

Jurisdiction: Worth County, Iowa	Title of Plan: Worth County Multi-Jurisdictional Hazard Mitigation Plan	Date of Plan: June 2013
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Funding Source: DR-1763		
State Reviewer:	Title:	Date:
FEMA Reviewer: Lynn Jameson Steve Greene <i>Card</i>	Title: Plan Reviewer Plan Reviewer	Date: 08/08/2013, <i>8/29/2013</i> 1 st review 11/25/2013, 12/16/2013
Date Received in FEMA Region VII	06/17/2013, 10/16/2013, 12/12/2013	
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved	12/17/2013	

Jurisdiction:	NFIP Status*	
	Y	NP
Worth County	X	
Fertile	X	
Grafton		X
Hanlontown	X	
Joice		X
Kensett		X
Manly	X	
Northwood	X	

* Notes: Y = Participating NP = Not Participating in NFIP S- Sanctioned R-Rescinded

SECTION 1: REGULATION CHECKLIST

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
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))	Page 1-6; Appendix C	✓		
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))	Page 3-5; Appendix D	✓		
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Page 3-5; Appendix C-D	✓		
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Page 2-5	✓		
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Page 120-123	✓		
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))	Page 120-123	✓		
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))	Pages 24-83	✓	
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))	Pages 24-83	✓	
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))	Pages 18-19; 24 – 83; 100	✓	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Page 13	✓	

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))	Page 12-13	✓	
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))	Table 1 page 13	✓	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Page 108	✓	
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))	Page 111-119	✓	
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))	Page 116-119	✓	
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))	Page 123	✓	

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))	Page 105-107	✓	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Page 105-107	✓	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Page 105-107; 99; 98;	✓	

ELEMENT D: REQUIRED REVISIONS

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))	Appendix H	✓	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Appendix H	✓	

ELEMENT E: REQUIRED REVISIONS

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.

Plan Strengths

- Good summary of development occurring in the planning area. This is an area that is often overlooked in hazard mitigation plan updates.
- Excellent summary of NFIP activities in the planning area.

Opportunities for Improvement

- The next plan update needs to have additional details on the responsible party (position, office, department or agency) for each jurisdiction's mitigation actions. Several of the actions list local boards as one of the responsible parties but it's unclear what those local boards are and which communities those boards represent.

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/>.

The FEMA Hazard mitigation planning site <http://www.fema.gov/multi-hazard-mitigation-planning> contains the official guidance to meet the requirements of the Stafford Act, as well as other resources and procedures for developing and updating hazard mitigation plans.

FEMA offers a Mitigation Best Practices Portfolio where communities can learn from others' successes, share their own successes, use the FEMA library, find detailed information and maps on hazards, read case studies, and find other resources for becoming a more resilient community:

<http://www.fema.gov/plan/prevent/bestpractices/index.shtm>

Review of the FEMA HMA guidance (FY13 is the most current) is also encouraged as guidance provides information about application and eligibility requirements. This guidance is available from http://sema.dps.mo.gov/programs/mitigation_management.asp or through FEMA's grant applicant resources page at <http://www.fema.gov/hazard-mitigation-assistance>.

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.

Worth County Multi-Jurisdictional Hazard Mitigation Plan



WORTH COUNTY MULTI- JURISIDICTIONAL MULTI-HAZARD MITIGATION PLAN

Board of Supervisors

Ken Abrams
Dave Haugen
Dennis May

County Auditor

Jacki Backhaus

Emergency Management Coordinator

Ray Huftalin

Fertile Mayor

Joyce Russel

Grafton Mayor

John Bork

Hanlontown Mayor

Richard Scholbrock

Joice Mayor

Mark Thoma

Kensett Mayor

Thomas Dakin

Manly Mayor

Kevin Isaacson

Northwood Mayor

Randy Severson

Worth County Courthouse

1000 Central Ave
Northwood, IA 50459

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CHAPTER I. INTRODUCTION & BACKGROUND

Through the Hazard Mitigation Grant Program funded through the Federal Emergency Management Agency (FEMA). Fortunately, this program was able to help some of the communities in North Iowa with federal mitigation grant funding provided through the FEMA. After Nov. 1, 2004, communities like these will still be eligible for federal disaster public assistance and individual assistance, but will not be eligible for mitigation assistance unless they have an approved hazard mitigation plan on file.

Under the initiative set forth by the Iowa Homeland Security and Emergency Management Division (IHSEMD) and the Iowa Association of Regional Councils (IARC) agreed to meet the challenge of developing plans for cities and counties throughout the state. An IHSEMD initiative further state that, the plans developed by Iowa's regional planning commissions and councils of governments should cover natural hazards and manmade hazards.

The 17 councils of governments of IARC provide an effective way for local governments to work together to share technical staff and address common problems in need of an area-wide approach. They also can effectively deliver programs that might be beyond the resources of an individual county or municipal government. The intent of the councils of governments in Iowa is to be of service to their member counties and municipalities and to bring an organized approach to addressing a broad cross-section of area-wide issues. They also are available to assist their member entities in coordinating the needs of the region with state and federal agencies or with private companies or other public bodies.

“Created more than thirty years ago by visionary public leaders, Iowa's Councils of Governments (COGs) provide professional planning, programming, and technical assistance to Iowa's cities, counties, businesses, community organizations and Iowans of all ages.

COGs are indigenous organizations formed by counties, cities and towns to serve local governments and their regional citizenry. Their governing boards are made up of local elected officials, business and education leaders, economic development professionals, and individual citizens.

COGs provide regional planning and technical assistance to local governments and the communities in their regions by:

- Providing individualized assistance to cities, counties, businesses, community organizations and community members (such as a local comprehensive plan, loans to local businesses, grant-writing assistance, and housing and workforce programs)
- Providing planning services across multiple jurisdictions (such as a regional comprehensive solid waste management plan or long-range transportation plan); and

- Providing a forum that combines the elements of transportation planning, housing development, solid waste planning, and use planning, workforce development, and economic development into a comprehensive approach to regional growth and development.

To ensure the vitality and growth of their regions, COGs actively pursue funding opportunities from a variety of local, state, and federal resources. They provide expertise to cities and counties in securing competitive state and federal grants. As Regional Planning Affiliations, COGs plan for and program the distribution of federal transportation funds within their regions, including highways, transit, trails, and other enhancement programs. Most COGs also have established and administer regional revolving loan funds targeting housing and economic development.” From the IARC website.

The role of a regional planning commission varies across the state, depending upon the desires of the member counties and municipalities and their representatives. Nonetheless, the primary role of the regional planning commission is to provide a technical staff capable of providing sound advice to its membership and working for coordination of various planning and infrastructure needs among the various counties and municipalities, as appropriate.

The Worth County Multi-Jurisdictional hazard mitigation plan which includes the cities of Northwood, Manly, Grafton, Kensett, Hanlontown, Fertile, and Joice plus the unincorporated areas of Worth County was prepared by the staff of the North Iowa Area Council of Governments (NIACOG), a member of IARC. The COG serves the eight-county area of Cerro Gordo, Floyd, Franklin, Hancock, Kossuth, Mitchell, Winnebago and Worth counties as well as 67 incorporated municipalities.

Citizens and public organizations have participated in the process. This effort will be sustainable over the long term because it enjoys grassroots support that stems from a sense of local and individual ownership. Through IHSEMD’s Scope of Work, the Cities and County of Worth contracted with NIACOG and participated fully in the preparation of the plan. Once this plan is approved, the Cities and County of Worth will be eligible for future mitigation assistance from FEMA and will be able to more effectively carry out mitigation activities to lessen the adverse impact of future hazards within the county.

Basis for planning authority

The basis for authority to create a natural hazard mitigation plan lies in Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), 42 U.S.C. 5165. This act was enacted under Section 104 of the Disaster Mitigation Act of 2000 (DMA 2000), P.L. 106-390. Section 104 is the legal basis for FEMA’s Interim Final Rule for 44 CFR Parts 201 and 206, published in the Federal Register on February 26, 2002.

Plan Purpose

The purpose of the Worth County Multi-Jurisdictional Hazard Mitigation Plan is to substantially and permanently reduce the county's vulnerability to natural hazards. The plan is intended to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property and the natural environment. This can be achieved by increasing public awareness, documenting resources for risk reduction and loss-prevention, and identifying activities to guide the community towards the development of a safer, more sustainable community.

Plan Organization

The Worth Multi-Jurisdictional Hazard Mitigation plan is developed and organized within the rules and regulations established under the 44 CFR 201.6. The plan contains a mitigation action listing, a discussion on the purpose and methodology used to develop the plan, a profile on the cities and county of Worth, as well as, the hazard identification and vulnerability assessment of natural and manmade hazards. In addition, the plan offers a discussion of the community's current capability to implement the goals, objectives and strategies identified herein. To assist in the explanation of the above-identified contents there are several appendices included which provide more detail on specific subjects. This plan is intended to improve the ability of the County and Cities to handle hazards and will document valuable local knowledge on the most efficient and effective ways to reduce loss.

The Worth plan was developed by members of the Worth Hazard Mitigation planning committee and planning staff from the North Iowa Area Council of Governments (NIACOG), contracted service. Plan development on the local level was spearheaded by the Worth County Emergency Management Coordinator, Ray Huftalin. A list of the planning committee members can be found in Appendix C of this plan. NIACOG staff was tasked with leading the planning meetings and preparing the plan. Members of the planning committees were tasked with providing information that was critical to the plan development, e.g. hazards, mitigation actions, scores, historical information, etc. The jurisdictions that fall under this plan are unincorporated Worth County, City of Fertile, City of Grafton, City of Hanlontown, City of Joice, City of Kensett, City of Manly, and City of Northwood.

The following resources were used to compile data and complete this plan include: State of Iowa Hazard Mitigation Plan (2010), National Climatic Data Center (NCDC), SHELDUS, US Census data, Worth County Assessor's Office, FEMA floodplain maps, zoning ordinances and comprehensive plan, and critical facilities in participating jurisdictions. These resources were used to compile information on community background information, vulnerability analysis, development of mitigation goals, critical facilities, hazard identification and profiles and historical weather events.

The unincorporated areas of the county were represented by the county supervisors since they are elected from those areas to represent the people living in the unincorporated areas of Worth County as well as incorporated areas. The Worth County EMA also represented the people living in the unincorporated areas of the county. Each community

was required to select at least one mitigation action. The Board of Supervisors required each community to participate by being at the meetings conducted by NIACOG and the Worth County EMA.

There were one to three meetings held in each city to assess each city's information during the preparation of this Plan. These included initial, update, review, and adoption meetings. Information for the Cities of Northwood and Manly and Worth County was also gathered previously at meetings during the preparation of their individual hazard mitigation plans. Once an initial draft of this Plan was prepared, hard and electronic copies were distributed to the jurisdictions for review by planning committees, members of the public, and city councils. At that time, notices were also placed at the county courthouse and various public locations around each city that stated that the plan was available for review by the public and questions and comments should be directed to NIACOG planning staff. Review meetings facilitated by the planner occurred after the distribution of the draft copies.

Meetings were held on the following dates, times and places.

- City of Kensett (**initial**), October 29, 2012, 6:30pm
- City of Grafton (**initial**), October 29, 2012, 7:00pm
- City of Fertile (**initial**), November 8, 2012, 7:00pm
- City of Hanlontown (**initial**), November 14, 2012, 6:00pm
- City of Joice (**initial**), May 20, 2013, 6:00pm
- Worth County (**update/review**), May 28, 2013, 12:00pm
- Worth County (**adoption**), June 24, 2013, 12:00pm
- City of Manly (**update/review/adoption**), Sept. 16, 2013, 7:00pm
- City of Grafton (**review**), September 19, 2012, 11:00am
- City of Northwood (**update/review/adoption**), Sept. 24, 2013, 7:00pm
- City of Kensett (**review**), October 3, 2013, 2:00pm
- City of Hanlontown (**review**), October 7, 2013, 6:00pm
- City of Kensett (**review/adoption**), October 7, 2013, 6:30pm
- City of Fertile (**review**), October 9, 2013, 3:00pm
- City of Grafton (**review/adoption**), October 14, 2013, 7:00pm
- City of Fertile (**review/adoption**), October 15, 2013, 7:00pm
- City of Hanlontown (**review/adoption**), November 4, 2013, 6:00pm
- City of Joice (**review/adoption**), November 4, 2013, 6:00pm
- City of Northwood (**review #2**), December 10, 2013, 7:00pm

Appendix B contains the meeting agendas and minutes. The discussion during the initial/update planning meetings for each community included the following:

- Overall Planning Process
- Explanation of the Hazard Analysis and Risk Assessment (HARA)
- Identification/review of hazards

- Comparison of identified hazards to hazards included in Worth County's 2009 Hazard Mitigation Plan
- Ranking of hazards (update included review of previous rankings)
- Discussion of current mitigation measures (update also included discussion on proposed measures from previous plans)
- Prioritization of mitigation measures

During the prioritization of the mitigation measures, each committee member gave a score of 0 to 3 to the measures. The weighted score for each mitigation measure was calculated by averaging the weighted scores. This is discussed further on pg. 117.

Public was involved in the planning process by being invited to the planning meetings with postings at the city halls and or in local newspapers. Meetings were held in each community that participated in the planning process. This garnered a lot more involvement and provided an opportunity for public comment. There was at least a 30 day public comment period alongside review of the plan by the public. There were no comments received by the county and cities when the plan was approved by each individual jurisdiction.

Additionally, Worth County sent letters to the Board of Supervisors of nearby counties. The letters invited outside supervisors to review a draft of the plan and provide comments. These counties are Mitchell, Cerro Gordo, Winnebago, and Freeborn (MN). Copies of the letters are shown in Appendix D.

The City of Manly's previous Hazard Mitigation Plan was completed in 2008. The committee from Manly determined their 2008 plan to be integrated into the Worth County Multi-Jurisdictional Hazard Mitigation Plan. Following adoption of the Worth County Multi-Jurisdictional Hazard Mitigation Plan, the Manly City Council will incorporate this plan and recommendations in their comprehensive plan, zoning ordinance, and other pertinent plans and ordinances of the city.

The City of Northwood and Worth County also have previous Hazard Mitigation Plans. Northwood's was adopted in 2007 and Worth County's in 2009. The Northwood planning committee determined their 2007 plan to be integrated into the Worth County Multi-Jurisdictional Hazard Mitigation Plan and hazards condensed and scored appropriately to the new hazard definitions and scores. The status updates of the proposed mitigation actions from the previous plans for Manly, Northwood, and Worth County are provided in Chapter VI.

CHAPTER II. COMMUNITY PROFILE

History

The land which now makes up Worth County was purchased from France in the Louisiana Purchase in 1803. The total amount of the purchase was about 28 dollars a square mile or barely 4 cents an acre and $\$1.22 \times 10^{-6}$ per square foot. The cost of the entire county was about \$11,256.

Worth County was organized under a court order of Arad Hitchcock, county judge of Mitchell County, September 1, 1857. That order divided the county into two townships; Northwood Township and Bristol Township.

The first elections held in the county were for the coming general election October 13, 1857, and was to be for county township officers. There were 186 votes polled in the entire county, 112 at Bristol and 74 at Northwood.

There were only two tiny towns of Northwood and Bristol. Most of the settlers were farmers. How tiny the towns are is illustrated by the fact that the first store in the county was built in Northwood in 1857; the town of Bristol did not have a store.

The first County seat was at Bristol. The County organized and officers were elected on October 13, 1857, but due to a technicality in the election the county officers did not begin their duties until May 1, 1858. The county seat remained at Bristol for five and a half years. Beginning in 1861 the citizens of Northwood made repeated efforts to get the county seat moved to Northwood, which was the beginning of several county seat fights. At the January 1864 session of the Board of Supervisors the site was commissioned, which was a solid oak building with a four-board fence surrounding the building. Then in 1879 a new courthouse was projected east of the old one and built and occupied in 1880. A special election was held on May 9th in 1893 to build a new more adequate courthouse. The vote was 903 to 644 and the present courthouse was built that summer.

Figure 1 - Location of Worth County

Location of Worth County and Cities

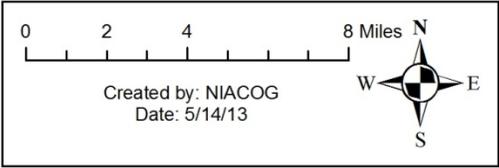
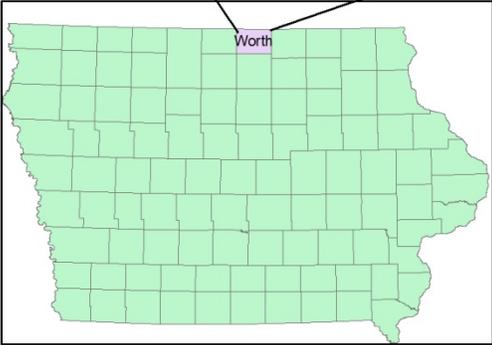
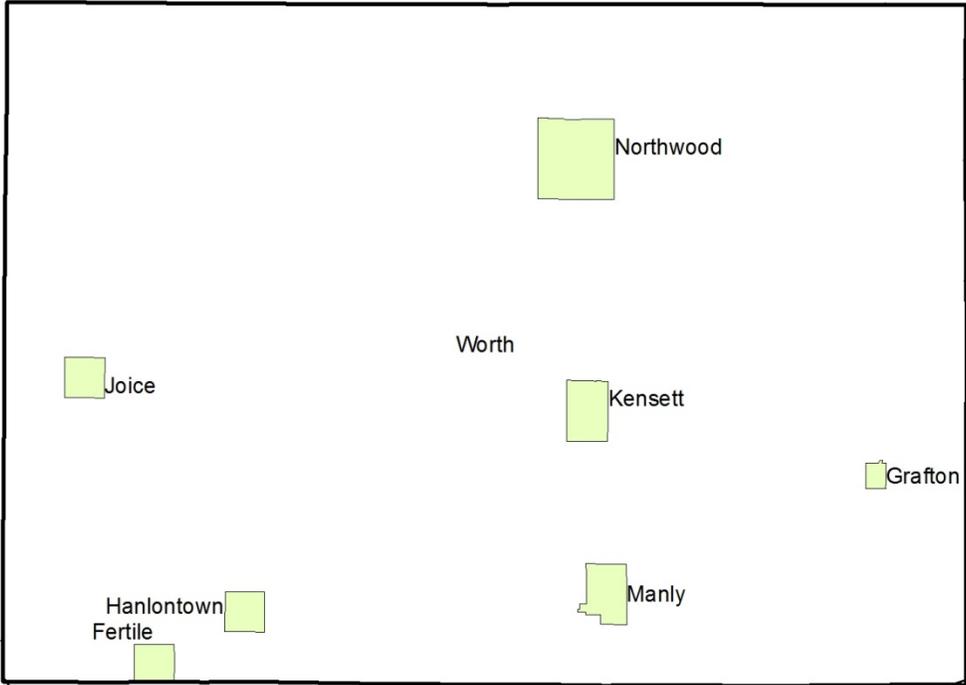
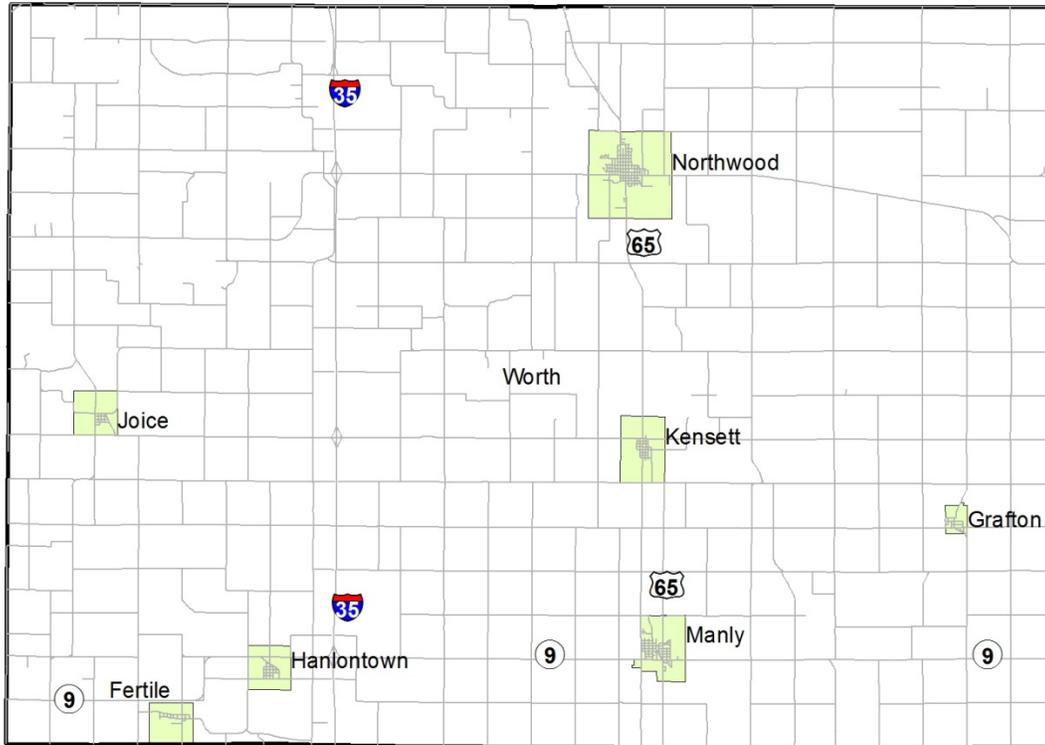
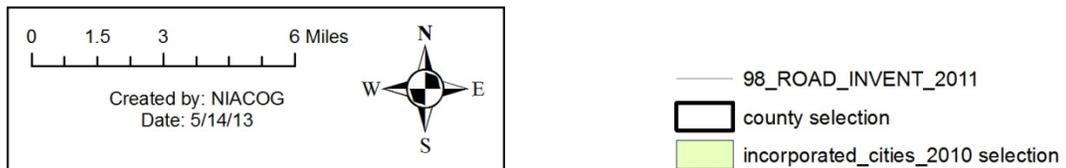


Figure 2 - Worth County Cities and Roadways



Worth County Cities and Roads



Water System

Rural homes and business rely on private wells for water service. This system provides adequate and safe water, although limited fire protection capability for the rural areas of Worth County. Water is also supplied by Xenia Rural Water to communities and cities also have their municipal supply systems.

Waste Water Treatment System

The residents of the unincorporated parts of Worth County are served by individual septic systems. These systems are typically dependent upon filtration fields that are adequately sized. The Diamond Jo Casino does have its own waste water treatment system located near the casino. The cities of Worth County have sanitary sewer systems located within their respective jurisdictions.

Storm Water System

Unincorporated Worth County is served by drainage districts for the drainage of surface waters from agricultural and other lands for the protection of said lands from overflow. The protection of these lands is conducive to public health, convenience and welfare. Drainage districts are established by the drainage district trustees at the request of the land owners within the proposed district. Cities within Worth County manage their own storm water in various ways including but not limited to surface ditches and storm water sewers.

Climate

The climate in Worth County is described as sub-humid and continental with cold winters and summers that tend to be hot and humid. Average winter temperature is 20 degrees Fahrenheit with an average snowfall of 37 inches. Summer temperatures average 73.5 degrees Fahrenheit with an average rainfall of 30 inches annually.

Soils

The soils that are found throughout Worth County belong to the Marshan-Saude-Lawler, Maxfield-Klinger-Franklin, Rockton-Faxon, Lester-Webster-Nicollet, Clarion-Webster-Nicollet, Clyde-Kenyon-Oran, Kilkenny-Minnetonka and Clarion-Webster Associations, as classified by Soil Conservation Service in the Soil Survey of Worth County, Iowa.

Water Shed Information

A watershed is the land area that drains to a water body and affects its flow, water level, level of pollutants, etc. Rivers, lakes and wells affect the condition of the watershed. EPA's Office of Water, along with State agencies and local groups, has been raising the importance of water quality on a watershed basis over the past years. In the past, water quality improvements have focused on specific sources of pollution, such as sewage discharge or elevated levels of bacteria. The efforts have also focused on just one aspect of the watershed, such as river segment or a lake. This approach to the problem will solve the immediate problems; it often fails to address the more chronic problems that

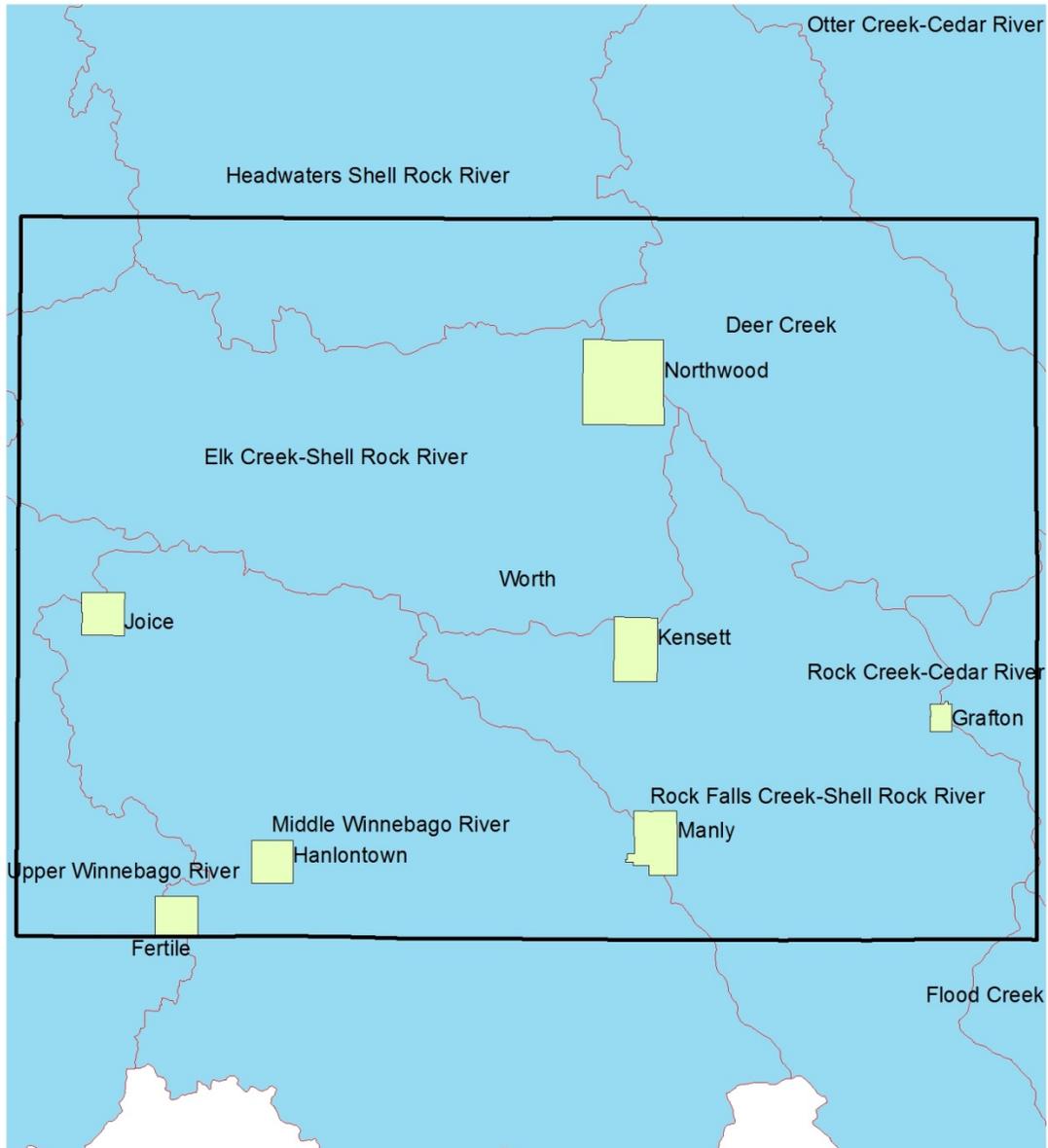
plague the whole watershed system. For example, pollution from a hog farm may be reduced by implementing storage tanks on the farm, yet the watershed could still suffer damage due to leaking septic tanks. Managing the watershed by uncovering what ails it will lead to a healthier watershed and a healthier environment for humans.

The three principal waterways in Worth County are the Shell Rock and Winnebago rivers and Elk Creek. There are also two major lakes located in Worth County and they are Silver Lake and Rice Lake that lies in Winnebago and Worth County. No creek or river runs through Bolan.

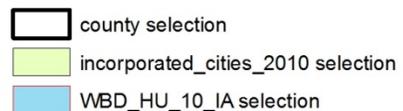
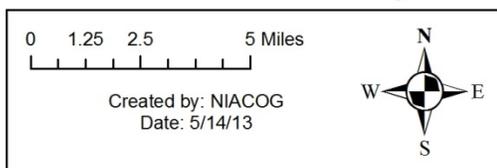
Future Development

In the past three years there has been \$35 million worth of development along the interchange of Interstate 35 and County Highway 105. Water and sewer hookups are being designed and extended to surrounding properties. There is possibility of up to an additional \$35 million worth of investment in the area. The county will take into consideration the protection of this property with its updated zoning ordinance. The comprehensive plan of Worth County designated the area around I-35 and County Highway 105 and the intersection at I-35 and Iowa Highway 9 as available for commercial development. These developments will be subjected to the new zoning ordinance and any recommendations of this plan. These developments are in the unincorporated areas of the county.

Figure 3 - Worth County Watersheds



Worth County Watershed Districts HUC 10



Zoning and Regulations

One tool the county uses to manage development and growth is the Worth County Comprehensive Land Use Plan and the county's zoning ordinance (which at present is only for the Hartland, Brookfield and Danville Townships). The zoning ordinance was finalized on January 26th, 2009. These two working documents function in conjunction with one another. Worth County has developed the Comprehensive Plan to continually adjust it over the years to meet the changing needs of the county and support county ordinances. The zoning ordinance provides the citizens of Worth County with a set of rules and regulations that promote a safe and healthy environment through land use controls. This document and accompanying maps also designate and allow different types of development to occur throughout various sections of the community. These designations are based on several factors such as past development, placement of infrastructure, anticipated future needs, and barriers to development such as flood plains, rivers, creeks and other topographical conditions and areas that are more suitable for development. There are roughly nine different types of zoning classifications which Worth County is comprised of, including:

- | | | |
|--------------------------|--------------------------|---------------------------|
| 1. Agricultural | 2. Low Density Residence | 3. Mod. Density Residence |
| 4. Res. Mobile Home | 5. Planned Unit Dev. | 6. Commercial |
| 7. Commercial Recreation | 8. Light Industrial | 9. Heavy Industrial |

The zoning ordinance is administered and interpreted by the zoning administrator and commission and provides the Board of Supervisors with recommendations related to zoning changes and development issues raised by citizens of the county. The Board of Supervisors must review all recommendations and then make a decision either for or against the recommendation. There is also a zoning board of adjustment that authorizes variances to the strict interpretation of the zoning ordinance, hears appeals of decisions of the zoning administrator and approves conditional use permits. There have been several amendments to the code by the county representatives since it was developed. The current zoning ordinance is currently being updated to reflect new development and will take the recommendations of this plan into consideration.

The Cities of Hanlontown, Manly, Northwood, Kensett, and Fertile require building permit approval by city staff before structures or buildings are constructed or modified. Of these five cities, Northwood and Manly are the only ones with zoning; however, Fertile and Kensett do have restricted residence ordinances. Northwood is the only city with subdivision regulations. The Cities of Grafton and Joice do not have a comprehensive plan nor regulations such as building, zoning, subdivision, and stormwater.

National Flood Insurance Program

Worth County has identified special flood hazard areas by the Federal Emergency Management Agency (FEMA). Worth County does have a FEMA issued Flood Insurance Rate Maps (FIRM) with an effective date of 8/02/12. Worth County’s community ID number issued by FEMA is #190916. Copies of selected FIRMS are located in Appendix I of this plan. By regularly updating the zoning codes, Worth County plans to continue to regulate development within the floodplains. The recommendation of the plan is to continue participation in the NFIP. Currently, Fertile, Hanlontown, Manly, and Northwood also participate in the NFIP and administer floodplain regulations.

Table 1- NFIP Status of Jurisdictions as of September 2013

Requirement: §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction’s participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.			
Jurisdictions	CID #	Effective Map Date	NFIP Participating
Worth County (Unincorporated)	190916	8/2/12	Yes
Fertile	190301	8/2/12	Yes
Grafton	190735	8/2/12	No
Hanlontown	190833	8/2/12	Yes
Joice	190746	8/2/12	No
Kensett	190749	8/2/12	No
Manly	190834	8/2/12	Yes
Northwood	190302	8/2/12	Yes

Table 2 - Repetitive Loss Structures by Jurisdictions as of April 2010

Requirement §201.6(c)(2)(ii): [The risk assessment] must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.						
Jurisdiction	RL Total	RL Insured	RL Losses Total	RL Losses Insured	RL Payments Total	RL Payments Insured
Worth County (Unincorporated)	0	0	0	0	0	0
Fertile	0	0	0	0	0	0
Grafton	0	0	0	0	0	0
Hanlontown	0	0	0	0	0	0
Joice	0	0	0	0	0	0
Kensett	0	0	0	0	0	0
Manly	0	0	0	0	0	0
Northwood	0	0	0	0	0	0

Population Profile

The population in Worth County in 1990 was 7,991; by the 2000 Census the population had declined to 7,909 and then by the 2010 Census the population in Worth County is 7,598. Rural areas of the state are losing population even though the State of Iowa in general is gaining population. The trend is reflective of a migration from rural agricultural areas to larger urban areas, with smaller communities near large urban areas experiencing growth. Worth County has an aging population with a median age of 43.8 years.

Table 3 - General Characteristics of Worth County

	Number	Percent	U.S.
Total Population	7,598	100%	-
Male	3,786	49.8%	49.2%
Female	3,812	50.2%	50.8%
Median Age (years)	43.8	-	37.2
Under 5 years	414	5.4%	-
18 years and over	5,841	76.9%	-
65 years and over	1,390	18.3%	-
One Race	7,531	99.1%	-
White	7,435	97.9%	-
Black	27	0.4%	-
American Indian and Alaska Native	14	0.2%	-
Asian	24	0.3%	-
Native Hawaiian and Pacific Islanders	0	0.0%	-
Some other race	31	0.4%	-
Two or more races	67	0.9%	-
Hispanic or Latino	147	1.9%	-

Source: 2010 U.S. Census Unincorporated and Incorporated data

Table 4 - Population of Unincorporated Worth County

	Number	Percent
Total Population	2,950	38.8%

Source: 2010 US Census Unincorporated Data

Table 5 - Population Statistics of Worth County

Jurisdiction	Population
Worth County	7,598
Fertile	370
Grafton	252
Hanlontown	226
Joice	222
Kensett	266
Manly	1,323
Northwood	1,989

Source: US Census 2010

Age Distribution

Age distribution is an important factor to future projects because county officials must know the diversity of the population that they are trying to protect from future hazards. The table below shows the age distribution of Worth County in the year 2010.

Table 6 - Population Age Distribution

Age Group	# Of Persons	Percent	Age Group	# Of Persons	Percent
Under 5	414	5.4%	45-54 years	1,238	16.3%
5-14 years	973	12.8%	55-64 years	1,064	14%
15-24 years	844	11.1%	65-74 years	680	8.9%
25-34 years	786	10.3%	75-84 years	459	6%
35-44 years	889	11.7%	Over 85 years	251	3.3%

Source: 2010 U.S. Census Unincorporated and Incorporated Data

Income Characteristics

Residents sometimes travel outside the county to earn an income. There are many income opportunities within Worth County as well. The median income of all households in Worth County was \$50,540, according to the American Community Survey 2007-2011 estimates. This means one-half of all households earned more than \$50,540 and one-half earned less. Table 7 below summarizes the income distribution for households in the County, Cities and State.

