

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CITY OF VAIL ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the City of Vail participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the City of Vail adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 11th DAY OF AUGUST, 2014

STANLEY MEYER, Mayor

ATTEST:

KATHY RUCH, City Clerk

Appendix N: City of Westside

Section 1: Community Profile

City of Westside History

West Side became Westside on July 1, 1800. The town of Westside was officially incorporated on March 11, 1878. The first school in Westside was opened in 1873. The population figures of 1875 show the town of Westside at 367 people.

Geography and Environment

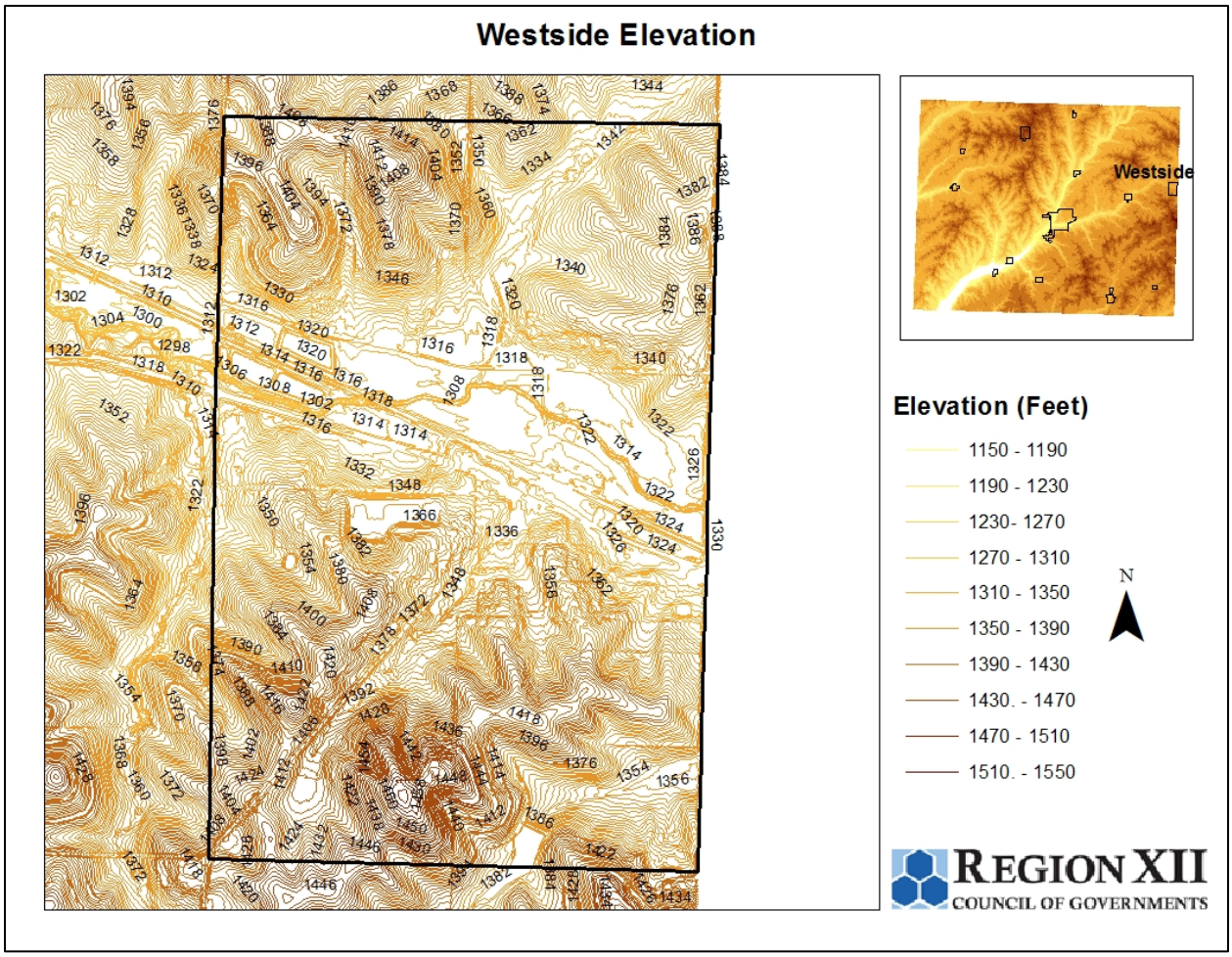
Location

Westside is located on the eastern border of Crawford County. Highway 30 runs through the central part of town. Westside is located 16.2 northeast of Denison, 12.5 miles west of Carroll, 41.3 miles northeast of Harlan, and 88 miles northeast of Omaha.

Elevation

The highest elevation in Crawford County can be found throughout the southeastern part of the county. Here, the elevation can reach as much as 1,494 feet above sea level. The southern portion of Westside reaches 1,444 feet with central Westside falling to 1,302 feet above sea level. The following map shows the elevation of Westside and its relation to the rest of Crawford County.

Map 1



Demographics

Population

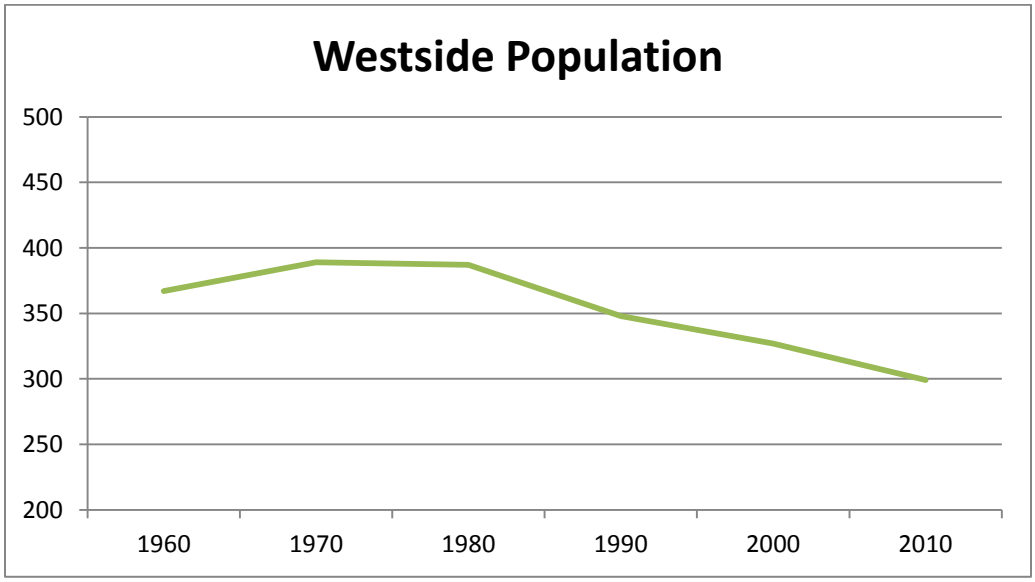
The population of an area represents one of its most important assets. A population includes the labor force, entrepreneurs, taxpayers, and buyers of goods and services. This section will address several characteristics of Westside's population through the past, present and future trends of the region.

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 education 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.

Westside experienced a population growth from 1960 to 1970 and then a decline from 1980 through 2010. The greatest population shift during this time period occurred from 1980 to 1990 when the population declined from 387 residents to 348 residents. Figure 1 below shows the historic population trend for Westside from 1960 to 2010.

Figure 1



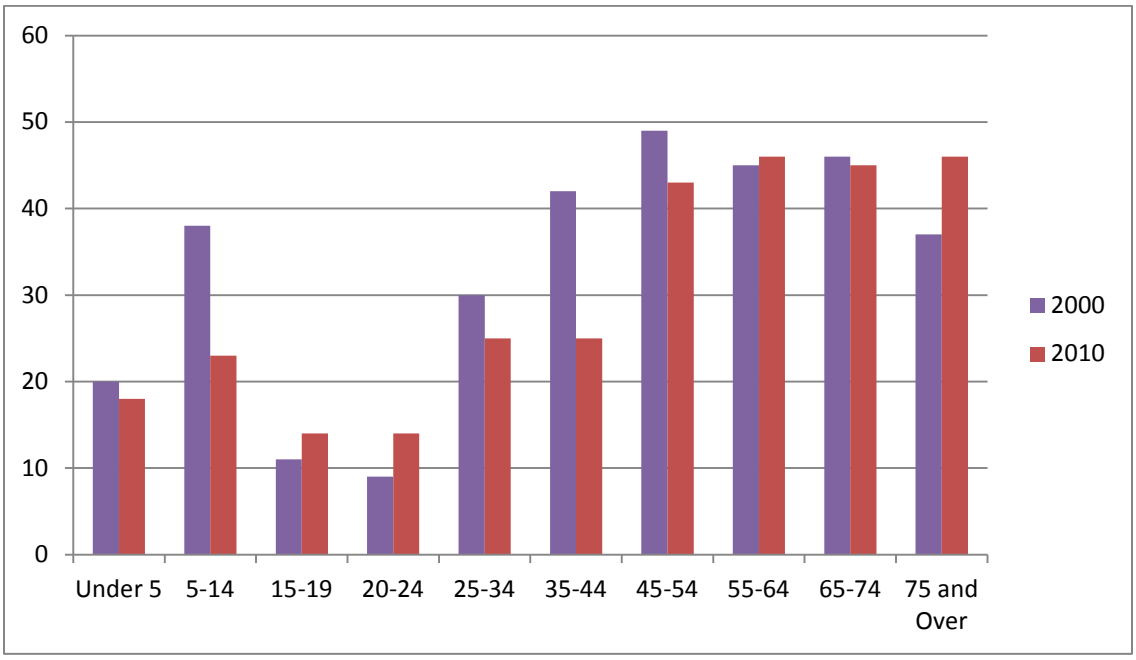
Source: US Census Bureau

Figure 2 is a comparison of the age distribution for Westside from 2000 to 2010. There are several ways of interpreting this graph. The first is to analyze how each specific age group has changed over ten years. The biggest population decrease occurred in the 35-44 age cohort, which lost seventeen individuals. Another significant loss came in the 5-14 (-15) age group. A notable increase in population was only seen in the 75 and over (9) age group.

A second way to interpret this figure is to identify the change of one age cohort as they move into the next age cohort. For example, individuals in the 35-44 age cohort in 2000 would be in the 45-54 age cohort in 2010. Therefore, the 35-44 age cohort from 2000 actually gained one individual instead of losing seventeen individuals as seen in the first observation. The age distribution in Figure 2 is consistent with other rural Iowa communities. Normally there is a smaller population of 15-24 year olds due to the number of young adults leaving town for education or other employment opportunities. This phenomenon is known as “brain drain.”

Figure 2

Westside Age Distribution



Source: US Census Bureau

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.

The number of occupied housing units, along with the total number of housing units, decreased slightly over the last ten years in Westside. The percentage of owner-occupied housing units in 2010 increased by six percent from 2000. The vacancy rate went from 5.2 percent in 2000 to 4.7 percent in 2010. Table 1 shows the housing trends for Westside from 2000 to 2010.

Table 1

Westside Housing Units, 2000 & 2010

	2000		2010	
	Number	Percentage	Number	Percentage
Occupied Housing Units	146	94.8%	143	95.3%
Owner Occupied	124	84.9%	130	90.9%
Renter Occupied	22	15.1%	13	9.1%
Vacant Housing Units	8	5.2%	7	4.7%
Total Housing Units	154	100.0%	150	100.0%

Source: US Census Bureau

Nearly forty percent of the housing units in Westside are valued at less than $50,000. These homes are likely to be aging and in need of revitalization. Due to this, these homes are susceptible to hazards such as fires, serious storms and other weather related hazards. Since the population has been declining, it will be important to invest in the rehabilitation of existing housing. This will improve the safety of homes and reduce their susceptibility to numerous hazards. Table 2 below displays the value of housing units in Westside in 2012.

Table 2

Value of Westside Housing Units, 2012

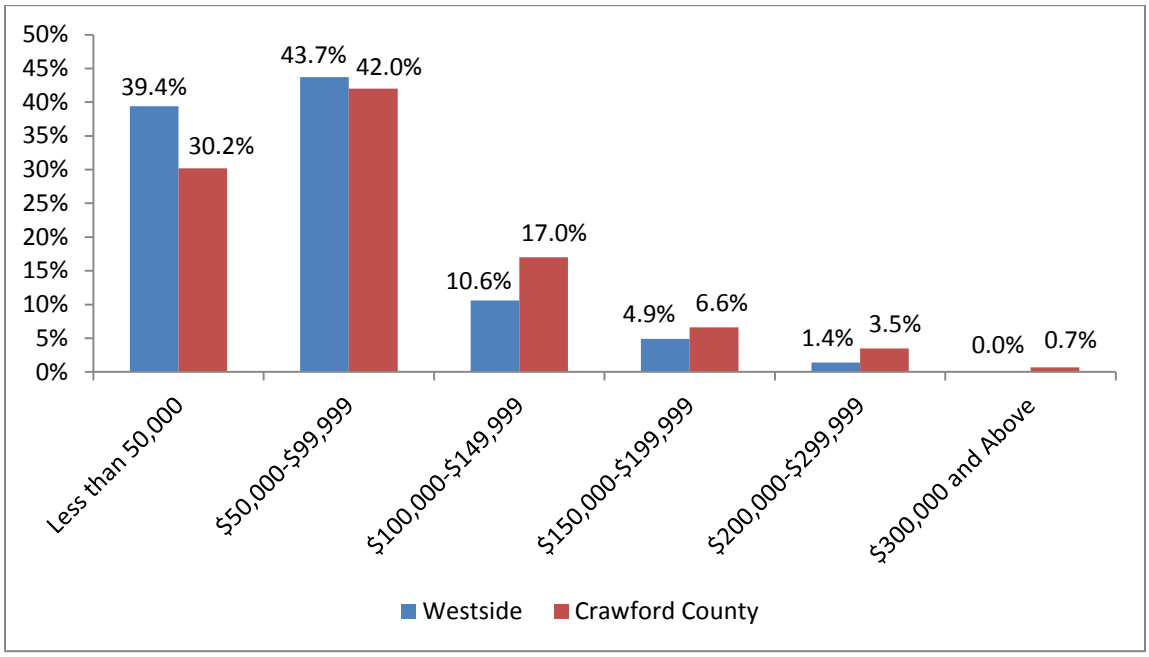
Value of Housing Unit	Number of Homes	Percentage of Homes
Less than $50,000	56	39.4%
$50,000-$99,999	62	43.7%
$100,000-$149,999	15	10.6%
$150,000-$199,999	7	4.9%
$200,000-$299,999	2	1.4%
$300,000 and above	0	0.0%
Median Value	$63,995	-

Source: Crawford County Housing Report, October 2012

Older homes generally show more structural deterioration and were constructed using less stringent building codes and standards, indicating that these homes may be more prone to weather related hazards and fires. Figure 3 compares the value of housing units in Westside to Crawford County. Figure 3 shows that Westside has a disproportionate percentage of housing units valued at less than $50,000, even when compared to Crawford County.

