

2020

Winneshiek County, Iowa Multi-Jurisdiction (MJ-9) Multi-Hazard Mitigation Plan

- Calmar • Castalia • Decorah • Fort Atkinson • Jackson Junction •
- Ossian • Ridgeway • Spillville • Unincorporated Areas •



FEMA APPROVED:

EXPIRES:

Developed by:

The Cities of Calmar, Castalia, Decorah, Fort Atkinson, Jackson Junction, Ossian, Ridgeway, Spillville and the County's unincorporated areas

Professional planning assistance provided by Upper Explorerland Regional Planning Commission (UERPC)



Acknowledgements

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Cross Reference for Community Rating System (CRS) 510 FMP

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Introduction and Planning Process

What is hazard mitigation?

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are determined, prioritized, and implemented. This plan documents the countywide hazard mitigation planning process and identifies relevant hazards, vulnerabilities and strategies the Participating Jurisdictions will use to decrease vulnerability and increase resiliency and sustainability. It will affect activities and decisions for proactive mitigation planning that will help reduce the cost of disaster response. Hazard mitigation is described as:

- Any action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects – an effort to reduce loss of life and property by lessening the impact of disasters.
- Hazard mitigation is specifically dedicated to breaking the cycle of damage, reconstruction, and repeated damage.
- Mitigation is taking action now—before the next disaster—to reduce human and financial consequences later by analyzing risk, reducing risk and insuring against risk.

Why do we plan?

Each year in the United States natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because subsequent expenses incurred by insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be minimized or even eliminated. Planning allows the stakeholders to identify policies and actions that can be implemented over the long term to reduce risk and future losses. Mitigation Plans form the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. Plans create a framework for risk-based decision making to reduce damages to lives, property, and the economy from future disasters. Planning has many benefits:

- Planning identifies cost effective actions for risk reduction that are agreed upon by stakeholders and the public
- Planning focuses resources on the greatest risks and vulnerabilities
- Planning builds partnerships by involving people, organizations, and businesses
- Planning increases education and awareness of hazards and risk
- Planning communicates priorities to state and federal officials
- Planning aligns risk reduction with other community objectives

Key Steps in the Planning Process

Figure 1 illustrates the key steps in the planning process. More specifically, each step can be further described as:

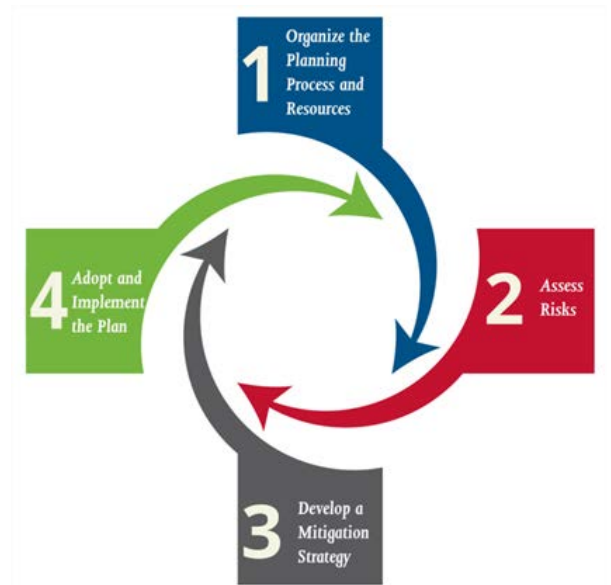
Step 1: From the start, communities should focus on the resources needed for a successful mitigation planning process. An essential first step is to identify and organize interested members of the community as well as including the technical expertise required during the planning process.

Step 2: Next, communities identify the characteristics and potential consequences of hazards through a hazard identification process. It is important to understand how much of the community can be affected by specific hazards and what the impacts would be on important community assets. This is accomplished through a vulnerability assessment.