Table 7 - Worth County Income Distribution

	County	State	Fertile	Grafton	Hanlontown	Joice	Kensett	Manly	Northwood
Less than \$10,000	164	74,631	4	3	6	7	8	11	69
\$10,000 to \$14,999	224	69,138	0	7	9	7	14	33	94
\$15,000 to \$24,999	274	136,518	33	5	3	18	7	44	143
\$25,000 to \$34,999	435	136,812	25	18	7	18	38	91	111
\$35,000 to \$49,999	508	186,904	20	27	8	21	28	72	148
\$50,000 to \$74,999	862	250,547	31	23	8	32	29	119	215
\$75,000 to \$99,999	364	161,980	18	16	13	9	9	83	92
\$100,00 to \$149,999	261	135,778	17	5	7	3	0	42	51
\$150,000 to \$199,999	90	36,837	1	0	1	0	0	6	28
\$200,000 or more	82	29,992	3	2	0	0	0	0	0
Total	3,264	1,219,137	152	106	62	115	133	501	951
Median Income	50,540	50,451	48,333	41,250	43,333	41,719	34,750	49,896	42,734

Source: US Census Bureau-American Community Survey(ACS) 5yr estimates-2007-2011

General Housing Information

Housing is a basic, fundamental and critical infrastructure needs to a community. Housing is vital to the strength, survival and prosperity to the community. The largest investment residents of a community undertake is in their housing and is an important component when establishing a style which the community uses to display to the outside world. Housing ought to be affordable, located in non-hazardous areas, needs to be maintained and support those on fixed incomes, e.g. elderly. Renter and owner occupied housing must be maintained to properly protect the residents within during inclement weather.

The 2010 U.S. Census reported 3,548 total housing units in Worth County. The average household size is 2.37 persons within the county; the State of Iowa 2.40 persons per household; and the United States, 2.58 persons per household.

According to the 2010 U.S. Census there were a total of 2,149 family households and 1,023 non-family households. A family household consists of a householder and one or more other persons living in the same household who are related to the householder by birth, marriage or adoption. A non-family household is a single person household or one in which the householder is living with non-relatives only. The 1,023 non-family households in Worth County, 872 of them are single person households and 939 of those households, the householder is 65 years and over. The following table shows housing occupancy in Worth County, according to the 2010 U.S. Census.

Table 8 - Worth County Housing Occupancy

Subject	Worth County	Iowa	United States
Total Units	3,548	1,336,417	131,704,730
Occupied Units	3,172	1,221,576	116,716,292
Vacancy Rate	13.3%	10.5%	11.6%
Owner Occupied	2,531	880,635	75,986,074
Renter Occupied	641	340,941	40,730,218

Source: 2010 U.S. Census Unincorporated and Incorporated Data

Value of Housing

The reported, 2005-2009 ACS, median value of owner-occupied housing units in Worth County, was \$94,900. One-half of the homes in Worth were valued above \$94,900 and the other one-half were valued under \$94,900. The median value for the State of Iowa was \$115,800. The increase over the past ten year time period can be attributed to declining interest rates and the large number of low down payment mortgage options that began appearing during the first part of the 2000 decade. These financial factors had a positive effect on demand for real estate which resulted in climbing house values. During the 2007-2009 housing collapse nationwide, this affected Worth County to a limited degree.

Community Valuations

Forming a dollar estimate to the potential losses during a disaster the county uses county valuations. The Worth County planning committee recognized that some hazards would cause more damage than others. An average valuation is calculated for each structure identified by the Worth County Assessor’s Office. Large and small area potential hazard damages can be determined by this method. Tables 9-12 below summarize the valuation of Worth County. Religious and Non-Profit Valuation does not have a separate table due to no breakdown by cities and unincorporated areas in the Worth County Tax Abstract Assessment.

Table 9 - Valuations in Worth County, Iowa

	Current Valuation (2012)	Average Valuation
Residential Valuation (Land and Buildings)	\$142,821,043	\$77,493
Commercial Valuation (Land and Buildings)	\$77,944,854	\$145,148
Industrial Valuation (Land and Buildings)	\$123,589,469	\$647,065
Agricultural Valuation (land, dwellings and buildings)	\$520,904,623	-
Exempt Valuation	-	-
Total Valuation	\$865,259,989	-

Source: Worth County Assessor’s Office, 2013 Incorporated and Unincorporated Data

Table 10 - Residential Valuation (dwellings only)

Jurisdiction	Residential Valuation	Number of Dwellings	Average Valuation
Fertile	\$10,035,103	136	\$73,787
Grafton	\$7,782,696	111	\$70,114
Hanlontown	\$6,012,134	83	\$72,435
Joice	\$4,693,515	92	\$51,016
Kensett	\$7,081,409	130	\$54,472
Manly	\$36,146,842	494	\$73,172
Northwood	\$71,069,344	797	\$89,171

Source: Worth County Assessor’s Office, 2013

Table 11 - Commercial Valuations

Jurisdiction	Commercial Valuation	Number of Commercial Units	Average Valuation
Fertile	\$417,297	10	\$41,729
Grafton	\$1,271,173	26	\$48,930
Hanlontown	\$1,266,872	30	\$42,229
Joice	\$4,588,904	33	\$139,057
Kensett	\$764,298	21	\$36,395
Manly	\$7,588,008	88	\$86,227
Northwood	\$13,123,869	194	\$67,649

Source: Worth County Assessors Office, 2013

Table 12 - Industrial Valuations

Jurisdiction	Industrial Valuation	Number of Industrial Units	Average Valuation
Fertile	\$16,741,156	13	\$1,287,781
Grafton	-	-	-
Hanlontown	-	-	-
Joice	-	-	-
Kensett	-	-	-
Manly	\$451,485	3	\$150,495
Northwood	\$5,492,979	19	\$289,104

Source: Worth County Assessors Office, 2013

Streets and Highways

The streets in Worth County conform to the traditional grid pattern. The county resurfaces each county road as it sees fit and performs snow removal and maintenance on an annual basis. The main transportation routes in Worth County include US Highway 65, State Highway 9 and US Interstate 35. The north south route County Roads are as follows: S-10, S-14, S-18, S-22, S-28, S-34, S-48, S-52, S-56, S-62 and S-68. The east west route County Roads are as follows: Co. 105, A-34, A-38 and A-39. US Highway 65 runs north south allowing resident's access to Albert Lea, MN and Mason City, IA. State Highway 9 runs east to west through the southern edge of the county and Interstate 35 runs north south allowing resident's access to Minneapolis, MN and Des Moines, IA.

Railways

The railway's that serve Worth County belong to Union Pacific (UP), Iowa, Chicago and Eastern (ICE) and Iowa Northern Railway (IANR). The Dakota, Minnesota and Eastern Railway (DME) use the same line as the UP. Six out of the seven cities in Worth County are served by the rail companies. The UP lines run thru Joice and Hanlontown in the western part of the county. The UP and DME run thru Manly, Kensett and Northwood and the ICE railway, runs through Grafton. The only town not on the rail lines is the town of Fertile. The main products handled by the railroad include coal, food and food products, chemicals, grain and grain products, forest products, autos, intermodal, metals and minerals, oil, gas and ethanol. The top products in Iowa include grain and grain products, coal, oil, gas and ethanol and unit train shippers.

Waterways

There are no private or commercial services offered along the Shell Rock and Winnebago Rivers, which run through the county.

Air Service

The municipal airport is located in Northwood in the northern section of the county. These airports typically handle small aircraft and operate instructional, business and personal flights. The nearest airport offering passenger service is Mason City Municipal Airport, located 15 miles south of the county line. The 6,500 feet of hard surfaced runways allows commercial and freight service to land. National and International air travel can be obtained by going south to Des Moines or north to Minneapolis, MN.

Transit Services

Public transit is available to the residents of Worth County through the Worth County Public Transit which runs on a door to door basis five days a week from 8:00 am to 4:30 pm, no holidays. The system can deliver riders to any one of the other seven counties in the region, which includes Kossuth, Winnebago, Cerro Gordo, Hancock, Franklin, Mitchell and Floyd Counties. In order to ride, reservations must be scheduled 24 hours in advance by calling the dispatch center at 641-324-1741.

CHAPTER III. HAZARD ANALYSIS & RISK ASSESSMENT

The Hazard Analysis and Risk Assessment (HARA) is a product developed to provide an overview and analysis of the county’s vulnerability to hazards. To assess the identified hazards, a methodology was established to account for how hazards impacted the communities or could potentially impact the communities. The HARA process measures the potential loss of life, personal injury, economic injury, and property damage resulting from hazards by assessing the four factors below:

Probability: reflects the likelihood of the hazard’s 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	Less than 10% probability in any given year (up to 1 in 10 chance of occurring), history of events is less than 10% likely or the event is unlikely but there is possibility of its occurrence.
2	Occasional	Between 11% and 20% probability in any given year (up to 1 in 5 chance of occurring, history of events is greater than 10% but less than 20%, or the event that could possibly occur.
3	Likely	Between 21% and 33% probability in any given year (up to 1 in 3 chance of occurring), history of events if greater than 20% but less than 33%, or the event is likely to occur
4	Highly Likely	More than 33% probability in any given year (event has up to a 1 in 1 chance of occurring), history of events is greater than 33% likely, or the event is highly likely to occur.

Magnitude/ Severity: Assessment of severity in terms of injuries and fatalities, personal property, and infrastructure and the degree and extent with which the hazard affects the jurisdiction.		
Score	Description	
1	Negligible	Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours, and/or injuries/illnesses treatable with first aid.
2	Limited	11% to 25% of property severely damaged, shutdown of facilities and services for more than a week, and/or injuries/illnesses that do not result in permanent disability.
3	Critical	26% to 50% of property severely damaged, shutdown of facilities and services for at least 2 weeks, and/or injuries/illnesses that result in permanent disability.
4	Catastrophic	More than 50% of property severely damaged, shutdown of facilities and services for more than 30 days, and/or multiple deaths.

Warning Time: Rating of the potential amount of warning time that is available before the hazard occurs.	
Score	Description
1	More than 24 hours warning time
2	12 to 24 hours warning time
3	6 to 12 hours warning time
4	Minimal or no warning (Up to 6 hours warning)

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

The hazard analysis and risk assessment process sought to strike a balance between evaluation criteria. An example would be the evaluation of low probability-high impact events versus high probability-low impact events. Each category of a particular hazard is rated on a scale of one through four based on the scoring guides above. These guides were used by the planning committees to help obtain a proper assessment for each of the hazards in a local and countywide context. A scale of one through four was used in all of the scoring guide tables because of the large variation in historical occurrences, probabilities, percentages of vulnerabilities, percentage of spatial extent, the number of casualties, or the value of property damaged. Often this data was not available or would have been impossible to extract from aggregate data. Using this scale provided the best option for comparison of vastly different types of hazards.

Hazard Identification

In order to properly identify mitigation strategies and projects, hazards that affect the county must first be identified before being analyzed. The following lists the potential hazards that were considered by the planning committees. This section also discusses previous occurrences of the hazards, the populations most at risk and the areas of the county most at risk. By identifying the hazards and quantifying the risks, the county can better assess current mitigation strategies, develop future mitigation strategies and identify needed mitigation projects.

The planning committee discussed twenty-three hazards on whether or not they impact the county or not. Nineteen of those hazards were chosen to be profiled and analyzed. The committee’s guidance was directed by FEMA requirements and regulations, the Iowa State Emergency Management Division guidelines and the contracted planning agency. The hazards that were not identified by the committee are at the end of this section along with their reason as to not include it.

The hazard analysis identifies potential hazards that could affect the County for the purposes of mitigation planning. In some cases, the hazards that are identified for

mitigation will not include all of the same hazards identified for preparedness, response or recovery.

The potential hazards that were presented to and discussed by the Worth planning committee are:

- Animal/Plant/Crop Disease
- Dam Failure
- Drought
- Earthquake
- Expansive Soils
- Extreme Heat
- Flash Flood
- Grass or Wild land Fire
- Hailstorm
- Hazardous Materials
- Human Disease
- Infrastructure Failure
- Landslide
- Levee Failure
- Radiological
- River Flooding
- Severe Winter storm
- Sinkholes
- Terrorism
- Thunderstorms & Lightning
- Tornado
- Transportation Incident
- Windstorm

These hazards have been defined and discussed at length on the following pages. The discussion includes probability, magnitude/severity, warning time, and duration. The results of the scoring are also included below in the planning committee's assessment.

The following hazards were picked by the Worth County Hazard Mitigation Planning Committee to be analyzed and profiled, they are as follows:

- Animal, Plant, Crop Disease
- Dam Failure
- Drought
- Earthquake
- Extreme Heat
- Flash Flood
- Grass or Wild land Fire
- Hailstorm

- Hazardous Materials
- Human Disease
- Infrastructure Failure
- Radiological
- River Flooding
- Severe Winter Storm
- Terrorism
- Thunderstorms and Lightning
- Tornado
- Transportation Incident
- Windstorm

These hazards have been defined and discussed at length on the following pages. The hazards are listed for the entire county unless indicated in that hazard’s profile. The results of the scoring are also included below in the planning committee’s assessment. The source of the historical occurrence came from the National Climatic Data Center (NCDC) website that is hosted by the National Oceanic and Atmosphere Administration (NOAA). The scoring activity by the committee was based on each member’s subject matter expertise, knowledge of the community, studies of previous events, historic information on damages, and other written resource materials. While available facts were presented to the hazard mitigation planning committees for Worth County and the incorporated jurisdictions, the members ultimately scored the factors based on what they judged was most appropriate for their community at the time. This has the potential to contradict the available recorded data. Furthermore, the accuracy and/or validity of the available data are not guaranteed.

Animal/Plant/Crop Disease

An outbreak of disease that can be transmitted from animal to animal or plant to plant represents an animal/crop/plant disease. The disease outbreak will likely have a significant economic implication or public health impact. The crop/plant pest infestation will likely have severe economic implications, cause significant crop production losses, or significant environmental damage.

Hazard	Animal/Plant/Crop Disease	Score
Location	Countywide	-
Probability	Each year the Iowa Department of Agriculture and Land Stewardship (IDALS) conducts numerous animal disease investigations. IDALS, along with Iowa’s universities and industries to conduct regular crop/plant pest surveillance. There are no known recorded events of disease outbreak in the county, but the Worth HM Committee determined that an animal/plant/crop disease event has an occasional probability of occurring or affecting the planning area. Even though the spread of disease may not have occurred in Worth County, outbreaks elsewhere can cause rumors of outbreak within Worth County. This could cause damage to markets. Additionally, Worth County is very agriculturally active	2

	and infectious diseases have been spreading throughout the world.	
Magnitude/ Severity	<p>With the increase in the movement of animals, animal products, plants, crops, and crop products have the potential to spread or introduce disease and pests to previous non-infested areas. Diseases/pests can also be introduced naturally by weather patterns. New strains of viruses and diseases that are not currently present in the county have the potential to devastate the current population of animals, crops and plants due to low immunity.</p> <p>The impact will vary by disease/pest and the type of animal/crop/plant infected/infested. Should the disease/pest have public health implications, the economic and social impact would be even greater. The severity will vary by disease/pest. The types of animals, crops, or plants affected will also significantly influence the severity.</p>	2
Warning Time	If the diseases/pests are highly infectious (many animals that are infected with disease can be transmitting disease before they show clinical signs), by the time they are discovered, they will likely have spread across the state or nation. This will put us at a severe disadvantage during response and recovery.	2
Duration	Response and recovery from serious infestation or disease are lengthy, with many producers likely to never be able to return to business, in addition, crop infestations/animal diseases can reoccur, causing repeated losses in subsequent years.	4

Sources for Animal/Plant/Crop Disease	
USDA	http://www.aphis.usda.gov
Department of Ag and Land Stewardship	http://www.iowaagriculture.gov/default.asp
USDA Crop and Plants Statistics	http://www.nass.usda.gov/QuickStats/indexbysubject.jsp?Pass_group=Crops+%26+Plants

Dam Failure

Dam failure is the uncontrolled release of impounded water resulting in downstream flooding, which can affect life and property. Flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, and poor construction, vandalism, or terrorism cause dam failures. Dams in Iowa have been constructed for a variety of uses including flood control, erosion control, water supply, hydroelectric power generation, and recreation.

Dams are classified into three categories based on the potential risk to people and property should a failure occur. The classification may change over time because of development downstream from the dam since its construction. Older dams may not have been built to the standards of its new classification. Below are the hazard classifications defined by Iowa Department of Natural Resources (IDNR):

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

Dam hazard potential classifications have nothing to do with the material 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. The IDNR tracks all dams in Iowa with height of at least 25 feet or a total storage of at least 50 acre feet of water. The inventory excludes all dams less than six feet high regardless of storage capacity and dams less than fifteen acre feet of storage regardless of height.

In Worth County, no dams are classified as High Hazard. Worth County is in Planning District 2 and has a total of 7 dams. The significant dams in Worth County are the Fertile Mill Dam on the Winnebago River and the Northwood Dam on the Shell Rock River. A total of 3 fatalities have occurred at these dams, but not because of dam failure. The Iowa DNR considers these two dams to be in good condition.

Hazard	Dam Failure	Score
Location	Only considered priority by Fertile and County	-
Probability	There have been no historical occurrences of dam failure in Worth County and larger dams are closely monitored by government agencies.	1
Magnitude/ Severity	People and property along streams are potentially vulnerable. Facilities and lives considerable distances from the actual impoundment are not immune from the hazard. Depending on the size and volume of the impoundment as well as the channel characteristics, a flash flood can travel a significant distance. However, the dams in Worth County do not have a significant amount of impoundment.	1
Warning Time	A dam failure can be immediate and catastrophic leaving little to no warning for those downstream. With maintenance and monitoring, weak areas and failure points can be identified and reinforced and for the additional time for evacuation that might need to be carried out. However most dams are only inspected periodically, allowing problems to go undetected until a failure occurs.	4
Duration	The effects of a dam failure in Worth County is not expected to be extensive	1

Sources for Dam Failure	
National Dam Safety Program	http://www.fema.gov/plan/prevent/damfailure/ndsp.shtml
Association of State Dam Safety Officials	http://www.damsafety.org/
Iowa DNR	http://www.state.ia.us/epd/wtresrce/wtres.htm

Drought

Drought is defined as a period of prolonged lack of precipitation for weeks at a time producing severe dry conditions. There are four types of drought conditions relevant to Iowa:

1. Meteorological drought, which refers to precipitation deficiency;
2. Hydrological drought, which refers to declining surface and groundwater supplies;
3. Agricultural drought, which refers to soil moisture deficiencies; and
4. Socioeconomic drought, which refers to when physical water shortages begin to affect people.

The highest occurrence of drought conditions with recorded events in Iowa is associated with agricultural and meteorological drought as a result of either low soil moisture or a decline in recorded precipitation.

Droughts can be localized or widespread and last from a few weeks to years. A prolonged drought can have a serious impact on a community's water supply and

economy. Increased demand for water and electricity may result in shortages of resources. Moreover, food shortages may occur if agricultural production is damaged by loss of crops and/or livestock. While droughts are generally thought to occur during extreme heat events, they can and do occur during the winter months.

According to the Hazards and Vulnerability Research Institute, Worth County has had seven different years with reported drought periods from 1988-2012. The details of drought events are shown in **Table 13**.

Table 13 - Droughts in Worth County

Begin Date	End Date	INJURIES	FATALITIES	Crop Damage
06-01-88	6-30-88	0	0	\$ 13,131,313
07-01-88	7-31-88	0	0	\$ 5,050,505
08-01-88	8-31-88	0	0	\$ 11,616,162
07-01-89	08-01-89	0	0	\$ 505,051
08-01-89	8-22-89	0	0	\$ 5,051
06-01-92	6-30-92	0	0	\$ 4,273,504
08-01-95	8-31-95	0	0	\$ 5,050,505
08-01-01	8-23-01	0	0	\$ 11,350,980
08-01-03	8-31-03	0	0	\$ 12,649,020
07-01-12	7-31-12	0	0	\$ 45,000,000
08-01-12	8-31-12	0	0	\$ 6,000,000

Source: Hazards and Vulnerability Research Institute, 2012

Drought is a normal part of climate fluctuations. Climatic variability can bring dry conditions to the region up to years at a time. Research and observations of the El Nino/La Nina climatic events are resulting in more predictable climatic forecasts. A drought would likely affect most of Worth County if not the whole State of Iowa and the Upper Midwest as a whole. Because of their dependence on precipitation and water, the agricultural community would be the most adversely effected, but the entire state would likely feel some impact. The Worth planning committee evaluated the probability of future droughts in Worth County in the order of magnitude of between -3.0 to -3.9 Palmer drought severity index (severe drought event) at between 11% and 20% in any given year.

Hazard	Drought	Score
Location	Countywide	-
Probability	According to the National Climatic Data Center, Worth County has 11 periods of drought in seven different years from 1988 to 2012. However, from 1990 to 2010, droughts have only occurred twice every ten years. These drought periods occurred in June, July, or August. While some may have been more severe than others, agricultural areas were impacted much more than the metropolitan areas where impacts were indirect. Based on the available data, droughts can occasionally or likely occur each year. The county planning committee scored the probability as	2

	occasional. Drought is part of normal climate fluctuations. Climatic variability can bring dry conditions to the area for up to years at a time. Observations from the El Nino/La Nina climatic events are resulting in more accurate and predictable climatic forecasts.	
Magnitude/ Severity	<p>Those dependent on rain would be the most vulnerable to a drought. This means that agriculture, agribusiness, and consumers (if the drought lasted long enough or impacted a large area) would be impacted. A drought limits the ability to produce goods and provide services. Because citizens draw their drinking water from surface water and groundwater sources, a prolonged severe drought may impact all citizens if there were to be a dramatic drop in the stream flow coupled with the drop in the water table. Fire suppression can also become a problem due to the dryness of the vegetation and possible lack of water.</p> <p>A drought would likely affect most of Worth County if not the whole state of Iowa as a whole. Due to the dependence on precipitation and water the agricultural community would be impacted the most. The agricultural areas would be most adversely impacted, but the entire state would likely feel at least some impact.</p> <p>Few if any health impacts to people in the affected area because of secondary sources of water. Drought in the US seldom results directly in the loss of life. Health impacts would be more significant on livestock without auxiliary water supplies.</p> <p>Property losses would be limited to livestock and crops to the agricultural community. Facilities would not be impacted. Infrastructure could be affected in areas of expansive soils due to drying soils, lower water levels around dams, etc. Delivery of services would be limited to source water delivery and those services that consume large amounts of water. Drought can lead to large and damaging impacts to the agricultural economy. Because of Iowa's reliance on the agricultural economy, the economic and financial impacts would certainly ripple out into other sectors. Rural areas can be especially affected by long-term drought. If restrictions are put on manufacturers that use large amounts of water, the local economy can be impacted that way as well.</p>	2
Warning Time	Drought warning is based on a complex interaction of many different variables, water uses, and consumer needs. Drought warning is directly related to the ability to predict the occurrence of atmospheric conditions that produce the physical aspects of drought, primarily precipitation and temperature. There are so many variables that can affect the outcome of climatic interactions, and it is difficult to predict a drought in advance. In fact, an area may already be in a drought before it is even recognized. While the warning of the drought may not come until the drought is already occurring the secondary effects of a drought may be predicted and warned against weeks in advance.	1
Duration	According to Worth County's and Iowa's drought history, most droughts that affect the areas occur for at least a month at a time.	4

Sources for Drought	
Iowa Climatology Bureau	http://www.agriculture.state.ia.us/climatology.asp
IDNR	http://www.iowadnr.gov/water/index.html
NOAA	http://www.drought.noaa.gov/
NCDC	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms

Earthquake

An earthquake is any shaking or vibration of the earth caused by the sudden release of energy that may impose a direct threat on life and property. It is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. This shaking can cause buildings and bridges to collapse; disrupt gas, electric and phone service; it sometimes triggers landslides, flash floods, and fires. The three general classes of earthquakes are, tectonic, volcanic, and artificially produced.

Worth County is located in Seismic Risk Zone 0. This does not mean that the county is not vulnerable to earthquake effects. Most structures in Worth County are not built to earthquake standards, but because of the low magnitude of a possible quake, property damage would likely be minimal. The most vulnerable structures would be those built on poorly consolidated substrate, especially floodplain materials.

Hazard	Earthquakes	Score
Location	Countywide	-
Probability	13 earthquakes have had epicenters in Iowa in historic times. No known historic earthquakes have had epicenters in Worth County. The closest to Worth County was located in Black Hawk County (located approximately 137 miles southeast) in 1925. Seismologists attempt to forecast earthquake size and frequency based on data from previous events. In the New Madrid Fault Zone, this analysis is difficult because there are few historic, moderate to large earthquakes, and the active faults are too deeply buried to monitor effectively. Based on recurrence intervals for small earthquakes, scientists estimate a 90% chance of a Richter magnitude 6.0 (scale shown in Table 3.2) earthquake in the New Madrid Fault Zone by 2040. A magnitude 6.5 in New Madrid would create magnitude 4 effects in Iowa resulting in little or no damage or fear.	1
Magnitude/ Severity	Worth County is located in Seismic Zone 0, the lowest risk zone in the United States. Most structures in Iowa are not built to earthquake standards, but because of the relatively low magnitude of the possible quake, property damage would likely be minor foundational damage. The most vulnerable structures are those built on poorly consolidated substrate, especially floodplain materials.	1

	<p>The strongest earthquake in Iowa occurred in Davenport (located approximately 270 miles southeast) in 1934 and resulted in only slight damage. Estimated effects of a 6.5 Richter magnitude earthquake along the New Madrid Fault Zone suggest Iowans in four southeast counties could experience trembling buildings, some broken dishes and cracked windows. Other areas of the state could experience vibrations similar to the passing of a heavy truck, rattling of dishes, creaking of walls, and swinging of suspended objects.</p> <p>Due to the relatively low magnitude of earthquakes that would occur in the state, and the distance from the epicenter of an earthquake that would occur in the New Madrid Fault Zone, Iowans would likely see only minor impacts. Fatalities would be very rare, injuries limited to falls and injury from small unsecured objects, property loss would likely be minimal, and economic loss could occur due to short disruptions in commercial and industrial activities.</p>	
Warning Time	Earthquake prediction is an inexact science. Even in areas that are well monitored with instruments, such as California's San Andreas Fault Zone, scientists only very rarely predict earthquakes.	4
Duration	Due to the limited effects to Worth County, response to the occurrence of an earthquake would likely be in support from Southern Iowa, Missouri and Illinois emergency units, utilizing mutual aid agreements.	1

Sources for Earthquake	
Iowa Geological Survey Bureau	http://www.igsb.uiowa.edu/service/hazards.htm
USGS	http://earthquake.usgs.gov/earthquakes/
FEMA	http://www.fema.gov/hazard/earthquake/index.shtm

Table 14 - Richter Scale

Richter Value	Potential Hazard
10	Extraordinary
9	Outstanding
8	Far-reaching
7	High
6	Noteworthy
5	Intermediate
4	Moderate
3	Minor
2	Low
1	Insignificant

Extreme Heat

Conditions for extreme heat are defined by summertime weather that is substantially hotter and/or more humid than average for a location at that time of year. Extreme heat includes temperatures in excess of 100 degrees Fahrenheit (including the heat index) or for 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 15 degrees. Heatstroke, sunstroke, cramps, exhaustion, and fatigue are possible with prolonged exposure and/or physical activity due to the body’s inability to dissipate heat. Urban areas are particularly at risk because of air stagnation and large quantities of heat absorbing materials such as streets and buildings. Extreme heat can also result in distortion and failure of structures and surfaces such as roadways and railroad tracks.

According to the Hazards & Vulnerability Research Institute, Worth County has 3 recorded heat events (described in **Table 15** below). Reported property damage from these events totaled \$361,987. Deaths have occurred in other areas but have not been reported in Worth County due to heat events.

Table 15 - Heat Activity in Worth County

Begin Date	End Date	INJURIES	FATALITIES	Property Damage	Crop Damage
02-01-92	2/29/1992	0	0	\$ 179,487.18	0
07-12-95	7/14/1995	0	0	\$ 47,500.00	0
7/15/2011	7/28/2011	0	0	\$ 135,000.00	0

Source: Hazards and Vulnerability Research Institute, 2012

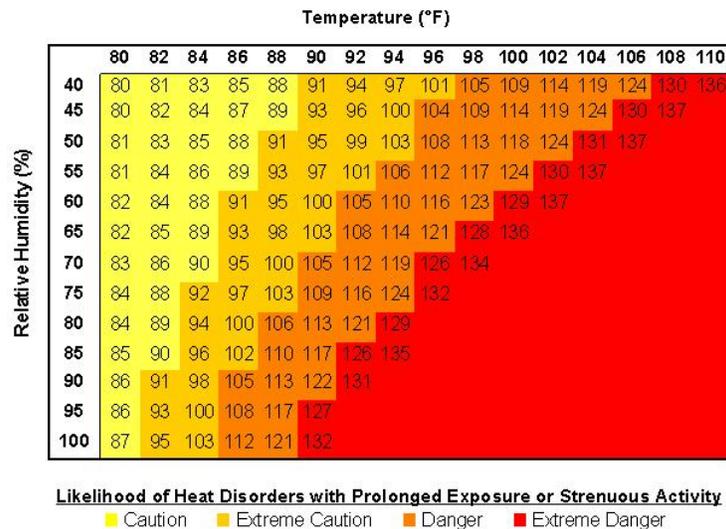
The Hazard Mitigation Committee evaluated that the probability of extreme heat in Worth County. The discussion focused on historical information and personal experiences by the committee and with dealing with extremely high temperatures.

Hazard	Extreme Heat	Score
Location	Countywide	-
Probability	The committee determined that there is a 21% to 33% chance of this occurring in any given year regardless of there only being a few heat events that have been recorded. Furthermore, probability of extreme heat varies from individual to individual based on amount of sun exposure. According to Worth County members, heat events of consecutive 90 + degree weather is likely to occur.	3
Magnitude/ Severity	Elderly persons, small children, chronic invalids, those on certain medications or drugs (especially tranquilizers and anticholinergic), and persons with weight and alcohol problems are particularly susceptible to heat reactions. Healthy individuals working outdoors in the sun and heat	2

	<p>are vulnerable as well. Individuals and families with low budgets as well as inner city dwellers can also be susceptible due to poor access to air-conditioned rooms.</p> <p>All of Worth County will likely be impacted by extreme heat, but urban areas of the county pose special risks. The stagnant atmospheric conditions of the heat wave trap pollutants in urban areas and add to the stresses of hot weather. Livestock and other animals are adversely impacted by extreme heat. High temperatures at the wrong time inhibit crop yields as well.</p> <p>Economic costs in transportation, agriculture, production, energy, and infrastructure. These direct costs could impact many other economic sectors indirectly.</p>	
Warning Time	As with other weather phenomena, periods of extreme heat are predictable within a few degrees within 3 days or so. Variations in local conditions can affect the actual temperature within a matter of hours or even minutes. The National Weather Service will initiate alert procedures when the heat index (Figure 4) is expected to exceed 105 degrees Fahrenheit for at least two consecutive days.	1
Duration	The definition of an extreme heat event is an occurrence of 90+ degree weather for a minimum of 3 days. The planning committee evaluated this hazard as likely to occur and last at less than 1 week.	3

Sources for Extreme Heat	
National Climatic Data Center	www.ncdc.noaa.gov
Extreme Heat Guide Book	http://www.aclink.org/PublicHealth/health_to_pics/pdf_files/ExtremeHeat2.pdf
FEMA	http://www.fema.gov/hazard/heat/index.shtm

Figure 4 - Heat Index



Flash Flood

A flash flood is an event that occurs with little or no warning. Water levels rise at an extremely fast rate. Flash flooding occurs due to intense rainfall over a short period of time; flash flood can also be the result of rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Most flash flooding events occur due to slow moving thunderstorms, or multiple thunderstorms over the same area in short time duration. Flash flooding is an extremely dangerous form of flooding which can reach full peak in only a few minutes and allows little or no time for protective measures to be implemented. Flash flood waters move at very fast speeds and can move boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. Flash flooding often results in higher loss of life, both human and animal, than slower developing river and stream flooding.

Floods are the most common and widespread of all-natural disasters except fire. The latest significant flood-related event to affect Worth County that resulted in a Presidential Declaration occurred in May of 2008. Additionally, the NCDC lists 16 reported flash flooding events from 1999 to 2013 with a total of \$2,025,000 in estimated property damage and \$450,000 in estimated crop damage. The details are given in the **Table 16** below.

The most significant event in the table (7/19/1999) occurred over much of North Central Iowa. Near Manly, 5.75 inches of rain was recorded in a 4 hour period just after midnight. Numerous basements were flooded and roads overtopped by water. A bucket survey indicated 9 to 12 inch rainfall amounts northeast of Manly, with the the highest unofficial measurement at 13.5 inches. There was also a report of 20 inches of rain. The Worth County Emergency Management Coordinator reported that 25% of the county was covered by water with at least 75 washouts. 550 buildings in Manly had water in the basement. Furthermore, a 54 car train derailed in the area just southwest of Grafton and at least 3 major highways were closed (Iowa Highway 9, U.S. Highway 18, and U.S. Highway 65). In Worth County, 2 homes were destroyed, 56 suffered major damage, and 249 sustained minor damage.

On 7/15/2011, storms produced heavy rainfall over a small part of North Central Iowa. 4 to 6 inches of rain fell in Worth County with flash flooding taking place. Several roads were washed out. The heaviest rainfall was north of Northwood, where 6 inches fell over a period of several hours. Also, a handful of areas with a foot of water flowing over roads through the town of Grafton.

On 6/01/2013, heavy rainfall of 2 to 3 inches occurred in a short period of time in parts of Worth County. Antecedent soil conditions were nearly saturated. The rains caused road closings as the water flooded over county roads. Flooding continued in the Grafton area well into the day Saturday once the flash flooding ended. The Worth County Sheriff's office reported road closures at Ulmus Road between 420th and 400th Rd. Water was flowing over the road from a culvert and 430th between Zinnia Rd. west to Yarrow Rd. is closed.

On 6/13/2013, rainfall of 2 to 3 inches in under an hour occurred. It resulted in flash flooding initially and then general flooding overnight. Numerous roads were flooded and closed. Rescue operations took place in Worth County as motorists were stranded by rising water and hydroplaned off of highways into ditches full of water. After the rain ended, flooding continued through the night as standing water took several hours to recede.

Table 16 - Flood Event Activity in Worth County

Location	Date	DEATHS	INJURIES	Property Damage	Crop Damage
MANLY	07/19/1999	0	0	\$ 1,100,000	\$ 250,000.0
MANLY	07/20/1999	0	0	\$ 100,000	\$ 50,000.0
COUNTYWIDE	07/09/2000	0	0	\$ 50,000	\$ 75,000.0
COUNTYWIDE	05/21/2004	0	0	\$ 100,000	\$ 50,000.0
COUNTYWIDE	09/15/2004	0	0	\$ 100,000	\$ 25,000.0
HANLONTOWN	08/21/2007	0	0	\$ 10,000	\$ -
NORTHWOOD	08/21/2007	0	0	\$ 10,000	\$ -
MANLY	06/07/2008	0	0	\$ 100,000	\$ -
MANLY	06/07/2008	0	0	\$ 50,000	\$ -
KENSETT	06/08/2008	0	0	\$ 10,000	\$ -
NORTHWOOD	06/12/2008	0	0	\$ 25,000	\$ -
GRAFTON	07/15/2011	0	0	\$ 50,000	\$ -
GRAFTON	07/15/2011	0	0	\$ 10,000	\$ -
NORTHWOOD	07/15/2011	0	0	\$ 10,000	\$ -
NORTHWOOD	06/01/2013	0	0	\$ 200,000	\$ -
MANLY	06/12/2013	0	0	\$ 100,000	\$ -

Source: National Climatic Data Center, 2013

As farmland is converted to roads and parking lots, it loses its ability to absorb rainfall. Urbanization increases runoff two to six times over what would occur on natural terrain. Portions of the county are developed with significant amounts of impervious surfaces, as more development occurs in the watersheds; the amount of runoff produced also increases. If measures are not taken to reduce the amount of runoff, flash floods will continue to occur and may possibly increase.