Figure 3

Value of Housing Units

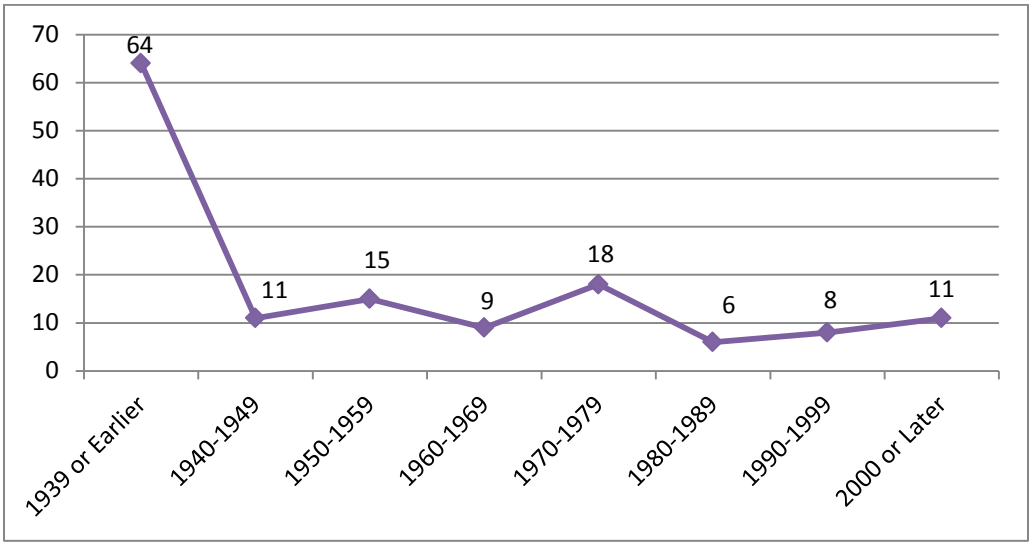


Source: Crawford County Housing Report, October 2012

As previously stated, aging housing stock is more susceptible to storm damage and other related events. Forty-five percent of the current housing stock in Westside was constructed prior to 1940. Nearly eight percent of homes have been constructed since 1990. Figure 4 shows the distribution of housing unit construction in Westside.

Figure 4

Year Housing Unit Constructed



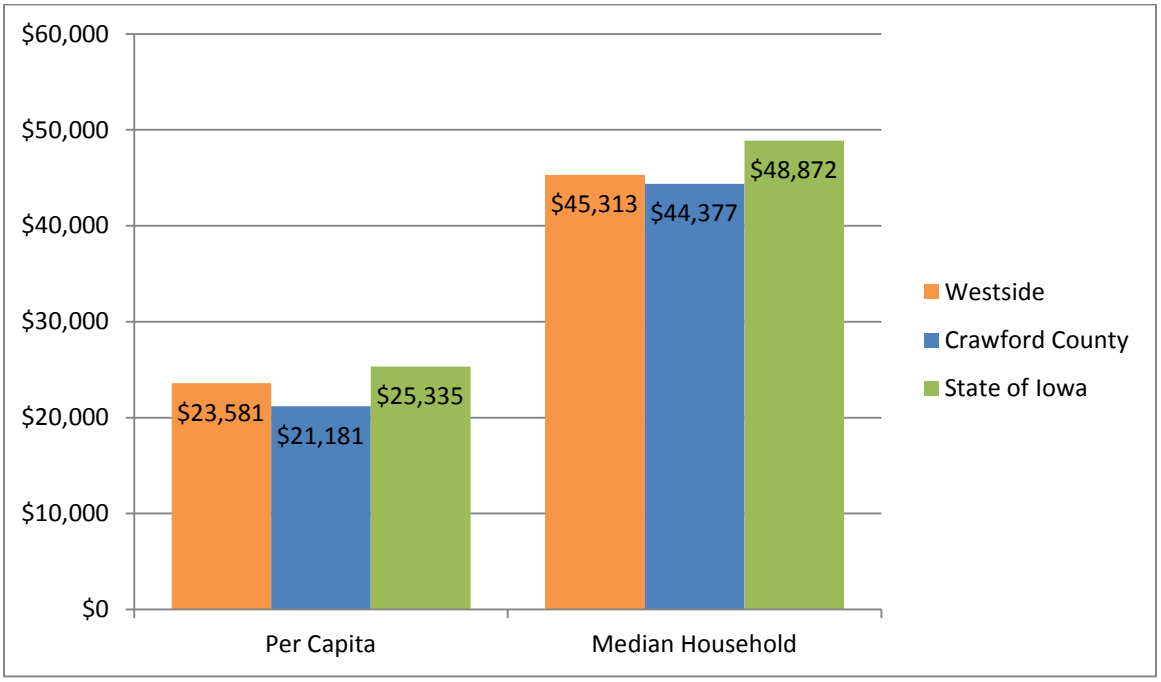
Source: Crawford County Housing Report, October 2012

Economic

An important indicator of the economic base in Westside is per capita income and median household income. Per capita income is the total income in a geographic area divided by the total population of an area. Median household income arranges all household incomes from the lowest value to the highest value and then finds the value in the middle.

Figure 5 on the following page shows that the per capita and median household incomes of those living in Westside are higher than Crawford County's average, but lower than the state average. The average per capita personal income in Westside from 2006-2010 American Community Survey 5-year estimate was $2,400 greater per year than Crawford County's average and $1,754 less per year than the average in the State of Iowa. The median household income in Ricketts for the same time was $3,936 more than Crawford County and trailed the state by $3,559 per year. An area's economy relies heavily on household income levels. Higher incomes means households have more spending power to purchase various goods and services and usually means better employment opportunities, with a chance to bring in workers from outside the area. Table 3 shows the household income distribution for Westside.

Figure 5
Income



Source: 2006-2010 American Community Survey 5-Year Estimates

The largest income group in Westside, according to the American Community Survey, included the $50,000-$74,999 (19.4%) followed closely by the $75,000-$99,999 (18.7%) income group. Just over twenty-seven percent of households in Westside make less than $25,000 and just twenty-seven percent of households have an income of $75,000 or more. Table 3 below shows a breakdown of household income in Westside.

Table 3
Household Income

Income (In 2010 Inflation-Adjusted Dollars)	Number of Households	Percentage of Households
Less than $10,000	12	7.7%
$10,000-$14,999	13	8.4%
$15,000-$24,999	17	11.0%
$25,000-$34,999	22	14.2%
$35,000-$49,999	19	12.3%
$50,000-$74,999	30	19.4%
$75,000-$99,999	29	18.7%
$100,000-$149,999	10	6.4%
$150,000-$199,999	0	0.0%
$200,000 or more	3	1.9%
Median Household Income	$45,313	-

Source: 2006-2010 American Community Survey 5-Year Estimates

The region's small urban communities and rural towns primarily serve as agricultural service centers and retail trade centers, but manufacturing activity is also found in many of these communities. While still maintaining a primary reliance on agriculture, over 97 percent of the land is farmland, the economies that diversified have been impacted less by a downturn in the market. Westside is typical of many smaller rural Iowa cities due to its dependence on regional employment opportunities. Many residents are required to commute to surrounding communities such as Denison and Carroll. The employment by industry statistics are shown in Table 4. The industries with the highest percentage employed include Educational Services, and Health Care and Social Assistance (25.1%), Wholesale Trade (15.0%), and Manufacturing (12.0%). These percentages are based on the total number of individuals 16 years and older that are from Westside and are employed.

Table 4

Industry

Industry	Number	Percentage
Agriculture, Forestry, Fishing and Hunting, and Mining	10	6.0%
Construction	4	2.4%
Manufacturing	20	12.0%
Wholesale Trade	25	15.0%
Retail Trade	16	9.5%
Transportation and Warehousing, and Utilities	13	7.8%
Information	10	6.0%
Finance and Insurance, and Real Estates and Rental and Leasing	17	10.2%
Professional, Scientific, and Management, and Administrative and Waste Management Services	2	1.2%
Educational Services, and Health Care and Social Assistance	42	25.1%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	1	0.6%
Other Services, except Public Administration	4	2.4%
Public Administration	3	1.8%
Civilian Employed Population 16 years and over	167	-

Source: 2006-2010 American Community Survey 5-Year Estimates

Changes in Development

Westside has seen limited development since the last plan update.

Existing Documents

Table 5 provides a compilation of the current planning and regulatory documents in place for the City of Westside.

Table 5

Current Planning and Regulatory Documents for the City of Westside

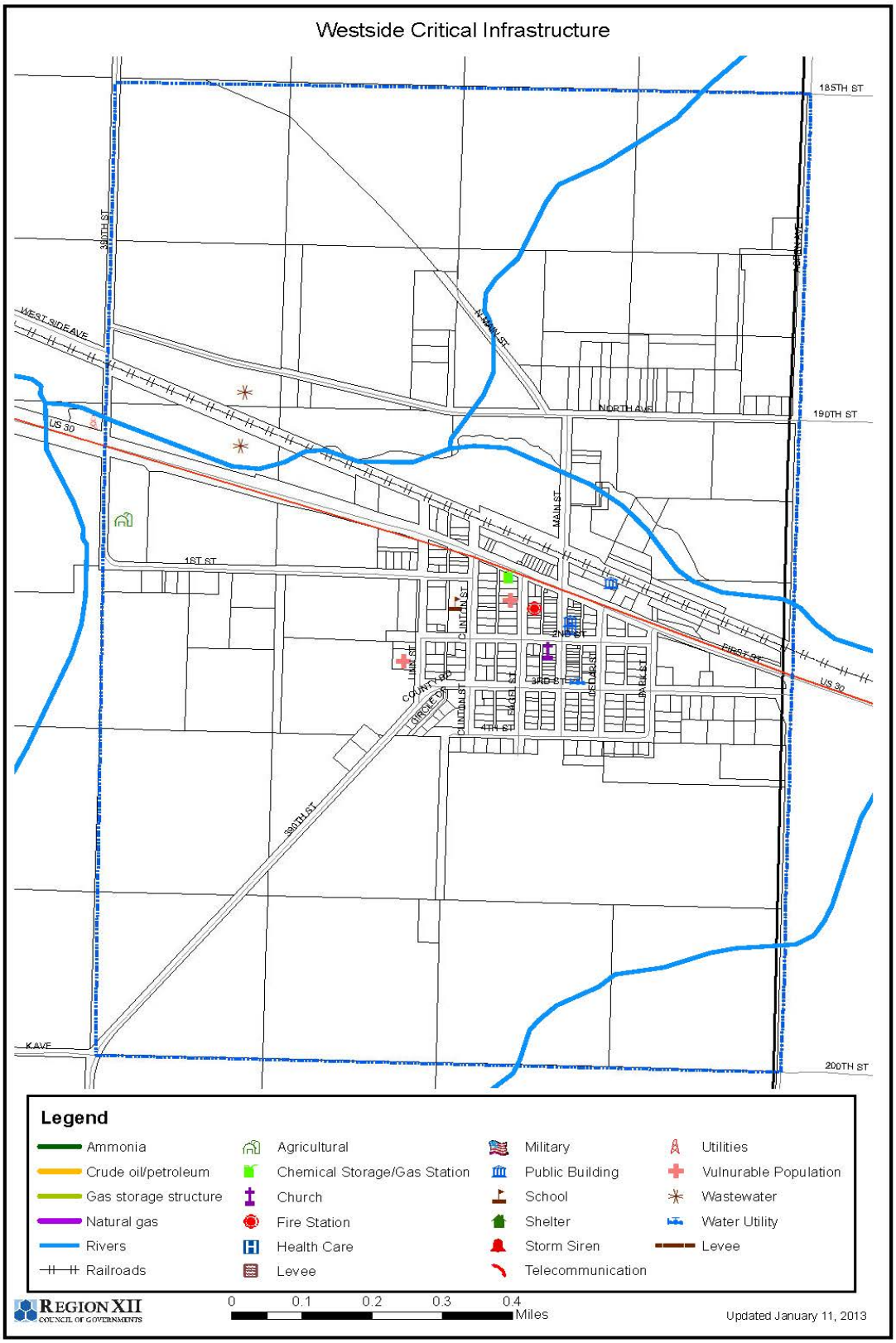
Document	Yes/No	Year
Previous HMP	Yes	2006
Comprehensive Plan	No	-
Building Code	No	-
Zoning Ordinance	Yes	?
Strategic Plan	Yes	1991
Housing Assessment	Yes	1999
NFIP Participant	No	-

Section 2: Critical Facilities

The following facilities were identified as critical facilities for the City of Westside. They are identified on Map 2

- AR-WE-VA, K-12 School
- Bus Barn
- Fire Hall
- City Hall
- Westside Community Building
- Day Care
- Elderly Living
- Water Tower
- Lagoon
- United Church of Westside
- FAC Ag Supply
- Substation
- Fuel and Food

Map 2


Westside Critical Infrastructure
185TH ST
190TH ST
200TH ST
380TH ST
WEST SIDE AVE
NORTH AVE
MAIN ST
1ST ST
2ND ST
3RD ST
4TH ST
FIRST ST
US 30
COUNTY RD
CIRCLE DR
CLINTON ST
K AVE
Legend
Ammonia
Crude oil/petroleum
Gas storage structure
Natural gas
Rivers
Railroads
Agricultural
Chemical Storage/Gas Station
Church
Fire Station
Health Care
Levee
Military
Public Building
School
Shelter
Storm Siren
Telecommunication
Utilities
Vulnurable Population
Wastewater
Water Utility
Levee
REGION XII
COUNCIL OF GOVERNMENTS
0 0.1 0.2 0.3 0.4
Miles
Updated January 11, 2013

Section 3: Risk Assessment

The following table lists the overall results of the Hazard Analysis that the committee member for Westside completed. The planning committee's scoring activity was based on local records and first-hand knowledge, local and national records, and best available data. The results are organized from highest risk rating to lowest.

Table 6

Westside Risk Assessment Scoring

Hazard	Previous Occurrence?	Likely to Experience?	Probability	Magnitude/ Severity	Warning Time	Duration	Hazard Score
Transportation Incident	N	Y	4	3	4	2	3.50
Flash Flood	Y	Y	4	2	4	3	3.30
Infrastructure Failure	Y	Y	4	2	4	3	3.30
Windstorm	Y	Y	4	2	4	3	3.30
River Flooding	Y	Y	4	2	4	2	3.20
Severe Winter Storms	Y	Y	3	3	4	3	3.15
Thunderstorm and Lightning	Y	Y	4	2	4	1	3.10
Hazardous Material	N	Y	3	3	4	2	3.05
Tornado	Y	Y	3	3	4	1	2.95
Grass or Wild Land Fire	Y	Y	4	1	4	2	2.90
Hailstorm	Y	Y	3	2	4	1	2.65
Drought	Y	Y	3	2	1	4	2.50
Extreme Heat	Y	Y	2	3	2	4	2.50
Radiological	N	Y	1	3	4	4	2.35
Dam and Levee Failure	Y	Y	2	2	4	2	2.30
Animal/Plant/Crop Disease	Y	Y	2	2	1	4	2.05
Terrorism	N	N	1	1	3	3	1.50
Human Disease	N	N	1	1	2	4	1.45

Table 7 below describes the scoring criteria used for the risk assessment.