Step 3: Armed with an understanding of the risks posed by hazards, communities determine what their priorities should be and then look at possible ways to avoid or minimize the undesired effects. The result is a hazard mitigation plan that identifies mitigation strategies and actions for implementation.

Step 4: Bring the plan to life. Communities can do this in a variety of ways, ranging from implementing specific mitigation projects to changes in day-to-day organizational operations. To ensure the success of an ongoing program, it is critical that the plan remains relevant. Therefore, it is important to conduct periodic evaluations and make revisions as needed, a plan maintenance process.

Figure 1: Hazard Mitigation Planning Process



Participants

Requirement §201.6(a)(3):

Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process

This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002, (44 CFR 201.6) and finalized on October 31, 2007. While the Disaster Mitigation Act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet or exceed in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288).

Information in this plan will be used to help guide and coordinate mitigation and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. The planning area has been affected by

hazards in the past and is therefore committed to reducing future impacts from hazard events and becoming eligible for mitigation-related federal funding.

The Disaster Mitigation Act requires that each jurisdiction participate in the planning process and officially adopt the multi-jurisdictional hazard mitigation plan. This plan includes several participating local governments:

- City of Calmar
- City of Castalia
- City of Decorah
- City of Fort Atkinson
- Unincorporated Areas of Winneshiek County
- City of Jackson Junction
- City of Ossian
- City of Ridgeway
- City of Spillville

Planners met or corresponded with the city councils (see Acknowledgements for listing of individuals) of each governmental unit. Each governing body reviewed their jurisdictional profiles; discussed their progress on and status of previously identified mitigation actions; discussed the planning significance of various hazards within their communities; and identified the mitigation actions they would pursue throughout the implementation of this plan. The Hazard Mitigation Planning Committee, the Winneshiek County Emergency Management Commission, and the Winneshiek County Board of Supervisors (see Acknowledgements for listing of individuals) ensured that the county as a whole, along with its unincorporated areas went through the same process of profile review, previous action status, determination of significance for specific hazards and mitigation action identification.

In addition, area schools directly participated in the planning process:

- Decorah Community School District
- Turkey Valley Community School District
- South Winneshiek Community School District
- Northeast Iowa Community College (NICC)
- Luther College

NICC and Luther College had representation on the planning committee (see Acknowledgements for listing of individuals), and other Winneshiek County school districts and schools participated in focused planning meetings. Each was responsible for ensuring that their respective boards were apprised of the planning process, and that all mitigation actions they seek to implement are included in the plan. School districts are not featured in this plan as separate sections. The unique risks and needs of each school, if any, are included within the jurisdictional sections in which the school or school buildings are located. Table 1 documents the ways that participating jurisdictions were involved in the planning process.

Table 1: Jurisdictional Involvement in the Development of MJ-9

Jurisdiction:	Involvement:
Winneshiek County	<ul style="list-style-type: none"> • Representation on the HMPC (Snyder, Beard, Marx, Vanden Brink, Lubke, Bjerke) • Participation at HMPC meetings (see Appendix C), watershed authority and school district meetings • Assistance with data collection (assessor, emergency management coordinator, engineer, sheriff, conservation, GIS) • Mitigation Action Identification • Plan review and comment • Host stand-alone public meeting for presentation of plan on 2-19-20