In certain areas, aging storm sewer systems were not designed to carry the capacity currently needs to handle the increased storm runoff. This combined with rainfall trends and rainfall extremes which occur in weather cycles, flash floods will continue to occur and may possibly increase.

The planning committee concluded it is likely that a flash flood will affect Worth County in any given year. The individual flood zone maps for each jurisdiction that participates in the NFIP are shown in Appendix A. The developed land within each incorporated area appears to be far outside of the flood zones except in Northwood and Fertile.

Hazard	Flash Flood	Score
Location	Countywide	-
Probability	The probability of flash floods and floods in Worth is likely. Floods occur on open land affecting croplands and grasslands. Some county roads will get covered and the county will have to direct traffic around the washout. Floods are the most common and widespread of all-natural disasters except fire. Worth County has had 16 flash flood events from 1999-2013. However, some of those events occurred simultaneously in the same or different jurisdictions according to Table 16 .	3
Magnitude/ Severity	<p>Flash floods occur in all 50 states in the US. Particularly at risk are those in low-lying areas; close to dry creek beds or drainage ditches; new water; or downstream from a dam, levee, or storage basin. People and property in areas with insufficient storm sewers and other drainage infrastructure can also be put at risk because the drains cannot rid the area of the runoff quickly enough. Nearly half of all flash flood fatalities are auto-related. Motorists often try to traverse water-covered roads and bridges and are swept away by the current. Six inches of swiftly moving water can knock persons off their feet and only two feet of water can float a full-sized automobile. Recreational vehicles and mobile homes located in low-lying areas can also be swept away by the water.</p> <p>Areas in a floodplain, downstream from a dam or levee, or in low-lying areas can certainly be impacted. People and property located in areas with narrow stream channels, saturated soil, or on land with large amounts of impermeable surfaces are likely to be impacted in the event of a significant rainfall. Unlike areas impacted by a river/stream flood, flash floods can impact areas a good distance from the stream itself. Flash flood prone areas are not particularly those areas adjacent to rivers and streams. Streets can become swift moving rivers, and basements can become deathtraps because flash floods can fill them with water in a manner of minutes.</p> <p>Flash floods can quickly inundate areas thought to be out of flood-prone areas. Loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock damage and loss and interruption of business are common impacts from flash flooding.</p>	2
Warning Time	Flash floods are somewhat unpredictable, but there are factors that can point to the likelihood of flood's occurring in the area. Flash floods occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Weather surveillance radar is being used to improve monitoring capabilities of intense rainfall. Knowledge of the watershed characteristics, modeling, monitoring, and warning systems increase the predictability of flash floods. Depending on the location in the watershed, warning times can be increased. The NWS forecasts the height of flood crests, the data, and time the flow is expected to occur at a particular location.	4
Duration	The response to the effects of flash flooding is short in duration due to the nature of the hazard.	3

Sources for Flash Flood	
FEMA Map Service Center	http://www.msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1
NCDC	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
NFIP Data	http://www.floodsmart.gov/floodsmart/
FEMA	http://www.fema.gov/hazard/flood/index.shtm
Iowa Flood Center	http://ifis.iowafloodcenter.org/ifis/en/

Grass or Wild-land Fire

A grass or wild-land fire is an uncontrolled fire that threatens life and property in either a rural or a wooded area. Grass and wild-land fires can occur when conditions are favorable, such as during periods of drought when natural vegetation would be drier and subject to combustibility.

No historically significant wildfire event has been reported by the National Interagency Fire Center (none are on record since the first recorded event in 1804). However, due to the nature of this hazard, the planning committee determined that the probability in any given year is highly likely (more than 33%) due to the amount of fires of various sizes reported.

Hazard	Grass or Wild-land Fire	Score
Location	Countywide	-
Probability	The committee determined that the probability in any given year is highly likely. The committee was working with undocumented sources of information from the volunteer fire departments and their own memories. The reports that were received from the committee members were that the fire departments respond to at least 2-3 grass fires a year and they are extinguished fairly rapidly.	4
Magnitude/ Severity	While wildfires have proven to be most destructive in the Western US, they have become an increasingly frequent and damaging phenomenon nationwide. People choosing to live in wild-land settings are more vulnerable to wildfires, and the value of exposed property is increasing at a faster rate than population. Worth County is less vulnerable to wild-land fire because of the extremely large percentage of land that is developed. Grass fires are often easily contained and usually occur during the harvest months. Most fires are contained in the highway and rail right-of-way ditches and are less than a few acres in size.	2
Warning Time	As mentioned above, most grassfires occur without warning and travel at a moderate rate. This situation depends upon conditions at the time such as moisture, wind, and land cover. However, methods for forecasting the probability of occurrence of conditions most suitable for wild-fires to occur has increased with the use of the national wild-land significant fire potential outlook issued by the National Interagency Fire Center and the NOAA Storm Prediction Center.	4

Duration	The majority of Worth County wildfires occur in short duration in areas of brush and forest lands with approximately half of the fires being prescribed as controlled burns supervised by trained experts.	1
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Sources for Grass or Wild-land Fire	
IDNR	http://www.iowadnr.gov/forestry/fire.html
Iowa Division of State Fire Marshal	http://www.dps.state.ia.us/fm/
National Interagency Fire Center Statistics	http://www.nifc.gov/fire info/fire stats.htm

Hailstorm

Hailstorms are an outgrowth of a severe thunderstorm in which pellets or irregularly shaped lumps of ice greater than 1 inch in diameter fall with rain. Hail is produced in many strong thunderstorms by strong rising currents of air carrying water droplets to a height where freezing occurs, the ice particles grow in size until they are too heavy to be supported by the updraft and fall back to earth. Hail can be smaller than a pea or as large as a softball and can be very destructive to plants and crops; pets and livestock are particularly vulnerable to hail. Hail size descriptions are given in **Table 17**.

According to the NCDC, Worth County experienced 55 hailstorms from 1998-2013. Two injuries occurred in Northwood in 2006. The storms caused \$311,500 in property damage and \$362,000 in crop damage. NCDC website data lists events by place in the county and one event may be counted several times if the event affected a large area of the County. Based on historical information Worth County can expect to have 3.67 hail events a year; however, the county can only expect .86 hail events with hail greater than 1 inch diameter (hailstorms) per year. The details on hailstorms are given in **Table 18**.

The planning committee determined that it is likely to experience a hailstorm in any given year.

Hazard	Hailstorm	Score
Location	Countywide	-
Probability	Data on probability and frequency of occurrence of hailstorms is limited, but research indicated that any given point in Worth County can expect on average 3.67 hail events in a year but only .86 hailstorms based on the definition given above. Hailstorms are likely to high likely to occur in Worth County. The planning committee determined that they are likely to occur.	3
Magnitude/ Severity	Agricultural crops such as corn and beans are particularly vulnerable to hailstorms stripping the plant of its leaves. Hail can also do considerable damage to vehicles and buildings. Hail only rarely results in loss of life directly although injuries can occur. The land area affected by individual hail events is not much smaller than	2

	<p>that of parent thunderstorm, an average of 15 miles in diameter around the center of the storm. Damage to property, facilities, and infrastructure is usually limited to broken windows and damaged roofs.</p> <p>Hailstorms cause nearly \$1 billion dollars annually in property and crop damage in the United States. The peak hail activity coincides with the Midwest's peak agricultural season. Financial impacts resulting from damage to property is in the millions of dollars every year, most of which is covered by crop and hazard insurance.</p>	
Warning Time	Forecasting hailstorms as with their parent thunderstorms, and forecasting the conditions suitable for developing storms with the potential to create hail is becoming quite accurate due to the advancement in Doppler Radar and other technologies operated by the National Weather Service and the local TV stations weather departments.	4
Duration	The occurrence of hailstorms is a short term weather phenomena and usually is limited to less than 6 hours per event.	1

Sources for Hailstorm

FEMA	http://www.fema.gov/hazard/thunderstorm/index.shtm
NCDC	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms

Table 17 - Hail Scale

Diameter Size	Description
1/4"	Pea Size
3/4"	Penny Size
7/8"	Nickel Size
1"	Quarter Size
1 1/4"	Half Dollar
1 1/2"	Walnut or Ping Pong Ball Size
1 3/4"	Golf Ball Size
2"	Hen Egg Size
2 1/2"	Tennis Ball Size
2 3/4"	Baseball Size
3"	Teacup Size
4"	Grapefruit Size
4 1/2"	Softball Size
Diameter Size	Description
1/4"	Pea Size
3/4"	Penny Size
7/8"	Nickel Size
1"	Quarter Size
1 1/4"	Half Dollar
1 1/2"	Walnut or Ping Pong Ball Size
1 3/4"	Golf Ball Size
2"	Hen Egg Size
2 1/2"	Tennis Ball Size
2 3/4"	Baseball Size
3"	Teacup Size
4"	Grapefruit Size
4 1/2"	Softball Size

Source: 2010 State of Iowa Hazard Mitigation Plan

Table 18 - Hailstorm Activity in Worth County

Location	Date	Magnitude/ Diameter	Deaths	Injuries	Property Damage	Crop Damage
MANLY	06/27/1998	1.25	0	0	1,000.00	5,000.00
HANLONTOWN	05/31/2000	1.75	0	0	10,000.00	5,000.00
JOICE	05/31/2000	2	0	0	20,000.00	5,000.00
KENSETT	06/18/2001	1.25	0	0	4,000.00	5,000.00
NORTHWOOD	09/20/2001	1.75	0	0	10,000.00	5,000.00
NORTHWOOD	09/20/2001	1.75	0	0	10,000.00	5,000.00
NORTHWOOD	09/20/2001	2	0	0	20,000.00	10,000.00
SILVER LAKE (unincorporated)	09/20/2001	2.5	0	0	50,000.00	50,000.00
NORTHWOOD	04/17/2004	1.25	0	0	5,000.00	-
NORTHWOOD	04/17/2004	1.5	0	0	10,000.00	-
NORTHWOOD	04/29/2010	1.5	0	0	10,000.00	-
BOLAN (unincorporated)	05/31/2013	1.25	0	0	1,000.00	5,000.00
MANLY	05/31/2013	1.75	0	0	10,000.00	15,000.00

Source: National Climatic Data Center, 2013

Hazardous Materials

Hazardous Materials covers a fixed hazardous material release, transportation hazardous material release, pipeline transportation release, and the accidental release of flammable or combustible, explosive, toxic, noxious, corrosive, oxidizable, an irritant or radioactive substances or mixtures that can pose a risk to life, health or property possibly requiring evacuation.

A fixed hazardous material release is an 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. A hazardous substance is one that may cause damage to persons, property, or the environment when released to soil, water, or air. Chemicals are manufactured and used in ever-increasing types and quantities, 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 materials”. Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous material incidents generally affect a localized area and the use of planning and zoning can minimize the area of impact.

During the period of January 1, 2000 – September 27, 2013, there have been 113 hazardous material incidents in Worth County according to the Iowa Department of Natural Resources (IDNR). Despite increasing safeguards, more and more potentially hazardous materials are being used in commercial, agricultural, and domestic activities. This situation is made worse by the density of people and hazardous materials in Iowa. However, none of the incidents are considered to be significant and high impact.

The planning committee determined the probability that an occurrence of a high impact hazardous material incident to be unlikely or less than 10% probability in any given year. A high impact occurrence is one defined as an environmental emergency by the EPA. 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 hazardous materials.

A pipeline that transports hazardous materials can pose as a hazardous material incident in the occurrence of a rupture of the pipeline. The pipeline rupture can possibly require evacuation of the surrounding area. An underground pipeline incident can be caused by the following: environmental disruption, accidental damage, or sabotage. Incidents can range from a small slow leak to a large rupture where an explosion is possible. Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure can lessen the risk to those near to the pipelines.

According to the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration, there have been 0 significant incidents in Worth County from 2002-2011.

Hazard	Hazardous Materials	Score
Location	Countywide	-
Probability	The planning committee determined the probability that a high impact occurrence of a hazardous material incident is unlikely in any given year. A high impact occurrence is one defined as an environmental emergency by the EPA. An environmental emergency is a sudden threat to the public health or the well-being of the environment, arising from the release of hazardous materials. A high impact incident has not occurred in the past, but low impact hazardous incidents are highly likely to occur.	1
Magnitude/ Severity	A hazardous materials accident can occur almost anywhere, so any area is considered vulnerable to an accident. People, pets, livestock, and vegetation in close proximity to facilities producing, storing, or transporting hazardous substances are at higher risk. Populations downstream, downwind, and downhill of a released substance are	3

	<p>particularly vulnerable. Depending on the characteristics of the substance released, a larger area may be in danger from explosion, absorption, injection, ingestion, or inhalation. Occupants of areas previously contaminated by a persistent material may also be harmed either directly or through consumption of contaminated food and water. Facilities are required to have an off-site consequence plan that addresses the population of the surrounding area. Responding personnel are required to be trained to HAZMAT Operations Level to respond to the scene, and those personnel that come into contact with the substances released are required to have HAZMAT Technician level training.</p> <p>Most of the hazardous materials incidents are localized and are quickly contained or stabilized by the highly trained fire departments and hazardous materials teams. Depending on the characteristic of the hazardous material or the volume of product involved, the affected area can be as small as a room in a building or as large as 5 square miles or more. Many times, additional regions outside the immediately affected area are evacuated for precautionary reasons. More widespread effects occur when the product contaminates the municipal water supply or water system such as a river, lake, or aquifer.</p> <p>Specialized training is needed to respond to these types of incidents. If inadequately trained personnel attempt to respond, the impacts could be the same as those for the general public exposed to the toxic materials. Proper training and equipment greatly reduce the risk to response personnel.</p>	
Warning Time	<p>When managed properly under regulations, hazardous materials pose little risk. However, when handled improperly or in the event of an accident, hazardous materials can pose a significant risk to the population. Hazardous materials incidents usually occur very rapidly with little or no warning. Even if reported immediately, people in the area of the release have very little time to be warned and evacuated. During some events, sheltering in-place is the best alternative to evacuation because the material has already affected the area and there is no time to evacuate safely. Public address systems, television, radio, and the NOAA Weather Alert Radios are used to disseminate emergency messages about hazardous materials incidents.</p>	4
Duration	<p>Response to a hazardous materials release is generally limited to the immediate effects of a release of dangerous materials and their threat to life and property. However, due to the laws surrounding hazardous materials and the duty of the public to inform and protect citizens from the effects of hazardous materials in their vicinity, response is expanded for environmental emergencies.</p>	1

Sources for Hazardous Materials	
US Environmental Protection Agency	http://www.epa.gov/epahome/commsearch.htm
IDNR	https://programs.iowadnr.gov/hazardousspills/introductory.aspx
IDOT	http://www.iowadot.gov/mvd/omve/hazmat.ht

	m
Iowa Pipeline Data	http://primis.phmsa.dot.gov/comm/StatePages/Iowa.htm?nocache=4138
US Office of Pipeline Safety	http://www.phmsa.dot.gov/pipeline
National Transportation Safety Board	http://www.nts.gov/Surface/pipeline/pipeline.htm

Human Disease

An incident related to human disease is defined as a medical, health, or sanitation threat to the general public (such as contamination, epidemics, plagues, and insect infestation). Public health action to control infectious diseases in the 21st century is based on the 19th century discovery of microorganisms as the cause of many serious diseases (e.g., cholera and TB). 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.

The Centers for Disease Control (CDC) has a list of notifiable infectious diseases at the national level and the latest data that was available was for the year 2009. A notifiable disease is one for which regular, frequent, and timely information regarding individual cases is considered necessary for the prevention and control of the disease. There are 86 notifiable diseases which include the variations of one disease. An example is Hepatitis (Hepatitis, viral, acute; Hepatitis A, acute; Hepatitis B, acute; Hepatitis B virus, perinatal infection; Hepatitis C, acute; and Hepatitis, viral chronic; Chronic Hepatitis B; and Hepatitis C virus infection).

The Iowa Department of Public Health tracks epidemiological statistics in Iowa. Worth County Public Health works to protect the citizens of Worth County from infectious diseases and preserves the health and safety of the citizens through disease surveillance, investigation of suspect outbreaks, education and consultation to county, local, and health agencies. Worth County Public Health also works to reduce the impact of communicable diseases and to reduce or eliminate the morbidity associated with these diseases. Programs that the agency administers guide community based prevention planning, monitor current infectious disease trends, provide early detection and treatment for infected persons, and ensure access to health care for refugees in Iowa. While vaccines are available for many diseases, citizens remain vulnerable to other diseases known and unknown.

A pandemic human disease is defined as a disease that has spread around the world to many people. The word, "pandemic", means that a disease has caused illness in a person on nearly every continent. Many diseases throughout the history of the world have been pandemic. Examples are HIV/AIDS/Influenza. A pandemic will have wide spread

economic and societal implications for our state. Response and recovery to a pandemic will likely be lengthy.

From 1900-2000, there were three influenza pandemics, all about 30 years apart. This seems to follow the same trend with the next occurrence to affect Iowa and Worth County beginning in 2009 with the H1N1 influenza virus causing 659 hospitalizations across the state and lab confirmed 41 H1N1 deaths across the state. Typically, people who become ill are the elderly, the very young and people with chronic medical conditions and high risk behaviors. Approximately 24% of Worth County’s population is considered high risk.

Hazard	Human Disease	Score
Location	Countywide	-
Probability	<p>From 1900-2010, there were four influenza pandemics, all about 30 years apart. This seems to follow the same trend with the next occurrence to affect Iowa and Worth County; beginning in 2009 the H1N1 influenza virus caused 659 hospitalizations across the state and the state lab confirmed 41 H1N1 deaths across the state. Typically, people who become ill are the elderly, the very young and people with chronic medical conditions and high risk behaviors. Approximately 25% of Worth County’s population is considered high risk. The committee determined that there was between an 11% and 20% probability of a human disease incident in any given year. Incidents include pandemic and non-pandemic. Widespread diseases, such as colds or flu, that are stable in terms of how many people are getting sick are non-pandemic. Additionally, Worth County Public Health works to protect the citizens of the county 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 public/private health agencies.</p>	2
Magnitude/ Severity	<p>Public health agencies work to reduce the impact of communicable diseases within the county. Programs guide community-based prevention planning, monitor current infectious disease trends, prevent transmission of infectious diseases, provide early detection and treatment for infected persons, and ensure access to health care for refugees in Worth County. While vaccines are available for many diseases that occur, citizens remain vulnerable to known and unknown diseases.</p> <p>Due to the high mobility of our society, these diseases can move rapidly across the county, state and nation within a matter of days and weeks. Many of the diseases on the national notification list result in serious illness if not death. Some diseases are treatable, in others only the symptoms are treatable.</p> <p>Influenza (flu) happens every year in nearly all the countries in the world. It spreads through a population for a few months and then will disappear or move to another area of the world. Influenza usually occurs in the fall and winter months. Typically people who usually become ill are the elderly, the very young and people with chronic medical conditions and high risk behaviors. Approximately 25% of Worth’s citizens are at high</p>	2

	risk.	
Warning Time	The private practitioner is the first line of defense and will undoubtedly be the first to witness the symptoms of human disease incidents. The Worth Public Health Department along with Iowa Department of Public Health and the US Centers for Disease Control monitor reports submitted by doctors, hospitals, and labs to identify patterns. The public health departments and the CDC are proactive in providing information to the health care community on medical concerns. Conditions related to scope and magnitude can escalate quickly and area resources can be drained of personnel, medications, and vaccinations rather quickly.	2
Duration	Response to highly infectious diseases occurs continuously, although the direct effects of a pandemic influenza can occur for months at a time as evident with the H1N1 influenza in August of 2009.	4

Sources for Human Disease	
Iowa Department of Public Health	http://www.idph.state.ia.us/hpcdp/default.asp
Iowa DPH Influenza	http://www.idph.state.ia.us/pandemic
Centers for Disease Control	http://www.cdc.gov/DataStatistics/
National Center for Health Statistics	http://www.cdc.gov/nchs/
CDC Prevention	http://www.cdc.gov/flu/pandemic/healthprofessional.htm
CDC Emergency Preparedness and Response	http://emergency.cdc.gov/
Worth County Public Health	http://www.worthcounty.org/pView.aspx?id=2125&catid=25

Infrastructure Failure

Infrastructure Failure can include communication failure, structural failure, energy failure, and structural fires. Communication failure is the widespread breakdown or disruption of normal communication capabilities. Communication failure includes major telephone outages, loss of local government radio facilities, 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 media as well. Mechanical failure, traffic accidents, power failure, line severance, and weather can affect communication systems and disrupt service. Disruptions and failures can range from localized and temporary to widespread and long-term. If switching stations are affected, the outage could be more widespread. Thus, the planning committee supports developing interoperability throughout the county and state.

No widespread communication failures have occurred in Worth County. Local incidents; due to weather conditions, equipment failure, excavation incidents, or traffic accidents

have been reported, the outages were usually resolved in a timely manner. Widespread communication losses are unlikely due to backup systems and redundant system designs. Local communication failures are likely to affect small areas of a county.

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 potentially affect supplies of energy producing products while local conditions could affect distribution of electricity, petroleum, or natural gas. The magnitude and frequency of energy shortages are associated with international markets. Local and state events such as ice storms can disrupt transportation and distribution systems; if disruptions are long lasting, public shelters may need to be activated to provide shelter from extreme cold or extreme heat. 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 energy crisis of the 1970s had significant impact on many consumers in Worth County. High inflation and unemployment were associated with the excessive dependence on foreign oil during the early and mid-1970s. An energy shortage of that magnitude has not affected Iowa in recent years. Only when free market forces cease to provide for the health, welfare, and safety of the citizens can governments can take appropriate actions to limit the effects of an energy shortage.

The federal government has a strategic petroleum reserve to supplement the fuel supply during energy emergencies. Shortages, especially electrical shortages, can be unpredictable with immediate effects. Natural events, human destruction, price escalation, and national security energy emergencies can cause unavoidable energy shortages. The planning committee evaluation the probability of an energy transportation failure likely to occur in Worth County to be between 21% and 33% probability in any given year.

The collapse (all or partial) of any public or private structure including roads, bridges, towers, buildings, and etc., is considered a structural failure. Infrastructure failures can be due to the failure of structural components or due to the overload of a structure. Natural events such as snow can cause a failure, heavy rains and flooding can undercut a bridge abutment or washout a road. Building codes and their enforcement can guarantee that a structure will hold-up under normal conditions. Annual or semi-annual inspections will alert stakeholders to weak points in the structure that need to be addressed. The level of damage depends on a number of factors including but not limited to the following: size, number of occupants, time of day, day of the week, amount of traffic, amount and type of products stored, etc.

There have been a few structural failures in Worth County; there is no collection of this type of incident, except from the personal experiences of the planning committee. Civil structures may fail in a variety of ways. The unprecedented growth in technology has resulted in a host of problems related to complex structures, special materials, and severe

operational and environmental loads, such as fire, excessive vibrations, explosion, high-energy piping failures, missiles, and earthquakes. With the exceptions of misuse, accidental or environmental loads, the causes of failure may be found in deficiencies of design, detailing, material, workmanship, or inspection. With the aging structures in the country along with problems with new materials discussed above, structural failures will continue to occur. Efforts to inspect and maintain these structures will lessen the probability of a failure, but not guarantee that it will not happen in the future. Internal weaknesses can be hidden from inspectors and not be realized until it is too late.

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 far greater threat to life and property and the potential for much larger economic losses. Modern fire codes and fire suppression requirements in new construction and building renovations, coupled with improved fire-fighting equipment, training, and techniques lessen the chance and impact of a major urban fire. 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 new the fire or fighting the fire because of the volume or type of the material involved. Structural fires are almost a daily occurrence in some communities. Nearly all are quickly extinguished by on-site personnel or local fire departments. There have been 1,535 deaths in Iowa from fires between the year 1974-1977 and 1980-2002. From 2006 through April of 2010, there have been 167 recorded fire fatalities in the state of Iowa.

Fire prevention efforts have gone to non-residential fires and the results have been highly effective. Even with an increase in the prevention efforts in residential fires, both residential and non-residential fires will continue to occur. During colder months, clogged chimneys and faulty furnaces and fireplaces can increase the probability of structural fires. The planning committee determined that structural fire would have between 20% and 33% probability of occurring in any given year.

Hazard	Infrastructure Failure	Score
Location	Countywide	-
Probability	<p>No widespread communications failures have occurred in Worth County. Local incidents due to weather conditions, equipment failure, excavation incidents, and traffic accidents have been reported, but outages have usually been resolved in a timely manner. Communication losses are unlikely due to backup systems and redundant system designs. Local communications failures are unlikely to affect cities of Worth County and small areas of the county.</p> <p>Energy failures happen in the county due to equipment failures, weather conditions, excavation incidents, etc. Local and regional electric and gas utilities maintain the transmission lines and are responsible for providing the energy. They have been proactive in the past 5-10 years in hardening their facilities to ensure proper transmission of energy.</p> <p>There has been no record of structural failures in Worth County.</p>	1

	<p>Structural fires are a yearly occurrence in some communities. Nearly all are quickly extinguished by on-site personnel or local fire departments. Widespread structural fires are unlikely.</p>	
<p>Magnitude/ Severity</p>	<p>Most communication systems that are highly necessary have backup and redundant designs to provide continuity of service. Most communications failures would be limited to localized areas. In the event of a widespread communications failure, only portions of Iowa would be impacted, but this is highly unlikely due to the support of other jurisdictions and secondary communications devices.</p> <p>Because Iowa is almost entirely dependent on out-of-state resources for energy, Iowans must purchase oil, coal, and natural gas from outside sources. World and regional fuel disruptions are felt in Iowa. It is likely that increasing prices will occur as market mechanisms are used to manage supply disruptions. This will disproportionately affect the low-income population because of their lower purchasing power. Agricultural, industrial, and transportation sectors are also vulnerable to supply, consumption, and price fluctuations. In Iowa, petroleum represents 97% of transportation fuel. Individual consumers such as commuters are also vulnerable.</p> <p>The effects of an energy shortage would be felt throughout the state. Because the distribution systems are very developed, local shortages can quickly be covered.</p> <p>There are many buildings in Iowa that are very old or which may become hazardous in the event of an earthquake, fire, high winds, or other natural events. All bridges are vulnerable to the effects of the elements and the deterioration that results. Increases in the amount and weight of traffic they are expected to support increase their vulnerability to failure.</p> <p>The impacts of the failed structure would be contained to the immediate area and adjacent properties. This could be as small as the house and yard of a fallen chimney, or the area could be relatively extensive if the structure that failed was a multi-story building of a downtown high-rise or a tall communication tower. Dam and levee failures would affect a much larger area and are discussed as separate hazards.</p> <p>Older structures with outdated electrical systems not built to current fire codes are particularly vulnerable to fire. Combustible building materials obviously are more vulnerable than structures constructed of steel or concrete. Structures without early detection devices are more likely to be completely destroyed before containment by response agencies. Structures in areas served by older, smaller, or otherwise inadequate water distribution infrastructure such as water mains and hydrants are also at significant risk. Problems vary from region to region, often because of climate, poverty, education, and demographics. The fire death risk for the elderly and children under 5 years is more than two times that of the average population.</p> <p>With modern training, equipment, fire detection devices, and building</p>	<p>2</p>

	regulations and inspections, most fires can be quickly contained and limited to the immediate structure involved. Certain circumstances, such as the involvement of highly combustible materials or high winds, can threaten a larger area. The age and density of a particular neighborhood can also make it more vulnerable to fire due to the spreading of fire from neighboring structures.	
Warning Time	<p>A communications failure would likely occur with little or no warning. It is usually impossible to predict a communications failure. Some communications may be shut down for periodic maintenance and the users are typically given prior notice to the out of service shutdown.</p> <p>The IDNR Energy Bureau monitors domestic and international energy situations and has developed a plan to deal with an energy crisis. Signs of an energy shortage can be seen sometimes be recognized months in advance but energy disruptions happen suddenly and unexpectedly.</p> <p>The actual failure of the structure would likely occur suddenly with little or no warning.</p> <p>Fires typically start with little to no warning and alert devices can allow time for responders to contain the fire.</p>	4
Duration	With the exception of structural fires which are largely handled by local response personnel, the response to the hazards of communications failure, energy failure, and structural failure are widespread in nature and are likely to require outside resources to assist the county and local jurisdictions in emergency response.	3

Sources for Infrastructure Failure	
Federal Communications Commission	http://www.fcc.gov/
Iowa Utility Board	http://www.iowa.gov/iub/
IDNR	http://www.iowadnr.gov/energy/index.html
Iowa Division of State Fire Marshall	http://www.dps.state.ia.us/fm/
National Fire Protection Association	http://www.nfpa.org/categoryList.asp?categoryID=951&URL=Research/Fire%20statistics

Radiological

An incident resulting in a release of radiological material at a fixed facility to include power plants, hospitals, laboratories and the like is a fixed radiological incident. 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 State were developed in the mid-1960’s 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.

Duane Arnold Energy Center is located in Palo, Iowa. Worth County is located far outside the 10 and 50 mile planning buffers.

The planning committee determined the probability of a fixed radiological incident occurring in Worth County to be unlikely in any given year.

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

When these materials are moved across Iowa highways, Iowa officials are notified and appropriate escorts are provided. As a rule there are two (2) categories of radioactive materials that are shipped over the interstate highways. Low level waste consists primarily of materials that have been contaminated by low level radioactive substances, but pose no serious threat except through long term exposure. These materials are shipped in sealed drums within placarded trailers. The danger to the public is no more than a wide array of other hazardous materials. High-level waste, usually in the form of spent fuel from nuclear plants, is transported in specially constructed casks that are built to withstand a direct hit from a locomotive.

Since 1990, hundreds of shipments have been made through Iowa. There have been no occurrences of a radiological incident in Iowa. Transportation accidents are the most common type of incident involving radioactive materials because of the sheer number of radioactive shipments.

Operators of facilities that use radioactive materials and transporters of radioactive waste are circumspect in the packaging, handling, and shipment of the radioactive waste and, since they are closely regulated by a variety of federal, state, and local organizations, the likelihood of an incident is remote.

There have been no events in Worth County, however; the planning committee determined that the probability of an occurrence does exist therefore they wanted radiological events to be scored and profiled.

Hazard	Radiological	Score
Location	Countywide	-
Probability	<p>Historically there have been zero significant releases of radiation from fixed facilities in the state of Iowa, or even the United States. Operators of facilities that use radioactive materials and transporters of radioactive waste are trained in the packaging, handling, and shipment of the radioactive waste; and, since they are closely regulated by the state, the likelihood of an incident is remote.</p> <p>Since 1990, hundreds of shipments have been made through Iowa. There have been no occurrences of radiological incidents in Iowa.</p> <p>Transportation accidents are the most common type of incident involving radioactive materials because of the sheer number of radioactive shipments. Operators of facilities that use radioactive materials and transporters of radioactive waste are trained in the packaging, handling, and shipment of the radioactive waste; and, since they are closely regulated by a variety of federal, state, and local organizations, the likelihood of an incident is remote.</p>	1
Magnitude/ Severity	<p>Sources of radioactive materials include medical products, industrial products, nuclear power plant fuel, nuclear weapons, and radioactive waste from hospitals, laboratories, nuclear reactors, and military facilities. Both the Duane Arnold and the Fort Calhoun Nuclear Power Plants have completed construction of on-site storage facilities of spent nuclear fuel.</p> <p>In over 50 years of nuclear power production in the US, no deaths or injuries from radiation have been recorded among the general public. Each of the nuclear facilities in the country identifies a 10 mile radius Emergency Planning Zone and a 50-mile radius Ingestion Pathway Zone.</p> <p>Depending on the level of exposure, radiation can cause loss of life and long and short term health effects. Time, distance, and shielding minimize radiation exposure to the body. Nuclear radiation above normal levels could be a health and safety consideration because of its ability to damage human cells biologically.</p> <p>Specialized training is needed to respond to these types of incidents. If inadequately trained personnel attempt to respond, the impacts could be the same as those for the general public exposed to the toxic materials. Proper training and equipment greatly reduce the risk to response personnel.</p> <p>If the land and facilities cannot be used for weeks, months, or even years, the loss of production would be devastating. Economic impacts would be multi-sector and long-lasting, especially in and around the affected region.</p> <p>The danger to the public is less than a wide array of other hazardous materials. Those working with or near sources of radiation are at a greater risk than the general citizens of the state. Those responding to a</p>	2

	<p>radiological incident should be trained in recognizing a radiological incident and minimizing exposure to radioactive materials.</p> <p>Other than a transportation incident involving large amounts of high-level radioactive materials, radiation exposure will be limited to localized areas.</p> <p>Time, distance, and shielding minimize radiation exposure to the body. Nuclear radiation above normal levels could be a health and safety consideration because of its ability to damage human cells biologically as well as its long-lasting effect on the environment.</p>	
Warning Time	<p>Ionizing radiation cannot be detected with human senses. Detection instruments are needed to indicate the existence of radiation. Distance from the incident would dictate the amount of time needed to avoid exposure from damaging radiation.</p> <p>A radiological incident in Worth County could result from an incident in handling or transporting radioactive materials. This accident could occur with little or no warning. Ionizing radiation cannot be detected with human senses. Detection instruments are needed to indicate the existence of radiation. Distance from the incident would dictate the amount of time needed to avoid exposure from damaging radiation.</p>	4
Duration	<p>Responding to the effects of a radiological release in Worth County is extensive and will require resources and assistance from several Federal agencies to determine and evaluate the threat to life and the environment in the affected sub-areas.</p>	1

Sources for Radiological	
US EPA	http://www.nrc.gov/about-nrc/emerg-preparedness.html
Iowa Department of Health	http://www.idph.state.ia.us/eh/radiological_health.asp
Nuclear Regulatory Commission	http://www.phmsa.dot.gov/hazmat
Energy Information Assurance	http://www.eia.doe.gov/overview_hd.html

River Flooding

River flooding is a rising or overflowing of a tributary or body of water that covers adjacent land, not usually covered by water, when the volume of water in a stream exceeds the channels capacity. Floods are the most common and widespread of all natural disasters, except fire. Most communities may experience some kind of flooding after spring rains, heavy thunderstorms, winter snow thaws, waterway obstructions, or levee or dam failures.

Floodwaters can be extremely dangerous; the force of six inches of swiftly moving water can knock people off their feet and two feet of water can float a car. Floods can be slow

or fast-rising but generally develop over a period of days. Flooding is a natural and expected phenomenon that occurs annually, usually restricted to specific streams, rivers or watershed areas.

The National Flood Insurance Program (NFIP) Repetitive Loss Properties report identifies properties vulnerable to multiple flood losses. There are no Repetitive Loss Properties located in Worth County as of December 2010.