Table 7

Probability: Likelihood of the hazard occurring again in the future considering both the hazard's historical occurrence and the projected likelihood of the hazard occurring in any given year		
Score	**Description**	
4	Highly Likely	Event is probable within the calendar year. History of events is greater than 33% likely per year.
3	Likely	Event is probable within the next three years. History of events is at least 20% but less than or equal to 33% likely per year.
2	Occasional	Event is probable within the next five years. History of events is at least 10% but less than or equal to 20% likely per year.
1	Unlikely	Event is possible within the next 10 years. History of events is less than 10% likely per year.
Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Score	**Description**	
4	Catastrophic	More than 50% of property severely damaged Shutdown of facilities and services for more than 30 days Multiple deaths
3	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
2	Limited	10% to 25% of property severely damaged Shutdown of facilities and services for more than a week Injuries/illnesses that do not result in permanent disability
1	Negligible	Less than 10% of property severely damaged Shutdown of facilities and services for less than 24 hours Injuries/illnesses treatable with first aid
Warning Time: Rating of the potential (average) amount of warning time before the hazard occurs		
Score	**Description**	
4	Less than 6 hours	
3	6 to 12 hours	
2	12 to 24 hours	
1	More than 24 hours	
Duration: A measure of the duration of time that the hazard will affect the area Ex. a snowstorm will likely last several hours, whereas a lightning strike would last less than a second		
Score	**Description**	
4	More than 1 week	
3	Less than 1 week	
2	Less than 1 day	
1	Less than 6 hours	

Section 4: Vulnerability Assessment and Loss Estimates

Potential losses for each hazard, as identified by each jurisdiction, were estimated using the structural inventory. To determine the extent of an area that is susceptible to damages from each hazard, the committee member estimated the magnitude/severity of each hazard on the jurisdiction. The magnitude/severity is an assessment in terms of injuries and fatalities, and property and infrastructure damage. The number of structures in the hazard area was determined by taking the maximum magnitude/severity percentage from the risk assessment. Table 4.1 below shows the percentages used.

Table 4.1

Magnitude/Severity: Assessment of severity in terms of injuries and fatalities, person property and infrastructure and the degree and extent with which the hazard affects the area		
Description		**Percentage Used in Loss Estimate**
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 Injuries/illnesses that do not result in permanent disability	25%
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%

Based on the potential impacts of each identified hazard, the vulnerability and loss estimates for the City of Westside were calculated. All structural data in the tables and figures are based on 2013 parcel data provided by the Crawford County Assessor and population data came from the 2010 U.S. Census. The following table provides information about maximum building and population exposure for the City of Westside.

Westside			
Maximum Building and Population Exposure			
Type of Structure	Number of Structures	Value of Structures	Number of People
Residential	143	$9,237,720	299
Commercial	22	$2,555,010	
Industrial	1	$194,120	
Agricultural Structures	7	$581,000	

The following hazards were determined to have a negligible impact on the City of Westside, were they to occur. Any shutdown of facilities and services is expected to last less than 24 hours and any injuries/illnesses are treatable with first aid. It is estimated that 9% of the city would be impacted.

Grass or Wild Land Fire, Human Disease and Terrorism

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	13	$831,395	27
Commercial	2	$229,951	
Industrial	0	$17,471	
Agricultural Structures	1	$52,290	

The following hazards were determined to have a limited impact on the City of Westside, were they to occur. A shutdown of some facilities and services could last more than a week and any injuries/illness would not result in permanent disability. It is estimated that 25% of the city would be impacted.

Dam and Levee Failure, Drought, Flash Flood, Hailstorm, River Flooding, Thunderstorm and Lightning, Windstorm, Animal/Plant/Crop Disease and Infrastructure Failure

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	36	$2,309,430	75
Commercial	6	$638,753	
Industrial	0	$48,530	
Agricultural Structures	2	$145,250	

The following hazards were determined to have a critical impact on the City of Westside, were they to occur. A shutdown of some facilities and services could last for at least two weeks and some injuries/illness will result in permanent disability. It is estimated that 50% of the city would be impacted. There are no school facilities located in the special flood hazard area.

Extreme Heat, Severe Winter Storms, Tornado, Hazardous Material, Radiological and Transportation Incident

Type of Structure	Number of Structures in Hazard Area	Value of Structures in Hazard Area	Number of People in Hazard Area
Residential	72	$4,618,860	150
Commercial	11	$1,277,505	
Industrial	1	$97,060	
Agricultural Structures	4	$290,500	

Section 5: Mitigation Strategy

Mitigation Goals, Objectives and Actions

Goal: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards

- Objective 1: Upgrade Storm Warning Capabilities
  - Action 1.1: Replace outdoor warning system
  - Action 1.2: Promote NOAA weather radios
  - Action 1.3: Reverse 911 program
- Objective 2: Protect Lagoons
  - Action 2.1: Build dikes

Goal: Reduce the extent of fatalities and minimize injuries due to the impacts of hazards

- Objective 3: Increase Public Safety
  - Action 3.1: Inform public about downed power lines
  - Action 3.2: Inform public about hazardous materials on railroad

Goal: Improve coordination and communication with other relevant organizations and build support for hazard mitigation

- Objective 4: Coordinate with Surrounding Counties Regarding Trainings
  - Action 4.1: Meet and train with Carroll County officials

The City of Westside completed a previous hazard mitigation plan in 2006. The table on the following page displays the status of the previous actions. Any action marked as ongoing or future was carried over to be included in this plan.

Table 8

Westside Previous Mitigation Actions

Westside	**Status**				
Previous Actions (2006)	**Complete**	**Underway**	**Ongoing**	**Future**	**Canceled**
Develop community evacuation procedures			X		
Continue participation in National Flood Insurance Program			X		
Encourage local businesses to prepare for flooding			X		
Work with Carroll County to control flooding on East Boyer River	X				
Construct a dike around the wastewater lift station				X	
Seek funding for a new fire truck	X				
Continue to train volunteers for fire, hazardous materials, medical emergencies			X		
Wire fire station to be compatible with portable generator	X				
Replace outdoor warning system			X		
Promote NOAA weather radios to residents and businesses			X		
Install power lines underground in new housing development				X	

STAPLEE Analysis

Chapter 5 explained the STAPLEE process and how mitigation actions were prioritized. The table on the following page shows the STAPLEE analysis for the City of Westside. Table 10 displays the STAPLEE evaluation criteria.

Table 9

Westside STAPLEE Analysis

STAPLEE Criteria	S		T			A			P			L			E				E				
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Inform public about hazardous material on railroad	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	Y	Y	Y	**15**
Build dikes	Y	N	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	Y	**14**
Continue to train volunteers for fire, hazardous materials, medical emergencies	Y	N	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N/A	N/A	N/A	N/A	N/A	**14**
Continue participation in National Flood Insurance Program	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y	N/A	N/A	Y	Y	**13**
Install power lines underground in new housing development	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N/A	N/A	Y	Y	**11**
Promote NOAA weather radios	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	**10**
Reverse 911 program	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	N/A	N/A	N/A	N/A	N/A	**10**
Inform public about downed power lines	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	N/A	N/A	N/A	N/A	N/A	**10**
Meet and train with Carroll County officials	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	N/A	N/A	N/A	N/A	N/A	**10**
Develop community evacuation procedures	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	N/A	N/A	N/A	N/A	N/A	**10**
Encourage local businesses to prepare for flooding	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y	N	Y	N	N/A	N/A	N/A	N/A	N/A	**10**

STAPLEE Criteria	S		T			A			P			L			E				E					
Considerations for ------→ Mitigation Actions ↓	Community Acceptance	Effect on Segment of Population	Technical Feasibility	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocated	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Goals	Consistent with Federal Laws	**TOTAL SCORE**
Replace outdoor warning system	Y	N	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	N	N	Y	N/A	N/A	N/A	N/A	N/A	**8**

Table 10

STAPLEE EVALUATION CRITERIA		
S	Social	▪ Will the action be acceptable to the community? ▪ Will the action adversely affect a particular segment of the population?
T	Technical	▪ Is the action technically feasible ▪ Does the action offer a long-term solution? ▪ Are there adverse secondary impacts?
A	Administrative	▪ Does the community have the staff to implement the action? ▪ Does the community have the funding to implement the action? ▪ Can the community provide the necessary maintenance of the action?
P	Political	▪ Does the action have the support of elected officials? ▪ Is there a local champion to see action to completion? ▪ Does the action have the support of the public?
L	Legal	▪ Has the state given the community the legal authority to implement the action? ▪ Are the proper laws, ordinances and resolutions in place to implement the action? ▪ Is the action likely to be challenged by stakeholders who may be negatively affected?
E	Economic	▪ Are there economic benefits related to the action? ▪ Does the cost seem reasonable for the size of the problem and likely benefits? ▪ Will the action contribute to the local economy? ▪ Is outside funding required for the action?
E	Environmental	▪ Will the action positively affect the natural environment? ▪ Will the action positively affect endangered species? ▪ Will the action positively affect HAZMAT/waste sites? ▪ Is the action consistent with community environmental goals? ▪ Is the action consistent with federal environmental laws?

Action Plan

Once the committee identified and ranked the future hazard mitigation activities, the activities were then analyzed. The City of Westside outlined details for the implementation of each action including associated hazards, priority, responsible departments, estimated costs, potential funding sources, and target completion dates. Table 11 displays all of the mitigation actions for Westside with their implementation strategy.

Table 11

Westside Action Plan

Inform Public about Hazardous Materials on Railroad	
Hazards Addressed	Hazardous Material, Terrorism, Infrastructure Failure, Transportation Incident
Priority	Medium
Previous Priority	Not Identified Previously
Responsible Department	First Responders, Fire Department
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Build Dikes	
Hazards Addressed	Dam and Levee Failure, Flash Flood, River Flooding
Priority	Low
Previous Priority	Not Identified Previously
Responsible Department	City
Estimated Cost	Moderate
Potential Funding Source	State, Federal
Mitigation Measure Category	Structural Project
Target Completion Date	Mid

Continue to Train Volunteers for Fire, Hazardous Materials, Medical Emergencies	
Hazards Addressed	All
Priority	High
Previous Priority	High
Responsible Department	Fire Department, Law Enforcement, First Responders
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Continue NFIP Participation and Follow NFIP Policies by Enforcing Floodplain Management Ordinance	
Hazards Addressed	Flash Flood, River Flooding, Dam and Levee Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	City, Public Works
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Ongoing

Install Power Lines Underground in New Housing Development	
Hazards Addressed	Infrastructure Failure, Windstorm, Thunderstorm and Lightning
Priority	Low
Previous Priority	Low
Responsible Department	City, Public Works
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Prevention
Target Completion Date	Mid

Promote NOAA Weather Radios	
Hazards Addressed	Flash Flood, Tornado, Windstorm, Extreme Heat, Hailstorm, River Flooding, Severe Winter Storms, Thunderstorm and Lightning
Priority	Medium
Previous Priority	
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Ongoing

Reverse 911 Program	
Hazards Addressed	All
Priority	Medium
Previous Priority	Not Identified Previously
Responsible Department	Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Inform Public about Downed Power Lines	
Hazards Addressed	Tornado, Windstorm, Thunderstorm and Lightning
Priority	Medium
Previous Priority	Not Identified Previously
Responsible Department	City, Fire Department
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Public Education and Awareness
Target Completion Date	Short

Meet and Train with Carroll County Officials	
Hazards Addressed	All
Priority	Medium
Previous Priority	Not Identified Previously
Responsible Department	First Responders, Fire Department
Estimated Cost	Low
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Develop Community Evacuation Procedures	
Hazards Addressed	Grass or Wild Land Fire, River Flooding, Severe Winter Storms, Dam and Levee Failure, Hazardous Material, Radiological
Priority	Medium
Previous Priority	Medium
Responsible Department	City, Fire Department, First Responders, County Emergency Management, Police Department, AR-WE-VA School District
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Encourage Local Businesses to Prepare for Flooding	
Hazards Addressed	Flash Flood, River Flooding, Dam and Levee Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	City, Fire Department
Estimated Cost	Minimal
Potential Funding Source	Local
Mitigation Measure Category	Property Protection
Target Completion Date	Short

Replace Outdoor Warning System	
Hazards Addressed	Tornado, Infrastructure Failure
Priority	Medium
Previous Priority	Medium
Responsible Department	City, Fire Department
Estimated Cost	Low
Potential Funding Source	Federal
Mitigation Measure Category	Emergency Services
Target Completion Date	Short

Incorporation into Other Planning Mechanisms

Where possible, the City of Westside 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:

- Westside City Code or Ordinances
- Westside Comprehensive Plan
- Westside Zoning Ordinance
- Other existing and future plans, such as water conservation plans, storm water management plans, and parks and recreation plans.

Resolution No. 11-04-2013R1

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE CITY OF WESTSIDE ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the City of Westside participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the City of Westside adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 4th DAY OF November, 2013.

Larry J. Jam
Mayor

ATTEST:

Bonnie Schmitz
City Clerk

Resolution No. 1.14.15

Resolution Adopting Multi-Jurisdictional Hazard Mitigation Plan

A RESOLUTION OF THE AR-WE-VA COMMUNITY SCHOOL DISTRICT ADOPTING THE CRAWFORD COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Whereas, The Board of Supervisors of Crawford County, Iowa has authorized the development of a multi-jurisdictional hazard mitigation plan; and,

Whereas, the Ar-We-Va Community School participated in the multi-jurisdictional hazard mitigation planning process; and

Whereas, the Crawford County Multi-Jurisdictional Hazard Mitigation Plan was prepared in compliance with the Hazard Mitigation Planning Requirements of the Disaster Mitigation Act of 2000 provided by the Iowa Homeland Security and Emergency Management Division.

NOW THEREFORE BE IT RESOLVED, that the Ar-We-Va Community School adopts the Crawford County Multi-Jurisdictional Hazard Mitigation Plan, incorporating citizen comments and recommendations.

PASSED AND ADOPTED THIS 14th DAY OF January, 2015.