	<ul style="list-style-type: none"> • Formally adopted plan on _____
City of Calmar	<ul style="list-style-type: none"> • Assistance with jurisdictional description • Risk Discussion & Mitigation Action Identification (city meeting on 7-10-19) • Plan review and comment • Hosted public meeting for presentation of plan, and formally adopted plan, on _____
City of Castalia	<ul style="list-style-type: none"> • Assistance with jurisdictional description • Risk Discussion & Mitigation Action Identification (city meeting on 8-5-19) • Plan review and comment • Hosted public meeting for presentation of plan, and formally adopted plan, on _____
City of Decorah	<ul style="list-style-type: none"> • Representation on the HMPC (Luse, Bird, Borowski, Growth, Albert) • Participation at HMPC meetings (see Appendix C) • Assistance with jurisdictional description • Risk Discussion & Mitigation Action Identification (city meeting on 7-15-19) • Plan review and comment • Hosted public meeting for presentation of plan, and formally adopted plan, on _____
City of Fort Atkinson	<ul style="list-style-type: none"> • Representation on the HMPC (Glass, Herold) • Participation at HMPC meetings (see Appendix C) • Assistance with jurisdictional description • Risk Discussion & Mitigation Action Identification (city meeting on 8-7-19) • Plan review and comment • Hosted public meeting for presentation of plan, and formally adopted plan, on _____
City of Jackson Junction	<ul style="list-style-type: none"> • Assistance with jurisdictional description • Risk Discussion & Mitigation Action Identification (city meeting on 10-8-19) • Plan review and comment • Hosted public meeting for presentation of plan, and formally adopted plan, on _____
City of Ossian	<ul style="list-style-type: none"> • Assistance with jurisdictional description • Risk Discussion & Mitigation Action Identification (city met, reviewed hazard mitigation presentation & provided feedback, 6-11-19) • Plan review and comment • Hosted public meeting for presentation of plan, and formally adopted plan, on _____
City of Ridgeway	<ul style="list-style-type: none"> • Representation on the HMPC (Engelhardt) • Participation at HMPC meetings (see Appendix C) • Assistance with jurisdictional description • Risk Discussion & Mitigation Action Identification (city meeting on 9-18-19) • Plan review and comment • Hosted public meeting for presentation of plan, and formally adopted plan, on _____
City of Spillville	<ul style="list-style-type: none"> • Representation on the HMPC (Klemish, Wagner) • Participation at HMPC meetings (see Appendix C) • Assistance with jurisdictional description • Risk Discussion & Mitigation Action Identification (city meeting on 6-4-19) • Plan review and comment • Hosted public meeting for presentation of plan, and formally adopted plan, on _____

Jurisdiction:	Involvement:
Decorah CSD	<ul style="list-style-type: none"> • Risk Discussion & Mitigation Action Identification at school/school district meeting on November 13, 2019 • Plan review and comment • Formally adopted plan on _____
South Winneshiek CSD	<ul style="list-style-type: none"> • Risk Discussion & Mitigation Action Identification at school/school district meeting on November 13, 2019 • Plan review and comment • Formally adopted plan on _____
Turkey Valley CSD	<ul style="list-style-type: none"> • Risk Discussion & Mitigation Action Identification at school/school district meeting on November 13, 2019 • Plan review and comment • Formally adopted plan on _____
Northeast Iowa Community College	<ul style="list-style-type: none"> • Representation on the HMPC (Siebert) • Risk Discussion & Mitigation Action Identification (email correspondence) • Plan review and comment • Formally adopted plan on _____

Local Planning Process

Requirements §201.6(b)(1-3) and §201.6(c)(1):

An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval; (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

CRS Steps 1(a) and 1(b):

- (a) Involvement of Office Responsible for Community Planning*
- (b) Planning committee of department staff*

CRS Steps 2(a), 2(c) and 2(d):

- (a) Planning process conducted through a planning committee*
- (c) Public meeting held on draft plan*
- (d) Other public information activities to encourage input*

CRS Steps 3(a) and 3(b):

- (a) Review of existing studies and plans*
- (b) Coordinating with communities and other agencies*

This plan is a full update to the previous FEMA-approved plan covering all county jurisdictions:

- **Winneshiek County Multijurisdictional (MJ-9)**, FEMA approved: May 5, 2015. MJ-9 Included Calmar, Castalia, Decorah, Fort Atkinson, Jackson Junction, Ossian, Ridgeway, Spillville, the Unincorporated Areas of Winneshiek County and other participating entities.