The statewide flood/severe storm/tornado-related event in May and June 2008 resulted in a Presidential declared disaster for Worth County. However, according to the National Climatic Data Center, there was no reported flooding damage in 2008. The reported river flooding damages according to the National Climatic Data Center are given in the **Table 19** below.

Table 19 - River Flooding Damage in Worth County

Locations	Date	Deaths	Injuries	Property Damage \$	Crop Damage \$
-	03/09/1997	0	0	0	0
-	03/19/1997	0	0	0	0
NORTHWOOD	06/20/1998	0	0	75000	10000
-	04/22/1999	0	0	10000	0
-	06/09/1999	0	0	50000	75000
-	07/19/1999	0	0	100000	150000
-	06/09/2000	0	0	25000	25000
-	03/23/2001	0	0	7500	0
-	04/01/2001	0	0	5000	0
-	04/07/2001	0	0	150000	0
-	05/01/2001	0	0	75000	0
-	06/12/2001	0	0	25000	50000
-	05/22/2004	0	0	100000	298039.2157
-	09/15/2004	0	0	50000	100000
COUNTYWIDE	04/01/2006	0	0	5000	0
SILVER LAKE	06/12/2010	0	0	0	20000000
MELTONVILLE	06/01/2013	0	0	100000	0
BRISTOL	06/13/2013	0	0	250000	0
KENSETT	06/13/2013	0	0	100000	0

Source: National Climatic Data Center, 2013

The planning committee determined that the probability of a river flood in Worth County is likely in any given year.

Hazard	River Flooding	Score
Location	See Appendix A	-
Probability	<p>Worth County has been involved in Presidential Disaster Declarations related to flooding since 1965.</p> <p>Given the history of this hazard, it is likely that there will be a river flooding event each year. A flooding event in any given year can potentially be prolonged if rivers fail to fully recede alongside intermittent precipitation. In effect, there may be several reported damages for one flooding event in a year.</p>	3
Magnitude/ Severity	<p>The vulnerability from river flooding is quite delineated. Much work in the area of flood hazard mapping has allowed many communities to restrict development in the hazardous areas.</p> <p>The Federal Emergency Management Agency has delineated the probable extent of the 1% chance flood hazard area in many areas of the county and those maps are located in Appendix I. These maps depict the areas that have at least a 1% chance of flooding occurring on these areas in any given year. Much of the areas are parkland, agricultural areas, or conservation land, but residential and commercial areas are impacted by river flooding as well.</p> <p>Flooding impacts include potential loss of life. River flooding does not have as high of risk as does flash flooding because of the slower onset of the river flood.</p> <p>Personal property can be extensively damaged and destroyed by swift moving water. Facilities and infrastructure can be scoured around and degrading its structural integrity. The severity of the floods in Worth county have been limited to the areas directly involved or approximately 10% to 25% of the property has been severely damaged.</p>	2
Warning Time	<p>There is a river gage on the Des Moines River in Algona that provides for an early flood warning system. River flooding usually develops over the course of several hours or even days depending on the basin characteristics and the position for the particular reach of the stream. The National Weather Service provides flood forecasts for Iowa. Flood warnings are issued over emergency radio and television messages as well as the NOAA Weather Radio. People in the paths of river floods may have time to take appropriate actions to limit harm to themselves and their property.</p>	3
Duration	<p>The response to the effects of river flooding in Worth County are extensive and require many days to adequately respond to the needs of the citizens of the County.</p>	2

Sources for River Flooding	
FEMA Map Service Center	http://www.msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1
IDNR	http://www.iowadnr.gov/water/floodplain/inde

	x.html
NCDC	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
Iowa Flood Center	http://ifis.iowafloodcenter.org/ifis/en/

Severe Winter Storm

Severe winter weather conditions that affect day-to-day activities 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 (**Table 20**) can cause considerable damage. Heavy snows can immobilize transportation systems, down trees and power lines, collapse buildings, and the loss of livestock and wildlife. Blizzard conditions are winter storms lasting at least three hours with sustained winds of 35 mph or more, reduced visibility of ¼ mile or less, and white out conditions. Heavy snows of more than six inches in a 12 hour period or freezing rain greater than ¼ inch accumulation causing hazardous conditions in the community can slow or stop the flow of vital supplies as well as disrupting emergency and medical services.

Loose snow begins to drift when wind speed reaches a critical speed of 9-10 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.

Worth County has had 187 winter storm events from 1960 to 2013. These events have caused 0 deaths, 0 injuries and \$3,904,043 in property damage and \$18,011,717 in crop damage. Worth County has been presidentially declared a Major Disaster for winter storms twice since 1990. Worth County can experience 3-4 winter storms in any given year. **Table 21** below shows reported winter storm events that have caused estimated property damage greater than \$10,000.

Hazard	Severe Winter Storm	Score
Location	Countywide	-
Probability	Worth County has had 187 winter storm events from 1960 to 2013. These events have caused 0 deaths, 0 injuries and \$3,904,043 in property damage and \$18,011,717 in crop damage. Worth County is highly likely to have winter storms but only likely to have severe events.	3
Magnitude/ Severity	Hazardous driving conditions due to snow and ice on highways and bridges lead to many traffic accidents. The leading cause of death during winter storms is transportation accidents. The leading cause of death during winter storms is transportation accidents. Emergency services such as police, fire, and ambulance are unable to respond due to road conditions. Emergency needs of remote or isolated residents for food or fuel, as well as for feed, water and shelter for livestock are unable to be met. People, pets, and livestock are also susceptible to frostbite and hypothermia during winter storms. Winter storms are quite vast and would likely impact not only Worth County but the Northern Iowa region as a whole. Certain areas may	2

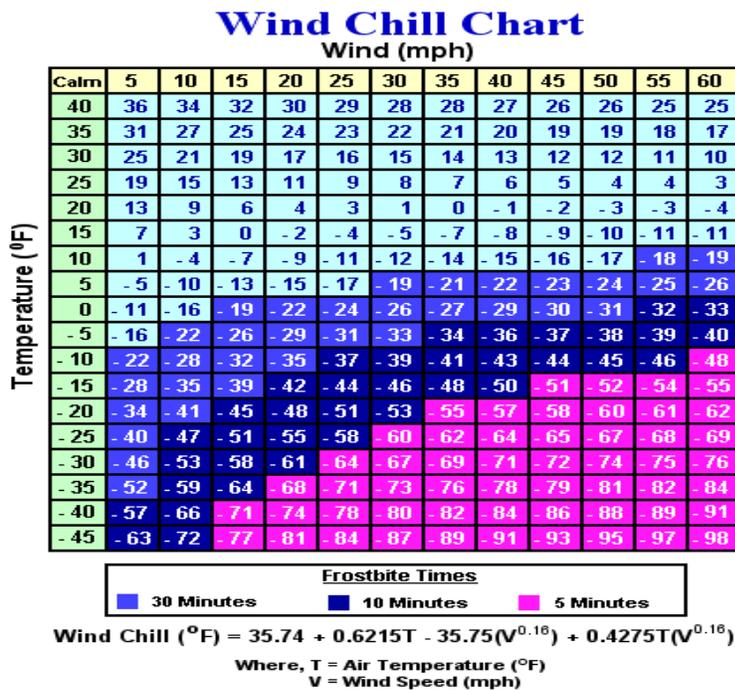
	experience local variations in storm intensity and quantity of snow or ice. IDOT, county road departments, and local public works agencies are responsible for the removal of snow and treatment of snow and ice with sand and salt on the streets and highways of Worth County.	
Warning Time	The National Weather Service (NWS) has developed effective weather advisories that are promptly and widely distributed. Radio, TV, and Weather Alert Radios provide the most immediate means to do this. Accurate information is made available to public officials and the public up to days in advance. Notifications made by the National Weather Service include winter storm watch, winter storm warning, blizzard warning, winter weather advisory, and frost/freeze advisory.	1
Duration	Severe winter storms in Iowa and the response to these declared events are tied to multiple storms necessitating large expenses to cities for snow removal and road service. The associated losses and dangers of electrical outages to rural areas further compounds the duration of responding to major storm events.	3

Table 20 - Winter Storm Notification

Winter Weather Advisory	Used when snow...or a mixture of precipitation such as snow, sleet, freezing rain or drizzle is expected, but will not reach warning criteria. Issued for snowfall amounts of less than 4". Forecast amounts would be 1-2", 1-3", 2-4", or perhaps 3". If only freezing rain or freezing drizzle is expected, then the product would be issued as a Freezing Rain or Freezing Drizzle advisory.
Freezing Rain Advisory	Used when freezing rain is expected to coat surfaces with up to one quarter of an inch of ice.
Wind Chill Advisory	Issued when wind chill temperatures are expected to range from -10F to -24F, with a minimum wind speed of 10 mph.
Winter Storm Watch	Issued if there is a threat for heavy snow or sleet, significant accumulations of freezing rain or freezing drizzle, or any combination of these. Issued for the second and third periods of a forecast, i.e. 12 to 36 hours in advance of the event. Not issued for the fourth period of a forecast unless confidence is high. The definition of heavy snow in Iowa is 4" or more in 12 hours, or 6" or more in 24 hours.
Winter Storm Warning	Issued if there is a high probability that severe winter weather will occur, such as heavy snow or sleet, significant accumulations of freezing rain or freezing drizzle, or any combination of these. Issued normally for the first period forecast, i.e. less than or equal to 12 hours in advance of the event. A winter storm warning may be extended into the second period of the

	forecast if necessary.
Ice Storm Warning	Issued when ice accumulations are expected to exceed one quarter of an inch on exposed surfaces.
Blizzard Warning	Issued for winter storms with sustained winds or frequent gusts of 35 mph or greater and considerable falling and/or blowing snow reducing visibilities to 1/4 mile or less. These conditions should last for 3 hours or longer.
Wind Chill Warning	Issued when wind chill temperatures are expected to reach -25°F or colder, with a minimum wind speed of about 10 mph.

Figure 5 - Wind Chill Chart



Sources for Severe Winter Storm	
NCDC	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
FEMA	http://www.fema.gov/hazard/winter/index.shtm
IDOT	http://weatherview.iowadot.gov/
Iowa Travel Information	http://www.511ia.org/

Table 21 - Winter Storm Activity in Worth County

Date	Injuries	Fatalities	Property Damage	Crop Damage
2/17/1961	0.71	0.07	11905	0
03-10-62	0	0	10638	0
02-11-65	0	0	10638	0
12/17/1967	0	0	11905	0
12-03-73	0	0	64935	0
04-08-73	0	0	694444	0
3/26/1975	0	0	73529	0
01-09-82	0	0	50505	0
4/29/1984	0	0	25000	0
03-03-85	0	0	11905	0
12-02-90	0	0	22472	0
03-07-90	0	0	480769	0
10/30/1991	0	0	1063830	10638
1/26/1996	0	0	11321	0
02-03-97	0	0	14706	0
5/13/1997	0	0	19608	1961
01-04-98	0	0	19608	0
12-10-00	0	0	25490	0
12/16/2000	0	0	50000	0
12/18/2000	0	0	25000	0
12/21/2000	0	0	20000	0
2/25/2001	0	0	25000	0
03-08-02	0	0	25000	0
11-10-06	0	0	70000	0
03-01-07	0	0	100000	0
2/24/2007	0	0	380435	0
12-08-08	0	0	12778	0
12-09-09	0	0	50000	0
1/25/2010	0	0	75000	0
12-11-10	0	0	75000	0
2/20/2011	0	0	25000	0
12/19/2012	0	0	25000	0
12/20/2012	0	0	100000	0

Data Source: Hazards and Vulnerability Research Institute, 2013

Terrorism

Enemy attack is an incident that would cause massive destruction and extensive casualties. An all-out war would affect the entire population. Some areas would experience direct weapons' effects: blast, heat, and nuclear radiation; others would experience indirect weapons' effect, primarily radioactive fallout.

The federal government monitors the international political and military activities of other nations and would notify the State of Iowa of escalating military threats. Worth County authorities would be notified by the State of Iowa. There have been no enemy attacks on or in Worth County in modern times. The only history of enemy attack dates back to the days of settlement. An enemy attack is still a possibility due to international conflicts and the large number of conventional and nuclear weapons in existence throughout the world.

It is however unlikely that Worth County would be a primary target during an enemy attack on the United States. The US federal government monitors global situations and provides for the security from international attacks. Enemy attack/war has changed in recent years due to world events.

The planning committee determined enemy attack is unlikely in any given year.

Mass demonstrations, or direct conflict by large groups of citizens, as in marches, protest rallies, riots, and non-peaceful strikes are examples of public disorder. These are the assembling of people in a manner that substantially interferes with public peace and constitutes a threat and with the use of unlawful force against another person, or causing property damage or attempting to interfere with, disrupting, or destroying the government, political subdivision, or group of people. Vandalism is usually initiated by a small number of individuals and limited to small target group or institution. Most events are within the capacity of local law enforcement.

Large-scale civil disturbances rarely occur; when they do they are usually an offshoot or the result of one or more following events: 1. Labor disputes where there is a high degree of animosity between the participating parties; 2. High profile/controversial laws or other governmental actions; 3. Resource shortages caused by a catastrophic event; 4. Disagreements between special interest groups over a particular issue or cause; or 5. A perceived unjust death or injury to a person held in high esteem or regard by a particular segment of society.

The potential for large-scale civil disturbances are rare especially in a rural county; however, the potential is always there for an incident to occur.

The planning committee determined that a serious public disorder in Worth County is unlikely in any given year.

Use of biological agents against persons or property in violation of the criminal laws of the US and State of Iowa for the purposes of intimidation, coercion, or ransom can be

described as biological terrorism. Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point of line sources such as munitions, covert deposits and moving sprayers. These agents pose a viable threat from hours to years depending on the substance used and the conditions for which it exists. Depending on the agent used and the effectiveness of the deployment of the agent, contamination can be spread thru wind and water. Infections could also spread from human to human, animal to animal, or human to animal and vice versa.

Worth County does not have any history of attacks but the planning committee could not rule out a future incident. The planning committee determined that the probability of a biological terrorism event is unlikely in any given year.

Causing intentional harm to an agricultural product or vandalism of an agricultural/animal related facility is agro-terrorism. Activities could include the following examples: animal rights activists who release mink or lab animals; disgruntled employees who intentionally contaminate bulk milk tanks or poison animals; eco-terrorists who destroy crops/facilities; theft of agricultural products, machinery, or chemicals; or criminals who vandalize agricultural facilities.

Incidents such as this have occurred in the state of Iowa. Worth County has not experienced any of these incidents. There are however cases of theft of agricultural machinery, products, and chemicals on a yearly basis within the county.

The planning committee determined that a serious agro-terrorism event is unlikely in Worth County in any given year.

Chemical terrorism involves the use or threat of chemical agents against persons or property in violation of the criminal laws of the US and the State of Iowa for the purposes of intimidation, coercion, or ransom. Liquid/aerosol or dry contaminants can be dispersed using sprayers or other aerosol generators; liquids vaporizing from puddles/containers; or munitions. 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 persons, vehicles, water, water and wind. Chemicals may be corrosive or otherwise damaging over time if not mitigated.

Worth County has experienced releases of anhydrous ammonia by persons engaged in illegal drug manufacturing.

The planning committee determined that chemical terrorism event is unlikely in Worth County in any given year.

Use of conventional weapons and explosives against persons or property in violation of the criminal laws of the US and the State of Iowa for purposes of intimidations, coercion, or ransom is conventional terrorism. Hazard affects are instantaneous; additional secondary devices may be used, lengthening the time duration of the hazard until the attack site is determined to be clear. The extent of damage is determined by the type and

quantity of explosive. Effects are generally static other than cascading consequences, incremental structural failures, etc. Conventional terrorism can also include tactical assault or sniping from remote locations.

Worth County has had one incident involving a pipe bomb that was used in an attempted murder case in 2006. Unfortunately, there will never be a way to totally eliminate all types of these clandestine activities. If person or persons are inclined to cause death and destruction, they are usually capable of finding a way to carry out their plans.

The planning committee determined that the probability of a high impact conventional terrorism event occurring in Worth County in any given year to be unlikely.

Electronic attack using one computer system against another in order to intimidate people or disrupt other systems is a cyber-attack. 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 felt depending upon the system being terrorized. Inadequate security can facilitate access to critical computer systems allowing them to be used to conduct attacks.

Cyber-security and critical infrastructure protection are among the most important national security issues facing our country today, and they will only become more challenging in the years to come. Recent attacks on our infrastructure components have taught us that security has been a relatively low priority in the development of computer software and internet systems. These attacks not only have disrupted electronic commerce, but have also had a debilitating effect on public confidence in the internet.

The planning committee determined the probability that a serious electronic attack in Worth County is unlikely in any given year.

Radiological terrorism involves the use or threat of radiological agents against persons or property in violation of the criminal laws of the US and the State of Iowa for the purposes of intimidation, coercion, or ransom. Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point of line sources such as munitions. Radiological terrorism will consist of detonation of a nuclear device underground, at the surface, in the air, or at high altitude.

There is no history of radiological terrorism in Worth County. The threat is relatively low, but it is technically feasible for a person or group of persons to construct a radiological weapon and use it for terrorist purposes.

Hazard	Terrorism	Score
Location	Countywide	-
Probability	The State of Iowa has experienced acts of terrorism. Internationally, such acts have, unfortunately, become quite commonplace, as various religious, ethnic, and nationalistic groups have attempted to alter and dictate political and social agendas. Persons and groups who have threatened violence and are inclined to cause death and destruction, are	1

	<p>usually capable of carrying out their plans. Due to the rural nature of Worth County and that the county is located in the breadbasket of the world there is a potential for terrorist attack but it is unlikely</p> <p>Law enforcement agencies respond to barricaded subject calls and deliver high risk warrants against armed persons. Protecting the computer systems of the county shall remain a high priority due to the increase of cyber-terrorism whether it is directed to the county or not.</p> <p>Destructive civil disturbances are rare; the potential is always there for an incident to occur. This is even more true today, where television, radio, and internet provides the ability to instantly broadcast information in real time to the entire community. This spread of information can easily devolve a situation from peaceful to violent.</p>	
<p>Magnitude/ Severity</p>	<p>Since targets of attacks will include civilian and government facilities, the entire community is considered vulnerable to direct and indirect impacts. The entire county would likely to be impacted in some way, areas near government facilities, transportation, communications, and fuel facilities would experience the largest impacts. A full-scale attack is unlikely in the near future, however a limited attack could take place that could potentially threaten the target areas. Given the tremendous destructive capability of even one nuclear device or the detonation of said nuclear device at a high altitude over the middle of the country causing an EMP wave that destroys all electronics would be far worse than anything ever experienced in this country.</p> <p>Innocent people are often the victims of terrorist activity targeted at certain organizations and activities. Based on the method of delivery, the general public is vulnerable to bioterrorism.</p> <p>There are many factors in terrorism that geographic extent is hard to determine due to agent used, effectiveness of delivery, spread by air, water, or human and animal vectors.</p> <p>Our society highly networked and interconnected. An attack could be launched from anywhere on earth and could cause impacts as small as a computer lab to as large as the world wide web.</p> <p>Duration of exposure to the effects of radiological terrorism, distance from the source of radiation, and the amount of shielding between source and target determine exposure to radiation.</p> <p>Initial effects will be localized to site of attack; depending on meteorological conditions, subsequent behavior of radioactive contaminants may be dynamic. Radiological terrorism, the severity of an incident would primarily be isolated to the impact point and areas that are downwind from the impact.</p> <p>Civil disturbances are often difficult for local communities to handle. There is a fine line between the Constitutional right of individuals and groups to assemble and air their grievances and the overall needs of the</p>	<p>1</p>

	<p>community to provide essential services, ensure personal safety of citizens, prevent property damage, and facilitate normal commerce. Fortunately, most demonstrations and large public gatherings are held in peaceful, responsible manner. However, there never seems to be a shortage of groups whose primary objective is to disrupt normal activities and perhaps even cause injury and property damage.</p> <p>Civil unrest often results in injuries, deaths, and property damage. Perhaps even more tragic has been the lingering, negative impact and loss of investment in the communities ravaged by the uprisings. Many riot areas do not fully recover from the damage, destruction, and negative image brought on by such events. Looting, burning, and sniping can occur during severe civil disturbances. Fires can sometimes burn uncontrolled because firefighters and equipment are unable to respond due to resistance from rioters.</p>	
Warning Time	Acts of terrorism can be immediate and often come after little or no warning. There are occasions when terrorists have warned the targeted organization beforehand, but often the attack comes without previous threat. Terrorists threaten people and facilities through “bomb threats” and other scare tactics. Even if it is a shallow threat, precautions must be taken to ensure the safety of the people and property involved.	4
Duration	The response to all sources of terrorism are extensive and will result in the need for outside resources and response from Federal agencies in both the investigation of a crime scene and in the response to the direct threats to life and property.	1

Sources for Terrorism	
Department of Homeland Security	http://www.dhs.gov/index.shtm
Iowa Homeland Security	http://www.iowahomelandsecurity.org/
US Department of Justice	http://www.justice.gov
CDC	http://emergency.cdc.gov

Thunderstorms and Lightning

Thunderstorms are common in Worth County and can occur singly, in clusters, or in lines. Thunderstorms result in heavy rains, winds reaching or exceeding 58 mph, producing a tornado, or dropping surface hail at least 1.00 inch in diameter. They are created from a combination of moisture, rapidly raising warm air, and a lifting mechanism such as clashing warm and cold air masses.

Between 1961 and September of 2011, at least 94 severe thunderstorm events have impacted Worth County, causing \$2,728,386 in property damage and \$15,042,126 in crop damage. Because thunderstorms occur singly, in clusters, or in lines, it is possible that several thunderstorms may affect the same area over the course of a few hours and only be listed as one occurrence. It is highly possible that more than 94 severe thunderstorm events have happened since 1961.

Most thunderstorms produce only thunder, lightning, and rain; severe storms, however, can produce tornadoes, straight-line winds and microburst's above 58 mph, lightning, hailstorms, and flooding. The National Weather Service (NWS) considers a thunderstorm severe if it produces hail at least 1-inch in diameter, wind meeting or exceeding 58mph, or tornadoes. Straight-line winds can often exceed 60 mph, are common occurrences, and are often mistaken for tornadoes. A number of thunderstorms have caused other hazards such as flash flooding, river flooding, and tornadoes.

Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt", this flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches temperatures approaching 50,000 degrees Fahrenheit in a split second, this rapid heating, expansion, and cooling of air near the lightning bolt creates thunder. Worth County has experienced 5 reported lightning events between 1994 and 2000, causing \$640,000 in property damage. However with an average of 25 million lightning strikes in the US in any given year, there are probably more than 5 events that happened in Worth County.

The tables for thunderstorms and lightning based on available data from the Hazards and Vulnerability Research Institute are below (Tables 3.10 – 11). Thunderstorms and lightning do not always occur simultaneously, but there is overlap between the two tables. As stated earlier, the same occurs for hailstorms and windstorms overlapping with thunderstorms.

Table 22 - Lightning Activity in Worth County

Date	INJURIES	FATALITIES	Property Damage	Crop Damage
7/30/1965	0	0	\$ 5,000	\$ -
7/18/1970	0	0	\$ 5,000	\$ -
6/27/1972	0	0	\$ 5,000	\$ -
06/12/1976	0	0	\$ 12,500	\$ -
07/05/1978	0	0	\$ 119,048	\$ 119,048
6/14/1978	0	0	\$ 128,205	\$ 128,205.13
3/14/1984	0	0	\$ 66.67	\$ -
5/25/1984	0	0	\$ 505	\$ -
09/05/1985	0	0	\$ 119	\$ 119
08/09/1985	0	0	\$ 5,051	\$ -
7/13/1997	0	0	\$ 5,000	\$ -
6/27/1998	0	0	\$ 20,000	\$ -

Data Source: Hazards and Vulnerability Research Institute, 2013

Table 23 - Thunderstorm Activity in Worth County

Date	INJURIES	FATALITIES	Property Damage	Crop Damage
7/22/1962	0	0	\$ 19,231	\$ 19,231
09-07-64	0	0	\$ 2,941	\$ 2,941
3/30/1967	0	0	\$ 91	\$ -
12-03-73	0	0	\$ 64,935	\$ -
4/27/1975	0	0	\$ 1,190	\$ -
06-12-76	0	0	\$ 12,500	\$ -
4/17/1978	0	0	\$ 21,739	\$ -
07-05-78	0	0	\$ 119,048	\$ 119,048
6/14/1978	0	0	\$ 128,205	\$ 128,205
6/28/1978	0	0	\$ 67,568	\$ 67,568
6/19/1979	0	0	\$ 8,475	\$ 85
5/29/1980	0	0	\$ 8,621	\$ 862
6/21/1981	0	0	\$ 45	\$ -
6/23/1981	0	0	\$ 98,039	\$ 98,039
06-12-81	0	0	\$ 17,857	\$ 1,785,714
5/17/1982	0	0	\$ 57	\$ -
07-06-82	0	0	\$ 5,682	\$ 568
07-09-82	0	0	\$ 1,852	\$ -
07-01-83	0	0	\$ 1,190	\$ -
07-01-83	0	0	\$ 980	\$ -
8/21/1983	0	0	\$ 505	\$ 51
11/26/1983	0	0	\$ 505	\$ -
3/14/1984	0	0	\$ 67	\$ -
4/26/1984	0	0	\$ 5,051	\$ -
5/25/1984	0	0	\$ 505	\$ -
6/26/1984	0	0	\$ -	\$ 119
7/16/1984	0	0	\$ 505	\$ -
07-03-85	0	0	\$ 22	\$ -
6/21/1985	0	0	\$ 89	\$ -
09-08-85	0	0	\$ 1,190	\$ 1,190
11-07-86	0	0	\$ 5,000	\$ -
5/20/1987	0	0	\$ 5,000	\$ -
4/29/1991	0	0	\$ 5,000	\$ 50
6/19/1991	0	0	\$ 50,000	\$ 50,000
6/17/1992	0	0	\$ 500,000	\$ 50,000
6/17/1992	0	0	\$ 5,000	\$ 500
06-01-93	0	0	\$ -	\$ 5,050,505
07-01-93	0	0	\$ -	\$ 23,737,374
06-01-95	0	0	\$ -	\$ 1,775,000

3/26/1995	0	0	\$ 1,000	\$ -
06-06-95	0	0	\$ 70,000	\$ -
8/28/1995	0	0	\$ 5,000	\$ 1,000
08-04-96	0	0	\$ 10,000	\$ -
5/15/1998	0	0	\$ 90,000	\$ 10,000
6/18/1998	0	0	\$ 1,000	\$ -
6/27/1998	0	0	\$ 3,000	\$ -
7/15/1998	0	0	\$ 1,000	\$ -
7/20/1998	0	0	\$ 5,000	\$ -
06-05-99	0	0	\$ 5,000	\$ -
06-06-99	0	0	\$ 3,000	\$ -
7/30/1999	0	0	\$ 2,000	\$ -
6/15/2000	0	0	\$ 3,000	\$ -
04-06-01	0	0	\$ 15,000	\$ -
04-06-01	0	0	\$ 10,000	\$ -
04-06-01	0	0	\$ 3,000	\$ -
04-06-01	0	0	\$ 3,000	\$ -
04-06-01	0	0	\$ 2,000	\$ -
6/18/2001	0	0	\$ 10,000	\$ 1,000
6/18/2001	0	0	\$ 5,000	\$ -
07-09-03	0	0	\$ 2,000	\$ -
4/17/2004	0	0	\$ 15,000	\$ -
06-08-04	0	0	\$ 5,000	\$ -
06-12-04	0	0	\$ 2,000	\$ -
08-01-06	0	0	\$ 50,000	\$ 5,000
10-04-06	0	0	\$ 10,000	\$ 15,000
7/19/2006	0	0	\$ 5,000	\$ -
7/19/2006	0	0	\$ 5,000	\$ -
05-02-08	0	0	\$ 10,000	\$ -
07-07-08	0	0	\$ 5,000	\$ -
07-07-08	0	0	\$ 3,000	\$ -
07-07-08	0	0	\$ 2,000	\$ -
07-10-09	0	0	\$ 25,000	\$ 50,000
6/25/2010	0	0	\$ 2,000	\$ -
6/25/2010	0	0	\$ 2,000	\$ -
07-01-11	0	0	\$ 25,000	\$ -
09-02-11	0	0	\$ 250,000	\$ 100,000
09-02-11	0	0	\$ 5,000	\$ 10,000
09-02-11	0	0	\$ 3,000	\$ 25,000
8/23/2011	0	0	\$ 10,000	\$ 150,000
8/23/2011	0	0	\$ 5,000	\$ -

04-09-11	0	0	\$ 300,000	\$ -
04-09-11	0	0	\$ 25,000	\$ -
05-04-12	0	0	\$ 10,000	\$ -

Source: Hazards and Vulnerability Research Institute, 2012

The planning committee determined that thunderstorms and lightning events affect Worth County more than a 33% probability in any given year or as highly likely based on available data.

Hazard	Thunderstorms and Lightning	Score
Location	Countywide	-
Probability	<p>Between 1962 and September of 2012, at least 83 severe thunderstorm events have impacted Worth County. Because thunderstorms occur singly, in clusters, or in lines, it is possible that several thunderstorms may affect the same area over the course of a few hours and only be listed as one occurrence. It is highly possible that more than 83 severe thunderstorm events have happened since 1962. Worth County has experienced 12 reported lightning events between 1965 and 1998, causing \$305,495 in property damage. However with an average of 25 million lightning strikes in the US in any given year, there are probably more than 12 events that happened in Worth County.</p> <p>The State of Iowa experiences between 30 and 50 thunderstorm days per year on average. With Iowa's and Worth County's location located in the interior of the US, there is a very high likelihood that a few of these thunderstorms will become severe and cause damage. Due to the humid continental climate that Iowa experiences, ingredients of a severe thunderstorm is usually available (moisture to form clouds and rain, relatively warm and unstable air that can rise rapidly, and weather fronts and convective systems that lift air masses).</p>	4
Magnitude/ Severity	<p>Those in unprotected areas, mobile homes, or automobiles during a storm are at risk. Sudden strong winds often accompany a severe thunderstorm and may blow down trees across roads and power lines. Lightning presents the greatest immediate danger to people and livestock during a thunderstorm. It is the second most frequent weather-related killer in the US with nearly 100 deaths and 500 injuries each year. (Floods and flash floods are the number one cause of weather related deaths in the US. Livestock and people who are outdoors, especially under a tree or other natural lightning rods, in or on water, or on or near hilltops are at risk from lightning. Hail can be very dangerous to people, pets, and livestock if shelter is not available. Flash floods and tornadoes can develop during thunderstorms as well. People who are in automobiles or along low-lying areas when flash flooding occurs and people who are in mobile homes are vulnerable to the impacts of severe thunderstorms.</p> <p>Severe thunderstorms can be quite expansive with areas of localized severe conditions. Most severe thunderstorm cells are 5 to 25 miles wide with a larger area of heavy rain and strong winds around the main cell. Most non-severe thunderstorms have a lifespan of 20 to 30 minutes, while thunderstorms last longer than 30 minutes.</p>	2

	<p>Like tornadoes, thunderstorms and lightning can cause death, serious injury, and substantial property damage. The power of lightning's electrical charge and intense heat can electrocute people and livestock on contact, split trees, ignite fires, and cause electrical failures. Thunderstorms can also bring large hail that can damage homes and businesses, break glass, destroy vehicles, and cause bodily harm to people, pets, and livestock.</p> <p>High winds can damage trees, homes, mobile homes, and businesses and can knock vehicles off of the road. Straight-line winds are responsible for most thunderstorm damage. One or more severe thunderstorms occurring over a short period (especially saturated ground) can lead to flooding and cause extensive power and communication outages as well as agricultural damage.</p>	
Warning Time	<p>Some thunderstorms can be seen approaching, while other hit without warning. The NWS issues severe thunderstorm watches and warnings as well as statements about severe weather and localized storms. These messages are broadcast over NOAA Weather Alert Radios and area TV and radio stations. Advances in weather prediction and surveillance have increased warning times. The resolutions of radar and Doppler radar have increased the accuracy of storm location and direction. Weather forecasting and severe weather warnings issued by the NWS usually provide residents and visitors alike adequate time to prepare. Isolated problems arise when warnings are ignored.</p>	3
Duration	<p>The immediate response related to severe thunderstorm and lightning events are more aptly associated with the cascading effects of multiple events occurring over a short amount of time in the case of flash and river flooding, and in particularly severe thunderstorm events in the case of tornadoes. Response to thunderstorm events is relatively minor in scope.</p>	2

Sources for Thunderstorms and Lightning	
NCDC	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
FEMA	http://www.fema.gov/hazard/thunderstorm/index.shtm

Tornado

A tornado is a violently rotating column of air, in contact with the ground, either pendant from a cumuliform cloud or underneath a cumuliform cloud, or often (but not always) visible as a funnel cloud. A tornado is an extremely violent local storm. A tornado is most commonly associated with a cumulonimbus cloud and can occur with heavy rainfall, lightning and hail. The vortex of the tornado usually rotates cyclonically although on rare occasions they have been observed to rotate anti-cyclonically. Wind speeds have been observed to as low as 40 mph to as high as 300 mph. Wind speeds are estimated on the basis of wind damage using the Enhanced Fujita scale or EF scale (**Tables 24-25**). Tornadoes occur most commonly in the Midwest region of the United States but can occur anywhere.

In the US, Iowa is ranked third in the number of tornadoes per 10,000 square miles. Between 1964 and 2008 according to the Hazards and Vulnerability Research Institute, there have been 11 recorded tornado events in Worth County causing 4 injuries, \$2,305,000 in estimated property damage, and \$306,000 in estimated crop damage. The scales of the four most recent tornadoes are given in the table below. These are considered to be events of light or moderate damage. The scale definitions of tornadoes are given later in this chapter.

Table 24 - Tornado Activity in Worth County

Date	INJURIES	FATALITIES	Property Damage	Crop Damage	Scale
8/29/1964	0	0	\$ 50,000.00	\$ 5,000.00	-
4/30/1967	0	0	\$ 500,000.00	\$ -	-
4/30/1967	1	0	\$ 500,000.00	\$ -	-
4/30/1967	0	0	\$ 50,000.00	\$ -	-
07/12/1971	0	0	\$ 250,000.00	\$ 250,000.00	-
5/28/1974	3	0	\$ 500,000.00	\$ 5,000.00	-
9/20/1980	0	0	\$ 250,000.00	\$ 25,000.00	-
5/15/1998	0	0	\$ 150,000.00	\$ 15,000.00	F1
08/09/1999	0	0	\$ 50,000.00	\$ 5,000.00	F2
06/07/2008	0	0	\$ 5,000.00	\$ -	EFO
06/07/2008	0	0	\$ -	\$ 1,000.00	EFO

Source: Hazards and Vulnerability Research Institute, 2012

Hazard	Tornado	Score
Location	Countywide	-
Probability	In the US, Iowa is ranked third in the number of tornadoes per 10,000 square miles. Based on the available data for both Iowa and Worth County given above, tornadoes can be considered to have a likely probability of occurring. The county planning committee determined that a tornado will likely occur in Worth County in any given year.	3
Magnitude/ Severity	Those most at risk from tornadoes include people living in mobile homes, campgrounds, and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to twisters. The elderly, very young, and physically and mentally handicapped are most vulnerable because of the lack of mobility to escape the path of destruction. People who may not understand watches and warnings due to language barriers are also at risk. Generally the destructive path of a tornado is only a couple hundred feet in width, but stronger tornadoes can leave a path of devastation up to a mile wide. Normally a tornado will stay on the ground for no more than 20 minutes; however, one tornado can touch ground several times in different areas. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may	2

	<p>cause significant damage to a wider area.</p> <p>Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows; all the way to complete destruction and disintegration of well-constructed structures, infrastructure, and trees. Tornadoes can impact many critical services, mainly electrical power. Buried services are not as vulnerable, but can be affected by their system components that are above ground.</p> <p>Whole towns have been known to be “wiped off the map.” Economic impacts can result from direct damages to facilities or business disruption from the lack of critical services such as power, gas, or water.</p> <p>Currently the severity of tornadoes is measured by intensity based upon the Enhanced Fujita Scale.</p> <p>The severity of a tornado is measured by using 5 different factors.</p> <ol style="list-style-type: none"> 1. The size of the tornado, with an EF-5 tornado being the most severe. 2. The amount of time a tornado stays on the ground. 3. The time of day will determine the number of people in vehicles. 4. The location within the county the tornado hits. 5. The density of the population at the point of impact. 	
Warning Time	Tornadoes strike with an incredible velocity. Wind speeds may exceed 300 mph and the storm can travel across the ground at more than 70 mph. These winds can uproot trees and structures and turn harmless objects	4
Duration	The response to a tornado event is tied to responding to the immediate threat to life and property immediately following the tornado event and in the shelter of affected families and individuals.	1

Sources for Tornadoes	
NCDC	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
FEMA	http://www.fema.gov/hazard/tornado/index.shtml
NOAA National Weather Service	http://www.crh.noaa.gov/images/dmx/IowaTorClimatology.pdf
FEMA Declared Disasters	http://www.fema.gov/femaNews/disasterSearch.do

Figure 6 - Tornado Activity in the U.S.