Todd Damm

Chair

ATTEST:

Shawn Stickrod

Secretary

REGION XII
COUNCIL OF GOVERNMENTS

Ar-We-Va Community School District

April 10, 2013, 5:30 PM

Ar-We-Va School

110 Clinton Street, Westside, Iowa

Agenda

I. What is Hazard Mitigation?

II. Why is Hazard Mitigation Important?

III. Requirements

IV. Plan Progress

V. Next Steps

VI. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

March 16, 2012, 12:50 PM

Region XII Office

Carroll, Iowa

Agenda

I. Welcome and Introductions

II. Hazard Mitigation Planning Process

III. Critical Facilities Identification

IV. Next Meeting

   a. Risk Assessment

V. Adjourn

BOYER VALLEY COMMUNITY SCHOOL DISTRICT
Agenda for the Regular Meeting of the Board of Education
7:00pm, January 21, 2013
Boyer Valley North Media Center, Dow City, Iowa

OPENING:

7:00	Call to Order Roll Call and Declaration of Quorum
	Mission Statement
	Approval of Agenda and minutes of previous meeting(s)
7:05	Open Forum
	Principals' Reports
	Superintendent's Report
7:15	Focus on Education – MS Social Studies Program
7:25	Information on Hazard Mitigation Plan – Staci Lynch from Region 12

ACTION ITEMS:

7:40	Approval of Consent Agenda
	a. Financial Reports
	b. Bills and Claims
7:45	Approval of Major Purchases and Personnel
7:55	Approve Application for Early Retirement
8:00	Approval of Elementary Staffing Recommendations for 2013-14
8:25	Approve Baseball Cooperative Agreement for Summer, 2013
8:40	Approve Driver Education Fees for 2013
8:45	Approve 28e Agreement with Woodbine for Elementary Counselor

Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Charter Oak-Ute Community School District

March 18th, 2013, 5:30 PM

Junior High/High School

321 Main Street Charter Oak, Iowa

Agenda

I. What is Hazard Mitigation?

II. Why is Hazard Mitigation Important?

III. Requirements

IV. Plan Progress

V. Next Steps

VI. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

April 18, 2013, 1:00 PM

Library

461 Railroad Avenue, Charter Oak Iowa

Agenda

I. Review of Community Objectives and Actions

II. STAPLEE

III. Action Plan

IV. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Fire Departments

April 29, 2013, 7:30 PM

Fire Station

Denison, IA

Agenda

I. What is Hazard Mitigation?

II. Why is Hazard Mitigation Important?

III. Requirements

IV. Plan Progress

V. Next Steps

VI. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

January 16, 2013, 6:00 PM

Denison Community Room (south side of City Hall)

111 N Main St, Denison Iowa

Agenda

I. Welcome and Introductions

II. Hazard Mitigation Overview

III. Plan Goals

IV. Community Objectives and Actions (Past and Future)

V. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

March 20, 2013, 5:00 PM

Region XII COG Office

1009 E. Anthony Street, Carroll, Iowa

Agenda

I. Hazard Analysis & Risk Assessment Review

II. Community Profile

III. Community Objectives and Actions (Past and Future)

IV. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

March 21, 2013, 5:30 PM

Denison Community Room (south side of City Hall)

111 N Main St, Denison Iowa

Agenda

I. Hazard Analysis & Risk Assessment Review

II. Community Profile

III. Community Objectives and Actions (Past and Future)

IV. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

December 20, 2012, 6:00 PM

Denison Community Room (south side of City Hall)

111 N Main St, Denison Iowa

Agenda

I. Welcome and Introductions

II. Hazard Mitigation Overview

III. Plan Goals

IV. Community Objectives and Actions (Past and Future)

V. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

Monday February 27th, 2012, 6:00 PM

Crawford County Law Enforcement Center (north side of Courthouse)

Denison, Iowa

Agenda

I. Welcome and Introductions

II. Hazard Mitigation Planning Process

III. Critical Facilities Identification

IV. Next Meeting

   a. Risk Assessment

V. Adjourn (No Later Than 7:30 PM)

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

March 21, 2013, 6:00 PM

Denison Community Room (south side of City Hall)

111 N Main St, Denison Iowa

Agenda

I. Welcome and Introductions

II. Review of Community Objectives and Actions

III. STAPLEE

IV. Action Plan (if time)

V. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

March 26, 2012, 6:00 PM

Denison Community Room (south side of City Hall)

111 N Main St, Denison Iowa

Agenda

I. Welcome and Introductions

II. Critical Facilities Review

III. Hazard Analysis & Risk Assessment

   a. Natural Hazards

   b. Human-Caused Hazards

IV. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

April 3, 2013, 6:00 PM

Denison Community Room (south side of City Hall)

111 N Main St, Denison Iowa

Agenda

I. Welcome and Introductions

II. Review of STAPLEE

III. Action Plan

IV. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

July 10th, 2013, 7:00 PM

Crawford County Law Enforcement Center (north side of Courthouse)

Denison, Iowa

Agenda

I. Welcome and Introductions

II. Hazard Mitigation Planning Process

III. Draft of Hazard Mitigation Plan

IV. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

August 23, 2012, 6:00 PM

Denison Community Room (south side of City Hall)

111 N Main St, Denison Iowa

Agenda

I. Welcome and Introductions

II. Hazard Analysis & Risk Assessment Review

III. Hazard Ranking

IV. Community Profile

V. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

August 8, 2012, 1:00 PM

Community Center

Deloit, Iowa

Agenda

I. Welcome and Introductions

II. Critical Facilities Review

III. Hazard Analysis & Risk Assessment

   a. Natural Hazards

   b. Human-Caused Hazards

IV. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Denison School District

Monday January 21st, 2013, 5:00 PM

Denison High School

819 N 16th Street Denison, Iowa

Agenda

I. What is Hazard Mitigation?

II. Why is Hazard Mitigation Important?

III. Requirements

IV. Plan Progress

V. Next Steps

VI. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

March 15, 2012, 9:00 AM

City Hall

Dow City, Iowa

Agenda

I. Welcome and Introductions

II. Hazard Mitigation Planning Process

III. Critical Facilities Identification

IV. Next Meeting

   a. Risk Assessment

V. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

June 24, 2013, 4:00 PM

Dow City, City Hall

117 N Franklin Street, Dow City, Iowa

Agenda

I. Review of STAPLEE

II. Action Plan

III. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

East Sac Community School District

Monday February 18th, 2013, 5:30 PM

East Sac High School

801 Jackson Street Lake View, Iowa

Agenda

I. What is Hazard Mitigation?

II. Why is Hazard Mitigation Important?

III. Requirements

IV. Plan Progress

V. Next Steps

VI. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

IKM-Manning Community School District

Thursday January 17th, 2013, 6:45 PM

IKM-Manning Middle School

755 Main Street Manilla, Iowa

Agenda

I. What is Hazard Mitigation?

II. Why is Hazard Mitigation Important?

III. Requirements

IV. Plan Progress

V. Next Steps

VI. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Schleswig School District

Monday December 17th, 2012, 5:45 PM

Schleswig Middle School

714 Date Street Schleswig, Iowa

Agenda

I. What is Hazard Mitigation?

II. Why is Hazard Mitigation Important?

III. Requirements

IV. Plan Progress

V. Next Steps

VI. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

March 15, 2012, 4:30 PM

City Hall

Vail, Iowa

Agenda

I. Welcome and Introductions

II. Hazard Mitigation Planning Process

III. Critical Facilities Identification

IV. Next Meeting

   a. Risk Assessment

V. Adjourn

REGION XII
COUNCIL OF GOVERNMENTS

Crawford County Hazard Mitigation Planning Committee

June 3, 2013, 4:00 PM

Vail City Hall

217 Main Street, Vail, Iowa

Agenda

I. Review of STAPLEE

II. Action Plan

III. Adjourn

REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: APRIL 10, 2013

TIME: 5:30pm **TO** 6:00pm

LOCATION: AR-WE-VA CSD, WESTSIDE

	Name	Representing	E-Mail Address
1	Sharon Stickrod	Ar-We-Va	Stickrod @ ar-we-va.k12.ia.us
2	Sara Skinner	Ar-We-Va	skinner@ar-we-va.k12.ia.us
3	Bryan Dalton	Ar-We-Va	bdallton@hotmail.com
4	Todd Danner	Ar-We-va	dannerse westiowa.net
5	Kurt Brosamle	Ar-We-Va	kbrosamle@ar-we-va.k12.ia.us
6	Jeremy Smith	AR-WE-VA	jeremy.osg@gmail.com
7	Denise Ragaller	Ar-We Va	dragaller@ar-wava.k12.ia.us
8	Rosemary Cameron	Ar-We-Va	rcameron@ar-we-va.k12.ia.us
9	Deb Dilts	Ar-We-Va	
10	Lorelei Mumm	Ar-We-Va	alcamumm@win-4-u.net
11		AR-WE-VA	tcameron@jansonproducts.com
12	Richard Rosener	AWV	rfsrrose@gmail.com
13	Sue Rosener	AWV	"
14	Stacey Rosener	AWV	"
15	Camille Mumm	AWV	camillemumm@yahoo.com
16	Cara Kraus	AWV	
17	Lou Wieland	AWV	lwieland@ar-we-va.k12.ia.us
18	Amy Danner	AWV	
19		AWV	
20		AWV	
21			
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: JANUARY 21, 2013

TIME: 7:05pm TO 7:35pm

LOCATION: DOW CITY ELEMENTARY

		Name	Representing	E-Mail Address
X	1	Sharon Lee	School Board	sharonlee@boyer-valley.k12.ia.us
X	2	Mark McWilliams	School Board	cally@iowatelecom.net
	3	Tom Vint	Supt.	
X	4	Ken Dunham	School Board	
X	5	Kelly [illegible]	School Board	
X	6	[illegible]	School Board	
X	7	Randy Mitchell	School Board	
X	8	Paul Klee	School Board	
	9	Mike Weber	elem. principal	
	10	Chad Straight	6-12 principal	
	11	Paul Martin	K-12 counselor	
	12	Deb Brown	2nd Grade Teacher	
	13	Julia Roberts	Dunlap	
	14	Pete Seuntjens	Dunlap	
	15	Jenny Seuntjens	Dunlap/parent	
	16	Elizabeth Hustmnol	parent	
	17	Barb Schmidt	1st grade teacher	
	18	Patty Branning	2nd Grade teacher	
	19	Julie Malone	5th grade teacher	
	20	Becky Emmermann	retired teacher	
	21	Diane Casey	Kindergarten teacher	
	22	Dawn Dante	Parent	
	23	Dana Viemann	Dunlap parent	
	24	Shana Hartmann	Dow City parent	
	25	Mary Meyer	Dow City parent	

26. Mike Bevers — Dunlap parent

27. Alexis Hustmann — Dow City parent

28. Kari Meyer Dow City Parent

29. Dianne Weiss Dunlap

30. Stephanie Lantz Moorhead - parent

31. Bill Emmerson

32. Peggy Christie Dow City Teacher

33. Susan Loma ~~Dunlap~~ Dow City Teacher

34. Doris Albrecht Dow City Teacher

35. Jeanine Peterson Dow City teacher

36. Michelle Earside Dunlap Parent

37. [illegible] Dunlap Teacher

REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: MARCH 18, 2013

TIME: 5:30pm **TO** 6:00pm

LOCATION: CHARTER OAK-UTE JUNIOR HIGH/HIGH SCHOOL, CHARTER OAK

	Name	Representing	E-Mail Address
1	Rollie Wiebers	Charter Oak-Ute Schools	wiebersr@charter-oak-ute.k12.ia.us
2	Betty Lou Olson	Charter Oak-Ute Schools	betty lou 48 @hotmail.com
3	Dean Staley	Charter Oak-Ute School	staleyshowcattle5@6mail.com
4	Dave Gress	Charter Oak-Ute	tgresse@charter-oak-ute.k12.ia.us
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: FEBRUARY 27TH, 2012

TIME: 6pm TO 6:50pm

LOCATION: CRAWFORD COUNTY LAW ENFORCEMENT CENTER, DENISON

	Name	Representing	E-Mail Address
1	Dan Bream	Arion	dabeam@frontiernet.net
2	William Mayall	CO-U School	wmm_co@yahoo
3	Karen Kolln	Buck Grove	
4	Marlene Inman	Buck Grove	inmandar@hotmail.com
5	ALAN JOHNSON	DELOIT	jjam510@hotmail.com
6	Mike Lickteig	KIRON FIRE	Kfdinc@schallertel.net
7	Kathy Lickteig	Kiron	katteig@schallertel.net
8	Bob Macumber	Manilla Fire	manillafire@fmctc.com
9	Leonard Kaufmann	Manilla	" " "
10	Dennis Kasperbauer	IKM Manning school	kasper@mmctsu.com
11	Pamela S. Tripp	City of Ricketts City of Charter Oak	cocityclerk@frontiernet.net
12	MICHAEL LARSON	CITY OF CHARTER OAK	COCITYCLERK@FRONTIERNET.NET
13	Steve Mumm	" " Westside	MummAuto@Win-4-U.Net
14	Brian Johnson	Schleswig CSD	brianjohnson@schleswig.k12.ia.us
15	Jack Johnson	Schleswig	grandmae01@iowatelecom.net
16	Mike Pardun	Denison	mpardun@denisoncsd.org
17	Cory Snowgren	Denison	firechief@denisonia.com
18	Lisa Koch	Denison	lisak@denisonia.com
19	Gordon Hough	Denison	gordon.hough@blackhillscorp.com
20	Rod Bradley	Denison Police Dept	denpd@frontiernet.net
21	DAN AHART	DENISON CITY COUNCIL	DANIEL.AHART52@GMAIL.COM
22	Robert Arambula	City of Denison	robert.arambula@denisonia.com
23			
24			
25			

REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: MARCH 15TH, 2011

TIME: 9 am **TO** 10 am

LOCATION: DOW CITY, CITY HALL

	Name	Representing	E-Mail Address
1	KEITH STARKWEATHER	City Council Dow City	STARKY97C FRONTIERNET.NET
X 2	Deb Garrett	City of Dow City	dowcity@frontiernet.net
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: MARCH 15TH, 2011

TIME: 4:30 TO 5:30

LOCATION: VAIL, CITY HALL

	Name	Representing	E-Mail Address
1	Kurt A. Brungardt	Vail City Council	KurtAins@rnwa.telecom
2	Ainsley Brungardt	Vail	abrungar@yahoo.com
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: 3-16-12

TIME: 12:50 **TO** 1:20

LOCATION: Region XII office, Carroll

	Name	Representing	E-Mail Address
1	Thomas W. Irlbeck	Aspirwall	
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: MARCH 26, 2012