The planning process began in December of 2018 and followed methodology prescribed by FEMA, with identification of a Hazard Mitigation Planning Committee (HMPC) comprised of key stakeholders from

the Participating Jurisdictions. Key jurisdictional representatives on the HMPC included County Board of Supervisors members; councilmembers and mayors; city staff/departments (manager, clerks, IT, engineer, police department); county staff/departments (emergency management coordinator, engineer, GIS, assessor, county public health). Other non-jurisdictional stakeholders involved in the HMPC or focused planning meetings included public and private school districts; higher learning institutions; hospital and medical centers; senior homes; regional transit; the Soil & Water Conservation District (SWCD); Turkey River Watershed Management Authority representatives; Upper Iowa River Watershed Management Authority representatives; Northeast Iowa Resource Conservation and Development representatives; nearby jurisdictions; and local residents. Upper Explorerland Regional Planning Commission facilitated the process, organized and attended meetings, and assembled all input, information and data to develop the written document.

In addition, the following were also invited to attend the hazard mitigation meetings and/or review and comment on the draft version Winneshiek County Multi-Jurisdiction Mitigation Plan (MJ-9): Dept. of Natural Resource reps (floodplain and NFIP programs), the Iowa State Extension Director for Winneshiek Co., the State of Iowa Geologist and Climatologist, the Northeast Iowa Community Action Corporation (NEICAC) Director, the Spectrum Network, a Natural Resource Conservation Service (NRCS) representative, and other county employees (auditor, zoning and floodplain management, conservation and environmental health). Meeting agendas and flyers were forwarded to listed jurisdictional representatives and stakeholder groups with the request to post in public locations and share. Public notices and/or press releases in countywide publications were utilized for all city meetings to ensure notification, inclusion, and opportunity for involvement to all concerned business, private non-profit organizations, and the general public. Appendix C offers a sampling of the notices and articles distributed by the planning agency.

As part of coordination with other agencies, Upper Explorerland and the HMPC collected and reviewed existing technical data, reports, and plans, and individual contacts were made with several agencies and organizations. Gathered information was used in the development of the hazard identification, vulnerability assessment, and capability assessment and in the formation of goals, objectives, and mitigation actions. These sources are documented throughout the plan and in Appendix A, References/Sources. The following is a summarized list of these resources and contacts:

Key reports that were reviewed in the process included:

- 2018 State of Iowa Hazard Mitigation Plan
- 2012 Winneshiek County Comprehensive Plan
- 2012 Decorah Comprehensive Plan, Decorah Stormwater Mgt. Plan & 2019 Decorah Sustainability Plan (Draft)
- 2015 Turkey River Watershed Authority Flood Reduction Plan
- 2018 Upper Iowa River Watershed Resiliency Plan
- Literature on local communities as well as other data from state and federal agencies.

Key agency contacts that were made during the process for data/information collection included:

- Iowa Dept. of Agriculture and Land Stewardship, State Entomologist & Ag Security Coordinator
- Iowa Department of Natural Resources, Flood Plain Management Engineer
- Iowa Department of Natural Resources, Environmental Specialist Sr.
- Iowa Dept. of Transportation, Office of Systems Planning
- Iowa Homeland Security and Emergency Mgt. Department, State Hazard Mitigation Planner
- Iowa State University Extension, Agronomist
- Iowa State University Extension, Plant & Insect Diagnostic Clinic
- NOAA's National Centers for Environmental Information (NCEI), Meteorologist

Key meetings with specific agencies/organizations included:

- A meeting with Turkey River Watershed Authority representatives
- A meeting with Upper Iowa River Watershed Authority representatives, the Watershed Planner from Northeast Iowa Resource Conservation and Development, and the Upper Iowa Watershed Project Coordinator from the Winneshiek County Soil & Water Conservation District

Several public meetings were held throughout the development of this plan including seven countywide meetings and one meeting in each of the county's communities. At the completion of the draft plan, additional public meetings were held to collect final public feedback on the plan (included in Table 1).