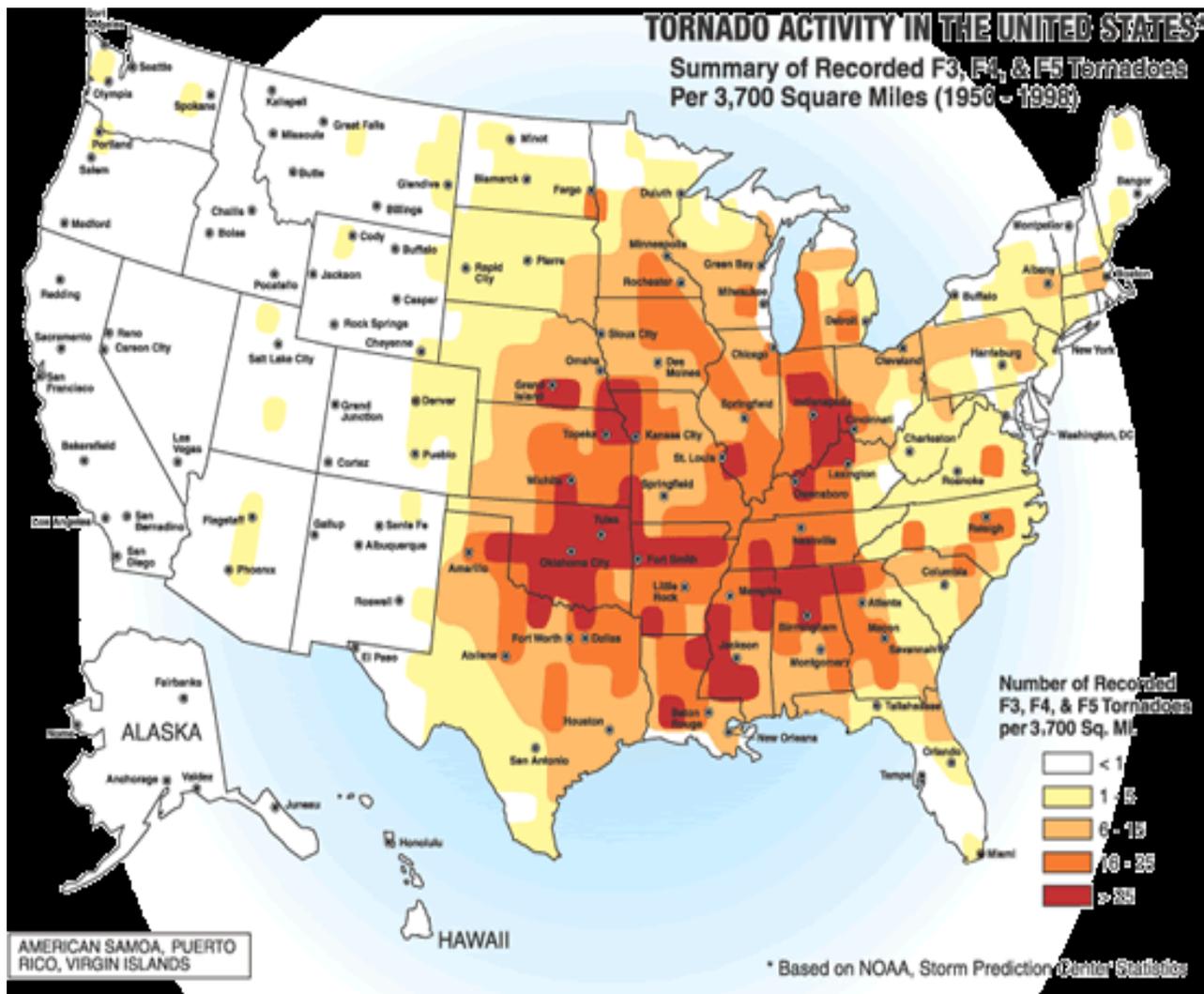


Table 25 - Enhanced Fujita Scale

EF Number	3-Second Gust(mph)	Description of Damage
0	65-85	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
1	86-110	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads
2	111-135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
3	136-165	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
4	166-200	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
5	Over 200	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

Table 26 - Fujita Scale used prior to February 2007

Scale	Wind Speed (MPH)	Typical Damage
F-0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F-1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F-2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F-3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F-4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F-5	261+	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

Transportation Incident

This hazard encompasses the following hazards: air transportation incident, highway transportation, railway transportation, and waterway incident. This includes a transportation accident involving any mode of transportation 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, goods, services for business and recreation. A variety of circumstances can result in an air transportation incident; mechanical failure, pilot error, enemy attack, terrorism, weather conditions, and on-board fire can all lead to an incident at or near the airport. Air transportation incidents can occur in remote unpopulated areas, residential areas, or

downtown business districts, incidents involving military, commercial, or private aircraft can also occur while the aircraft is on the ground.

Worth County has one known public airport, which is located 1 mile east of Northwood. The Northwood municipal airport has a runway that is 2,660ft. The airport is a local service airport. No commercial services are offered at the airport. Anyplace in Worth County could experience a significant air transportation incident; the most likely scenarios exist near airports.

More and more people are utilizing air travel now than in the past; the trend of increasing numbers of people flying is likely to continue as will the crowdedness of airports and the skies above Iowa. Despite the increase in the number of people using air travel, incidents that require response personnel and involve casualties are likely to continue to decrease in number due to increases in the quality of training, equipment, and safety. Proper land-use near the airport will also decrease the chance that people and property on the ground will suffer significant impacts in the event of an air transportation accident.

A highway transportation incident can be single or multi-vehicle requiring responses exceeding normal day-to-day capabilities. An extensive surface transportation network exists in Iowa; local residents, travelers, business, and industry rely on this network on a daily basis. Hundreds of thousands of trips a day are made on the streets, roads, and highways of Worth County. The design capacity of the roadway if exceeded has the potential for increasing the occurrences of a serious highway incident. Weather conditions play a major role in the ability of traffic to flow safely in and through the county as does the time of day and day of week and time of the year (planting and harvest). Incidents involving busses and other high-occupancy vehicles could trigger a response that exceeds the normal day-to-day capabilities of local response agencies.

Between 2004 and 2008 (latest data available) in rural Worth County there were 616 vehicle crashes, 8 were fatal, 29 were classified as major, 78 were classified as minor, 86 possible/unknown, and 415 property damage only. Out of these 616 crashes, there were 275 injuries. Data is currently not available for the urban areas.

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

A railway transportation incident is a train accident that directly threatens life and/or property or adversely impacts a community's capabilities ability to provide emergency services. Railway incidents may include derailments, collisions, and highway/rail crossing accidents. Train incidents can result from a variety of causes; human error, mechanical failure, faulty signals, and/or problems with the track. Results of an incident can range from minor "track hops" to catastrophic hazardous material incidents and even

human/animal casualties. With the many miles of track in Iowa, vehicles must cross the railroad tracks at numerous at-grade crossings.

According to the Federal Railroad Administration Office of Safety Analysis there have been 3 reported highway-rail incidents from 2004 to 2012. This included 2 incidents in 2008 and 1 incident in 2010. There were no reported deaths, but one of the incidents in 2008 had a reported injury. With street and highway crossings the probability of an incident is more likely to happen. Derailments are also possible, while a major derailment would occur less frequently.

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

There have been no disasters causing waterway incidents in Iowa and Worth County. There have been search and rescue events involving a single person or small boats with only a few people on board. There are no navigable waterways in Worth County that are used for commercial purposes.

Hazard	Transportation Incident	Score
Location	Countywide	-
Probability	<p>More and more people are utilizing air travel now than in the past; the trend of increasing numbers of people flying is likely to continue as will the crowdedness of airports and the skies above Iowa. Despite the increase in the number of people using air travel, incidents that require response personnel and involve casualties are likely to continue to decrease in number due to increases in the quality of training, equipment, and safety. Proper land-use near the airport will also decrease the chance that people and property on the ground will suffer significant impacts in the event of an air transportation accident.</p> <p>Between 2004 and 2008 (latest data available) in rural Worth County there were 616 vehicle crashes, 8 were fatal, 29 were classified as major, 78 were classified as minor, 86 possible/unknown, and 415 property damage only. Out of these 616 crashes, there were 275 injuries. Data is currently not available for the urban areas.</p> <p>Although traffic engineering, inspection of traffic facilities, land use management of adjacent areas to roads and highways, and the readiness of local response agencies has increased, highway incidents continue to occur. As the volume of traffic on Iowa streets, highways, and interstates increase, the number of traffic accidents will increase. The combination of large numbers of people on the road, unpredictable</p>	4

	<p>weather conditions, potential mechanical problems, and human error create the potential for a transportation accident.</p> <p>According to the Federal Railroad Administration Office of Safety Analysis there have been 3 highway-rail incidents from 2004 to 2012. This included 2 incident in 2008 and 1 incident in 2010. There were no deaths, but one of the incidents in 2008 had an injury. With street and highway crossings the probability of an incident is more likely to happen. Derailments are also possible, while a major derailment would occur less frequently.</p> <p>There have been no disasters causing waterway incidents in Iowa and Worth County. There have been search and rescue events involving a single person or small boats with only a few people on board. There are no navigable waterways in Worth County that are used for commercial purposes.</p> <p>Overall, highway incidents are highly likely to occur while other transportation incidents are unlikely to occur.</p>	
<p>Magnitude/ Severity</p>	<p>People aboard airplanes are the most vulnerable. 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. As a result, developed areas adjacent to the airports and in airport flight paths are particularly vulnerable to this hazard. For areas away from the airport, a smaller percentage of the population would be directly in the area of impact. Because of the infrequency of aircraft in the skies above areas away from the airport, these areas would not be considered as vulnerable.</p> <p>A mentioned above, most accidents occur during takeoffs and landings. Accordingly, the spatial extent of the majority of incidents would occur on airport grounds or adjacent areas. Compared to many other hazards, an air transportation accident would occupy a relatively small area. The extent to which the impacts would be felt would depend on the materials involved. For example, if a cargo plan transporting volatile or hazardous materials were involved in an accident, the area of concern would be significantly larger than the area for an accident involving a small personal aircraft carrying stable materials.</p> <p>Users of surface transportation systems are the most vulnerable. Travelers, truckers, delivery personnel, and commuters are at risk at all times that they inhabit the roadway. Certain times of the day, week, and year the number of vehicles and people on the roadway are significantly higher. This is also true after major public events; sports, concerts, etc. Pedestrians are less vulnerable but not immune from the impacts of a highway incident.</p> <p>Highway incidents are usually contained to areas on the roadway or directly adjacent to the roadway. Very few highway incidents affect areas outside the traveled portion of the road and the right-of-way. Extensive segments of the transportation system can be impacted during significant weather events, such as a large snowstorm, when multiple separate</p>	<p>1</p>

	<p>accidents occur. The area of impact can extend beyond the localized areas if the vehicle(s) involved transporting hazardous materials.</p> <p>People and property near railway lines, crossings, sidings, switching yards, and loading/unloading points are more at risk. Those away from railways and facilities are vulnerable only to large-scale incidents including those in which hazardous material are involved.</p> <p>The railways that traverse Worth County include the UP (Union Pacific). These railways provide services to haul grain, chemicals, farm equipment and ethanol from the producers of these materials in Worth County. The railways go through the towns of Lake Mills and Scarville. There is a railway spur that ends in Forest City that is no longer active. Harmful products may contaminate streams, rivers, lakes, and entire watersheds. If this would happen a large portion of the community or county could be affected. The ability of response personnel to contain the product on-scene usually limits the area affected.</p> <p>Passengers of watercraft are vulnerable to a waterway incident. The maximum extent of a waterway incident would be limited. Impacts would not extend beyond the initial incident scene. The only exception would be during a search and rescue event that could expand downstream. In the case of a hazardous material being released to the waterway the extent could expand rapidly.</p>	
Warning Time	The amount of warning time for a transportation incident could vary from tens of minutes to a few seconds. Operators of aircraft, vehicles, trains, and watercraft are affected by the road conditions and weather. There is not enough ample warning time attributed to these hazards.	4
Duration	Instances of transportation incidents, particularly rail, air and waterway related hazards are likely to create more intensive response and resources to protect life and safety of those affected. High incidents, which occur most frequently, require less intensive resources.	1

Sources for Transportation Incident	
US DOT	http://hazmat.dot.gov/
Federal Railroad Administration	http://fra.dot.gov/safety/hazmat.htm
NTSB	http://www.nts.gov/
Federal Aviation Administration	http://www.faa.gov/
Iowa Crash Statistics	http://ai.fmcsa.dot.gov/CrashProfile/StateCrashProfileMain.asp?StCd=IA
IDNR	http://www.iowadnr.gov/law/boating/index.html

Windstorm

Windstorms can be described as extreme winds associated with severe winter storms, severe thunderstorms, downburst, and very steep pressure gradients. Windstorms, other than tornadoes, are experienced in all regions of the United States. It is difficult to separate the various wind components that cause damage from other wind-related natural events that often occur with or generate windstorms. The Wind Scale is provided in Table 27.

Although Iowa does not experience direct impacts from hurricanes, the state is no stranger to strong, damaging winds. Unlike tornadoes, windstorms may have a destructive path that is tens of miles wide and the duration of the event could range from hours to days. These events can produce straight line winds in excess of 64 knots causing some power outages, property damage, impaired visibility, and crop damage.

Wind-related events, such as windstorms, can occur Worth County. Historically, windstorms are associated with severe thunderstorms and blizzards. It is difficult to separate windstorms and tornado damage when winds get above 64 knots (73MPH).

The NWS has developed a windstorm warning system similar to other events such as, tornado, winter storm, and thunderstorm. Watches are issued when conditions are favorable for windstorms to develop and they come 12 to 24 hours in advance. Advisories are issued when existing or imminent windstorms cover part or all of the area and pose a mere inconvenience. Windstorm warnings are issued when existing or imminent high winds cover part or all of the forecast area and pose a threat to life and property.

According to the Hazards and Vulnerability Research Institute, Worth County has had a total of 180 reported wind-related events from 1963 to 2012. Combined with other hazards, these wind events have caused a total of \$4,947,307 in property damage and \$2,750,878 in crop damage.

Even though wind-related events at various degrees are highly likely to occur, the Worth County planning committee determined that windstorms separate from severe winter storms and thunderstorms/lightning/hailstorms are unlikely to occur.

Hazard	Windstorm	Score
Location	Countywide	-
Probability	Historically, windstorm events are associated with severe thunderstorms and winter storms. Also, it is difficult to separate windstorms and tornado damage when winds get above 64 knots (73MPH). Worth County has experienced 180 wind-related events from 1963 to 2012. However, the planning committee determined that an actual windstorm independent of other hazards is unlikely to occur. Furthermore, the Beaufort Wind Scale from NOAA (Table 27) states that wind-related events considered storms seldom occur on land.	1

Magnitude/ Severity	<p>Those most at risk from windstorms include living in mobile homes, campgrounds, and other dwellings without secure foundations or basements. People in automobiles are also very vulnerable to wind storms, particularly tornadoes. The elderly, very young, and the physically and mentally handicapped are most vulnerable because of the lack of mobility to seek shelter or escape the path of destruction. People who may not understand watches and warnings due to language barriers are also at risk.</p> <p>Unlike tornadoes, windstorms may have a destructive path that is tens of miles wide and several hundred miles long. Large hail, strong straight-line winds, heavy rains, flash flooding, and lightning are also associated with severe storms and may cause significant damage to a wider area.</p> <p>Disruption of critical services can also affect operations. Employees may be affected and unable to attend work-related issues. Impacts can range from broken tree branches, shingle damage to roofs, and some broken windows; all the way to complete destruction of well-constructed structures, infrastructure, and trees.</p> <p>Windstorms can affect many critical services, especially electrical power. Buried services are not as vulnerable, but can be affected by their system components that are above ground.</p> <p>Economic impacts can result from direct damages to facilities or business disruption from the lack of critical services such as power. Crop damage is often associated with windstorms; laying down crops, breaking stalks, and twisting plants, reducing the yield and making it difficult to harvest.</p>	2
Warning Time	<p>Wind speeds may approach 120 miles per hour and the storm can travel across the ground at more than 50 mph. These winds can uproot trees and structures and turn harmless objects into deadly missiles, all in a matter of seconds. The development of conditions suitable for high and strong wind events is available a day in advance. The advancement in weather forecasting has allowed watches to be delivered to those in the path of these storms up to hours in advance. The best warning lead-time for a specific severe storm is about 30 minutes.</p>	4
Duration	<p>The response tied to windstorm events is one directly related to the immediate protection of vulnerable populations from the direct threat to life and property. Response time is limited to event duration and immediate impact.</p>	2

Sources for Windstorms	
NCDC	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
FEMA	http://www.fema.gov/hazard/tornado/index.shtm

Table 27 - Beaufort Wind Scale

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind determined on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4ft. becoming longer, numerous whitecaps	Dust, leaves and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 ft, white foam streaks off breakers	Whole trees moving, resistance determined walking against wind
8	34-30	Gale	Moderately high (13-20 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance determined walking against wind
9	41-47	Strong Gale	High waves (20 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 ft) with overhanging crests sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (30-45 ft) waves, foam patches cover sea, visibility more reduced	NA
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	NA

Source: National Oceanic and Atmospheric Administration, 2013

Hazards Not Considered

There are many hazards that are identified by the Federal Emergency Management Agency and the State of Iowa that do not apply to Worth County or were not considered to be profiled by the Worth Planning Committee. The following table identifies the hazards that are not included in this plan and the reason they were excluded.

Table 28 - Excluded Hazards

Hazard Excluded	Reasoning
Expansive Soils	Expansive soils hazard and risk information provided by Iowa HLSEM, the Multi-Hazard Identification and Risk document, USGS, and the Worth County Emergency Management Coordinator indicated the level of risk associated with expansive soils was slight with little swelling clay potential.
Landslide	Minor landslides and rock falls do occur in Worth County. Due to the geography and incident rate information provided by HLSEM, that any landslide that may occur is only going to be small and cause only minor damage with no threats to human safety and minimal threats to property.
Levee Failure	Planning committee research revealed no records of levees in the planning area. The National Levee Database, maintained by the U.S.A.C.E., shows no federal levees located in Worth County. While it is likely that levees exist, such as low-head agricultural levees, no records indicate that the breach or overtopping of these levees would impact property other than that of the levee owner. Significant damage to residential structures is unlikely.
Sink Holes	Not profiled due to no or low occurrence in the county according to the committee. Measures are in place for rescue due to a sink hole if necessary.

CHAPTER IV. Hazard Scoring & Prioritization

The Worth County hazard mitigation planning committees reviewed discussed and scored all of the hazards that might impact their community. The chart that follows shows a breakdown of the scoring for each hazard that was identified. The following tables show the scoring summary for Worth County and its jurisdictions. Jurisdictions scored some of the hazards different than the county and that is reflected in that particular jurisdictions table, also some communities elected to not score some of the hazards and their justification is listed after each respective hazard. The weighted score is calculated by using the following formula: $(Probability \times .45) + (Magnitude/Severity \times .30) + (Warning Time \times .15) + (Duration \times .10) = \text{Final Hazard Assessment Score}$. The scores allow priorities to be assigned to the hazards

Table 29 - Worth County Hazard Scores

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	2	2	2	4	10	2.2
Dam Failure	1	1	4	1	7	1.45
Drought	2	2	1	4	9	2.05
Earthquake	1	1	4	1	7	1.45
Extreme Heat	3	2	1	3	9	2.4
Flash Flood	3	2	4	3	12	2.85
Grass or Wildland Fire	4	2	4	1	11	3.1
Hailstorm	3	2	4	1	10	2.65
Hazardous Materials	1	3	4	1	9	2.5
Human Disease	2	2	2	4	10	2.2
Infrastructure Failure	1	2	4	3	10	1.95
Radiological	1	2	4	1	8	1.75
River Flooding	3	2	3	2	10	2.6
Severe Winter Storm	3	2	1	3	9	2.4
Terrorism	1	1	4	1	7	1.45
Thunderstorms and Lightning	4	2	3	2	11	3.05
Tornado	3	2	4	1	10	2.65
Transportation Incident	4	1	4	1	10	2.8
Windstorm	1	2	4	2	9	1.85

Table 30 - Fertile Hazard Scores

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	2	1	4	1	8	1.9
Dam Failure	1	1	3	2	7	1.4
Drought	1	1	1	4	7	1.3
Earthquake	1	4	4	1	10	2.35
Extreme Heat	3	2	3	4	12	2.8
Flash Flood	4	3	3	3	13	3.45
Grass or Wildland Fire	2	2	4	1	9	2.2
Hailstorm	3	2	4	1	10	2.65
Hazardous Materials	1	1	4	1	7	1.45
Human Disease	2	2	4	4	12	2.5
Infrastructure Failure	3	2	4	3	12	2.85
Radiological	1	2	4	2	9	1.85
River Flooding	4	3	3	4	14	3.55
Severe Winter Storm	2	2	3	3	10	2.25
Terrorism	2	2	4	1	9	2.2
Thunderstorms and Lightning	4	2	4	1	11	3.1
Tornado	1	4	4	1	10	2.35
Transportation Incident	3	2	4	1	10	2.65
Windstorm	4	2	4	1	11	3.1

Table 31 - Grafton Hazard Scores

The Grafton planning committee determined to not score River Flooding due to no river being located within or near the community. They also did not score Dam Failure based on no dam existing in or near Grafton.

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	2	2	4	3	11	2.4
Drought	2	2	1	4	9	2.05
Earthquake	1	1	4	1	7	1.45
Extreme Heat	3	2	1	4	10	2.5
Flash Flood	2	3	4	3	12	2.7
Grass or Wildland Fire	1	1	4	1	7	1.45
Hailstorm	2	3	4	1	10	2.5
Hazardous Materials	2	2	4	3	11	2.4
Human Disease	1	2	2	4	9	1.75
Infrastructure Failure	2	2	4	4	12	2.5
Radiological	1	4	4	4	13	2.65
River Flooding						
Severe Winter Storm	4	1	3	3	11	2.85
Terrorism	1	3	4	4	12	2.35
Thunderstorms and Lightning	4	2	4	2	12	3.2
Tornado	4	4	4	1	13	3.7
Transportation Incident	1	2	4	2	9	1.85
Windstorm	4	2	3	3	12	3.15

Table 32 - Hanlontown Hazard Scores

The Hanlontown planning committee determined to not score Animal/Plant/Crop Diseases based on there not being a significant amount of agricultural land within the incorporated area. They also did not score Dam Failure based on no dam existing in or near Grafton.

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
Drought	2	2	1	4	9	2.05
Earthquake	1	3	4	1	9	2.05
Extreme Heat	4	1	1	4	10	2.65
Flash Flood						
Grass or Wildland Fire	4	4	4	2	14	3.8
Hailstorm	2	3	4	1	10	2.5
Hazardous Materials	1	4	4	2	11	2.45
Human Disease	1	1	4	4	10	2.05
Infrastructure Failure	2	3	4	4	13	2.8
Radiological	1	4	4	4	13	2.65
River Flooding						
Severe Winter Storm	4	3	2	4	13	3.4
Terrorism	1	4	4	2	11	2.45
Thunderstorms and Lightning	4	2	2	1	9	2.8
Tornado	2	4	4	1	11	2.8
Transportation Incident	4	4	4	2	14	3.8
Windstorm	2	4	4	1	11	2.9

Table 33 - Joice Hazard Scores

The Joice planning committee determined to not score Dam Failure based on no dam existing in or near the incorporated area

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
A/P/C Disease	1	1	4	4	10	1.75
Drought	3	3	1	4	11	2.8
Earthquake	1	1	3	4	9	1.6
Extreme Heat	4	2	1	2	9	2.75
Flash Flood	2	2	3	2	9	2.15
Grass or Wildland Fire	1	1	4	2	8	1.55
Hailstorm	4	3	3	1	11	3.25
Hazardous Materials	2	2	4	1	9	2.20
Human Disease	1	2	4	4	11	2.05
Infrastructure Failure	1	1	4	4	10	1.75
Radiological	1	3	4	4	12	2.35
River Flooding						
Severe Winter Storm	4	2	2	2	10	2.9
Terrorism	1	3	4	2	10	2.15
Thunderstorms and Lightning	4	2	3	1	10	2.95
Tornado	4	4	3	1	12	3.55
Transportation Incident	2	1	4	1	8	1.9
Windstorm	1	3	4	2	10	2.15

Table 34 - Kensett Hazard Scores

Earthquake, Grass or Wildland Fire, Radiological, River Flooding, and Terrorism were eliminated by the planning committee because of no known hazards. Earthquake was eliminated due to no known historical occurrences and the 0% rating given by the USGS for potential ground movement. River flooding was removed due to no river within the community.

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
Drought	4	2	1	4	11	2.95
Extreme Heat	2	1	1	3	7	1.65
Flash Flood	2	2	2	2	8	2
Hailstorm	2	1	3	1	7	1.75
Hazardous Materials	1	2	4	3	10	1.95
Human Disease	1	3	1	4	9	1.9
Infrastructure Failure	1	2	4	3	10	1.95
Severe Winter Storm	4	2	1	3	10	2.85
Thunderstorms and Lightning	4	2	3	2	11	3.05
Tornado	1	4	4	1	10	2.35
Transportation Incident	2	1	4	1	8	1.9
Windstorm	1	2	4	1	8	1.75

Table 35 - Manly Hazard Scores

The Manly planning committee removed A/P/C Disease, Dam Failure, Drought, Earthquake, Extreme Heat, Grass or Wildland Fire, Human Disease, and Terrorism because of no known hazards.

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
Flash Flood	2	2	3	2	9	2.15
Hailstorm	3	3	3	1	10	2.80
Hazardous Materials	1	3	4	3	11	2.25
Infrastructure Failure	1	1	4	1	7	1.45
Radiological	1	3	4	3	11	2.25
River Flooding	2	2	2	3	9	2.1
Severe Winter Storm	4	3	2	3	12	3.3
Thunderstorms and Lightning	4	2	3	1	10	2.95
Tornado	3	4	4	1	12	3.25
Transportation Incident	2	1	4	1	8	1.9
Windstorm	3	2	3	1	9	2.5

Table 36 - Northwood Hazard Scores

A/P/C Disease was eliminated due to no known hazards present within the community and most types of this hazard occur outside the community. Earthquake was eliminated due to no known historical occurrences and the 0% rating given by the USGS for potential ground movement

Hazard	Probability	Magnitude / Severity	Warning Time	Duration	Total Score	Weighted Score
Drought	2	2	1	4	9	2.05
Extreme Heat	4	2	1	3	10	2.85
Flash Flood	3	2	4	2	11	2.75
Grass or Wildland Fire	1	1	4	1	7	1.45
Hailstorm	2	2	4	1	9	2.2
Hazardous Materials	3	2	4	2	11	2.75
Human Disease	1	2	1	4	10	1.6
Infrastructure Failure	2	2	4	1	9	2.2
Radiological	1	2	4	4	11	2.05
River Flooding	4	1	2	3	10	2.7
Severe Winter Storm	4	3	2	3	12	3.3
Terrorism	1	1	4	2	8	1.55
Thunderstorms and Lightning	4	2	3	2	11	3.05
Tornado	2	3	4	1	10	2.5
Transportation Incident	4	2	4	2	12	3.2
Windstorm	2	2	2	2	8	2.0

HAZARD PRIORITIZATION

Hazard Mitigation planning committee has scored and identified the hazards affecting their community. They examined each hazard in relation to the risk it posed to the county. The committee then gave each identified hazard a priority level. The weighted score served to give the committee a basis to put the hazards in a priority level which then determined which mitigation measures to put with each hazard. The following tables show the priority levels for each jurisdiction starting with the County. Priority Group 1 hazards are candidates for immediate focus in the emergency plans because of their high risk. Priority Group 2 hazards are those hazards that should be addressed, but are longer-term in focus. These are low-risk hazards that can affect the community, but will not be addressed immediately. Priority Group 3 hazards are those that have an acceptable level of risk. In the happenstance that the weighted score is the same between two or more hazards the hazards are listed in alphabetical order.

Table 37 - Hazard Priorities in Worth County

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Grass or Wildland Fire	3.1	1
2	Thunderstorms and Lightning	3.05	
3	Flash Flood	2.85	
4	Transportation Incident	2.8	
5	Hailstorm	2.65	
6	Tornado	2.65	
7	River Flooding	2.6	
8	Hazardous Materials	2.5	2
9	Extreme Heat	2.4	
10	Severe Winter Storm	2.4	
11	A/P/C Disease	2.2	
12	Human Disease	2.2	
13	Drought	2.05	3
14	Infrastructure Failure	1.95	
15	Windstorm	1.85	
16	Radiological	1.75	
17	Dam Failure	1.45	
18	Earthquake	1.45	
19	Terrorism	1.45	

Table 38 - Hazard Priorities in Fertile

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	River Flooding	3.55	1
2	Flash Flood	3.45	
3	Thunderstorms and Lightning	3.1	
4	Windstorm	3.1	
5	Infrastructure Failure	2.85	
6	Extreme Heat	2.8	
7	Hailstorm	2.65	2
8	Transportation Incident	2.65	
9	Human Disease	2.5	
10	Earthquake	2.35	
11	Tornado	2.35	
12	Severe Winter Storm	2.25	
13	Grass or Wildland Fire	2.2	3
14	Terrorism	2.2	
15	A/P/C Disease	1.9	
16	Radiological	1.85	
17	Hazardous Materials	1.45	
18	Dam Failure	1.4	
19	Drought	1.3	

Table 39 - Hazard Priorities in Grafton

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Tornado	3.7	1
2	Thunderstorms and Lightning	3.2	
3	Windstorm	3.15	
4	Severe Winter Storm	2.85	
5	Flash Flood	2.7	
6	Radiological	2.65	
7	Extreme Heat	2.5	2
8	Hailstorm	2.5	
9	Infrastructure Failure	2.5	
10	A/P/C Disease	2.4	
11	Hazardous Materials	2.4	
12	Terrorism	2.35	
13	Drought	2.05	3
14	Transportation Incident	1.85	
15	Human Disease	1.75	
16	Earthquake	1.45	
17	Grass or Wildland Fire	1.45	

Table 40 - Hazard Priorities in Hanlontown

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Grass or Wildland Fire	3.8	1
2	Transportation Incident	3.8	
3	Severe Winter Storm	3.4	
4	Windstorm	2.9	
5	Infrastructure Failure	2.8	
6	Thunderstorms and Lightning	2.8	2
7	Tornado	2.8	
8	Extreme Heat	2.65	
9	Radiological	2.65	
10	Hailstorm	2.5	
11	Hazardous Materials	2.45	3
12	Terrorism	2.45	
13	Drought	2.05	
14	Earthquake	2.05	
15	Human Disease	2.05	

Table 41 - Hazard Priorities for Joice

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Tornado	3.55	1
2	Hailstorm	3.25	
3	Thunderstorms and Lightning	2.95	
4	Severe Winter Storm	2.9	
5	Drought	2.8	
6	Extreme Heat	2.75	
7	Radiological	2.35	2
8	Hazardous Materials	2.2	
9	Flash Flood	2.15	
10	Terrorism	2.15	
11	Windstorm	2.15	
12	Human Disease	2.05	
13	Transportation Incident	1.9	3
14	A/P/C Disease	1.75	
15	Infrastructure Failure	1.75	
16	Earthquake	1.6	
17	Grass or Wildland Fire	1.55	

Table 42 - Hazard Priorities for Kensett

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Thunderstorms and Lightning	3.05	1
2	Drought	2.95	
3	Severe Winter Storm	2.85	
4	Tornado	2.35	
5	Flash Flood	2	
6	Hazardous Materials	1.95	2
7	Infrastructure Failure	1.95	
8	Human Disease	1.9	
9	Transportation Incident	1.9	
10	Hailstorm	1.75	3
11	Windstorm	1.75	
12	Extreme Heat	1.65	

Table 43 - Hazard Priorities for Manly

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Severe Winter Storm	3.3	1
2	Tornado	3.25	
3	Thunderstorms and Lightning	2.95	
4	Hailstorm	2.8	
5	Windstorm	2.5	2
6	Hazardous Materials	2.25	
7	Radiological	2.25	
8	Flash Flood	2.15	
9	River Flooding	2.1	3
10	Transportation Incident	1.9	
11	Infrastructure Failure	1.45	

Table 44 - Hazard Priorities for Northwood

Hazard Analysis Ranking	Hazard	Weighted Score Total	Priority
1	Severe Winter Storm	3.3	1
2	Transportation Incident	3.2	
3	Thunderstorms and Lightning	3.05	
4	Extreme Heat	2.85	
5	Flash Flood	2.75	
6	Hazardous Materials	2.75	2
7	River Flooding	2.7	
8	Tornado	2.5	
9	Hailstorm	2.2	
10	Infrastructure Failure	2.2	
11	Drought	2.05	3
12	Radiological	2.05	
13	Windstorm	2	
14	Human Disease	1.6	
15	Terrorism	1.55	
16	Grass or Wildland Fire	1.45	

CHAPTER V. Vulnerability Assessment & Loss Estimates

In order to identify appropriate mitigation techniques and projects the committee determined that it was necessary to identify the assets of the community. The tables that follow lists the Worth County’s assets that would be potentially affected if the entire community was to be impacted by a hazard. Hazards do not typically affect an entire community to complete destruction.

Table 45 - Vulnerability

Type of Structure	Number of Vulnerable Structures		Potential Damages (Loss Estimates)		Number of Vulnerable People	
	# in County	# vulnerable	\$ in County	\$ Loss	# in County	# vulnerable
Residential	1,843	1,843	123,120,712	123,120,712		
Commercial	537	537	70,608,408	70,608,408		
Industrial	191	191	119,919,651	119,919,651		
Agricultural	-	-	21,358,617	21,358,617		
Totals	2571	2571	335,007,388	335,007,388	7,598	

Source: Worth County Auditor’s Abstract Values, 2012

Worth County has identified specific structures in the county as critical facilities and infrastructure. Due to the function and value of the structures in the community, they need to be protected against the identified hazards. The critical facilities maps are located in the appendix of this plan, along with a list of critical facilities.