TIME: 6pm TO 7:30

LOCATION: DENISON COMMUNITY ROOM, DENISON

	Name	Representing	E-Mail Address
1	Don Beam	Arion	dgbeam@frontiernet.net
2	Bob Maccumber	Manilla	
3	Leonard Kaufmann	Manilla	
4	Thomas IRlbeck	Aspinwall	712-653-3250
5	KEITH STARKWEATHER	Dow City	
6	Pam Tripp	Charter Oak Ricketts	
7	MICHAEL LARSON	CHARTER OAK	
8	Darlene Inman	Buck Grove	
9	Mike Pardun	Denison	
10	Lisa Koch	Denison	
11	Robert Arambula	Denison	
12	Kurt Brungardt	Vail	
13	Todd Danner	Westside	
14	Steve Mumm	Westside	
15	Greg Miller	Emerg Mgt	
16	Steve Clemens	Crawford County	
17	Brian Johnson	Schleswig	
18	Terry Kluender	Schleswig	Kluender@iowatelecom.net
19	DAN ALBERS	DENISON	
20	Karl Sandbo	Kiron	
21	MIKE LICHTEG	KIRON	
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: AUGUST 8, 2012

TIME: 1:00pm **TO** 2:00pm

LOCATION: COMMUNITY CENTER, DELOIT

	Name	Representing	E-Mail Address
1	Brian Newell	City of Deloit	briannewell36@Gmail.com
2	ALAN Johnson	City " Dewit	jjam510@hotmail.com
3	Dick Lorenzen	" "	
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: AUGUST 23, 2012

TIME: 6:00 pm TO 7:00 pm

LOCATION: DENISON COMMUNITY ROOM, DENISON

	Name	Representing	E-Mail Address
1	Gordon Hough	Black Hills & City of Denison	gordon.hough@blackhillscorp.com
2	Cory Snowgren	DVFD	firechief@denisonia.com
3	Tim Zenk	Crawford Co EMA	tim.zenk@racom.net
4	Greg Miller	Crawford Co EMA	MGRLYTE@frontiernet.net
5	Richard Roorda	Deloit	221 Walnut
6	Steve Mamm	Westside	Mamm.Auto@Win-4-us.net
7	Leonard Kaufmann	Manilla	
8	Bob Macumber	Manilla	
~~9~~	~~Greg Miller~~	~~Crawford Co EMA~~	~~MGRLYTE@FRONTIERNET.NET~~
10	Steve Ulmer	Crawford Co.	ulmerwelding@gmail.com
11	Don Beam	Arion	dgbeam@frontiernet.net
12	MIKE LICHTER	KIRON	
13	MICHAEL LARSON	CHARTER OAK	
14	Pamela Tripp	Charter Oak + Ricketts	cocityclerk@frontiernet.net
15	Wallene Inman	Buck Grove	inmander@hotmail.com
16	Troy Kluender	Schleswig	Kluender@iowatelecom.net
17	Brian Johnson	Schleswig	brianjohnson@schleswig.k12.ia.us
18	Brian Newell	City of Deloit	briannewell36@Gmail.com
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: JANUARY 16, 2013

TIME: 6:00 pm **TO** 7:30 pm

LOCATION: COMMUNITY ROOM, DENISON

	Name	Representing	E-Mail Address
1	Karen Kalln	Buck Grove	Kalln@frontier.com
2	Marlene Inman	Buck Grove	inmandar@hotmail.com
3	Troy Kluender	Schleswig	Kluender@iowatelecom.net
4	Brian Johnson	Schleswig	brianjohnson@schleswig.k12.ia.us
5	Pam Tripp	Charter Oak Ricketts	cocityclerk@frontiernet.net
6	MICHAEL LARSON	CHARTER OAK	"
7	Dennis Kasparbauer	IKM-Manning School	Kaspar@mmctsn.com
8	Eric Skoog	Crawford Co	eskoog@frontiernet.net eskoog@crawfordco.org
9	Randall Kuhlmann	Crawford Co	Kuhlmann deKalb@gmail.com
10	Jerry Buller	CRAWFORD CO	NBuller@SchallerTel.Net
11	MIKE ZICKTER	KIRON; City of	
12	Bob Macumber	Manilla Fire	mathclw@fmctc.com
13	Leonard Kaufmann	City of Manilla	
14	Don Beam	Arion	
X 15	Greg Miller	CCEMA	MLRLYTS@Frontiernet.net
16	Steve Ulmer	Crawford Co.	
17	Rod Bradley	Denison Police Dept	chief@denisonpd.net
18	Mike Pardun	Denison CSD	mpardun@denisoncsd.org
19	DAN ALBERT	CITY OF DENISON	DANIEL.ALBERT52@GMAIL.com
20	ALAN Johnson	CITY of DELOIT	JJAM510@hotmail.com
21	Eileen Sailer	Public	jpljr@frontiernet.net
22	Patty Lally	Public	patty-lally@yahoo.com
23	Cory Snowgren	Denison FD	f.f.
X 24	Tim Zenk	Crawford EMA	trzenk@frontiernet.net
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: MARCH 20, 2013

TIME: 4:45pm **TO** 5:15pm

LOCATION: REGION XII OFFICE, CARROLL

	Name	Representing	E-Mail Address
1	Thomas W. Gilbert	Aspinwall Eng.	
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: MARCH 21, 2013

TIME: 5:30pm **TO** 6:00pm

LOCATION: COMMUNITY ROOM, DENISON

	Name	Representing	E-Mail Address
1	KEITH STARKWEATHER	Dow City	KSTARKY2@GMAIL.COM
2	Stan Mumm	Westside	mummsxto@win-4-u.net
3	K A. Brt	Vail	abranger@yahoo.com
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: APRIL 18, 2013

TIME: 1:00 pm **TO** 3:30 pm

LOCATION: LIBRARY, CHARTER OAK

	Name	Representing	E-Mail Address
1	Pam Tripp	City of Charter Oak City of Redbetter	cocityclerk@frontiernet.net
2	MICHAEL K. LARSON	CITY OF CHARTER OAK	" "
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: MARCH 21, 2013

TIME: 6:00pm TO 7:30pm

LOCATION: COMMUNITY ROOM, DENISON

	Name	Representing	E-Mail Address
1	Dennis Wellsandt	Kiron	denlan@schallertel.net
2	Jay Miller	Kiron	jm3641175@hotmail.com
3	MIKE LICHTEIG	CITY of KIRON	
4	Kyle Wulf	Kiron	
5	John Larsen	Kiron	
6	Steve Ulmer	Crawford Co.	ulmerwelding@gmail
x 7	Tim Zenk	Crawford EMA	trzenk@frontiernet.net
x 8	Greg Miller	CCEMA	MERLYTE@frontiernet.net
9	ALAN JOHNSON	DELOIT	jjam510@hotmail.com
10	Jerry Lorenzen	Deloit	deloitfirechief@Hotmail.com
11	Robert Segebart	DeLoiT	
12	David Beam	Arion	
13	Thomas W. Dellrich	ASPINWALL	
14	[illegible]	Vail	
15	Steve Mumm	Westside	
16	[illegible]	Dow City	KSTARKY2@GMAIL.com
17	Troy M. Kluender	Schleswig	Kluender@iowatelecom.net
18	Karen Kolln	BUCK GROVE	kkolln@frontier.com
19	Kenny Steckelberg	Manilla	steckelberg@yahoo.com
20	Cody Gaskill	Manilla	gaskill@fmctc.com
21	Leonard Kaufman	Manilla	
22	Bob Maenner	Manilla	
23	Bill Simonsen	Manilla	
24	Gordon Hough	Denison	gordon.hough@blackhillscorp.com
25	Laura Beeck	Public Health	cchha@frontiernet.net

	Name	Representing	E-Mail Address
26	Jenny Bullen	CRAWFORD COUNTY	NBULLER@SCHALLENTEL.NET
27	Fred Coltrain	Kiron Fire	
28	Jesse Coltrain	Kiron Fire Dept.	
29	CECIL BLUM	CRAWFORD COUNTY	
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: APRIL 3, 2013

TIME: 6:00pm TO 7:30pm

LOCATION: COMMUNITY ROOM, DENISON

		Name	Representing	E-Mail Address
	1	Darlene Inman	Buck Grove	inmandar@hotmail.com
	2	Jay Klein	Buck Grove	N/A
	3	Thomas W. Seibeck	Aspinwall	
	4	[illegible]	Arion	
	5	Kristi Stephens	Arion	
	6	Troy Kluender	Schleswig	
	7	Bob Macumber	Manilla	
	8	Jerry Lorenzen	Deloit	
	9	ALAN JOHNSON	DELOIT	
	10	JOHN EMSWILEK	DENISON	
X	11	Greg Miller	Craw Co EMA	
X	12	Tim Zenk	Crawford EMA	
	13	Steve Ulmer	Crawford Co.	
	14	Paul Assman	Crawford Co.	
	15	Steve Mumm	Westside	
	16	Dolores Kuhlman	Crawford Co	
	17	Randy Kuhlmann	Crawford Co	
	18	[illegible]	Denison Fire	
	19	CECIL BLUM	CRAW Co.	
	20	Mike Lichtenberg	Kiron	
	21	Jerry Buller	CRAW CO.	
	22	Dennis Kasparbauer	IKM Manning School	
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: JUNE 3, 2013

TIME: 4:00pm **TO** 5:00pm

LOCATION: VAIL CITY HALL

	Name	Representing	E-Mail Address
1	Kurt A. Brungardt	Vail	
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: JUNE 24, 2013

TIME: 4:00pm **TO** 5:00pm

LOCATION: CITY HALL, DOW CITY

	Name	Representing	E-Mail Address
1	Keith Hawkins	Dow City	
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: JULY 10, 2013

TIME: 7:00 pm **TO** 7:30 pm

LOCATION: CRAWFORD COUNTY LAW ENFORCEMENT CENTER, DENISON

	Name	Representing	E-Mail Address
1	Greg Miller	EMA	
2	Tim Zenk	EMA	
3	Karen Kolln	Buck Grove	
4	Darlene Inman	Buck Grove	
5	Jerry Lorenzen	Deloit	
6	Alan Johnson	Dewit-	
7	Ainsley Brungardt	Vail	
8	Pamela Tripp	Ricketts, Charter Oak	
9	Michael Larson	Charter Oak	
10	Troy Kluender	Schleswig	
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: APRIL 29, 2013

TIME: 7:30pm **TO** 8:00pm

LOCATION: FIRE STATION, DENISON

	Name	Representing	E-Mail Address
1	Greg Miller	EMA	mcrlytc@frontiernet.net
2	Jerry Buller	Kiron Fire	NBuller@SchallerTel.net
3	Jame Steinkuehler	Crawford Co Sheriff	JSteinkuehler@Crawfordso.net
4	LOREN JEPSEN	Schleswig Fire	lorenjepsen@yahoo.com
5	Gordon Quandt	Schleswig Fire	GBQuandt@IowaTelecom
6	Karl Sandberg	Kiron Fire Dept.	KFD inc@schallertel.net
7	Ed Sandberg	KIRON FIRE DEPT.	KFD inc.@SchallerTel.Net
8	Gaylen Mohr	Westside Fire	flytwins@westianet.net
9	John C Granzen Sr	Denison Fire	Jonnyga811@yahoo.com
10	Blake J Deiber	Denison FD	blaked@denisonia.com
11	Tim Zenk	Denison FD	tzenk@frontiernet.net
12	Duane Zenk	" "	DZENK@Crawfordcounty.org
13	Bob Macumber	Manilla	
14	Corey Gaskill	Manilla FD	gaskill@fmctc.com
15	Bill Simonsen	Manilla FD	
16	Kyle R Schultz	Charter Oak FD	
17	Rony Weis	Denison Fire	
18	Brent Kelm	CHARTER OAK F.D.	
19	Matt Howland	Charter Oak FD	radman34@gmail.com
20	David L Yankey	DENISON FIRE	davey1943@hotmail.com
21	Eugene Mohr	Vail Fire	Kemohr1@hotmail.com
22	Jerry Lorenzen	Deloit Fire	deloitfirechief@hotmail.com
23	John Walsh	VAIL FIRE	walsh1964@iowatelecom.net
24	Josh Hoffmeier	Denison Fire	joshhoffmeier@yahoo.com
25	B.H. MEYER	RICKETTS FIRE	ricketts fire@HotMail.Com

	Name	Representing	E-Mail Address
26	Derek B. Meyer	Richetts Fire	d.meyer23@hotmail.com
27	Tim Weber	Denison Fire	wbernt@frontier.com
28	James T. Clark	DVFD	JNCLARK@MCHSI.COM
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: JANUARY 21, 2013

TIME: 5:00pm **TO** 5:30pm

LOCATION: DENISON HIGH SCHOOL

	Name	Representing	E-Mail Address
1	Larry Anderson	Schal Board	
2	Les Lewis	DCS Board	
3	Mark Johnson	DCS Board.	
4	Kris Roweddey	Dcs Board	
5	Mike Pardun	DCS District	
6	Scott Larson	DCS District	
7	Ruth Frazier	DCS District	
8	Lynn Torr	DCS District	
9	Pat Roush	DCS District	
10	Rod Bradley	DCS Board	
11	Chris Schultz	DCS District	
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: January 17, 2013

TIME: 6:45pm TO 7:15pm

LOCATION: IKM-Manning School District, Manilla

	Name	Representing	E-Mail Address
1	Thomas Ward	IKM-Manning	Tward@IKM-Manning.k12.ia.us
2	Mary K. Heller	IKM-Manning CSD	mheller@ikm-manning.k12.ia.us
3	Dennis Kasparbauer	IKM Manning	Manning
4	Paul Heller	IKM Manning	Irwin
5	Amy Fernedling	IKM-Manning	afernedling@IKM-Manning-
6	Kermit Joehl	IKM-Manning	kaj64@fmctc.com
7	Eric Ramsey	IKM-MANNING	ramsey@mmctsu.com
8	Lynn Barry	IKM-Manning	lbarry@fmctc.com
9	Scott Hodne	IKM-Manning	hodneliv@mmctsu.com
10	Janelle Hansen	IKM Manning	jhansen@ikm-manning.k12.ia.us
11	Deb Musfeldt	IKM-Manning	dmusfeldt@ikm-manning.k12.ia.us
12	Rhonda Sieverding	IKM-Manning	rsieverding@ikm-manning.k12.ia
13	Lori Darling	IKM-Manning	ldarling@ikm-manning.k12.us
14	Tanya Graer	IKM-Manning	—
15	Denise Wall	IKM-Manning	
16	Brian Wall	IKM-Manning	
17	Pam Kusel	Media-IKM MG	Pam@manningnews.com
18	Rose Miller	IKM-Manning	—
19	Lorine Linde	" "	—
20	Jen Rasmussen	" "	—
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REGION XII COUNCIL OF GOVERNMENTS

CRAWFORD COUNTY HAZARD MITIGATION SIGN-IN SHEET

DATE: DECEMBER 17, 2012

TIME: 5:45 pm **TO** 6:15 pm

LOCATION: MIDDLE SCHOOL, SCHLESWIG

	Name	Representing	E-Mail Address
1	Brian Johnson	Schleswig CSD	
2	David Galvin	Schleswig CSD	
3	Gene E. Rein	Schleswig	
4	Wade Gurney	Schleswig CSD	
5	Alan Weiss	Schleswig CSD	
6	Lee Schumann	Schleswig CSD	
7	Sherri Jones	Schleswig CSD	
8	Rhonda Nemitz	Schleswig CSD	
9	Angie Rosener	Schleswig CSD	
10	Andrea Gurney	Schleswig CSD	
11	Jamie Hennings	Schleswig	
12	Ashley Hennings	Schleswig	
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Crawford County Hazard Mitigation Meeting
April 10, 2013
Ar-We-Va School

Stacy Lentsch of the Region XII Council of Governments met with the Ar-We-Va School Board on April 10, 2013 at 5:30 pm at the school in Westside. Ms. Lentsch met with the school board prior to their meeting to discuss the Crawford County Hazard Mitigation Plan. Ms. Lentsch confirmed that all attendees were there as volunteers. The signed attendance sheet is attached.