The planning timeline was laid out as follows:

1. A jurisdictional planning kick-off meeting was held on January 3, 2019. Guest speakers included the Deputy State Hazard Mitigation Officer and State Hazard Mitigation Planner, the Winneshiek County Emergency Mgt. Coordinator and County Sheriff, the Decorah City Manager, and the Spillville Mayor. Attendees discussed steps of the planning process, requirements for participants, and involvement in the countywide hazard mitigation planning committee.
2. A Hazard Mitigation Planning Committee (HMPC) kick-off meeting was held on January 30th, 2019. Attendees discussed the purpose of mitigation planning, what the planning process would entail, participation in the planning committee, and the project timeline, and were introduced to activities to attain community profile and capability information.
3. HMPC Meeting #2 was held on February 27th, 2019. The purpose and process of mitigation planning, and needs for community profile and capability information were reviewed. In addition, the committee reviewed detailed information on all potential hazards, and created a list of those hazards to be profiled within the plan.
4. The Risk Assessment was completed by Upper Explorerland and reviewed by the HMPC at a 3rd meeting on April 29th, 2019. The committee reviewed summarized data on hazard risks (previous occurrences, probability, and impacts), and completed an exercise to group hazards as high, medium or low risk. Also, city-specific planning meetings provided an opportunity to review hazard risk and local vulnerabilities in more detail.

5. Previous hazard mitigation plans, as well as the county’s Comprehensive Plan and the Iowa Hazard Mitigation Plan were reviewed and incorporated where relevant. In addition, a number of references were consulted in the development of this plan (see Appendix A).
6. From June – October 2019 planning meetings were held in each community to 1) review their community profile and capabilities, 2) discuss hazard risks and priorities specific to their community, and 3) develop mitigation strategies and actions to minimize harm from potential hazards.
7. Countywide hazard risks and vulnerabilities, and potential mitigation actions, were further discussed at coordination/planning meetings with watershed authority members on October 16th, 2019 (Upper Iowa River Watershed Authority) and November 18th, 2019 (Turkey River Watershed Authority), and school district representatives on November 13th, 2019.
8. The HMPC met on September 19th, 2019 to develop mitigation goals, strategies and mitigation activity categories to address hazard risks.
9. The HMPC met on December 10th, 2019 to finalize the mitigation action plan, prioritize mitigation actions using a scoring methodology that considered costs and benefits, and to discuss implementation considerations for actions (e.g. implementing party, action timeframe, potential funding, etc.).
10. The written document was finalized by Upper Explorerland and reviewed by the HMPC and the public at a meeting on January 30th, 2020. Copies of the draft plan were emailed to each jurisdiction and HMPC members for review and distribution to stakeholders for additional comments a week before the meeting. A public comment period for review of the draft plan was also noticed in mid-January and began on January 23rd, 2020. In addition, the meeting on January 30th provided an opportunity to discuss the implementation plan.
11. Public input was sought through several outlets:
 - a. The draft plan was available on the Upper Explorerland Planning Website where comments could be left through an online form or by direct contact with planners. The Web address was announced through a press release in Winneshiek County newspapers. The website was also used earlier in the planning process to share information.
 - b. A stand-alone public presentation of the plan was made on February 19, 2020 in Decorah, with feedback forms provided. In addition, committee members briefly reviewed the plan at all county, city or school district adoption meetings.
 - c. All city planning meetings were noticed in a countywide news publication and/or noticed locally. Also, a public flyer/agenda notification was created for every countywide planning meeting and forwarded to all jurisdictions and HMPC members to be shared or posted to notify the public of those meetings.
 - d. Residents were participants of countywide planning meetings.
 - e. Additional public information activities included an interview on the plan and plan feedback options conducted on Thursday February 6th on KVIK, a local radio station.
12. Public input was incorporated into the planning document as appropriate. All questions were answered as part of the presentation process.
13. The plan was adopted by each jurisdiction (see Table 2) and submitted to FEMA for approval on _____, 2020.