Table 46 - Critical Facilities Values

Structures listed below are not known to be in a SFHA, more research will be conducted at the next plan update to determine if any of the following structures or possible new structures added to this list at the next plan update currently dwell within an SFHA. These are the critical facility values that were received by the planner by the timeline that was set.

Critical Facility	Replacement Value \$	Content Value \$
Courthouse/Jail/Sheriff 1000 Central Ave Northwood	2,973,010	437,501
Treasurer's Office 822 Central Ave Northwood	381,976	72,215
Engineer's Office North 10 th Street Northwood	432,275	51,387
Maintenance Garage 210 North East Street Northwood	430,486	6,600
Storage Building 210 North East Street Northwood	40,794	6,600
Maintenance Garage 203 North Western Northwood	424,328	3,300
Hoop Storage Building 309 4 th Street Northwood	84,398	-
Quanset Storage 309 4 th Street Northwood	56,633	12,100
Storage building 309 4 th Street Northwood	368,912	15,000
Storage Building 309 4 th Street Northwood	21,040	-
Maintenance Garage 306 13 th Street S	387,065	11,000
Maintenance Garage 400 13 th Street	145,565	6,820
Storage Building 400 13 th Street S	25,469	18,150
Maintenance Garage 201 ½ E Main	121,112	2,750
County Nurse Homemaker Service 95 9 th Street N	122,535	-
Maintenance Garage East 503 1 st Ave N	42,448	15,000
Maintenance Garage West 503 1 st Ave N	53,060	20,000
Bridge east on 430 th Street	37,142	-
Ochee Yahola Park 1284 495 th Street Restrooms and Shelter House	22,815	-
Silver Lake Rec Park 497 500 th Street Restrooms and Shelter House	31,836	-
Kuennen's Quarry Restrooms, Shelter House and Picnic Shelters	252,358	-
Fair Grounds Show Arena	188,939	10,000
Fair Grounds Office	86,311	-
Fair Grounds Restroom x3	293,501	-

Fair Grounds Shelter House	188,939	-
Fair Grounds Storage Building	330,395	-
Worth County Recycling Center	318,362	-
Winn Worth Betco Office 203 North 1 st Ave W	6,200	-
Waste Water Treatment Facility 23998 141 st Street	1,538,976	1,000
Pump Station 23998 141 st Street	145,860	-
Water Treatment Facility 23998 141 st Street	184,620	1,000
Water Pump Building 23998 141 st Street	47,940	-
Water Tower (100,000 gallon) 23998 141 st Street	255,000	-
Wells x4 23998 141 st Street	408,000	-
Fire Hydrants x7 23998 141 st Street	7,140	-
Water Tower (500,000 gallon) 23998 141 st Street	887,400	-
Collection System 23998 141 st Street	315,180	-

To determine loss estimates from the hazards the committee determined to use the State of Iowa Hazard Mitigation Plan dated 2010. The following table has the loss estimates by hazard for Worth County.

Table 47 - Annual Loss Estimation by Natural Hazard

County	Flood	Drought	Lightning	Extreme Heat	Extreme Cold
Worth	\$11,398,000	\$2,033,031	\$1,470	\$3,000	\$283,375
County	Snow & Ice	Tornado	Thunderstorm	Windstorm	Hail
Worth	\$37,008	\$217,533	\$31,647	\$80,305	\$63,250

CHAPTER VI. CURRENT MITIGATION ACTIVITIES

This section is intended to give a brief overview of current and past mitigation activities that have been undertaken in Worth County.

Hazardous Materials

The North Iowa Hazardous Emergency Action Team (NIHEAT) was formed in 1993. The program is administered by the North Central Regional Emergency Planning Commission (NCREPC) with representatives from Cerro Gordo, Emmet, Floyd, Worth, Hancock, Worth, Mitchell, Palo Alto, Kossuth and Worth. The hazardous emergency action team consists of twenty-six (26) hazardous materials technicians, twenty-six (26) of which are Mason City Firefighters. When a hazmat incident occurs the team assembles technicians for response. The firefighters in Worth County's fire departments are trained to operations level. Contact information for Hazardous Material Response is as follows:

Hazardous Material Response

350 Fifth St. SW
Mason City, IA 50401
Phone: 641-421-3640

Tornado/Windstorm Activities

Tornadoes have been known to cause great destruction. They can demolish entire buildings and it is not uncommon to hear of a tornado tearing off the roof of a house. With this type of potential damage, it is important that mitigation efforts are made to protect people from this deadly force. The most important measure in reducing the threat of injury is to be aware of the oncoming danger. Worth County has weather sirens implemented within most communities. Members of the emergency services departments in the cities act as tornado spotters if storm conditions warrant.

There are a wide variety of early warning messages provided through local radio and television stations as well as the cable channel, Weather Channel. The National Oceanic and Atmospheric Administration (NOAA) provide an alternative weather band over the radio. Special NOAA Weather Radios and general radios capable of tuning into this band receive weather information that is broadcast from nearby National Weather Service offices. The local National Weather Service office broadcasts National Weather Service warnings, watches, forecasts and other hazardous weather information 24 hours a day. Information regarding protecting one's self in the event of a tornado should be largely publicized in the form of flyers, radio, newspaper and television announcements. The following is an example of the types of actions that should be taken in the event of a tornadic storm.

Table 48 - Tornado Safety Rules

1.	In a home or building, move to a pre-designated shelter such as a basement.
2.	If an underground shelter is not available, move to a small interior room or hallway on the lowest floor and get under a sturdy piece of furniture. Put as many walls as possible between you and the outdoors.
3.	Stay away from windows.
4.	Stay away from automobiles.
5.	Do not try to outrun a tornado in your car, leave it and immediately seek shelter. If caught outside or in a vehicle, lie flat in a nearby ditch or depression and cover your head with your hands.
6.	Highway overpasses do not provide shelter from tornadoes and high speed winds.
7.	Be aware of flying debris. Flying debris from tornadoes causes most fatalities and injuries.
8.	Mobile homes, even if tied down, offer little protection from tornadoes. You should leave a mobile home and go to the lowest floor of a sturdy nearby building or storm safe-room.

Winter Storm

Worth residents rely on local forecasting efforts to predict the onset of a winter storm. Current technology usually allows for one or more days of notice before the arrival of a major winter storm. NOAA estimates that approximately 70 percent of all deaths attributed to winter storms occur in an automobile. Therefore, the County of Worth road department provides snow and ice removal for roadways to mitigate the negative effects of winter storms. Snow removal equipment has been updated regularly within the past five years to give Worth County a fast response time.

Sheriff's Department

Law enforcement and protection is provided by the Worth County Sherriff's Department, which is located at 1000 Central Ave Northwood, IA. All officers must be certified by the Iowa Law Enforcement Academy, be certified in CPR annually, train on a firing range annually and view films on crime control. Additional police services are provided through the local jurisdictions police departments and the Iowa State Patrol and the communications center is also operated by the Worth County Sherriff's office within the City of Algona.

**Worth County Sheriff's Office
1000 Central Ave
Northwood, IA 50459
(641) 324-2481**

Emergency Medical Services and Health and Human Services

Emergency medical care in the county is provided by the Mercy Medical Center in Mason City, Iowa and the Albert Lea Medical Center located in Albert Lea, Minnesota. EMT's must take 128 hours of class, on the job training and 28 hours of continuing education each year to serve with the transport services. Three ambulance services serve the county; one is based in the City of Lake Mills, the other in the City of Mason City and the third is based in Osage, Iowa. Personnel at all three services provide 24-hour, seven days a week service and are trained EMT volunteers.

There is a medical clinic provided by the Mercy Family Care center in Northwood to serve the citizens of Worth County for routine checkups. Patients with health problems exceeding the county's medical expertise are referred to larger health care facilities in Iowa or Minnesota including Mercy Medical Center in Mason City, IA; Mayo Clinic in Rochester, MN; and the Albert Lea Medical Center in Albert Lea, MN.

Manly Mitigation Actions Status Updates

From the 2008 Manly Hazard Mitigation Plan, the updates on the proposed mitigation measures/activities are as follows:

- Promote NOAA weather radio, including citizen purchase of receivers and rebate program.- **Cancelled:** No rebate program offered but price of radios have decreased exponentially since original plan written and local media personalities promote its use each spring
- Maintain backup power generators.-**Ongoing**
- Construct public safe rooms for government facilities, recreational areas, mobile home parks, schools and day care centers.- **Ongoing** as funds and projects become available
- Maintain HAZMAT decontamination sites. - **Ongoing**
- Develop/maintain list of facilities that produce, process, store or transport hazardous materials.- **Ongoing:** Performed by Fire Department and County EMA
- Continue participation in the NFIP.- **Ongoing**

Northwood Mitigation Actions Status Updates

From the 2007 Northwood Hazard Mitigation Plan, the updates on the proposed mitigation measures/activities are as follows:

- Continue enforcement of the city snow ordinance – **Ongoing**
- Continue to provide support for city services to ensure safe streets during winter storm events. – **Ongoing**
- Continue to support tree inspection and trimming program. – **Ongoing**
- Protect all utilities and critical infrastructure in and around the city. – **Ongoing**

- Provide reliable backup system for the city's current radio communications system. – **Ongoing**
- Provide off-site computer data storage system that allows continuation of city services. – **Ongoing**
- Provide fire, police, and emergency medical personnel with appropriate training as needed. – **Ongoing**
- Install new and maintain existing warning sirens to expand current outdoor warning system. – **Ongoing**
- Provide NOAA weather radios to vulnerable populations. – **Cancelled** – Citizens and businesses already have reliable access to these radios
- Review and implement mitigation activities identified in the evacuation plan for Northwood. – **Ongoing**
- Continue to provide first responder training for HAZMAT events. – **Ongoing**
- Provide hazardous materials education for industry and residents of Northwood. – **Ongoing**
- Establish local cooling sites for at risk populations such as the elderly and/or disabled. – **Ongoing**
- Protect critical infrastructure, such as pump station controls, in and around the floodplain area. – **Ongoing**
- Raise the grade and seal coat 2nd Avenue South from 4th Street to 8th Street. – **Ongoing**
- Protect the bridges in Northwood at Hwy 105, 4th Street South (2 bridges), and 2nd Avenue South from being flooded by Turtle Creek and the Shell Rock River, and during spring ice flows. – **Ongoing**
- Control erosion in the floodplain area. – **Ongoing**
- Provide pre-manufactured sewer plugs for basement floor drains. – **Ongoing**
- Conduct a sewer inflow and infiltration study and implement remedies. – **Ongoing**
- Create a comprehensive stormwater management plan and city policies – **Not Initiated**
- Continue compliance and implementation of the requirements of the NFIP to reduce the flood risks associated with the flood hazard area. – **Ongoing**
- Provide tornado shelters at outdoor recreation facilities such as parks, swimming pools, and fairgrounds. – **Ongoing**
- Construct tornado resistant shelters in or near large population centers such as schools, industry, and retirement homes. – **Ongoing** – received disaster mitigation money for the City of Northwood Tornado Shelter Project
- Improve public awareness of the steps to be taken in the event of a tornado and shelter location. – **Ongoing**
- Install shatter resistant window film at vulnerable city facilities. – **Ongoing**
- Recruit and train weather spotters to increase potential warning time. – **Ongoing**
- Continue abatement of nuisance structures. – **Ongoing**
- Continue to monitor and test the water quality of city wells. – **Ongoing**
- Conduct regular water collection system maintenance and upgrades – **Ongoing**
- Enforce City guidelines for burning. – **Ongoing**

- Install deer fencing at the airport to protect airline passengers. - **Not Initiated**
- Review traffic signage and line of sight problems to help alleviate traffic accidents. – **Ongoing**
- Purchase and install a fire suppression system and an oil/water separator at the airport fuel depot. – **Not Initiated**
- Provide fire alarms for city structures vulnerable to fire. – **Ongoing**
- Educate residents about dangerous human and animal diseases and how to avoid contracting them. – **Ongoing**
- Ensure local schools and industry have emergency response plans in place. – **Ongoing**
- Continue to review, revise, and enforce city zoning ordinance. - **Ongoing**

Worth County Mitigation Actions Status Updates

High Priority –

- Make educational materials available to the public to improve people’s awareness of hazard risks and ways to prevent or reduce their impact.- **Ongoing**
- Maintain energy security at critical facilities. - **Ongoing**

Medium Priority –

- Develop/update/publicize emergency management plans, including preparedness, response, recover operations and mitigation plans. – **Ongoing**
- Train key county and community leaders. – **Ongoing**

Low Priority –

- Research and construct tornado safe rooms that are located in vulnerable areas of the county – **Ongoing**
- Participate in the National Flood Insurance Program. – **Ongoing**
- Update zoning ordinances to include the whole county. - **Ongoing**
- Maintain proper floodplain ordinances. - **Ongoing**

CHAPTER VII: MITIGATION GOALS & MEASURES ANALYSIS

The Worth County Mitigation Planning Committee identified the mitigation plan goals. The committee set as a priority the development of broad-based goals that would address a multitude of hazards and encompass a variety of mitigation activities. The hazard mitigation plan goals identified are as follows:

The purpose of establishing goal statements is to set a general guideline for eliminating or reducing the long-term effects to property and life, reducing costs of response and recovery and minimizing disruption to Worth County following a hazardous event. Goal statements do not spell out specific strategies that can be measured but are written in general terms. Mitigation actions or measures are designed to be measured. The subsections of the hazards worksheets sections, i.e., probability, magnitude/severity, warning time, and duration (which form the methodology of the assessment) were consulted as necessary. These are all the goals that were established and considered by the Worth Planning Committee.

The individual jurisdictions accepted the goals for each of their respective communities.

Table 49 - Goals

Goals Requirement §201.6(c)(3)(i): <i>[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.</i>	
1. Minimize vulnerability of the people and their property in Worth County to the impacts of hazards.	2. Protect critical facilities, infrastructure and other community assets from the impacts of hazards.
3. Improve education and awareness regarding hazards and risk in Worth County.	4. Strengthen communication among agencies and between agencies and the public.

MITIGATION MEASURES FEASIBILITY

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

The Worth Hazard Mitigation committee and each jurisdictions planning committee were given a list of mitigation measures which all 12 follow starting on page 106, these were all the mitigation measures that were discussed. After mitigation measures were chosen each person present was given the STAPLEE score sheet which follows and was told to rate each mitigation measure based upon the STAPLEE statements but to rate each mitigation measure based on a 0-3 score listed on the STAPLEE sheet that follows on

page 105. The scores were collected and were added and divided by the number turned into the planner to receive the priority of the mitigation measure.

The mitigation measures are categorized as follows:

- A. **Prevention:** Administrative or regulatory actions or processes that influence the way land and buildings are developed and built.
- B. **Property protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or remove them from the hazard area.
- C. **Structural:** Actions that involve the construction of structures to reduce the impact of hazards.
- D. **Natural resource protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems.
- E. **Public education and awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential way to mitigate them.

The planning committee reviewed the hazards that had been identified as well as the mitigation measure goals and categories with regards to the identified hazards. Anyone on the committee and in attendance at the meetings could verbally submit a mitigation measure to be considered in the plan, and then each mitigation measure was discussed, placing particular emphasis on new and existing buildings and infrastructure. Through much discussion of a comprehensive range of alternatives the planning committee achieved and consensus on the measures to include in the plan. Each jurisdiction had respective measures that were important to them. Each jurisdiction would be willing to accomplish any/all measure(s), if funds were secured.

STAPLEE stands for the following:

Social: Will the action be acceptable to the community? Could it have an unfair effect on a particular segment of the population?

Technical: Is the action technically feasible? Are there secondary impacts? Does it offer a long-term solution?

Administrative: Are there adequate staffing, funding, and maintenance capabilities to implement the project?

Political: Will there be adequate political and public support for the project?

Legal: Does your jurisdiction have the legal authority to implement the action?

Economic: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?

Environmental: Will there be negative environmental consequences from the action? Does it comply with environmental regulations? Is it consistent with community environmental goals?

Score

0

Explanation

This is a mitigation action that has **NO** priority based on STAPLEE criteria

1

This is an action that would benefit the mitigation of hazards, but is considered a **LOW** priority based on the STAPLEE criteria.

2

This is an action that would benefit the mitigation of hazards, but is considered a **MODERATE** priority based on the STAPLEE criteria.

3

This is an action that would benefit the mitigation of hazards and is considered a **HIGH** priority based on the STAPLEE criteria.

Analysis of Mitigation Measures

- 1. Develop/update/publicize emergency management plans, including preparedness, response, recover, operations, long term recovery, and mitigation plans and maintain data inventory.**

This measure will allow the jurisdiction to produce required and relevant plans that are up to date and are working documents that the community can use.

- 2. Public Education and Awareness of all hazards.**

This measure gives the jurisdiction the opportunity to produce, inform, etc. using a variety of mass communication methods to inform the public and to keep them aware of the hazards that pose or could potentially pose a threat to the jurisdiction.

- 3. Continuity of Operations Plan (COOP)**

This measure gives the jurisdiction the means to provide the jurisdiction a plan that in the case of severe destruction a means to continue operations, who is in charge, where to set up control and command, etc.

- 4. Construct, retrofit, or maintain water supply, drainage, sewage, retention and detention systems to provide for the proper functioning of those systems.**

This measure will allow the jurisdiction to construct proper water supply, drainage and sewer systems in order to prevent infiltration of silt, soil, and other foreign materials into their supply and sewage systems causing backup into homes and businesses and to maintain proper functioning of water supply to decrease inefficiencies in those systems.

- 5. Construction or retrofit existing structures into public safe rooms at government facilities, recreational facilities, recreational areas, manufactured home parks, schools, day care centers, and other critical facilities.**

This measure will allow the jurisdiction to construct safe rooms that will protect the public during extremely hazardous events, i.e., tornado, thunderstorms and lightning, severe winter storm, etc.

- 6. Acquire flood prone properties for conversion into green space; or elevate structures to or above base flood elevation; construction of levees, dams, and culverts to ensure adequate capacity and protection levels for property and critical facilities.**

This measure will allow the jurisdiction the option to acquire flooded properties in order to prevent the continued flooding of structures located in a flood plain, or elevate structures as to not have to have the threat of repeated flooding to the subject property. This measure will allow the jurisdiction the ability to prevent damage from flash floods with additional capacity to handle large amounts of water from heavy rains.

7. **Purchase/install backup power generators.**
This mitigation measure assures that a jurisdiction's critical facilities as designated by the Board of Supervisors, City Councils, Emergency Management Coordinator, Sheriff's Department, etc., have adequate backup power supply to carry on the critical mission of the jurisdictions during a disaster.
8. **Heating/Cooling centers/shelters.**
This measure will allow the jurisdiction to provide a place for residents to come to get warm or cool depending on the time of year and preferably would have backup power generators due to the use of these structures during an infrastructure failure i.e. energy failure.
9. **Install and maintain security measures at all critical facilities and training of emergency response personnel.**
This measure will ensure that security measures at noted critical facilities will be in place to prevent damage and protect those that rely on the function of those critical facilities. This measure will also provide that training of response personnel is up to date and relevant to the disaster at hand.
10. **Complete FIRM (Flood Insurance Rate Maps) and encourage NFIP community and individual participation, and survey of flood prone areas, and river channel studies, and update of existing flood maps.**
This action ensures the safety and property protection of Worth County residents and property owners and the participation in NFIP.
11. **Develop and promote comprehensive, cost-effective, common sense recommendations for adoption and enforcement of land use, ordinances and regulations, zoning, and building codes that decrease risk in areas susceptible to hazards.**
This measure will allow jurisdictions the option of putting into place proper ordinances and building codes to prevent or lessen the damage from hazardous events.
12. **Natural resource measures to prevent the damage to critical facility functions.**
This measure will prevent many hazardous events like flooding, grass or wild-land fire, etc. This measure will ensure safety and property protection of Worth County residents and property owners.

The following tables show the mitigation measures for each jurisdiction that were chosen by each jurisdiction and their respective scores. The individual scores range from 0-3; a score of 0= no priority, or mitigation measure does not need to be considered; 3 = mitigation measure needs to be focused on by the city. The weighted score gives the priority of mitigation measures for each jurisdiction. It is calculated by averaging the individual scores.

Table 50 - Fertile Mitigation Measure Scores

Mitigation Measure	Fertile-Individual Scores									Raw Score	Weighted Score
1	2	3	2	3	2	3	3	3	3	24	2.67
2	2	3	2	3	3	3	3	2	3	24	2.67
4	3	3	3	2	3	2	3	3	2	24	2.67
6	2	3	2	3	3	2	3	2	3	23	2.56
10	2	3	1	3	3	3	3	2	2	22	2.44
7	1	3	3	3	3	3	3	2	0	21	2.33
3	2	2	1	3	3	3	2	2	2	20	2.22
5	3	3	3	2	2	1	2	2	2	20	2.22
9	1	2	2	2	3	3	3	1	3	20	2.22
11	2	3	2	3	2	2	2	1	2	19	2.11
8	1	3	2	2	3	2	2	1	0	16	1.78
12	2	2	3	2	1	2	2	1	1	16	1.78

Table 51 - Grafton Mitigation Measure Scores

Mitigation Measure	Grafton-Individual Scores								Raw Score	Weighted Score
2	3	3	1	1	3	3	3	3	20	2.50
4	3	3	1	2	3	3	2	2	19	2.38
1	1	3	1	1	2	2	2	2	14	1.75
5	1	1	2	2	2	2	1	1	12	1.50
8	1	3	2	1	1	1	1	2	12	1.50

Table 52 - Hanlontown Mitigation Measures Scores

Mitigation Measure	Hanlontown-Individual Scores														Raw Score	Weighted Score
7	3	2	3	3	3	2	3	3	3	3	2	3	3	3	39	2.79
2	3	2	2	3	3	3	2	3	3	3	3	3	1	3	37	2.64
1	2	3	2	3	3	3	3	3	2	2	3	3	1	2	35	2.50
9	2	3	3	3	1	2	3	3	3	3	3	2	2	1	34	2.43
3	1	2	3	3	3	3	3	3	2	2	2	3	2	1	33	2.36
4	2	3	3	3	3	2	3	1	3	3	2	2	0	2	32	2.29
8	3	1	3	2	1	1	3	2	3	2	1	1	3	3	29	2.07
11	2	2	3	2	2	3	2	2	3	3	1	2	0	2	29	2.07
5	2	2	1	2	2	1	2	2	3	2	1	2	2	1	25	1.79
12	2	2	2	2	2	2	3	2	3	1	1	2	0	1	25	1.79

Table 53 - Joice Mitigation Measures Scores

Mitigation Measure	Joice-Individual Scores										Raw Score	Weighted Score
1	3	3	3	3	2	3	3	3	3	1	24	2.67
2	3	3	2	3	3	3	3	3	3	1	24	2.67
7	1	3	3	2	3	3	3	3	3	1	22	2.44
4	3	2	3	2	3	2	2	3	3	1	21	2.33
8	1	3	3	3	1	3	3	3	3	1	21	2.33
9	1	3	3	2	3	1	2	3	3	1	19	2.11
5	2	2	3	0	3	2	3	2	3	1	18	2.00
3	2	3	1	2	1	1	1	2	3	1	14	1.56
11	0	2	2	1	2	1	1	1	3	1	11	1.22
6	0	1	0	0	0	1	1	0	3	1	4	0.44

Table 54 - Kensett Mitigation Measures Scores

Mitigation Measure	Kensett –Individual Scores	Raw Score	Weighted Score
2	3	3	3
4	3	3	3
1	2	2	2
9	2	2	2
5	1	1	1
7	1	1	1
8	1	1	1

Table 55 - Worth County Mitigation Measures Scores

Mitigation Measure	Worth County – Individual Scores						Raw Score	Weighted Score
1	3	3	3	3	3	3	18	3.00
2	3	3	3	3	3	3	18	3.00
3	3	3	3	3	3	3	18	3.00
7	3	1	3	3	3	2	15	2.50
9	2	2	3	2	2	3	14	2.33
5	3	2	2	2	1	2	12	2.00
10	1	2	3	1	3	2	12	2.00
11	2	3	3	1	1	2	12	2.00
8	1	1	3	2	2	2	11	1.83
12	2	1	3	1	2	2	11	1.83
6	0	2	2	2	1	1	8	1.33

CHAPTER VIII: ACTION PLAN

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

All the mitigation actions included in the revised list received a preponderance of positive ratings and were discussed at length. The planning committee's chose many of the same measures and many of them received the highest votes. The following Mitigation Actions Table identifies the goal(s), hazard addressed, action category (ies) from page 114.

Priority is based on the number of votes. Since many jurisdictions chose 3-4 mitigation measures the measure with the highest vote is listed as a high priority the next top vote getter receives medium priority and so on. In the case of a tie, priority is given to the measure with the least costs but most benefit.

Table 56 - Mitigation Measures and Goals

Measure	Goals	Hazard addressed	Action Category
Develop/update/publicize emergency management plans, including preparedness, response, recover, operations, long term recovery, and mitigation plans and maintain data inventory.	1,2,3,4	All hazards	Public education and awareness
Public education and awareness of all hazards.	3,4	All hazards	Public education and awareness
Continuity of Operations Plan (COOP)	2,4	Radiological, Terrorism, Tornado	Prevention
Construct, retrofit, or maintain water supply, drainage, sewage, retention and detention systems to provide for the proper functioning of those systems.	1,2	Flash Flood, River Flooding, Infrastructure Failure	Property protection, structural
Construction or retrofit existing structures into public safe rooms at government facilities, recreational facilities, recreational areas, manufactured home parks, schools, day care centers, and other critical facilities.	1,2	Tornado, Windstorm	Property protection, structural
Acquire flood prone properties for conversion into green space; or elevate structures to or above base flood elevation; construction of levees, dams, and culverts to ensure adequate	1,2	Flash Flood, River Flooding	Prevention, Property protection, structural

capacity and protection levels for property and critical facilities.			
Purchase/install backup power generators.	1,2	Flash Flood, Hailstorm, Infrastructure Failure, River Flooding, Severe Winter Storm, Terrorism, Thunderstorms and Lightning, Tornado, Windstorm	
Heating/Cooling centers/shelters.	2	Extreme Heat, Severe Winter Storm	Structural
Install and maintain security measures at all critical facilities and training of emergency response personnel.	1,2,4	All hazards	Prevention, Property protection, structural
Complete FIRM (Flood Insurance Rate Maps) and encourage NFIP community and individual participation, and survey of flood prone areas, and river channel studies, and update of existing flood maps.	1,2,3	Flash Flood, River Flooding	Prevention, Property protection, structural, public education and awareness
Develop and promote comprehensive, cost-effective, common sense recommendations for adoption and enforcement of land use, ordinances and regulations, zoning, and building codes that decrease risk in areas susceptible to hazards.	1,2,3,4	All hazards	Prevention, Property protection, Natural resource protection
Natural resource measures to prevent the damage to critical facility functions.	1,2	All hazards	Natural resource protection

Some of these mitigation measures relate to measures in the previous Manly, Northwood, and Worth County plans, while others are new. The following are new to the plan:

- Continuity of Operations Plans
- Heating Cooling Shelters
- Natural resource measures to prevent damage to critical facility functions

FUNDING OF FUTURE MITIGATION MEASURES

The planning committee analyzed the future mitigation actions and identified future funding associated with each mitigation action. The actions that called for a continuation of a current activity were easily identified, whereas other cost estimates were available from previous planning documents or project plans. Some of the costs were estimated by the committee's knowledge of the activity in question. **The projects are to be considered for implementation during the next five years and a full cost/benefit analysis will be required to determine the feasibility of each project.**

Factors and/or information necessary for further consideration of future mitigation activities:

1. Estimated Cost = Estimated cost to construct or purchase.
2. Federal Funds = Federal funds identified as possible source of funds.
3. State Funds = State funds identified as possible source of funds.
4. Local Funds = Local (City and County) funds identified as possible source of funds.
5. \$ = Possible future funding source.

TABLE 8.2 – Funding of Future Measures

Mitigation Action	Estimated Cost	Funding Sources			Comment and Responsible Party
		Federal Funds	State Funds	Local Funds	
Develop/update/publicize emergency management plans, including preparedness, response, recover, operations, long term recovery, and mitigation plans and maintain data inventory.	\$1,000+	-	-	15%-100%	Local boards and city Councils, Emergency Management Coordinator, Fire Departments
Public education and awareness of all hazards.	-	-	-	100%	Local Boards and City Councils, Emergency Management Coordinator
Continuity of Operations Plan (COOP)	-	-	-	100%	Local Boards and City Councils
Construct, retrofit, or maintain water supply, drainage, sewage, retention and detention systems to provide for the proper functioning of those systems.	\$50,000+	?	?	10%-100%	Local Boards and City Councils, Public Works Departments
Construction or retrofit existing structures into public safe rooms at government facilities, recreational facilities, recreational areas, manufactured home parks, schools, day care centers, and other critical facilities.	\$250,000+	75%	10%	15%	Local Boards and City Councils
Acquire flood prone properties for conversion into green space; or elevate structures to or above base flood elevation; construction of levees, dams, and culverts to ensure adequate	\$5,000+	75%	10%	15%	Local Boards and City Councils, Emergency Management Coordinator, Local Floodplain Managers

capacity and protection levels for property and critical facilities.					
Purchase/install backup power generators.	\$5,000+	-	-	100%	Local Boards and City Councils
Heating/Cooling centers/shelters.	\$5,000+	-	-	100%	Local Boards and City Councils
Install and maintain security measures at all critical facilities and training of emergency response personnel.	\$500+	-	-	100%	Local Boards and City Councils, Police and Fire Departments, Public Works Departments
Complete FIRM (Flood Insurance Rate Maps) and encourage NFIP community and individual participation, and survey of flood prone areas, and river channel studies, and update of existing flood maps.	?	-	-	-	Local Boards and City Councils, State DNR and Emergency Management
Develop and promote comprehensive, cost-effective, common sense recommendations for adoption and enforcement of land use, ordinances and regulations, zoning, and building codes that decrease risk in areas susceptible to hazards.	?	-	-	-	Local Boards and City Councils
Natural resource measures to prevent the damage to critical facility functions.	\$500+	-	-	100%	

CHAPTER IX: PLAN MAINTENANCE, REVIEW, & UPDATE

Mitigation Prioritization

There are a number of hazards that could potentially affect the residents of Worth County indicated throughout this plan. In relation, there are also a large number of activities that could be undertaken to mitigate the effects of these hazards. Unfortunately, the jurisdictions do not have an unlimited amount of funds or funding sources for mitigation projects. In an attempt to determine the most immediate mitigation needs, the planning committees prioritized each mitigation activity for every hazard as detailed in the MITIGATION MEASURES FEASIBILITY section of this plan.

Plan Adoption and Amendment

This plan and any future amendments to the plan shall occur only after an official Public Notice has been posted in local publications and city halls announcing a Public Meeting on the matter. After the public has had the opportunity to review the proposed amendments the Worth County Board of Supervisors may, by resolution, choose to accept any amendments to the plan. Amendments to the plan will be shared with the County Emergency Management Coordinator, the Iowa Department of Homeland Security and Emergency Management Division and the Federal Emergency Management Agency.

Phasing

Phasing is a budgetary responsibility of the Worth County Board of Supervisors, city councils, and Department Heads who will review the projects annually. It is recommended that this review be incorporated into the strategic planning documents and plans, i.e. comprehensive land use plan, floodplain ordinance, etc. For projects that require a local match commitment, the governing bodies should begin setting aside appropriate resources to meet their match liability. Land-use plans and county evacuation plans shall be incorporated within this plan as well as this plan shall be implemented in those future plans. The Board of Supervisors and City Councils will incorporate the requirements of this plan into these future plans and any other plans the Board sees fit to include.

Continued Public Participation

In order to ensure that the public remains involved in the future implementation of this plan a file shall remain on hand at the County Courthouse and city halls. This plan shall be made available to any party who requests to see it. Furthermore, if Worth County or other jurisdictions intend to make amendments to the plan, a posted public notice in local newspapers and local fliers should be made available so that the public can be made aware. Public notice should also be posted for any meetings that deal with the amendment of this plan. Said meetings are to remain open to the public.

Evaluation and Review Process

Members of the public and elected officials of each community will review and evaluate progress of the mitigation plan once each year. The plan will be reviewed and updated by the end of every fifth year. The planning committees will invite a cross section of the community to participate in any future meetings regarding the update or amendment of the Plan. In addition, public notice will be posted at the County Courthouse and city halls inviting the general public to participate as members of the planning committee and/or to review the plan and provide comments. The county auditor and city clerks are responsible for contacting members and organizing the five year update meetings. The meetings will be held after the first of the year and committee members will be responsible for evaluating the progress of the plan activities. To make sure that the plan is current with expected conditions, the planning committees will review each goal and activity to determine the relevance to the county, as well as changes in state or federal policies. The planning committees will also review the risk assessment for updates and modifications. The responsible department/individual for each activity will then report the status of each project including implementation process that worked well, the difficulties that were encountered during the activity and how strategies could be revised. Worth County will then update the plan and make the appropriate changes to the plan. Copies of the plan and the committee's review will be available at the County Courthouse and city halls. Following the planning committees' completion of the review process, the findings of the annual review and recommended changes, if applicable, will be presented during a regular Board of Supervisors meeting and a public hearing will be held at that time. Copies of the plan will then be sent to the Iowa Department of Homeland Security and Emergency Management Division and the Federal Emergency Management Agency. Any changes to future plans will be integrated with the multi-hazard mitigation plan. The multi-hazard mitigation plan will also take into account any changes in these plans and incorporate the information in the next update.

The jurisdictions will use Worksheet #1 (located in the Appendix) when they are working on a mitigation activity. This will give the future committees a good place to start when updating the plan and deciding which activities were successful or not. The committees will use Worksheet #2 during each yearly review and during the 5 year plan update to evaluate how to make the committees more representative of the community and surrounding communities. The committees and county will use Worksheet #3 to evaluate each activity that was completed and each activity that was not completed. The committees and county will use Worksheet #4 at each yearly review and update to evaluate the risk assessment in order to address new concerns and update inventories of assets.

The Worth County Multi-Jurisdictional Mitigation Plan will be updated every five years as stated, and reviewed annually and after hazardous events by the Board of Supervisors, Emergency Management Coordinator, city councils, and other key community members.

Schedule for Updating

In the five year cycle, the Board of Supervisors and city councils will look at the plan at its annual review and at that time appoint committee members to update the plan. If assistance is needed, the county will contact a planner and ask for assistance in updating their plan. The updating process will consist of two to three meetings of the planning committees for each community and county-wide to discuss changes that need to be made to the plan. After that time the committees will recommend the plan be offered for adoption by the Worth County Board of Supervisors and city councils. Following adoption by the Board the county will submit the plan to Iowa Homeland Security and Emergency Management and FEMA for final approval. The following is a schedule that Worth County will follow for plan updates.

Objective A. Evaluate the effectiveness of the planning process.

1. Reconvene or reappoint the Planning Team.
2. Review your Planning Process.
Items to Discuss:
 - a. Building the Planning Team.
 - b. Engaging the Public.
 - c. Data Gathering and Analysis.
 - d. Coordinating with other Agencies.

Objective B. Evaluate the effectiveness of your 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 those actions that were slow to get started or not implemented.

Objective C. Determine why the actions worked or did not work.