Ms. Lentsch explained the purpose of mitigation planning, the goals for the project and what the mitigation plan was intended to do for each entity. She also went over what the planning process would involve and the benefits of having a plan in place regarding funding opportunities and general preparedness.

Ms. Lentsch went through the critical infrastructure and hazard rankings that the committee representatives for Westside, Vail and the school completed at the first three meetings. Ms. Lentsch explained that the next step in the planning process is to complete a draft of the plan. The meeting adjourned at 6:00 pm.

Crawford County Hazard Mitigation Meeting
January 21, 2013
Dow City Elementary School

Stacy Lentsch of the Region XII Council of Governments met with the Boyer Valley School Board on January 21, 2013 at 7:05 pm at the Elementary School in Dow City. Ms. Lentsch met with the school board during their meeting to discuss the Crawford County Hazard Mitigation Plan. The signed attendance sheet is attached. Due to the fact that Ms. Lentsch met with the school board during an official meeting, the school board members' time cannot be counted.

Ms. Lentsch explained the purpose of mitigation planning, the goals for the project and what the mitigation plan was intended to do for each entity. She also went over what the planning process would involve and the benefits of having a plan in place regarding funding opportunities and general preparedness.

Ms. Lentsch went through the critical infrastructure and hazard rankings that the committee representatives for Dow City and the school completed at the first three meetings. Ms. Lentsch explained that the Crawford County Hazard Mitigation Committee met on January 16th and worked on developing mitigation objectives and actions. Ms. Lentsch encouraged the school board to attend future meetings, as well as invite others they felt would be important to the process. The hazard mitigation portion of the meeting concluded at 7:35 pm.

Crawford County Hazard Mitigation Meeting
March 18, 2013
Charter Oak-Ute Junior High/High School

Stacy Lentsch of the Region XII Council of Governments met with the Charter Oak-Ute School Board on March 18, 2013 at 5:30 pm at the Junior High/High School in Charter Oak. Ms. Lentsch met with the school board prior to their meeting to discuss the Crawford County Hazard Mitigation Plan. Ms. Lentsch confirmed that all attendees were there as volunteers. The signed attendance sheet is attached.

Ms. Lentsch explained the purpose of mitigation planning, the goals for the project and what the mitigation plan was intended to do for each entity. She also went over what the planning process would involve and the benefits of having a plan in place regarding funding opportunities and general preparedness.

Ms. Lentsch went through the critical infrastructure and hazard rankings that the committee representatives for Charter Oak and the school completed at the first three meetings. Ms. Lentsch explained that the next committee meeting, which would be on March 21st at 6:00 pm, would focus on the STAPLEE process and Action Plan. Ms. Lentsch encouraged the school board to attend, as well as invite others they felt would be important to the process. The meeting adjourned at 6:00 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #1 Follow-Up
March 15, 2012
City Hall, Dow City

Several planning committee members were unable to attend the meeting on February 27th. An individual meeting was scheduled for March 15, 2012 at 9:00 am at City Hall in Dow City, IA. A signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. Ms. Lentsch confirmed that the committee member was there as a volunteer. The city clerk assisting the committee member was there on company time, and therefore could not be counted as a volunteer.

Ms. Lentsch explained the purpose of the meeting and mitigation planning, the goals for the project and what the Mitigation Plan was intended to do. She also went over what the planning process would involve and the benefits of having a plan in place regarding funding opportunities and general preparedness.

The planning committee member was given a map of their community, a copy of the previous plan's critical infrastructure section, and a worksheet for identifying existing critical infrastructure. The committee member created a list of critical facilities using the previous plan and identified the facilities on a current map. Ms. Lentsch explained that prior to the next meeting, drafts of the critical infrastructure list and map will be shared with the representative, along with city staff for review.

Ms. Lentsch told the committee member that the next meeting would focus on a risk assessment to establish which hazards could potentially happen within the county and each individual city. The next meeting will be March 26th at 6:00 pm at the Denison Community Room. The meeting adjourned at 10:00 am.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #1 Follow-Up
March 15, 2012
City Hall, Vail

Several planning committee members were unable to attend the meeting on February 27th. An individual meeting was scheduled for March 15, 2012 at 4:30 pm at City Hall in Vail, IA. A signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. Ms. Lentsch confirmed that the committee member was there as a volunteer.

Ms. Lentsch explained the purpose of the meeting and mitigation planning, the goals for the project and what the Mitigation Plan was intended to do. She also went over what the planning process would involve and the benefits of having a plan in place regarding funding opportunities and general preparedness.

The planning committee member was given a map of their community, a copy of the previous plan's critical infrastructure section, and a worksheet for identifying existing critical infrastructure. The committee member created a list of critical facilities using the previous plan and identified the facilities on a current map. Ms. Lentsch explained that prior to the next meeting, drafts of the critical infrastructure list and map will be shared with the representative, along with city staff for review.

Ms. Lentsch told the committee member that the next meeting would focus on a risk assessment to establish which hazards could potentially happen within the county and each individual city. The next meeting will be March 26th at 6:00 pm at the Denison Community Room. The meeting adjourned at 5:30 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #1 Follow-Up
March 16, 2012
Region XII Office, Carroll

Several planning committee members were unable to attend the meeting on February 27th. An individual meeting was scheduled for March 16, 2012 at 12:50 pm at Region XII Council of Governments in Carroll, IA. A signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. Ms. Lentsch confirmed that the committee member was there as a volunteer.

Ms. Lentsch explained the purpose of the meeting and mitigation planning, the goals for the project and what the Mitigation Plan was intended to do. She also went over what the planning process would involve and the benefits of having a plan in place regarding funding opportunities and general preparedness.

The planning committee member was given a map of their community, a copy of the previous plan's critical infrastructure section, and a worksheet for identifying existing critical infrastructure. The committee member created a list of critical facilities using the previous plan and identified the facilities on a current map. Ms. Lentsch explained that prior to the next meeting, drafts of the critical infrastructure list and map will be shared with the representative, along with city staff for review.

Ms. Lentsch told the committee member that the next meeting would focus on a risk assessment to establish which hazards could potentially happen within the county and each individual city. The next meeting will be March 26th at 6:00 pm at the Denison Community Room. The meeting adjourned at 1:20 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #1
February 27, 2012
Crawford County Law Enforcement Center, Denison

The Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee met for the first time on February 27, 2012 at 6:00 pm at the Crawford County Law Enforcement Center in Denison, IA. The planning committee includes a representative from each city and school district, as well as a representative from the Crawford County Board of Supervisors and the Crawford County Emergency Manager. The signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting.

After introductions, Ms. Lentsch explained the purpose of the meeting and mitigation planning, the goals for the project and what the Mitigation Plan was intended to do for each entity. She also went over what the planning process would involve and the benefits of having a plan in place regarding funding opportunities and general preparedness.

Representatives were given a map of their community, a copy of the previous plans critical infrastructure section, and a worksheet for identifying existing critical infrastructure. Each community created a list of critical facilities using the previous plan and identified the facilities on a current map. Ms. Lentsch explained that prior to the next meeting, drafts of the critical infrastructure list and map will be shared with the representatives along with county and city staff for review.

Ms. Lentsch told the committee that the next meeting would focus on a risk assessment to establish which hazards could potentially happen within the county and each individual city. The next meeting will be March 26th at 6:00 pm at the Denison Community Room. The meeting adjourned at 7 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #2 Follow-Up
August 8, 2012
Community Center, Deloit

One planning committee member was unable to attend the meeting on March 26th. An individual meeting was scheduled for August 8th, 2012 at 1:00 pm at the community center in Deloit, IA. The signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. After introductions, Ms. Lentsch confirmed that all attendees were there as volunteers.

Ms. Lentsch stated which hazards the Hazard Mitigation Committee members included in the Crawford County Multi-Jurisdictional Hazard Mitigation Plan. The committee decided to include both natural and human-caused hazards in the plan and that several natural hazards (sinkholes, earthquakes, landslides, and expansive soils) were highly unlikely to occur and therefore did not need to be considered.

Ms. Lentsch explained the four aspects of risk assessment (probability, magnitude/severity, warning time, and duration) and passed out a handout which included the ranking system and definitions of each natural and human-caused hazard. Mr. Newell, Mayor Johnson and Mr. Lorenzen completed the risk assessment process for Deloit using the ranking form.

Ms. Lentsch told the attendees that the next meeting would focus on ranking the hazards and going over the community profiles. The next meeting will be August 23rd at 6 pm at the Denison Community Room. The meeting adjourned at 2:00 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #2
March 26, 2012
Community Room, Denison

The Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee met for the second time on March 26, 2012 at 6:00 pm at the community room in Denison, IA. The planning committee includes a representative from each city and school district, as well as a representative from the Crawford County Board of Supervisors and the Crawford County Emergency Manager. The signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. After introductions, Ms. Lentsch confirmed that all attendees were there as volunteers.

Prior to the meeting, representatives were provided with a copy of the mapped critical infrastructure of their community. Copies were also sent to each city clerk for review by city staff. Ms. Lentsch asked if there were any corrections that needed to made to the maps. Several committee members provided corrections. Ms. Lentsch also asked the committee to fill in any blanks on the worksheet for their community.

Next the committee discussed which hazards should be included in the Crawford County Multi-Jurisdictional Hazard Mitigation Plan. A list of natural and human-caused hazards, as identified by the State of Iowa Hazard Mitigation Plan, was provided and each hazard was briefly defined. The committee decided to include both natural and human-caused hazards in the plan and that several natural hazards (sinkholes, earthquakes, landslides, and expansive soils) were highly unlikely to occur and therefore did not need to be considered.

Ms. Lentsch explained the four aspects of risk assessment (probability, magnitude/severity, warning time, and duration) and gave each representative a handout which included the ranking system and definitions of each natural and human-caused hazard. Representatives completed the risk assessment process for their individual community using a ranking form. Ms. Lentsch then took the individual results of natural hazards and used them to calculate an average for the entire county. Those results were discussed with the committee and changes were made as necessary to better reflect the probability, magnitude/severity, warning time, and duration on a multi-jurisdictional basis. Ms. Lentsch said she would email out the average for the natural-made hazards and discuss it at the next meeting.

Ms. Lentsch told the committee that the next meeting would focus on ranking the hazards and going over the community profiles. At the conclusion of the meeting, representatives met with Ms. Lentsch individually to discuss additions/corrections to their community's critical infrastructure map and to turn in the completed worksheets.

The meeting adjourned at 7:30 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #3
August 23, 2012
Community Room, Denison

The Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee met for the third time on August 23, 2012 at 6:00 pm at the community room in Denison, IA. The planning committee includes a representative from each city and school district, as well as a representative from the Crawford County Board of Supervisors and the Crawford County Emergency Manager. The signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. After introductions, Ms. Lentsch confirmed that all attendees were there as volunteers.

Ms. Lentsch handed out the ranked hazards for the individual communities, as well as the multi-jurisdictional score. Ms. Lentsch explained that she used the formula found in the 2010 Iowa Hazard Mitigation Plan. In that formula, categories were weighted to allow for a higher priority to be placed on hazards that have a higher occurrence and that have a higher potential for adverse impacts. The formula used is as follows: (Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10) = Final Hazard Assessment Score. The multi-jurisdictional score was obtained by taking the average of all the community scores.

Ms. Lentsch went through the hazards with the committee, focusing on the warning time and duration of the hazards. She wanted to make sure that the committee understood that the duration of a hazard does not include the aftermath and clean up time, just the actual duration of the event itself. Ms. Lentsch gave the committee several minutes to look through their hazard scores and make any changes they felt were necessary.

Next the committee went through their profiles. Each profile consisted of the community's history, geography, environment, population demographics, housing, income, and industries. Ms. Lentsch asked the committee if they would like to see any additional information listed. Some suggested they would like to see how their community compared to the rest of the state. Ms. Lentsch stated she would include some state statistics in the community profiles.

Ms. Lentsch informed the committee that the next meeting would focus on plan goals, objectives, and mitigation strategies. She stated that the next meeting would most likely be in late October or early November.

The meeting adjourned at 7:00 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #4 Follow-Up
March 20, 2013
Region XII COG Office, Carroll

Several planning committee members were unable to attend the meeting on January 16th. A follow-up meeting was scheduled for March 20, 2013 at 4:45 pm at the Region XII COG Office in Carroll. A signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. Ms. Lentsch confirmed that the committee member was there as a volunteer.

Ms. Lentsch handed out the ranked hazards for Aspinwall, as well as the multi-jurisdictional score. Ms. Lentsch explained that categories were weighted to allow for a higher priority to be placed on hazards that have a higher occurrence and that have a higher potential for adverse impacts. The formula used is as follows: (Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10) = Final Hazard Assessment Score. The multi-jurisdictional score was obtained by taking the average of all the community scores.

Ms. Lentsch went through the hazards with the committee member, focusing on the warning time and duration of the hazards. She wanted to make sure that the Mr. Irlbeck understood that the duration of a hazard does not include the aftermath and clean up time, just the actual duration of the event itself. Ms. Lentsch gave the committee member several minutes to look through the hazard scores and make any changes he felt were necessary. Next, Ms. Lentsch went through Aspinwall's community profile. The profile consisted of the city's history, geography, environment, population demographics, housing, income, and industries.

Ms. Lentsch stated that at the previous meeting, the committee determined four goals for the hazard mitigation plan. The four goals are: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards; Reduce the extent of fatalities and minimize injuries due to the impacts of hazards; Improve coordination and communication with other relevant organizations and build support for hazard mitigation; and Maintain and support public safety facilities, including equipment and training.

Ms. Lentsch explained that the committee then went through and decided on objectives and actions for the plan. She handed out several worksheets to aid in developing mitigation objectives and actions. The first worksheet listed the critical facilities and hazard rankings that the committee member worked on the first three meetings. Ms. Lentsch then handed out a worksheet of Aspinwall's goals, objectives and actions from its previous plan. Ms. Lentsch asked the Mr. Irlbeck to check off whether Aspinwall had completed its previous actions, if they were underway, ongoing, still planned to occur in the future, or if the community no longer planned to complete the action.

Ms. Lentsch provided the committee member with example objectives and actions taken from plans around the state. Mr. Irlbeck asked to keep his worksheets in order to consult with others in the community. Ms. Lentsch stated that it was okay to do so, but he needed to return them before the next meeting. She told Mr. Irlbeck that the next meeting would focus on STAPLEE. The meeting adjourned at 5:15 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #4 Follow-Up
March 21, 2013
Community Room, Denison

Several planning committee members were unable to attend the meeting on January 16th. A follow-up meeting was scheduled for March 21, 2013 at 5:30 pm at the Denison Community Room. A signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. Ms. Lentsch confirmed that the committee members were there as volunteers.

Ms. Lentsch handed out the ranked hazards for the individual communities, as well as the multi-jurisdictional score. Ms. Lentsch explained that categories were weighted to allow for a higher priority to be placed on hazards that have a higher occurrence and that have a higher potential for adverse impacts. The formula used is as follows: (Probability x .45) + (Magnitude/Severity x .30) + (Warning Time x .15) + (Duration x .10) = Final Hazard Assessment Score. The multi-jurisdictional score was obtained by taking the average of all the community scores.

Ms. Lentsch went through the hazards with the committee members, focusing on the warning time and duration of the hazards. She wanted to make sure that the committee members understood that the duration of a hazard does not include the aftermath and clean up time, just the actual duration of the event itself. Ms. Lentsch gave the committee members several minutes to look through their hazard scores and make any changes they felt were necessary. Next, Dow City and Vail went through their profiles. Each profile consisted of the community's history, geography, environment, population demographics, housing, income, and industries.

Ms. Lentsch stated that at the previous meeting, the committee determined four goals for the hazard mitigation plan. The four goals are: Minimize damage to critical facilities, infrastructure, and other community assets from the effects of hazards; Reduce the extent of fatalities and minimize injuries due to the impacts of hazards; Improve coordination and communication with other relevant organizations and build support for hazard mitigation; and Maintain and support public safety facilities, including equipment and training.

Ms. Lentsch explained that the committee then went through and decided on objectives and actions for the plan. She handed out several worksheets to aid in developing mitigation objectives and actions. The first worksheet listed the critical facilities and hazard rankings that the committee members worked on the first three meetings. Ms. Lentsch then handed out a worksheet of the communities' goals, objectives and actions from their previous plan. Ms. Lentsch asked the committee members to check off whether the community had completed their previous actions, if they were underway, ongoing, still planned to occur in the future, or if the community no longer planned to complete the action.

Ms. Lentsch provided the committee members with example objectives and actions taken from plans around the state. The committee members spent the rest of the meeting determining objectives and actions for their community. Ms. Lentsch collected the worksheets at the end of the meeting. Ms. Lentsch told the committee that the meeting later that night would focus on STAPLEE. The meeting adjourned at 6:00 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #4
January 16, 2013
Community Room, Denison

The Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee met for the fourth time on January 16, 2013 at 6:00 pm at the Community Room in Denison, IA. The planning committee includes a representative from each city and school district, as well as a representative from the Crawford County Board of Supervisors and the Crawford County Emergency Manager. The signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. After introductions, Ms. Lentsch confirmed that all attendees were there as volunteers.

Ms. Lentsch briefly went over what hazard mitigation planning is and why it is important since there were some new people in attendance. She then handed out several worksheets to aid in developing mitigation objectives and actions. The first worksheet listed the critical facilities and hazard rankings that the committee members worked on the first three meetings. Ms. Lentsch then handed out a worksheet of the communities' goals, objectives and actions from their previous plan. Ms. Lentsch asked the committee to check off whether the community had completed their previous actions, if they were underway, ongoing, still planned to occur in the future, or if the community no longer planned to complete the action.

Next, Ms. Lentsch provided the communities with a worksheet that had all of the natural and human-caused hazards addressed in the plan. She asked the community to take 10-15 minutes and write down any issues the community has with the hazards.

The last item the committee focused on was developing objectives and actions for their community. Ms. Lentsch provided the committee with examples taken from plans around the state. The committee spent the rest of the meeting determining goals and objectives for their community. Ms. Lentsch collected the worksheets at the end of the meeting. Several communities asked to keep their worksheets to consult with others in their community. Ms. Lentsch stated that it was okay to do so, but they needed to return them before the next meeting.

Ms. Lentsch told the committee that the next meeting would focus on STAPLEE. Ms. Lentsch expected the next meeting to occur in late February or early March. The meeting adjourned at 7:30 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meetings #5 & 6 Follow-Up
April 18, 2013
Charter Oak Library

Committee members from Charter Oak and Ricketts were unable to attend the meeting on March 21st and April 3rd. A follow-up meeting was scheduled for April 18, 2013 at 1:00 pm at the library in Charter Oak. A signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. Ms. Lentsch confirmed that the committee members were there as volunteers.

Ms. Lentsch handed back the mitigation action worksheet that the committee members worked on during the previous meeting. Then, she handed out a list of mitigation ideas taken from FEMA's *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards*. Ms. Lentsch went through the list of mitigation ideas she thought the community would find most useful. The committee spent the next 15 minutes adding/enhancing their mitigation actions.

Next, Ms. Lentsch handed out the STAPLEE form along with the list of questions the committee members needed to answer. Ms. Lentsch explained that they needed to write "Yes," "No," "Maybe" or "N/A" for each question for all their actions. Ms. Lentsch walked through the first action with Ms. Tripp and Mayor Larson, explaining what the questions were asking. The committee members spent the rest of the meeting filling out the STAPLEE form. Ms. Lentsch explained that she would add up the responses to determine a score for each action.

The final item on the agenda was the Action Plan. Ms. Lentsch explained that the Action Plan looks at the actions in more detail, determining which hazards the action addresses, if the project is a low, medium or high priority for the community, the responsible department, the estimated cost of the project, potential funding sources, the mitigation measure category, and the estimated completion date. The committee members spent the rest of the meeting filling out the Action Plan.

Ms. Lentsch stated that there were no more committee meetings until a draft of the plan was ready. She stated that a draft should be ready sometime in late May. The meeting adjourned at 3:30 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #6 Follow-Up
June 3, 2013
Vail City Hall

Several planning committee members were unable to attend the meeting on April 3rd. A follow-up meeting was scheduled for June 3, 2013 at 4:00 pm at the City Hall in Vail. A signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. Ms. Lentsch confirmed that the committee member was there as a volunteer.

Ms. Lentsch handed back the STAPLEE analysis worksheet that the committee member worked on during the previous meeting. Ms. Lentsch went through some of the STAPLEE questions again that Mr. Brungardt had questions about. Mr. Brungardt spent the next 10 minutes reviewing his STAPLEE responses. Ms. Lentsch informed the committee member how the STAPLEE score was determined. The maximum score possible for each action is 23. Each question that was answered with a "yes" received one point, a "no" received negative one point, and "maybe" or "Not Applicable" received zero points. There were four questions that were opposite, meaning that a "yes" received negative one point and a "no" received one point. These four questions were *will the action adversely affect a particular segment of the population; are there adverse secondary impacts; is the action likely to be challenged by stakeholders who may be negatively affected;* and *is outside funding required for the action?*

The final item on the agenda was the Action Plan. Ms. Lentsch explained that the Action Plan looks at the actions in more detail, determining which hazards the action addresses, if the project is a low, medium or high priority for the community, the responsible department, the estimated cost of the project, potential funding sources, the mitigation measure category, and the estimated completion date. Mr. Brungardt spent the rest of the meeting filling out the Action Plan.

Ms. Lentsch informed the committee member that a draft of the plan should be ready by the end of June. The meeting adjourned at 5:00 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #6 Follow-Up
June 24, 2013
Dow City, City Hall

Several planning committee members were unable to attend the meeting on April 3rd. A follow-up meeting was scheduled for June 24, 2013 at 4:00 pm at the City Hall in Dow City. A signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. Ms. Lentsch confirmed that the committee member was there as a volunteer.

Ms. Lentsch handed back the STAPLEE analysis worksheet that the committee member worked on during the previous meeting. Ms. Lentsch went through some of the STAPLEE questions again that Mr. Starkweather had questions about. Mr. Starkweather spent the next 10 minutes reviewing his STAPLEE responses. Ms. Lentsch informed the committee member how the STAPLEE score was determined. The maximum score possible for each action is 23. Each question that was answered with a "yes" received one point, a "no" received negative one point, and "maybe" or "Not Applicable" received zero points. There were four questions that were opposite, meaning that a "yes" received negative one point and a "no" received one point. These four questions were *will the action adversely affect a particular segment of the population; are there adverse secondary impacts; is the action likely to be challenged by stakeholders who may be negatively affected;* and *is outside funding required for the action?*

The final item on the agenda was the Action Plan. Ms. Lentsch explained that the Action Plan looks at the actions in more detail, determining which hazards the action addresses, if the project is a low, medium or high priority for the community, the responsible department, the estimated cost of the project, potential funding sources, the mitigation measure category, and the estimated completion date. Mr. Starkweather spent the rest of the meeting filling out the Action Plan.

Ms. Lentsch informed the committee member that a draft of the plan should be ready by the beginning of July. The meeting adjourned at 5:00 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #5
March 21, 2013
Community Room, Denison

The Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee met for the fifth time on March 21, 2013 at 6:00 pm at the Community Room in Denison, IA. The planning committee includes a representative from each city and school district, as well as a representative from the Crawford County Board of Supervisors and the Crawford County Emergency Manager. The signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. After introductions, Ms. Lentsch confirmed that all attendees were there as volunteers.

Ms. Lentsch handed back the mitigation action worksheet that the committee worked on during the previous meeting. Then, she handed out a list of mitigation ideas taken from FEMA's *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards*. Ms. Lentsch went through the list of mitigation ideas she thought the community would find most useful. The committee spent the next 15 minutes adding/enhancing their mitigation actions.

Next, Ms. Lentsch handed out the STAPLEE form along with the list of questions the committee needed to answer. Ms. Lentsch explained to the committee they needed to write "Yes," "No," "Maybe" or "N/A" for each question for all their actions. Ms. Lentsch walked through the first action with the committee, explaining what the questions were asking. The committee spent the rest of the meeting filling out the STAPLEE form. Ms. Lentsch explained that she would add up the committee member's responses to determine a score for each action.

Ms. Lentsch told the committee that the next meeting would focus on the Action Plan. The Action Plan looks at the actions in more detail, determining which hazards the action addresses, if the project is a low, medium or high priority for the community, the responsible department, the estimated cost of the project, potential funding sources, and the estimated completion date. The next meeting will take place in early April. The meeting adjourned at 7:30 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #6
April 3, 2013
Community Room, Denison

The Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee met for the sixth time on April 3, 2013 at 6:00 pm at the Community Room in Denison, IA. The planning committee includes a representative from each city and school district, as well as a representative from the Crawford County Board of Supervisors and the Crawford County Emergency Manager. The signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. After introductions, Ms. Lentsch confirmed that all attendees were there as volunteers.

Ms. Lentsch handed back the STAPLEE analysis worksheet that the committee worked on during the previous meeting. Ms. Lentsch went through some of the STAPLEE questions again that the committee had questions about. The committee spent the next 15 minutes reviewing their STAPLEE responses. Ms. Lentsch informed the committee how the STAPLEE score was determined. The maximum score possible for each action is 23. Each question that was answered with a "yes" received one point, a "no" received negative one point, and "maybe" or "Not Applicable" received zero points. There were four questions that were opposite, meaning that a "yes" received negative one point and a "no" received one point. These four questions were *will the action adversely affect a particular segment of the population; are there adverse secondary impacts; is the action likely to be challenged by stakeholders who may be negatively affected;* and *is outside funding required for the action?*

The final item on the agenda was the Action Plan. Ms. Lentsch explained that the Action Plan looks at the actions in more detail, determining which hazards the action addresses, if the project is a low, medium or high priority for the community, the responsible department, the estimated cost of the project, potential funding sources, the mitigation measure category, and the estimated completion date. The committee spent the rest of the meeting filling out the Action Plan.

Ms. Lentsch told the committee this was their last committee meeting until a draft of the plan was ready. She stated that a draft should be ready sometime in May. The meeting adjourned at 7:30 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee
Meeting #7
July 10, 2013
Crawford County Law Enforcement Center, Denison

The Crawford County Multi-Jurisdictional Hazard Mitigation Planning Committee met for the seventh time on July 10, 2013 at 7:00 pm at the Crawford County Law Enforcement Center in Denison, IA. The planning committee includes a representative from each city and school district, as well as a representative from the Crawford County Board of Supervisors and the Crawford County Emergency Manager. The signed attendance sheet is attached. Stacy Lentsch of Region XII Council of Governments facilitated the meeting. After introductions, Ms. Lentsch confirmed that all attendees were there as volunteers.

Ms. Lentsch briefly went over what hazard mitigation planning is and why it is important as there were new people in attendance. Next, Ms. Lentsch covered each chapter in the draft plan. Ms. Lentsch asked if there were any questions or concerns about the plan. Hearing none at the meeting, Ms. Lentsch stated that she would take comments on the plan until Friday at 4:00 pm.

Ms. Lentsch told the committee this was their final committee meeting. She stated that on July 16th she would take the plan to the Board of Supervisors for approval and then send the plan to the state and FEMA. The meeting adjourned at 7:30 pm.

Crawford County Hazard Mitigation Meeting
April 29, 2013
Denison Fire Station

Stacy Lentsch of the Region XII Council of Governments met with several fire departments in Crawford County on April 29, 2013 at 7:30 pm at the Denison Fire Station. Ms. Lentsch confirmed that all attendees were there as volunteers. The signed attendance sheet is attached.

Ms. Lentsch explained the purpose of mitigation planning, the goals for the project and what the mitigation plan was intended to do for each entity. She also went over what the planning process would involve and the benefits of having a plan in place regarding funding opportunities and general preparedness.

Ms. Lentsch went through some of the critical infrastructure that the committee representatives identified at the first three meetings. Ms. Lentsch explained that the committee recently completed the STAPLEE analysis and Action Plan. Ms. Lentsch provided a list of the mitigation actions that committee members decided on. Ms. Lentsch explained that the STAPLEE process ranked the mitigation actions based on seven criteria: Social, Technical, Administrative, Political, Legal, Economic and Environmental. The Action Plan looked at the actions in more detail, determining what hazards the action addresses, if the project is a low, medium or high priority for the community, the responsible department, the estimated cost of the project, potential funding sources, and the estimated completion date. Ms. Lentsch asked the fire departments to look over the mitigation actions list and let her know if there was anything missing they would like to see on the list. Hearing no suggestions, the hazard mitigation portion of the meeting adjourned at 8:00 pm.