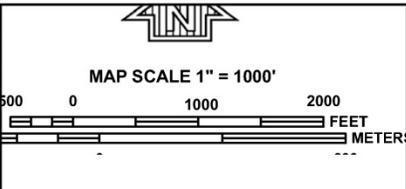
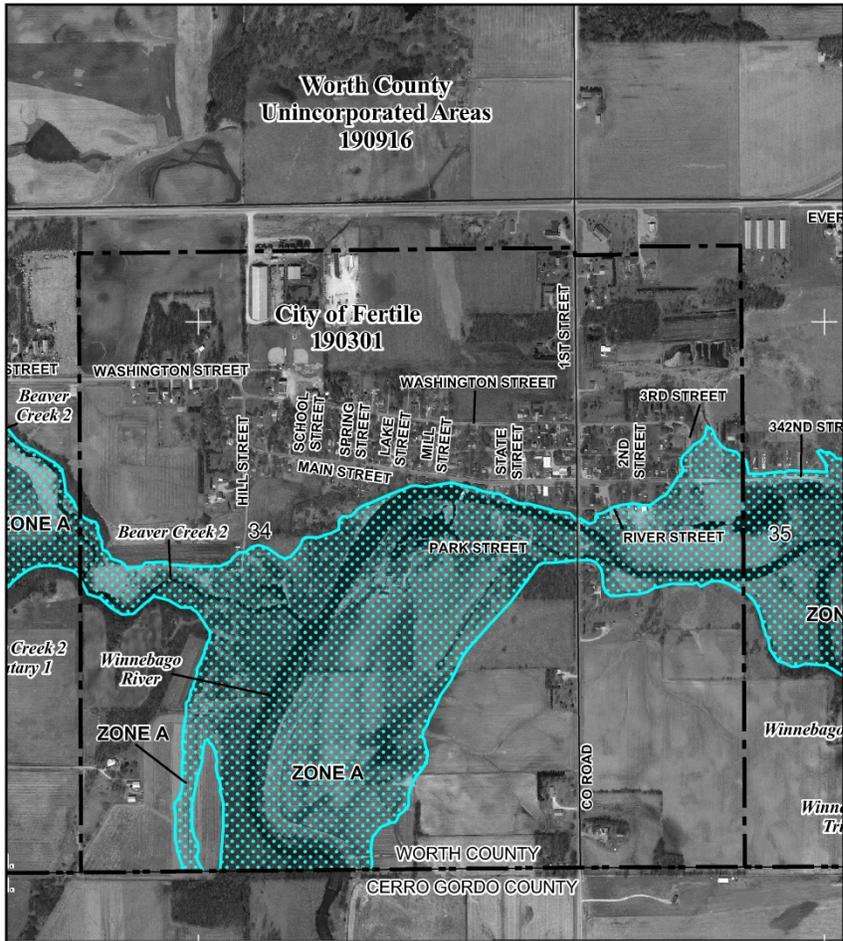
1. Lack of available resources.
2. The political or popular support for or against the action.
3. The availability of funds.
4. The workloads of the responsible parties.
5. The actual time necessary to implement the actions.

Existing Document Incorporation

The Worth County Multi-Jurisdictional Hazard Mitigation Committee will remain focused on this plan and will ensure this plan's recommendations are included in current planning processes. The Emergency Management Coordinator will monitor development and the effectiveness of ordinances and will continue to do so following adoption of the Mitigation Plan. These activities will be incorporated into the Plan Evaluation and Review Process.

Note that the Committee intends to review current ordinances as part of the implementation, in order to ensure that we do not have to wait until a new plan or ordinance is created in order to update the methods used to monitor land use in the county. The capital improvements planning of the future will include some of the recommendations of this plan and will include funding toward some of the capital infrastructure issues discussed in this plan. Within 12 months, the adopted plan should be incorporated fully into the current and future county and other jurisdiction plans.

APPENDIX A: MAPS



NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0120C

FIRM
FLOOD INSURANCE RATE MAP
WORTH COUNTY,
IOWA
AND INCORPORATED AREAS

PANEL 120 OF 200
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FERTILE, CITY OF	190301	0120	C
WORTH COUNTY	190916	0120	C

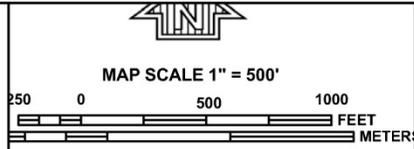
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.



MAP NUMBER
19195C0120C
EFFECTIVE DATE
AUGUST 2, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



PANEL 0117C

FIRM
FLOOD INSURANCE RATE MAP
WORTH COUNTY,
IOWA
AND INCORPORATED AREAS

PANEL 117 OF 200
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

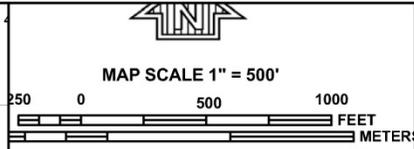
COMMUNITY	NUMBER	PANEL	SUFFIX
HANLONTOWN, CITY OF	190833	0117	C
WORTH COUNTY	190916	0117	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
19195C0117C
EFFECTIVE DATE
AUGUST 2, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



PANEL 0119C

FIRM
FLOOD INSURANCE RATE MAP
WORTH COUNTY,
IOWA
AND INCORPORATED AREAS

PANEL 119 OF 200
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

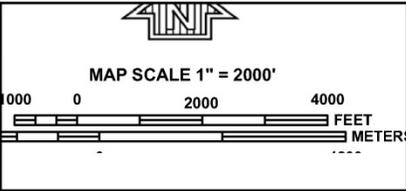
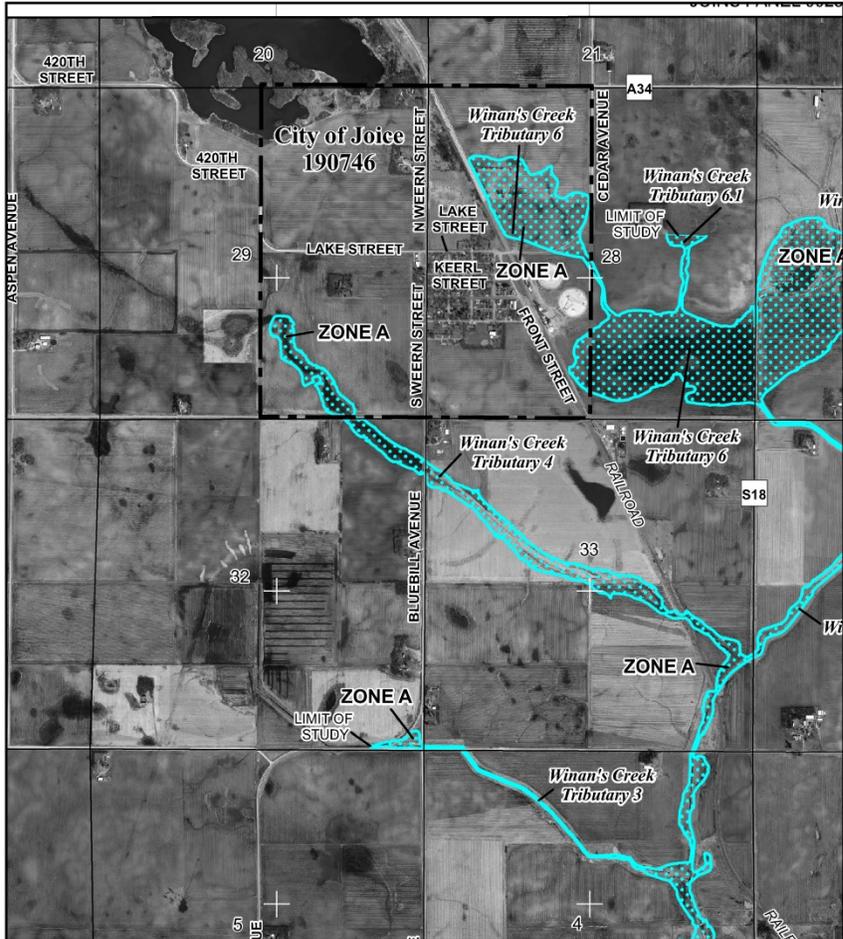
COMMUNITY	NUMBER	PANEL	SUFFIX
HANLONTOWN, CITY OF	190833	0119	C
WORTH COUNTY	190916	0119	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
19195C0119C
EFFECTIVE DATE
AUGUST 2, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



PANEL 0125C

FIRM
FLOOD INSURANCE RATE MAP
WORTH COUNTY,
IOWA
AND INCORPORATED AREAS

PANEL 125 OF 200
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
JOICE, CITY OF	190746	0125	C
WORTH COUNTY	190916	0125	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

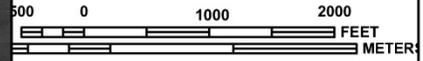
MAP NUMBER
19195C0125C
EFFECTIVE DATE
AUGUST 2, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 1000'



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0155C

FIRM
FLOOD INSURANCE RATE MAP
WORTH COUNTY,
IOWA
AND INCORPORATED AREAS

PANEL 155 OF 200
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KENSETT, CITY OF	190749	0155	C
WORTH COUNTY	190916	0155	C

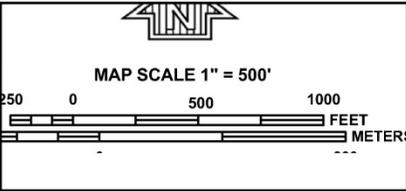
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.



MAP NUMBER
19195C0155C
EFFECTIVE DATE
AUGUST 2, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



PANEL 0162C

FIRM
FLOOD INSURANCE RATE MAP
WORTH COUNTY,
IOWA
AND INCORPORATED AREAS

PANEL 162 OF 200
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

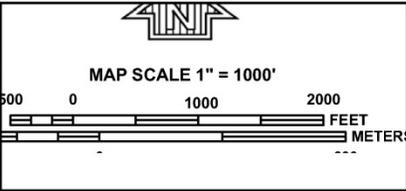
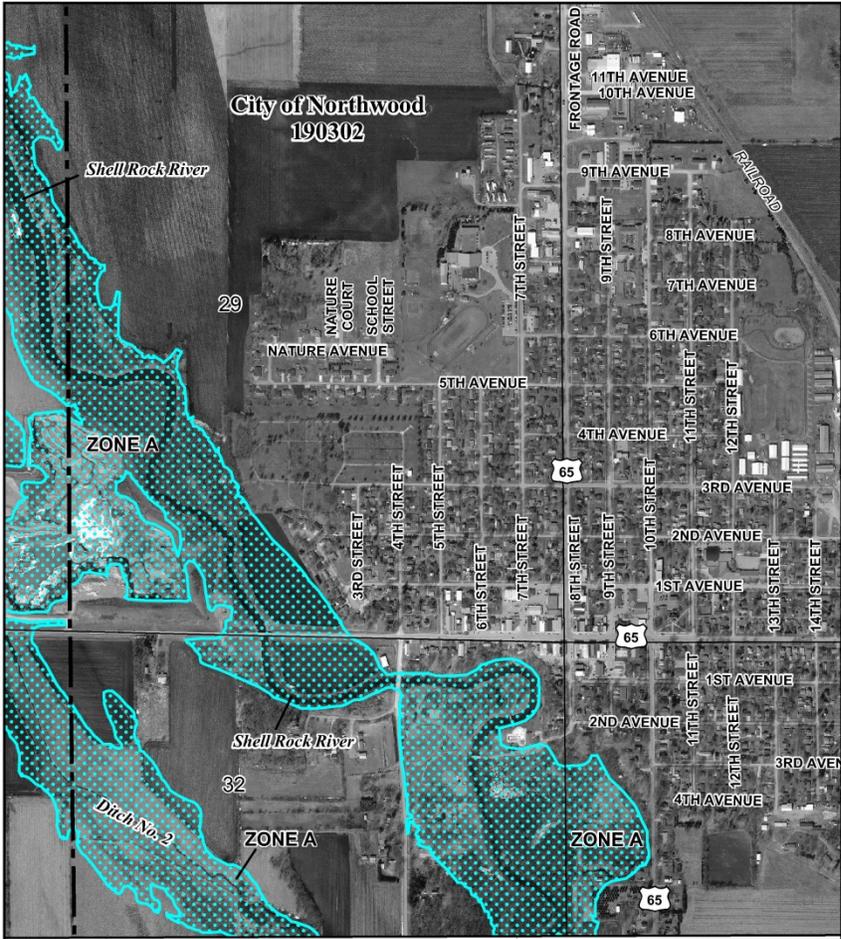
COMMUNITY	NUMBER	PANEL	SUFFIX
MANLY, CITY OF	190834	0162	C
WORTH COUNTY	190916	0162	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
19195C0162C
EFFECTIVE DATE
AUGUST 2, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



NFIP

PANEL 0055C

FIRM
FLOOD INSURANCE RATE MAP
WORTH COUNTY, IOWA
AND INCORPORATED AREAS

PANEL 55 OF 200
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

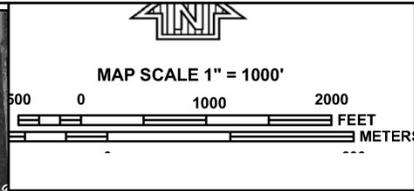
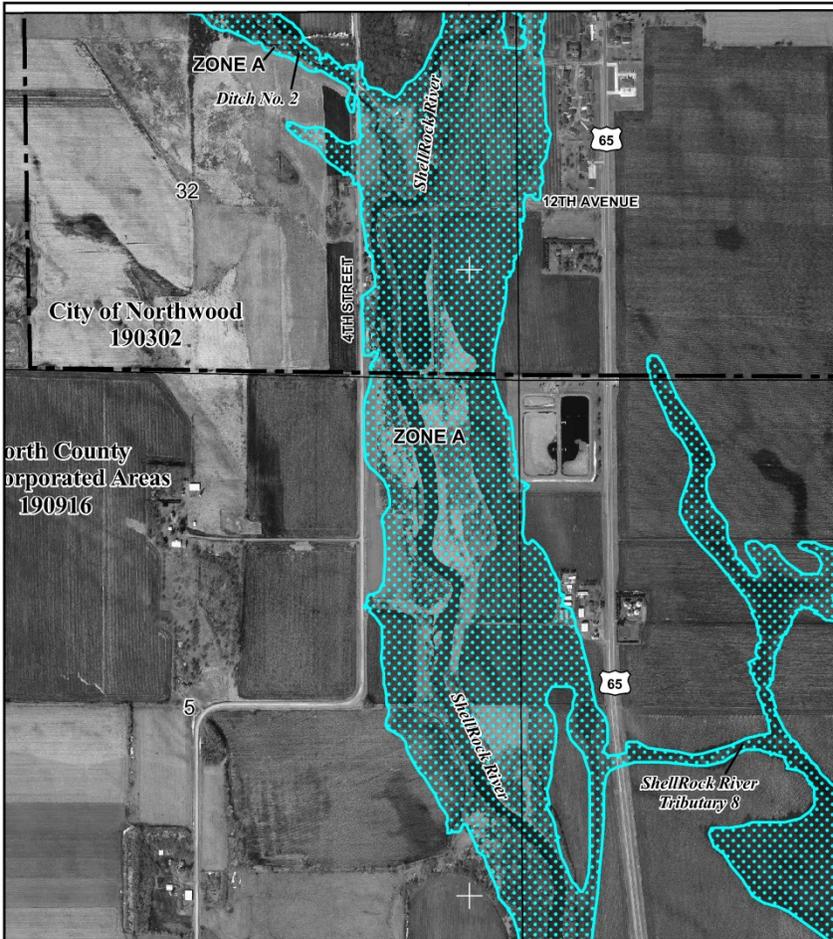
COMMUNITY	NUMBER	PANEL	SUFFIX
NORTHWOOD, CITY OF	190302	0055	C
WORTH COUNTY	190916	0055	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
19195C0055C
EFFECTIVE DATE
AUGUST 2, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



PANEL 0065C

FIRM
FLOOD INSURANCE RATE MAP
WORTH COUNTY,
IOWA
AND INCORPORATED AREAS

PANEL 65 OF 200
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

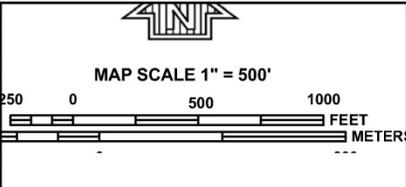
COMMUNITY	NUMBER	PANEL	SUFFIX
NORTHWOOD, CITY OF	190302	0065	C
WORTH COUNTY	190916	0065	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
19195C0065C
EFFECTIVE DATE
AUGUST 2, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



NFP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0162C

FIRM

FLOOD INSURANCE RATE MAP

WORTH COUNTY, IOWA

AND INCORPORATED AREAS

PANEL 162 OF 200
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MANLY CITY OF	190834	0162	C
WORTH COUNTY	190916	0162	C

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
19195C0162C

EFFECTIVE DATE
AUGUST 2, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

APPENDIX B: AGENDAS & MINUTES

Worth County Multi-Jurisdictional Hazard Mitigation Meeting
29 October 2012 7:00 pm
Grafton Community Center

1. Introduction
2. Prioritize hazards
3. Community Background Information
4. Identify Critical Facilities
5. Identify current mitigation measures
6. Identify and score mitigation measures
7. Adjourn

Grafton, Iowa meeting for the community portion of the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
29 October, 2012 7-9:30pm
Grafton Community Center

Conducted by NIACOG Planner

Introduction-

Explained that FEMA now requires multi-jurisdictional plans.

Definition and explanation of Hazard Mitigation, multi-jurisdictional plans, community responsibilities in planning process, & that each community will have representation within the plan.

Explanation of meetings and steps needed to complete plan process.

Sign in sheet/attendance and “local match” explained. *see attached sign- in sheets.

Reviewed specific county level hazards that had been identified at the County meeting and then identified hazards specific to Grafton.

Explained scoring system/process for each hazard and ranking process. Discussed & scored hazards based on probability, magnitude/severity, warning, and duration for each hazard identified by Grafton.

Reviewed & discussed Community Background information regarding community plans, ordinances, etc. and will continue to communicate with Grafton City Clerk to gather all needed information.

Identified Critical Facilities in Grafton and will continue to work with Clerk to gather additional information.

Identified and discussed current mitigation measures within Grafton.

Identified and scored new/future mitigation measures.

Explained the next steps needed in the plan development.

Answered questions.

Worth County Multi-Jurisdictional Hazard Mitigation Meeting
29 October 2012 6:30 pm
Kensett City Hall

1. Introduction
2. Hazard Mitigation Explanation
3. Planning Process
4. Community Evaluation
5. Explanation of HARA
6. Identify Hazards and Score Hazards
7. Current Mitigation Measures
8. Identify New Mitigation Measures
9. Score New Mitigation Measures
10. Adjourn

**Kensett, Iowa meeting for the community portion of the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
29 October, 2012 6:30-8:30pm
Kensett Community Center**

Conducted by NIACOG Planner

Introduction-

Explained that FEMA now requires multi-jurisdictional plans.

Definition and explanation of Hazard Mitigation, multi-jurisdictional plans, community responsibilities in planning process, & that each community will have representation within the plan.

Explanation of meetings and steps needed to complete plan process.

Sign in sheet/attendance and “local match” explained. *see attached sign- in sheets.

Reviewed specific county level hazards that had been identified at the County meeting and then identified hazards specific to Kensett.

Explained scoring system/process for each hazard and ranking process. Discussed & scored hazards based on probability, magnitude/severity, warning, and duration for each hazard identified by Kensett.

Reviewed & discussed Community Background information regarding community plans, ordinances, etc. and will continue to communicate with Kensett City Clerk to gather all needed information.

Identified Critical Facilities in Kensett and will continue to work with Clerk to gather additional information.

Identified and discussed current mitigation measures within Kensett.

Identified and scored new/future mitigation measures.

Explained the next steps needed in the plan development.

Answered questions.

**Worth County Multi-Jurisdictional Hazard Mitigation Meeting
08 November 2012 7:00pm
Fertile Community Center**

1. Introduction
2. Hazard Mitigation Explanation
3. Planning Process
4. Community Evaluation
5. Explanation of HARA
6. Identify Hazards and Score Hazards
7. Current Mitigation Measures
8. Identify New Mitigation Measures
9. Score New Mitigation Measures
10. Adjourn

**Fertile, Iowa meeting for the community portion of the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
8 November, 2012 7-9:30pm
Fertile Community Center**

Conducted by NIACOG Planner

Introduction-

Explained that FEMA now requires multi-jurisdictional plans.

Definition and explanation of Hazard Mitigation, multi-jurisdictional plans, community responsibilities in planning process, & that each community will have representation within the plan.

Explanation of meetings and steps needed to complete plan process.

Sign in sheet/attendance and “local match” explained. *see attached sign- in sheets.

Reviewed specific county level hazards that had been identified at the County meeting and then identified hazards specific to Fertile.

Explained scoring system/process for each hazard and ranking process. Discussed & scored hazards based on probability, magnitude/severity, warning, and duration for each hazard identified by Fertile.

Reviewed & discussed Community Background information regarding community plans, ordinances, etc. and will continue to communicate with Fertile City Clerk to gather all needed information.

Identified Critical Facilities in Fertile and will continue to work with Clerk to gather additional information.

Identified and discussed current mitigation measures within Fertile.

Identified and scored new/future mitigation measures.

Explained the next steps needed in the plan development.

Answered questions.

**Worth County Multi-Jurisdictional Hazard Mitigation Meeting
14 November 2012 6:00pm
Hanlontown Community Center**

1. Introduction
2. Hazard Mitigation Explanation
3. Planning Process
4. Community Evaluation
5. Explanation of HARA

6. Identify Hazards and Score Hazards
7. Current Mitigation Measures
8. Identify New Mitigation Measures
9. Score New Mitigation Measures
10. Adjourn

**Hanlontown, Iowa meeting for the community portion of the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
14 November, 2012 6-9:00pm
Hanlontown Community Center**

Conducted by NIACOG Planner

Introduction-

Explained that FEMA now requires multi-jurisdictional plans.

Definition and explanation of Hazard Mitigation, multi-jurisdictional plans, community responsibilities in planning process, & that each community will have representation within the plan.

Explanation of meetings and steps needed to complete plan process.

Sign in sheet/attendance and “local match” explained. *see attached sign- in sheets.

Reviewed specific county level hazards that had been identified at the County meeting and then identified hazards specific to Hanlontown.

Explained scoring system/process for each hazard and ranking process. Discussed & scored hazards based on probability, magnitude/severity, warning, and duration for each hazard identified by Hanlontown.

Reviewed & discussed Community Background information regarding community plans, ordinances, etc. and will continue to communicate with Hanlontown City Clerk to gather all needed information.

Identified Critical Facilities in Hanlontown and will continue to work with Clerk to gather additional information.

Identified and discussed current mitigation measures within Hanlontown.

Identified and scored new/future mitigation measures.

Explained the next steps needed in the plan development.

Answered questions.

Worth County Multi-Jurisdictional Hazard Mitigation Meeting
20 May 2013 6:00pm
Joice Community Center

1. Introduction
2. Hazard Mitigation Explanation
3. Planning Process
4. Community Evaluation
5. Explanation of HARA
6. Identify Hazards and Score Hazards
7. Current Mitigation Measures
8. Identify New Mitigation Measures
9. Score New Mitigation Measures
10. Adjourn

Joice, Iowa meeting for the community portion of the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
20 May, 2013 6-8:00pm
Joice Community Center

Conducted by NIACOG Planner

Introduction-

Explained that FEMA now requires multi-jurisdictional plans.

Definition and explanation of Hazard Mitigation, multi-jurisdictional plans, community responsibilities in planning process, & that each community will have representation within the plan.

Explanation of meetings and steps needed to complete plan process.

Sign in sheet/attendance and “local match” explained. *see attached sign- in sheets.

Reviewed specific county level hazards that had been identified at the County meeting and then identified hazards specific to Joice.

Explained scoring system/process for each hazard and ranking process. Discussed & scored hazards based on probability, magnitude/severity, warning, and duration for each hazard identified by Joice.

Reviewed & discussed Community Background information regarding community plans, ordinances, etc. and will continue to communicate with Joice City Clerk to gather all needed information.

Identified Critical Facilities in Joice and will continue to work with Clerk to gather additional information.

Identified and discussed current mitigation measures within Joice.

Identified and scored new/future mitigation measures.

Explained the next steps needed in the plan development.

Answered questions.

Worth County Multi-Jurisdictional Hazard Mitigation Meeting
28 May 2013 12-1pm
Worth County Courthouse

1. Introduction
2. Prioritize hazards
3. Community Background Information
4. Identify Critical Facilities
5. Identify current mitigation measures
6. Identify and score mitigation measures
7. Adjourn

Worth County Multi-Jurisdictional Hazard Mitigation Plan
28 May, 2013 12-1pm
Worth County Courthouse

Conducted by NIACOG Planner

Introduction-

Explained that FEMA now requires multi-jurisdictional plans.

Definition and explanation of Hazard Mitigation, multi-jurisdictional plans, community responsibilities in planning process, & that each community will have representation within the plan.

Explanation of meetings and steps needed to complete plan process.

Sign in sheet/attendance and “local match” explained. *see attached sign- in sheets.

Reviewed specific county level hazards that had been identified

Explained scoring system/process for each hazard and ranking process. Discussed & scored hazards based on probability, magnitude/severity, warning, and duration for each hazard identified by Worth County.

Reviewed & discussed Community Background information regarding community plans, ordinances, etc. and will continue to communicate with Worth County Auditor to gather all needed information.

Identified Critical Facilities in Worth County and will continue to work with Auditor to gather additional information.

Identified and discussed current mitigation measures within Worth County.

Identified and scored new/future mitigation measures.

Explained the next steps needed in the plan development.

Answered questions.

Worth County Multi-Jurisdictional Hazard Mitigation Meeting
September 16, 2013 7:00pm
Manly City Hall

1. Introduction
2. Review of Planning Process
3. Discussion of Public Participation Requirements for Manly in Multi-Jurisdictional Hazard Mitigation Plan
4. Review of Manly's current hazard and mitigation measure ranking and critical facilities
5. Discussion of update of mitigation actions in incorporated plan
6. Discussion on review process and adoption resolution
7. Discussion on next steps after adoption
8. Adjourn

Manly, Iowa meeting for the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
September 16, 2013, 7:00pm – 8:00pm.
Manly City Hall

Conducted by NIACOG Planner

Introduced new NIACOG staff and discussed what has been completed in the Multi-Jurisdictional Hazard Mitigation plan process for Worth County.

Reviewed & discussed hazard and mitigation measure rankings, goals, statuses of mitigation actions updates, and critical facilities list update.

It was stated by planner that the plan's goals and recommended mitigation measures should be reviewed annually and monitored by the jurisdictions. It was also stated by the planner that the further specific mitigation actions should be developed off of the mitigation measures and an update will be initiated by the county within 4 years.

Answered questions.

Meeting adjourned at 8:00pm.

Worth County Multi-Jurisdictional Hazard Mitigation Meeting

September 24, 2013 7:00pm

Northwood City Hall

1. Introduction
2. Review of Planning Process
3. Discussion of Public Participation Requirements for Manly in Multi-Jurisdictional Hazard Mitigation Plan
4. Review of Manly's current hazard and mitigation measure ranking and critical facilities
5. Discussion of update of mitigation actions in incorporated plan
6. Discussion on review process and adoption resolution
7. Discussion on next steps after adoption
8. Adjourn

**Northwood, Iowa meeting for the
Worth County Multi-Jurisdictional Hazard Mitigation Plan**

September 24, 2013, 7:00pm – 8:00pm.

Northwood City Hall

Conducted by NIACOG Planner

Introduced new NIACOG staff and discussed what has been completed in the Multi-Jurisdictional Hazard Mitigation plan process for Worth County.

Reviewed & discussed hazard and mitigation measure rankings, goals, statuses of mitigation actions updates, and critical facilities list update.

It was stated by planner that the plan's goals and recommended mitigation measures should be reviewed annually and monitored by the jurisdictions. It was also stated by the planner that the further specific mitigation actions should be developed off of the mitigation measures and an update will be initiated by the county within 4 years.

Answered questions.

Meeting adjourned at 8:00pm.

Worth County Multi-Jurisdictional Hazard Mitigation Meeting #2

September 19, 2013 11:00am

Grafton City Hall

1. Introduction
2. Review of Planning Process
3. Review of level of Public Participation throughout Worth County
4. Review of hazard ranking, mitigation measures prioritization, and critical facilities identification outcomes from last meeting
5. Discussion on review process and adoption resolution
6. Discussion on next steps after adoption
7. Adjourn

MINUTES

**Worth County, Iowa meeting for the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
September 19, 2013, 11:00am – 12:00pm.
Grafton City Hall**

Conducted by NIACOG Planner

Introduced new NIACOG staff

Reviewed & discussed hazard and mitigation measure ranking and goals outcomes from initial meeting

It was stated by planner that the plan's goals and recommended mitigation measures should be reviewed annually and monitored by the jurisdictions. It was also stated by the planner that the further specific mitigation actions should be developed off of the mitigation measures with assistance from Worth County's emergency management coordinator and an update will be initiated by the county within 4 years.

Answered questions.

Copies of the Worth County Multi-Jurisdictional Hazard Mitigation Plan Draft were left at the city hall for review by the public along with copies of the adoption resolution.

Meeting adjourned at 12:00pm

Worth County Multi-Jurisdictional Hazard Mitigation Meeting #2

October 3, 2013 2:00

Kensett City Hall

1. Introduction
2. Review of Planning Process
3. Review of level of Public Participation throughout Worth County
4. Review of hazard ranking, mitigation measures prioritization, and critical facilities identification outcomes from last meeting
5. Discussion on review process and adoption resolution
6. Discussion on next steps after adoption
7. Adjourn

MINUTES

**Worth County, Iowa meeting for the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
October 3rd, 2013, 2:00-3:00pm
Kensett City Hall**

Conducted by NIACOG Planner

Introduced new NIACOG staff

Reviewed & discussed hazard and mitigation measure ranking and goals outcomes from initial meeting

It was stated by planner that the plan's goals and recommended mitigation measures should be reviewed annually and monitored by the jurisdictions. It was also stated by the planner that the further specific mitigation actions should be developed off of the mitigation measures with assistance from Worth County's emergency management coordinator and an update will be initiated by the county within 4 years.

Answered questions.

Copies of the Worth County Multi-Jurisdictional Hazard Mitigation Plan Draft for further review were left at the city hall for review by the public along with copies of the adoption resolution.

Meeting adjourned at 3:00pm

Worth County Multi-Jurisdictional Hazard Mitigation Meeting #3

October 7th, 2013 6:30pm

Kensett City Hall

1. Introduction
2. Discuss what was addressed at previous review meeting
3. For residents/planning committee members not present at previous review meeting, re-discuss hazard mitigation goals and measures ranking and hazard prioritization
4. Document comments and questions from the public

MINUTES

Worth County, Iowa meeting for the

Worth County Multi-Jurisdictional Hazard Mitigation Plan

October 7th, 2013, 6:30-7:30pm

Kensett City Hall

Re-discussed hazard ranking based on probability, magnitude/severity, warning time and duration

Discussed which mitigation measures were applied by planning committee to hazards and why.

Discussed what facilities are considered critical

Did not receive any additional comments or questions from the public prior to adoption

Meeting adjourned at 7:30pm

Worth County Multi-Jurisdictional Hazard Mitigation Meeting #3

October 14, 2013 7:00pm

Grafton City Hall

1. Introduction
2. Discuss what was addressed at previous review meeting
3. For residents/planning committee members not present at previous review meeting, re-discuss hazard mitigation goals and measures ranking and hazard prioritization
5. Document comments and questions from the public

MINUTES
Worth County, Iowa meeting for the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
October 14th, 2013, 7:00-8:00pm
Grafton City Hall

Re-discussed hazard ranking based on probability, magnitude/severity, warning time and duration
Discussed which mitigation measures were applied by planning committee to hazards and why.
Discussed what facilities are considered critical
Did not receive any additional comments or questions from the public prior to adoption

Meeting adjourned at 8:00pm

Worth County Multi-Jurisdictional Hazard Mitigation Meeting #2
October 9, 2013 3:00
Fertile City Hall

1. Introduction
2. Review of Planning Process
3. Review of level of Public Participation throughout Worth County
4. Review of hazard ranking, mitigation measures prioritization, and critical facilities identification outcomes from last meeting
5. Discussion on review process and adoption resolution
6. Discussion on next steps after adoption
7. Adjourn

MINUTES
Worth County, Iowa meeting for the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
October 9th, 2013, 3:00-4:00pm
Fertile City Hall

Conducted by NIACOG Planner

Introduced new NIACOG staff

Reviewed & discussed hazard and mitigation measure ranking and goals outcomes from initial meeting

It was stated by planner that the plan's goals and recommended mitigation measures should be reviewed annually and monitored by the jurisdictions. It was also stated by the planner that the further specific mitigation actions should be developed off of the mitigation measures with assistance from Worth County's emergency management coordinator and an update will be initiated by the county within 4 years.

Answered questions.

Copies of the Worth County Multi-Jurisdictional Hazard Mitigation Plan Draft for further review were left at the city hall for review by the public along with copies of the adoption resolution.

Meeting adjourned at 4:00pm

Worth County Multi-Jurisdictional Hazard Mitigation Meeting #3
October 15th, 2013, 7:00pm
Fertile City Hall

1. Introduction
2. Discuss what was addressed at previous review meeting
3. For residents/planning committee members not present at previous review meeting, re-discuss hazard mitigation goals and measures ranking and hazard prioritization
4. Document comments and questions from the public
5. Adjourn

MINUTES
Worth County, Iowa meeting for the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
October 15th, 2013, 7:00-8:00pm
Fertile City Hall

Re-discussed hazard ranking based on probability, magnitude/severity, warning time and duration

Discussed which mitigation measures were applied by planning committee to hazards and why.

Discussed what facilities are considered critical

Did not receive any additional comments or questions from the public prior to adoption

Meeting adjourned at 8:00pm

Worth County Multi-Jurisdictional Hazard Mitigation Meeting #2

October 7, 2013 6:00
Hanlontown City Hall

1. Introduction
2. Review of Planning Process
3. Review of level of Public Participation throughout Worth County
4. Review of hazard ranking, mitigation measures prioritization, and critical facilities identification outcomes from last meeting
5. Discussion on review process and adoption resolution
6. Discussion on next steps after adoption
7. Adjourn

MINUTES

**Worth County, Iowa meeting for the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
October 7, 2013, 6:00-7:00pm
Hanlontown City Hall**

Conducted by NIACOG Planner

Introduced new NIACOG staff

Reviewed & discussed hazard and mitigation measure ranking and goals outcomes from initial meeting

It was stated by planner that the plan's goals and recommended mitigation measures should be reviewed annually and monitored by the jurisdictions. It was also stated by the planner that the further specific mitigation actions should be developed off of the mitigation measures with assistance from Worth County's emergency management coordinator and an update will be initiated by the county within 4 years.

Answered questions.

Copies of the Worth County Multi-Jurisdictional Hazard Mitigation Plan Draft for further review were left at the city hall for review by the public along with copies of the adoption resolution.