Crawford County Hazard Mitigation Meeting
January 21, 2013
Denison High School

Stacy Lentsch of the Region XII Council of Governments met with the Denison School Board on January 21, 2013 at 5:00 pm at the High School in Denison. Ms. Lentsch met with the school board prior to their meeting to discuss the Crawford County Hazard Mitigation Plan. Ms. Lentsch confirmed that all attendees were there as volunteers. The signed attendance sheet is attached.

Ms. Lentsch explained the purpose of mitigation planning, the goals for the project and what the mitigation plan was intended to do for each entity. She also went over what the planning process would involve and the benefits of having a plan in place regarding funding opportunities and general preparedness.

Ms. Lentsch went through the critical infrastructure and hazard rankings that the committee representatives for Denison and the school completed at the first three meetings. Ms. Lentsch explained that the Crawford County Hazard Mitigation Committee met on January 16th and worked on developing mitigation objectives and actions. Ms. Lentsch encouraged the school board to attend future meetings, as well as invite others they felt would be important to the process. The meeting adjourned at 5:30 pm.

Crawford County Hazard Mitigation Meeting
January 17, 2013
IKM-Manning Middle School

Stacy Lentsch of the Region XII Council of Governments met with the IKM-Manning School Board on January 17, 2013 at 6:45 pm at the Middle School in Manilla. Ms. Lentsch met with the school board prior to their meeting to discuss the Crawford County Hazard Mitigation Plan. Ms. Lentsch confirmed that all attendees were there as volunteers. The signed attendance sheet is attached.

Ms. Lentsch explained the purpose of mitigation planning, the goals for the project and what the mitigation plan was intended to do for each entity. She also went over what the planning process would involve and the benefits of having a plan in place regarding funding opportunities and general preparedness.

Ms. Lentsch went through the critical infrastructure and hazard rankings that the committee representatives for Manilla and the school completed at the first three meetings. Ms. Lentsch explained that the Crawford County Hazard Mitigation Committee met the night before and worked on developing mitigation objectives and actions. Ms. Lentsch encouraged the school board to attend future meetings, as well as invite others they felt would be important to the process. The meeting adjourned at 7:15 pm.

Crawford County Multi-Jurisdictional Hazard Mitigation
December 17, 2012
Schleswig Community School

Ms. Lentsch from the Region XII Council of Governments met for the first time with the Schleswig School Board on December 17, 2012 at 5:45 pm at the Schleswig middle school building. The signed attendance sheet is attached. Ms. Lentsch met with the school board prior to their official meeting to discuss the Crawford County Hazard Mitigation Plan. Ms. Lentsch confirmed that all attendees were there as volunteers. The signed attendance sheet is attached.

After introductions, Ms. Lentsch explained what hazard mitigation is, the purpose of the hazard mitigation plan, what the committee has done so far, and what the committee has left to do for the plan. She also went over the benefits of having a plan in place regarding funding opportunities and general preparedness.

Those in attendance were given a summary of the critical facilities identified by the committee members for Schleswig and the school district. Also included in the summary were the ranked hazards for Schleswig. Ms. Lentsch distributed fliers for the next Crawford County hazard mitigation meeting, which would focus on mitigation strategies. Ms. Lentsch encouraged the school board to pass along the word and to attend, if possible. The school board expressed interest in obtaining back-up generators and a safe room for the school district.

The meeting adjourned at 6:15 pm.

Jurisdiction: **Crawford County**	**Title of Plan:** 2013 Crawford County Multi-Jurisdictional Hazard Mitigation Plan	**Date of Plan:** 7-19-2013 1-6-2014 5-14-2014
Local Point of Contact: Chris Whitaker	**Address:** 1009 East Anthony Street PO Box 768 Carroll, IA 51401	
Title: Transportation Planner		
Agency: Region XII Council of Governments		
Phone Number: 712-792-9914	**E-Mail:** cwhitaker@region12cog.org	
Funding Source:		
State Reviewer:	**Title:**	**Date:**
FEMA Reviewer: Steve Greene Lynnis Jameson	**Title:** HM Community Planner HM Community Planner	**Date:** 10/09/2013; 2/5/2014; 06/26/2014 10/22/2013; 2/11/2014
Date Received in FEMA Region VII	09/05/2013; 02/05/2014; 05/15/2014	
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved	06/30/2014	

Jurisdiction:	NFIP Status* **Y**	**NP**
1. Crawford County	X	
2. City of Arion	X	
3. City of Aspinwall		X
4. City of Buck Grove	X	
5. City of Charter Oak	X	
6. City of Deloit	X	
7. City of Denison	X	
8. City of Dow City	X	
9. City of Kiron	X	
10. City of Manilla	X	
11. City of Ricketts	X	
12. City of Schleswig		X
13. City of Vail	X	
14. City of Westside	X	
15. Ar-We Va Community School District		X
16. Boyer Valley Community School District		X
17. Charter Oak-Ute Community School District		X
18. Denison Community School District		X
19. IKM-Manning Community School District		X
20. Schleswig Community School District		X

*** Notes: Y = Participating NP = Not Participating in NFIP S- Sanctioned R-Rescinded**

SECTION 1: REGULATION CHECKLIST

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Chapter 1 p. 1-1 – 1-3	✓	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Chapter 1 p. 1-3 – 1-6	✓	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Chapter 1 p. 1-3 – 1-6	✓	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Chapter 1 p. 1-6 Chapter 3 p. 3-52	✓	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Chapter 6 p. 6-1 – 6-3	✓	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Chapter 6 p. 6-1 – 6-3	✓	
ELEMENT A: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Chapter 3 p. 3-6 – 3-29 Appendix A p. A-14 Appendix B p. B-12 Appendix C p. C-12 Appendix D p. D-13 Appendix E p. E-12 Appendix F p. F-12 Appendix G p. G-12 Appendix H p. H-12 Appendix I p. I-12 Appendix J p. J-12 Appendix K p. K-12 Appendix L p. L-12 Appendix M p. M-12 Appendix N p. N-12	✓	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Chapter 3 Appendix A p. A-14 Appendix B p. B-12 Appendix C p. C-12 Appendix D p. D-13 Appendix E p. E-12 Appendix F p. F-12 Appendix G p. G-12 Appendix H p. H-12 Appendix I p. I-12 Appendix J p. J-12 Appendix K p. K-12 Appendix L p. L-12 Appendix M p. M-12 Appendix N p. N-12	✓	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Chapter 3 Appendix A p. A-16-18 Appendix B p. B-14-15 Appendix C p. C-14-15 Appendix D p. D-15-16 Appendix E p. E-14-15 Appendix F p. F-14-15 Appendix G p. G-14-15 Appendix H p. H-14-15 Appendix I p. I-14-15 Appendix J p. J-14-15 Appendix K p. K-14-15 Appendix L p. L-14-15 Appendix M p. M-14-15 Appendix N p. N-115	✓	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Chapter 4 p. 4-2	✓	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B: REQUIRED REVISIONS			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Chapter 2 p. 2-10 Chapter 6 Appendix A p. A-10, 21-23 Appendix B p. B-9, 17 Appendix C p. C-9, 18-19 Appendix D p. D-10, 19 Appendix E p. E-9, 18-19 Appendix F p. F-9, 18-19 Appendix G p. G-9, 18-19 Appendix H p. H-9, 17 Appendix I p. I-9, 18-19 Appendix J p. J-9, 18-19 Appendix K p. K-9, 18-19 Appendix L p. L-9, 19-20 Appendix M p. M-9, 18-19 Appendix N p. N-9, 18-19	✓	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Chapter 2 p. 2-10 Chapter 3 p. 3-20 Appendix A p. A-10 Appendix B p. B-9 Appendix C p. C-9, 18, 20 Appendix D p. D-10, 18 Appendix E p. E-9, 17, 19, 25 Appendix F p. F-9, 17-18, 22 Appendix G p. G-9, 17-18, 22 Appendix H p. H-9 Appendix I p. I-9, 17-18, 23 Appendix J p. J-9, 17, 19, 25 Appendix K p. K-9, 17-18, 22 Appendix L p. L-9, 18-19, 21 Appendix M p. M-9, 17-18, 20 Appendix N p. N-9, 17-18, 21	✓	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Chapter 5 p. 5-1	✓	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Chapter 5 p. 5-1 – 5-2 Appendix A p. A-19-24 Appendix B p. B-15-17 Appendix C p. C-16-20 Appendix D p. D-17-20 Appendix E p. E-16-20 Appendix F p. F-16-19 Appendix G p. G-16-20 Appendix H p. H-16-18 Appendix I p. I-16-20 Appendix J p. J-16-20 Appendix K p. K-16-20 Appendix L p. L-17-21 Appendix M p. M-16-20 Appendix N p. N-16-19	✓	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Chapter 5 p. 5-4 – 5-7 Appendix A p. A-24-30 Appendix B p. B-17-18 Appendix C p. C-20-23 Appendix D p. D-20-22 Appendix E p. E-20-25 Appendix F p. F-20-23 Appendix G p. G-20-25 Appendix H p. H-18-20 Appendix I p. I-20-24 Appendix J p. J-20-25 Appendix K p. K-20-25 Appendix L p. L-21-26 Appendix M p. M-20-24 Appendix N p. N-20-23	✓	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Chapter 6 p. 6-2	✓	
ELEMENT C: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Appendix A p. A-19 Appendix C p. C-16 Appendix D p. D-17 Appendix E p. E-16 Appendix F p. F-16 Appendix G p. G-16 Appendix I p. I-16 Appendix J p. J-16 Appendix K p. K-16 Appendix L p. L-18 Appendix M p. M-16-17 Appendix N p. N-16	✓	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Appendix A p. A-20 Appendix C p. C-17 Appendix D p. D-18 Appendix E p. E-17 Appendix F p. F-17 Appendix G p. G-16-17 Appendix I p. I-17 Appendix J p. J-17 Appendix K p. K-17 Appendix L p. L-18 Appendix M p. M-17 Appendix N p. N-17	✓	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Appendix A p. A-24-30 Appendix B p. B-17-18 Appendix C p. C-20-23 Appendix D p. D-20-22 Appendix E p. E-20-25 Appendix F p. F-20-23 Appendix G p. G-20-25 Appendix H p. H-18-20 Appendix I p. I-20-24 Appendix J p. J-20-25 Appendix K p. K-20-25 Appendix L p. L-21-26 Appendix M p. M-20-24 Appendix N p. N-20-23	✓	

ELEMENT D: REQUIRED REVISIONS

(All page numbers are in PDF format)

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Chapter 6 p. 6-4	✓	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	B-20 D-24 E-27 K-25		✓

ELEMENT E: REQUIRED REVISIONS

E2) No resolutions for the jurisdictions of Aspinwall, Denison, Kiron, Manilla, Schleswig, Ar-We-Va Community School District, Boyer Valley Community School District, Charter Oak-Ute Community School District, Denison School District, IKM-Manning Community School District and Schleswig Community School District.

Written proof that all jurisdictions' governing bodies have formally adopted the plan (usually a resolution) must be submitted to FEMA. *See Local Multi-Hazard mitigation Planning Guidance (July 2008) pages 17-18.*

Note: If the plan is not adopted by a participating jurisdiction, that jurisdiction would not be eligible for project grants under the following hazard mitigation assistance programs: HMGP, PDM, FMA, and SRL.

SECTION 2: PLAN ASSESSMENT

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Opportunities for Improvement

Multi-Jurisdictional HM Plans provide the opportunity for multiple jurisdictions to engage in an comprehensive approach to mitigating hazards that affect multiple jurisdictions, sharing resources and avoiding duplication of efforts that can be costly and produce unbeneficial results (such as inaccurate and misleading information). A multi-jurisdictional plan is not developing several single-jurisdiction plans and binding them together in one document nor combining all the hazards identified for each jurisdiction to create a risk assessment based on overall averages. For a multi-jurisdictional plan, the countywide hazards (severe winter storms, thunderstorms and lightning, hailstorms, tornadoes, earthquakes, extreme heat, drought and windstorms) need to be assessed on a countywide basis. If there is any community specific information (i.e. a specific type of damage that occurred or unique impact in the community from that hazard) that the planning committees would like to highlight, it is highly encouraged to do so in the individual jurisdiction sections. For the next plan update, countywide hazards need to be analyzed on a countywide basis and area-specific hazards (flooding, dam failure, levee failure, grass/wild land fire) analyzed per jurisdiction.

- For the next plan update, incorporating each jurisdiction's floodmaps will enhance the flood analysis section of the plan as well as provide a better understanding of the impact to the community.
- Levee Failure – While the plan provides discussion on Dam Failure, there is very little discussion about levee failures and what potential impacts they may cause on the planning area. For the next plan update, please provide more discussion as to the impacts of the community in the event of this hazard.

Changes in Development:

While the plan does describe the changes in development, the discussion in the plan is vague, does not describe if these changes have occurred in hazard prone areas and if it has increased or decreased the vulnerability for that jurisdiction. For example, the changes in development discussion for the City of Charter Oak states "Charter Oak has seen limited development since the last plan update". What does limited development mean? The purpose of this section is to identify any additional vulnerabilities that a community has incurred since their last plan and to take those additional vulnerabilities into consideration when developing a mitigation strategy. The next plan update must indicate what changes in development have occurred since the last plan update and provide a thorough explanation as to whether the changes occurred in hazard prone areas (such as areas prone to flooding) and whether these changes led to an increase/decrease in a community's vulnerability.

- Prior to completing the planning area's next plan update, we request a meeting with the plan author and his/her staff to discuss the plan update process as well as opportunities to improve the overall plan.

B. Resources for Implementing Your Approved Plan

A variety of mitigation resources are available to communities. The Iowa Homeland Security & Emergency Management website: http://www.iowahomelandsecurity.org/disasters/hazard_mitigation.html provides planning and project related information as well as details on how major FEMA mitigation programs are implemented in the State.

HSEMD's training website provides information on upcoming training opportunities within the State: http://homelandsecurity.iowa.gov/training/.

Review of the FEMA HMA guidance (FY11 is the most current) is also encouraged as guidance provides information about application and eligibility requirements. This guidance is available from

http://www.iowahomelandsecurity.org/grants/HMA.html or through FEMA's grant applicant resources page at http://www.fema.gov/government/grant/hma/grant_resources.shtm.

The FEMA Hazard mitigation planning site http://www.fema.gov/plan/mitplanning/index.shtm contains the official guidance to meet the requirements of the Stafford Act, as well as other resources and procedures for the development of hazard mitigation plans.

Various funding programs are available from several state and federal agencies to assist local jurisdictions in accomplishing their mitigation activities and goals. A detailed listing of programs, information on each program, and contact information is also available from the 2013 State Hazard Mitigation Plan.