Meeting adjourned at 7:00pm

Worth County Multi-Jurisdictional Hazard Mitigation Meeting #3

November 4th, 2013, 6:00pm

Hanlontown City Hall

1. Introduction
2. Discuss what was addressed at previous review meeting
3. For residents/planning committee members not present at previous review meeting, re-discuss hazard mitigation goals and measures ranking and hazard prioritization
4. Document comments and questions from the public
5. Adjourn

MINUTES

**Worth County, Iowa meeting for the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
November 4th, 2013, 6:00-7:00pm
Hanlontown City Hall**

Re-discussed hazard ranking based on probability, magnitude/severity, warning time and duration
Discussed which mitigation measures were applied by planning committee to hazards and why.
Discussed what facilities are considered critical
Did not receive any additional comments or questions from the public prior to adoption

Meeting adjourned at 7:00pm

Worth County Multi-Jurisdictional Hazard Mitigation Meeting #2

November 4, 2013 6:00

Joice City Hall

1. Introduction
2. Review of Planning Process
3. Review of level of Public Participation throughout Worth County
4. Review of hazard ranking, mitigation measures prioritization, and critical facilities identification outcomes from last meeting
5. Discussion on review process and adoption resolution and questions and comments from public
6. Discussion on next steps after adoption
7. Adjourn

MINUTES
Worth County, Iowa meeting for the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
November 4th, 2013, 6:00-7:00pm
Joice City Hall

Discussed hazard ranking based on probability, magnitude/severity, warning time and duration
Discussed which mitigation measures were applied by planning committee to hazards and why.
Discussed what facilities are considered critical
Did not receive any additional comments or questions from the public prior to adoption

Meeting adjourned at 7:00pm

Worth County Multi-Jurisdictional Hazard Mitigation Meeting #2
December 10, 2013 7:00
Northwood City Hall

1. Summary of List of mitigation activities and statuses discussed at previous meeting
2. Discussion of status of mitigation activities not discussed previously
3. Adjourn

MINUTES
Worth County, Iowa meeting for the
Worth County Multi-Jurisdictional Hazard Mitigation Plan
December 10, 2013, 7:00pm – 8:00pm
Northwood City Hall

Summarized mitigation activities that the Northwood planning committee provided status updates on at previous meeting. These activities were the ones included in the hazard mitigation plan prior to 2007. The planning committee then discussed the mitigation activities in 2007 hazard mitigation plan. The committee provided NIACOG staff the updated statuses for those activities to include in 2013 hazard mitigation plan.

Meeting adjourned at 8:00pm

APPENDIX C: PLANNING COMMITTEE AND SIGN-IN SHEETS

WORTH COUNTY PLANNING COMMITTEE

- Jacki Backhaus-Auditor-Worth County
- Dave Haugen-Supervisor-Worth County
- Dennis May-Supervisor-Worth County
- Kenneth Abrams-Supervisor-Worth County
- Jim Rice-Planning and Zoning Worth County
- Mark Thoma-Mayor of Joice
- Jean Miller-Citizen-Joice
- Wayne Brackey-Joice Fire Dept.
- Kelly Hansen-Poet Bio refining-Hanlontown
- Mike Kennedy-Citizen-Hanlontown
- Sharon Rice-City Clerk Hanlontown
- Tad Miller-City Council Fertile
- Steve Roberts- City Staff Fertile
- Robin Tabbert-Citizen-Fertile
- Joann Nichols-City Clerk Grafton
- Thomas Dakin-Mayor of Fertile
- Ray Huftalin-Worth County EMA
- Dee Dunbar – City Clerk Manly
- Amber Julseth – City Clerk Northwood

Hazard Mitigation Planning Meeting Sign-In Sheet					
Jurisdiction: Worth County MJ Plan- Grafton			Date: 10/29/12	Time: 7:00pm - 9:30	
Print Name	Sign Name	Address or Phone # or email address	Representing (City Council, citizen, City works, school district, business, etc.) Name of who you are representing	Volunteer	Compensated
Sample Name		555-456-3223	Anytown City Council	x	
Cory HECKEN	Cory Hecken	641-748-2247	City Council Fire Dept.	X	
Kyle Tabbert	Kyle Tabbert	641-748-2712	Fire Dept	X	
Chris Kruger	Chris Kruger	641-420-4369	City work	X	
John W. Dork	John W. Dork	641-420-5409	Mayor	X	
David Diedrich	David Diedrich	641-420-2185	Fire Dept	X	
Diane Tabbert	Diane Tabbert	641-748-2260	Fire Dept	X	
ROBIN TABBERT	Robin Tabbert	641-748-2260	CITIZEN	X	
Joann Nichols	Joann Nichols	641-748-2249	City Clerk	X	
Bruce White	Bruce White	641-748-2938	Citizen	X	

Hazard Mitigation Planning Meeting Sign-In Sheet					
Jurisdiction: Worth County MJ Plan- Fertile			Date: 11/08/12	Time: 7:00 pm - 9:30	
Print Name	Sign Name	Address or Phone # or email address	Representing (City Council, citizen, City works, school district, business, etc.) Name of who you are representing	Volunteer	Compensated
Sample Name		555-456-3223	Anytown City Council	x	
Tad Miller	<i>Tad Miller</i>	641-797-2158	City Council	x	no
Joyce C. Russell	<i>Joyce C. Russell</i>	641-590-1715 9j1r@wctel.net	Mayor	x	no
Penny Miller	<i>Penny Miller</i>	641-797-2704 dpmiller@wctel.net	City Council	x	no
Eddie May	<i>Eddie May</i>	641-797-2121	City Clerk	x	no
Steve Roberts	<i>SR</i>	641 529 2993 srsjessen@wctel.net	city staff	+	no
Julia Jensen	<i>Julia Jensen</i>	641-797-2629	city council	x	no
Dennis Faber	<i>Dennis P. Faber</i>	641-590-2540	Business Person	x	no
Pat Renchin	<i>Pat Renchin</i>	641 797-2406	Fertile city council	x	no
Jeffrey Burg	<i>Jeffrey Burg</i>	641-590-3192	City Council / Fire Dept	x	no

Hazard Mitigation Planning Meeting Sign-In Sheet					
Jurisdiction: Worth County MJ Plan- Hanlontown			Date: 11/14/12	Time: 6:00pm - 9:00pm	
Print Name	Sign Name	Address or Phone # or email address	Representing (City Council, citizen, City works, school district, business, etc.) Name of who you are representing	Volunteer	Compensated
Sample Name		555-456-3223	Anytown City Council	x	
Wayne Steven	Wayne Steven	507-402-1492	Five Star Corp	X	
ROBERT MICHAELIS	Robert Michaelis	641-590-1925	CITY council	X	
KENT HANSEN	Kelly Hansen	641 896 2500	POET PAPERLINK	✓	
Mike Kennedy	Michael Kennedy	641-420-5010	Citizen	X	
Ramona Kinella	Ramona Kinella	641-896-2888	Librarian	X	
Jim Rice	James Rice	641-430-2415	CITIZEN	X	
DAVE FULTON	Dave Fulton	641-896-2968	City Council	X	
Sarah Hagen	Sarah Hagen	641-420-3421	City Council	X	
Peter Bratton	Bob Bratton	641 590-1896	Fire Dept.	X	
Blayne Brunsvold	Blayne Brunsvold	641-420-3165	Fire Dept	X	
Patrick Mack	Patrick Mack	641-420-6915	Water Superintendent	X	
Jacob Jackson	Jacob Jackson	641-420-1702	Fire Dept & City Council	X	
SHARON RICE	Sharon Rice	641-896-2036	City Clerk	X	
Rick Scholbrock	Rick Scholbrock	641-896-3148	Mayor	X	

Hazard Mitigation Planning Meeting Sign-In Sheet					
Jurisdiction: Worth County MJ Plan- Joice		Date: 05/20/2013	Time: 6:00am - 8:00pm		
Print Name	Sign Name	Address or Phone # or email address	Representing (City Council, citizen, City works, school district, business, etc.) Name of who you are representing	Volunteer	Compensated
Sample Name		555-456-3223	Anytown City Council	x	
Mardene Lien	Mardene Lien	641-588-3383	Joice City Clerk / Postmaster	X	
MARILYN HOLT	Marilyn Holt	641-588-3355	City of Joice - Treasurer	X	
Jean Miller	Jean Miller	641-588-3483	Citizen	X	
RON MILLER	Ron Miller	641-588-3483	CITY COUNCILMAN	X	
BARRY ANONSON	Barry Anonson	641-588-3129	CITY COUNCILMAN	X	
Terry Anonson	Terry Anonson	641-588-3129	Citizen	X	
Mark DeLaney	Mark DeLaney	641-588-3486	Fire Chief	X	
Mark Thoma	Mark Thoma	641-588-3440	Mayor		X
Jayne Shaffer	Jayne Shaffer	641-590-1844	Joice Fire Dept / Rth	X	
Wayne Brackey	Wayne Brackey	641-588-3152	Fire Dept.	X	

Hazard Mitigation Planning Meeting Sign-In Sheet

Jurisdiction: <i>Worth County - Northwood</i>		Date: <i>9/24/13</i>	Time: <i>7 pm - 8 pm</i>		
Print Name	Sign Name	Address or Phone # or email address	Representing (City Council, citizen, City works, school district, business, etc.) Name of who you are representing	Volunteer	Compensated
Sample Name		555-456-3223	Anytown City Council	x	
<i>Amber Julseth</i>	<i>Amber Julseth</i>	<i>(641) 324-1075</i>	<i>Northwood City Council</i>	<i>X</i>	
<i>Jane Bloomgarden</i>	<i>Jane Bloomgarden</i>	<i>641-324-1201</i>	<i>City</i>	<i>X</i>	
<i>Doug Helgebrand</i>	<i>Doug Helgebrand</i>	<i>641-324-2251</i>	<i>Northwood IA.</i>	<i>X</i>	
<i>Russ Meyer</i>	<i>Russ Meyer</i>	<i>641-324-3606</i>	<i>Northwood IA.</i>	<i>X</i>	
<i>Gary Newlin</i>	<i>Gary Newlin</i>	<i>641-390-0257</i>	<i>Northwood IA</i>	<i>X</i>	
<i>Chudie Taylor</i>	<i>Chudie Taylor</i>	<i>641-324-1052</i>	<i>Northwood IA</i>	<i>X</i>	
<i>Roger Husted</i>	<i>Roger Husted</i>	<i>324-1343</i>	<i>Northwood IA</i>	<i>X</i>	
<i>Kris Benison</i>	<i>Kris Benison</i>	<i>790-0103</i>	<i>Northwood Anchor</i>	<i>X</i>	
<i>Craig TPT</i>	<i>Craig TPT</i>	<i>390-0475</i>	<i>Northwood</i>	<i>X</i>	

Hazard Mitigation Planning Meeting Sign-In Sheet

Jurisdiction: <i>Worth County - Canton</i>		Date: <i>10/04/13</i>	Time: <i>7pm - 8pm</i>		
Print Name	Sign Name	Address or Phone # or email address	Representing (City Council, citizen, City works, school district, business, etc.) Name of who you are representing	Volunteer	Compensated
Sample Name		555-456-3223	Anytown City Council	x	
JOANN NICHOLS	<i>Joann Nichols</i>	<i>641-748-2970</i>	<i>City Clerk</i>	X	
Tom Truquer	<i>Tom Truquer</i>	<i>641-748-2290</i>	<i>City Council</i>	X	
Tyler Johannes	<i>Tyler Johannes</i>	<i>641-748-2008</i>	<i>City Council</i>	X	
Gary Schotanus	<i>Gary Schotanus</i>	<i>641-748-2372</i>	<i>City Council</i>	X	
Cory HICKEN	<i>Cory Hicken</i>	<i>641-748-2247</i>	<i>City Council</i>	X	
John W. Bark	<i>John W. Bark</i>	<i>641-420-5409</i>	<i>Mayor</i>	X	

Hazard Mitigation Planning Meeting Sign-In Sheet

Jurisdiction: <i>City of Fertile</i>		Date: <i>10-15-2013</i>	Time: <i>7:00pm-8:00pm</i>		
Print Name	Sign Name	Address or Phone # or email address	Representing (City Council, citizen, City works, school district, business, etc.) Name of who you are representing	Volunteer	Compensated
Sample Name		555-456-3223	Anytown City Council	x	
<i>Penny Miller</i>	<i>Penny Miller</i>	<i>641-797-2704</i>	<i>City Council</i>	<i>X</i>	
<i>Tad Miller</i>	<i>Tad Miller</i>	<i>641-797-2158</i>	<i>City Council</i>	<i>X</i>	
<i>Jeffrey E. Ber</i>	<i>Jeffrey E. Ber</i>	<i>641-590-3192</i>	<i>Fertile City Council</i>	<i>X</i>	
<i>Pat Benchin</i>	<i>Pat Benchin</i>	<i>641-797-2406</i>	<i>Fertile City Council</i>	<i>X</i>	
<i>Julie Vessen</i>	<i>Julie Vessen</i>	<i>641-797-2629</i>	<i>Fertile City Council</i>	<i>X</i>	
<i>Eddie May</i>	<i>Eddie May</i>	<i>641-425-9878</i>	<i>Visitor</i>	<i>X</i>	
<i>Steve Roberts</i>	<i>SR</i>	<i>641-357-6624</i>	<i>Fertile City worker</i>	<i>X</i>	

Hazard Mitigation Planning Meeting Sign-In Sheet

Jurisdiction: <i>Worth County - Hantontown</i>		Date: <i>10/7/13</i>	Time: <i>6:00 pm - 7:00 pm</i>		
Print Name	Sign Name	Address or Phone # or email address	Representing (City Council, citizen, City works, school district, business, etc.) Name of who you are representing	Volunteer	Compensated
Sample Name		555-456-3223	Anytown City Council	X	
<i>Nancy Lunning</i>	<i>Nancy Lunning</i>	<i>641-896-3929</i>	<i>Hantontown City Clerk</i>	X	
<i>Rick Scholbrock</i>	<i>Rick Scholbrock</i>	<i>641-896-3148</i>	<i>Hantontown Mayor</i>	X	
<i>Jake Jackson</i>	<i>Jake Jackson</i>		<i>H-town, IA Council member</i>	X	
<i>Jody Moritz</i>	<i>Jody Moritz</i>	<i>641-896-3629</i>	<i>H-town IA Council member</i>	X	
<i>David Furton</i>	<i>David Furton</i>	<i>641-896-2968</i>	<i>Hantontown Council Member</i>	X	
<i>Robert Michaelus</i>	<i>Robert Michaelus</i>	<i>641-896-2472</i>	<i>Hantontown Council Member</i>	X	
<i>Sarah Hagen</i>	<i>Sarah Hagen</i>	<i>641-420-3421</i>	<i>Hantontown Council Member</i>	X	
<i>Mike Kennedy</i>	<i>Mike Kennedy</i>	<i>641-420-5010</i>	<i>Hantontown,</i>	X	

Hazard Mitigation Planning Meeting Sign-In Sheet

Jurisdiction: <i>Lehigh County - Kensett</i>		Date: <i>10/7/13</i>	Time: <i>6:30-7:30pm</i>		
Print Name	Sign Name	Address or Phone # or email address	Representing (City Council, citizen, City works, school district, business, etc.) Name of who you are representing	Volunteer	Compensated
Sample Name		555-456-3223	Anytown City Council	x	
<i>Tom Spahn</i>	<i>[Signature]</i>	<i>641-845-2507</i>	<i>Kensett IA / Mayor</i>	<i>x</i>	
<i>Herb Thompson</i>	<i>[Signature]</i>	<i>641 845 2435</i>	<i>Kensett Council</i>	<i>x</i>	
<i>Dave Hsiker</i>	<i>[Signature]</i>	<i>641-845-2582</i>	<i>Kensett Council</i>	<i>x</i>	
<i>Erise Ehlkenfeldt</i>	<i>[Signature]</i>	<i>641-390-1005</i>	<i>Kensett Council</i>	<i>x</i>	
<i>Kristine Noltzen</i>	<i>[Signature]</i>	<i>641-430-4887</i>	<i>Kensett Council</i>	<i>x</i>	
<i>Azary Harrison</i>	<i>[Signature]</i>	<i>641-390-2216</i>	<i>Kensett Council</i>	<i>x</i>	
<i>Richard A Bauer</i>	<i>[Signature]</i>	<i>641-512-3349</i>	<i>city maintenance</i>	<i>x</i>	
<i>Corey Fuhr</i>	<i>[Signature]</i>	<i>507-581-0380</i>	<i>Citizen</i>	<i>x</i>	
<i>Justin Robinson</i>	<i>[Signature]</i>	<i>641-430-7613</i>	<i>Citizen</i>	<i>x</i>	
<i>Devin Deiken</i>	<i>[Signature]</i>	<i>641-845-2802</i>	<i>Citizen</i>	<i>x</i>	
<i>Lon McNally</i>	<i>[Signature]</i>	<i>641-845-2484</i>	<i>Kensett City Clerk</i>	<i>x</i>	

APPENDIX D: LETTERS TO COMMUNITIES

Worth County Board of Supervisors
1000 Central Ave
Northwood, IA 50459

May 28th, 2013

Board of Supervisors
Winnebago County Courthouse
126 S Clark St.
Forest City, IA 50436

Dear Supervisors:

The North Iowa Area Council of Governments has just completed the Multi-Jurisdictional Hazard Mitigation Plan Draft for Worth County.

Your community leaders are invited to review our Hazard Mitigation Plan. FEMA and NIACOG have requested that we, as Supervisors, contact neighboring communities to ask if they would like to review the plan in order to provide comments to Worth County.

If you would like to review the plan, please contact our Auditor at 641-324-2316 to make arrangements in reviewing the plan draft. The draft will be available starting May 28th, 2013. Thank you.

Sincerely,

Kenneth Abrams
Dave Haugen
Dennis May

Worth County Board of Supervisors
1000 Central Ave
Northwood, IA 50459

May 28th, 2013

Board of Supervisors
Mitchell County Courthouse
117 Plaza Lane
Osage, IA 50461

Dear Supervisors:

The North Iowa Area Council of Governments has just completed the Multi-Jurisdictional Hazard Mitigation Plan Draft for Worth County.

Your community leaders are invited to review our Hazard Mitigation Plan. FEMA and NIACOG have requested that we, as Supervisors, contact neighboring communities to ask if they would like to review the plan in order to provide comments to Worth County.

If you would like to review the plan, please contact our Auditor at 641-324-2316 to make arrangements in reviewing the plan draft. The draft will be available starting May 28th, 2013. Thank you.

Sincerely,

Kenneth Abrams
Dave Haugen
Dennis May

Worth County Board of Supervisors
1000 Central Ave
Northwood, IA 50459

May 28th, 2013

Board of Supervisors
Cerro Gordo County Courthouse
220 North Washington Avenue
Mason City, IA 50401

Dear Supervisors:

The North Iowa Area Council of Governments has just completed the Multi-Jurisdictional Hazard Mitigation Plan Draft for Worth County.

Your community leaders are invited to review our Hazard Mitigation Plan. FEMA and NIACOG have requested that we, as Supervisors, contact neighboring communities to ask if they would like to review the plan in order to provide comments to Worth County.

If you would like to review the plan, please contact our Auditor at 641-324-2316 to make arrangements in reviewing the plan draft. The draft will be available starting May 28th, 2013. Thank you.

Sincerely,

Kenneth Abrams
Dave Haugen
Dennis May

Worth County Board of Supervisors
1000 Central Ave
Northwood, IA 50459

May 28th, 2013

Board of Supervisors
Freeborn County Government Center
411 South Broadway
Albert Lea, Minnesota 56007

Dear Supervisors:

The North Iowa Area Council of Governments has just completed the Multi-Jurisdictional Hazard Mitigation Plan Draft for Worth County.

Your community leaders are invited to review our Hazard Mitigation Plan. FEMA and NIACOG have requested that we, as Supervisors, contact neighboring communities to ask if they would like to review the plan in order to provide comments to Worth County, Iowa.

If you would like to review the plan, please contact our Auditor at 641-324-2316 to make arrangements in reviewing the plan draft. The draft will be available starting May 28th, 2013. Thank you.

Sincerely,

Kenneth Abrams
Dave Haugen
Dennis May

APPENDIX E: REFERENCES

REFERENCES

U.S. Department of Homeland Security. FEMA Risk Assessment Workshop: Participant Manual FEMA, 2007.

FEMA Risk Assessment Workshop On Disk. CD-ROM. FEMA. 2007.

Mitigation Planning References. CD-ROM. Iowa Homeland Security and Emergency Management, 2008

U.S. Department of Homeland Security. FEMA Homepage. 2013

Available at: <http://www.fema.gov/>

North Iowa Area Council of Governments.

Worth County, Iowa Hazard Mitigation Plan. Worth County, IA, 2008

North Iowa Area Council of Governments

Manly Iowa Multi-Hazard Mitigation Plan 2008

North Iowa Area Council of Governments

Northwood Hazard Mitigation Plan 2004

State of Iowa. Hazard Mitigation Plan. 2010

U.S. Census Bureau. United States Census Homepage. 2013

Available at: <http://www.census.gov/>

National Climatic Data Center. NOAA and NCDC Homepage. 2013

Available at: <http://www.ncdc.noaa.gov/oa/ncdc.html>

National Resources Conservation Service. NRCS Soils Homepage. 2013

Available at: <http://soils.usda.gov/>

APPENDIX F: ACRONYM LIST

Acronym List

BCA	Benefit Cost Analysis
BFE	Base Flood Elevation
CBD	Central Business District
CFR	Code of Federal Regulations
COG	Council of Governments
CRS	Community Rating System
DMA 2000	Disaster Mitigation Act of 2000
EMI	Emergency Management Institute
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance
GIS	Geographic Information Systems
HAZUS _{MH}	Hazards U.S. – Multi- Hazard
HMGP	Hazard Mitigation Grant Program
HQ	Headquarters
ISO	Insurance Services Office
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
N/A	Not Applicable
NCDC	National Climatic Data Center
NEIC	National Earthquake Information Center
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
PDM	Pre-Disaster Mitigation
PGA	Peak Ground Acceleration
QC	Quality Control
SHMO	State Hazard Mitigation Officer
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, Environmental
USGS	U.S. Geological Survey

APPENDIX G: UPDATE SHEETS

Worksheet # 1: Progress Report

Progress Report Period: _____ to _____
(Date) (Date)

Project Title: _____ Project ID#: _____

Responsible Agency: _____

Address: _____

City/County: _____

Contact Person: _____ Title: _____

Phone #(s): _____ e-mail address: _____

List Supporting Agencies and Contacts: _____

Total Project Cost: \$ _____ Anticipated Cost Overrun/Under run: _____

Date of Project Approval: _____ Start date of the project: _____

Anticipated completion date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase).

Milestones	Complete	Projected Date of Completion

--	--	--

Plan Goal(s)/Objective(s) Addressed:

Goal: _____

Objective: _____

Indicator of Success (e.g., losses avoided as a result of the acquisition program):

In most cases, you will list losses avoided as the indicator. In cases where it is difficult to quantify the benefits in dollar amounts, you will use other indicators, such as the number of people who now know about mitigation or who are taking mitigation actions to reduce their vulnerability to hazards.

Status (Please check pertinent information and provide explanations for items with an asterisk. For completed or canceled projects, see Worksheet #2 — to complete a project evaluation):

Project Status

(1) Project on schedule

(2) Project completed

(3) Project delayed*

*explain: _____

(4) Project canceled

Project Cost Status

(1) Cost unchanged

(2) Cost overrun*

*explain: _____

(3) Cost under run*

*explain: _____

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

B. What obstacles, problems, or delays did you encounter, if any?

C. How was each problem resolved?

Next Steps: What is/are the next step(s) to be accomplished over the next reporting period?

Other comments:

Worksheet #2: Evaluating Your Planning Team

When gearing up for the plan evaluation, the planning team should reassess its composition and ask the following questions:

	YES	NO
<p>Have there been local staffing changes that would warrant inviting different members to the planning team?</p> <p>Comments/Proposed Action:</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Are there organizations that have been invaluable to the planning process or to project implementation that should be represented on the planning team?</p> <p>Comments/Proposed Action:</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Are there any representatives of essential organizations who have not fully participated in the planning and implementation of actions? If so, can someone else from this organization commit to the planning team?</p> <p>Comments/Proposed Action:</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Are there procedures (e.g., signing of MOAs, commenting on submitted progress reports, distributing meeting minutes, etc.) that can be done more efficiently?</p> <p>Comments/Proposed Action:</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Are there ways to gain more diverse and widespread cooperation?</p> <p>Comments/Proposed Action:</p>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?</p> <p>Comments/Proposed Action:</p>	<input type="checkbox"/>	<input type="checkbox"/>

If the planning team determines the answer to any of these questions is “yes,” some changes may be necessary.

Worksheet #3: Evaluate Your Project Results

Project Name and Number:

Project Budget:

Project Description:

Associated Goal and Objective (s):

Indicator of Success (e.g., losses avoided):

Insert location map

include before and after photos if appropriate

Was the action implemented?

IF YES



What were the results of the implemented action?

IF NO



Why not?

Was there political support for the action?	YES	NO
Were enough funds available?	YES	NO
Were workloads equitably or realistically distributed?	YES	NO
Was new information discovered about the risks or community that made implementation difficult or no longer sensible?	YES	NO
Was the estimated time of implementation reasonable?	YES	NO
Were sufficient resources (for example staff and technical assistance) available?	YES	NO

Were the outcomes as expected?

YES NO Additional comments or other outcomes:

If No, please explain:



Did the results achieve the goal and objective (s)? **YES** **NO**
Explain how:

Was the action cost-effective? **YES** **NO**
Explain how or how not:

What were the losses avoided after having completed the project?

If it was a structural project, how did it change the hazard profile?

Date _____

Prepared by: _____

Worksheet #4: Revisit Your Risk Assessment

Risk Assessment Steps	Questions	YES	NO	COMMENTS
Identify hazards	Are there new hazards that can affect your community?			
Profile hazard events	Are new historical records available?			
	Are additional maps or new hazard studies available?			
	Have chances of future events (along with their magnitude, extent, etc.) changed?			
	Have recent and future development in the community been checked for their effect on hazard areas?			
Inventory assets	Have inventories of existing structures in hazard areas been updated?			
	Are future developments foreseen and accounted for in the inventories?			
	Are there any new special high-risk populations?			
Estimate losses	Have loss estimates been updated to account for recent changes?			

If you answered “Yes” to any of the above questions, review your data and update your risk assessment information accordingly

Worksheet #5: Revise the Plan

Prepare to update the plan.

When preparing to update the plan:

Check the box when addressed ✓

1. Gather information, including project evaluation worksheets, progress reports, studies, related plans, etc.

Comments:

2. Reconvene the planning team, making changes to the team composition as necessary (see results from *Worksheet #2*).

Comments:

Consider the results of the evaluation and new strategies for the future.

When examining the community consider:

Check the box when addressed ✓

1. The results of the planning and outreach efforts.

Comments:

2. The results of the mitigation efforts.

Comments:

3. Shifts in development trends.

Comments:

4. Areas affected by recent disasters.

Comments:

5. The recent magnitude, location, and type of the most recent hazard or disaster.

Comments:

6. New studies or technologies.

Comments:

7. Changes in local, state, or federal laws, policies, plans, priorities, or funding.

Comments:

8. Changes in the socioeconomic fabric of the community.

Comments:

9. Other changing conditions.

Comments:

Incorporate your findings into the plan.

When examining the plan:

Check the box when addressed ✓

1. Revisit the risk assessment.

Comments:

2. Update your goals and strategies.

Comments:

3. Recalculate benefit-cost analyses of projects to prioritize action items.

Comments:

Use the following criteria to evaluate the plan:

Criteria

YES NO Solution

Are the goals still applicable?

--	--	--

Have any changes in the state or community made the goals obsolete or irrelevant?

--	--	--

Do existing actions need to be reprioritized for implementation?
Do the plan's priorities correspond with state priorities?
Can actions be implemented with available resources?

Comments:

APPENDIX H: ADOPTION RESOLUTIONS

Resolution No. 06-24-2013

WORTH COUNTY

Resolution Adopting Worth County Multi-Jurisdictional Multi-Hazard Mitigation Plan

A RESOLUTION OF THE BOARD OF SUPERVISOR'S OF WORTH COUNTY IOWA ADOPTING A COUNTY WIDE MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN FOR THE UNINCORPORATED AREAS OF THE COUNTY

WHEREAS, the Worth County Board of Supervisor's recognizes the cost of reoccurring hazards to county services, infrastructure, and users.

WHEREAS, the Board of Supervisor's of Worth County has authorized the development of a Multi-Jurisdictional Multi-Hazard Mitigation Plan for Worth County which includes the Worth County Unincorporated Areas; and,

WHEREAS, the Worth County Board of Supervisor's recognizes the need for public support during the planning process; and,

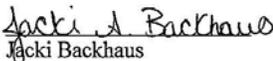
NOW THEREFORE BE IT RESOLVED, that the Worth County Board of Supervisor's, herewith adopts said plan, incorporating citizen comment and recommendations.

PASSED AND ADOPTED THIS 24th DAY OF JUNE, 2013.



Dave Haugen
Board of Supervisor's Chair

ATTEST:



Jacki Backhaus
County Auditor

Resolution No. 2013-21

CITY OF MANLY

Resolution Adopting Worth County Multi-Jurisdictional Multi-Hazard Mitigation Plan

A RESOLUTION OF THE CITY COUNCIL OF MANLY IOWA ADOPTING A COUNTY WIDE MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN FOR THE INCORPORATED AREAS OF THE CITY

WHEREAS, the Manly City Council recognizes the cost of reoccurring hazards to municipal services, infrastructure, and users.

WHEREAS, the City Council of Manly has authorized the development of a Multi-Jurisdictional Multi-Hazard Mitigation Plan for Manly which includes the Manly incorporated areas; and,

WHEREAS, the Manly City Council recognizes the need for public support during the planning process; and,

NOW THEREFORE BE IT RESOLVED, that the Manly City Council herewith adopts said plan, incorporating citizen comment and recommendations.

PASSED AND ADOPTED THIS 16th DAY OF September, 2013.



Mayor

ATTEST:



Manly City Clerk

Resolution No. 1309-20

CITY OF NORTHWOOD

Resolution Adopting Worth County Multi-Jurisdictional Multi-Hazard Mitigation Plan

A RESOLUTION OF THE CITY COUNCIL OF NORTHWOOD IOWA ADOPTING A COUNTY WIDE MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN FOR THE INCORPORATED AREAS OF THE CITY

WHEREAS, the Northwood City Council recognizes the cost of reoccurring hazards to municipal services, infrastructure, and users.

WHEREAS, the City Council of Northwood has authorized the development of a Multi-Jurisdictional Multi-Hazard Mitigation Plan for Northwood which includes the Northwood incorporated areas; and,

WHEREAS, the Northwood City Council recognizes the need for public support during the planning process; and,

NOW THEREFORE BE IT RESOLVED, that the Northwood City Council herewith adopts said plan, incorporating citizen comment and recommendations.

PASSED AND ADOPTED THIS 24th DAY OF September, 2013.


Mayor

ATTEST:


Northwood City Clerk

Resolution No. 13-10-15-2

CITY OF FERTILE

Resolution Adopting Worth County Multi-Jurisdictional Multi-Hazard Mitigation Plan

A RESOLUTION OF THE CITY COUNCIL OF FERTILE IOWA ADOPTING A COUNTY WIDE MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN FOR THE INCORPORATED AREAS OF THE CITY

WHEREAS, the Fertile City Council recognizes the cost of reoccurring hazards to municipal services, infrastructure, and users.

WHEREAS, the City Council of Fertile has authorized the development of a Multi-Jurisdictional Multi-Hazard Mitigation Plan for Fertile which includes the Fertile incorporated areas; and,

WHEREAS, the Fertile City Council recognizes the need for public support during the planning process; and,

NOW THEREFORE BE IT RESOLVED, that the Fertile City Council herewith adopts said plan, incorporating citizen comment and recommendations.

PASSED AND ADOPTED THIS 15 DAY OF October, 2013.


Mayor

ATTEST:


Fertile City Clerk

Resolution No. 2013-11

CITY OF GRAFTON

Resolution Adopting Worth County Multi-Jurisdictional Multi-Hazard Mitigation Plan

A RESOLUTION OF THE CITY COUNCIL OF GRAFTON IOWA ADOPTING A COUNTY WIDE MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN FOR THE INCORPORATED AREAS OF THE CITY

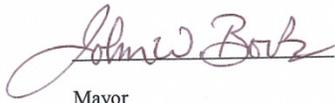
WHEREAS, the Grafton City Council recognizes the cost of reoccurring hazards to municipal services, infrastructure, and users.

WHEREAS, the City Council of Grafton has authorized the development of a Multi-Jurisdictional Multi-Hazard Mitigation Plan for Grafton which includes the Grafton incorporated areas; and,

WHEREAS, the Grafton City Council recognizes the need for public support during the planning process; and,

NOW THEREFORE BE IT RESOLVED, that the Grafton City Council herewith adopts said plan, incorporating citizen comment and recommendations.

PASSED AND ADOPTED THIS 14th DAY OF October, 2013.


Mayor

ATTEST:


Grafton City Clerk

Resolution No. 2013 007

CITY OF HANLONTOWN

Resolution Adopting Worth County Multi-Jurisdictional Multi-Hazard Mitigation Plan

A RESOLUTION OF THE CITY COUNCIL OF HANLONTOWN IOWA ADOPTING A COUNTY WIDE MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN FOR THE INCORPORATED AREAS OF THE CITY

WHEREAS, the Hanlontown City Council recognizes the cost of reoccurring hazards to municipal services, infrastructure, and users.

WHEREAS, the City Council of Hanlontown has authorized the development of a Multi-Jurisdictional Multi-Hazard Mitigation Plan for Hanlontown which includes the Hanlontown incorporated areas; and,

WHEREAS, the Hanlontown City Council recognizes the need for public support during the planning process; and,

NOW THEREFORE BE IT RESOLVED, that the Hanlontown City Council herewith adopts said plan, incorporating citizen comment and recommendations.

PASSED AND ADOPTED THIS 21 DAY OF November, 2013.



Mayor

ATTEST:



Hanlontown City Clerk

Resolution No. 302461

CITY OF JOICE

Resolution Adopting Worth County Multi-Jurisdictional Multi-Hazard Mitigation Plan

A RESOLUTION OF THE CITY COUNCIL OF JOICE IOWA ADOPTING A COUNTY WIDE MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN FOR THE INCORPORATED AREAS OF THE CITY

WHEREAS, the Joice City Council recognizes the cost of reoccurring hazards to municipal services, infrastructure, and users.

WHEREAS, the City Council of Joice has authorized the development of a Multi-Jurisdictional Multi-Hazard Mitigation Plan for Joice which includes the Joice incorporated areas; and,

WHEREAS, the Joice City Council recognizes the need for public support during the planning process; and,

NOW THEREFORE BE IT RESOLVED, that the Joice City Council herewith adopts said plan, incorporating citizen comment and recommendations.

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



Mayor Protem

ATTEST:



Joice City Clerk

Resolution No. 544

CITY OF KENSETT

Resolution Adopting Worth County Multi-Jurisdictional Multi-Hazard Mitigation Plan

A RESOLUTION OF THE CITY COUNCIL OF KENSETT IOWA ADOPTING A COUNTY WIDE MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN FOR THE INCORPORATED AREAS OF THE CITY

WHEREAS, the Kensett City Council recognizes the cost of reoccurring hazards to municipal services, infrastructure, and users.

WHEREAS, the City Council of Kensett has authorized the development of a Multi-Jurisdictional Multi-Hazard Mitigation Plan for Kensett which includes the Kensett incorporated areas; and,

WHEREAS, the Kensett City Council recognizes the need for public support during the planning process; and,

NOW THEREFORE BE IT RESOLVED, that the Kensett City Council herewith adopts said plan, incorporating citizen comment and recommendations.

PASSED AND ADOPTED THIS 7th DAY OF October, 2013.



Mayor

ATTEST:



Kensett City Clerk

Motion by Heiken, 2nd by Ehlenfeldt, Roll Call Vote taken, all Ayes, carried unanimously.

All Council present.