Requirement §201.6(c)(5):

[The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of each jurisdiction requesting approval of the plan

The Winneshiek County Multi-Jurisdiction (MJ-9) Multi-Hazard Mitigation Plan will be updated within a five-year timeframe and has been formally adopted by the following entities (adoption documentation in Appendix B):

Table 2: Jurisdiction Adoption Dates

Jurisdiction:	Adoption Date:
Winneshiek County Board of Supervisors	
City of Calmar	
City of Castalia	
City of Decorah	
City of Fort Atkinson	
City of Jackson Junction	
City of Ossian	
City of Ridgeway	
City of Spillville	
Decorah Community School District	
South Winneshiek Community School District	
Turkey Valley Community School District	
Northeast Iowa Community College	

Planning Area Profile and Capabilities

Overview

Requirement §201.6(c)(3):

[The plan shall] 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(d)(3):

[The plan shall] be revised to reflect changes in development, progress in local mitigation efforts and changes in priorities

This section of the Winneshiek County Hazard Mitigation includes a community profile for the county and incorporates each of the jurisdictions participating in the plan. This section will review the climate and weather, geography, land use, and other conditions that impact the county, as well an overview of location, history, demographic trends and background information for the county. This section will also include relevant data for communities within the county. The County is governed by a five member Board of Supervisors. Additional elected officials include:

- County Auditor
- County Recorder
- County Attorney
- County Sheriff
- County Treasurer

Key staff positions include:

- County Assessor
- County Central Point of Coordination (CPC)
- County Conservation Director
- County Emergency Management Coordinator
- County Engineer
- County Environmental Health
- County GIS Coordinator
- County Landfill Coordinator
- County Planning and Zoning Administrator (also the Flood Plain Administrator)
- County Public Health Administrator
- County Recycling Coordinator
- County VA Administrator

The Winneshiek County Sheriff’s office provides law enforcement to the unincorporated parts of the county and Winneshiek County Emergency Management provides emergency management services. Winneshiek County 911 Communications Center is under Winneshiek County Emergency Management. In total there are eight (8) Telecommunicator personnel and one (1) Emergency Management Coordinator.

All Police Departments, Fire Departments, and Ambulance services in the County as well as some neighboring counties have a mutual aid agreement to respond and assist with an incident as appropriate. Fire Department coverage is illustrated in Figure 2. The Frankville Fire Department is the only department in the county not located within an incorporated city.

Winneshiek County children attend one of five school districts covering the county. There are three independent community school districts and two catholic school districts with administrative

headquarters located within the county: Decorah Community School District, South Winneshiek Community School District, Turkey Valley Community School District, St. Benedict's Catholic School, St. Teresa of Calcutta Catholic School. Three other districts serve children from the county, but are physically located in neighboring counties: Howard-Winneshiek, Allamakee and Postville School Districts. School District coverage is illustrated in Figure 3.

Winneshiek County Emergency Management and the County GIS departments provide technical resources and services to the County and its emergency responders. The County has outdoor warning sirens throughout the county that are automatically activated by the County's 911 dispatch center. Winneshiek County contracts with the Northeast Iowa Response Group (NIRG), a specialized HAZMAT Team from the Waterloo Fire Department, to provide technician-level incident response throughout the county.

The County utilizes a County Zoning Ordinance to control land use, direct decision-makers and protect the quality of life for its residents. The Winneshiek County Comprehensive Plan was adopted in 2012, which outlines goals, strategies and actions for future growth and development. The County utilizes the Winneshiek County Emergency Operations Plan and the Winneshiek County Recovery Plan. All Response Personnel follow appropriate protocol and guidance.

Figure 2: Winneshiek County Fire Department Coverage

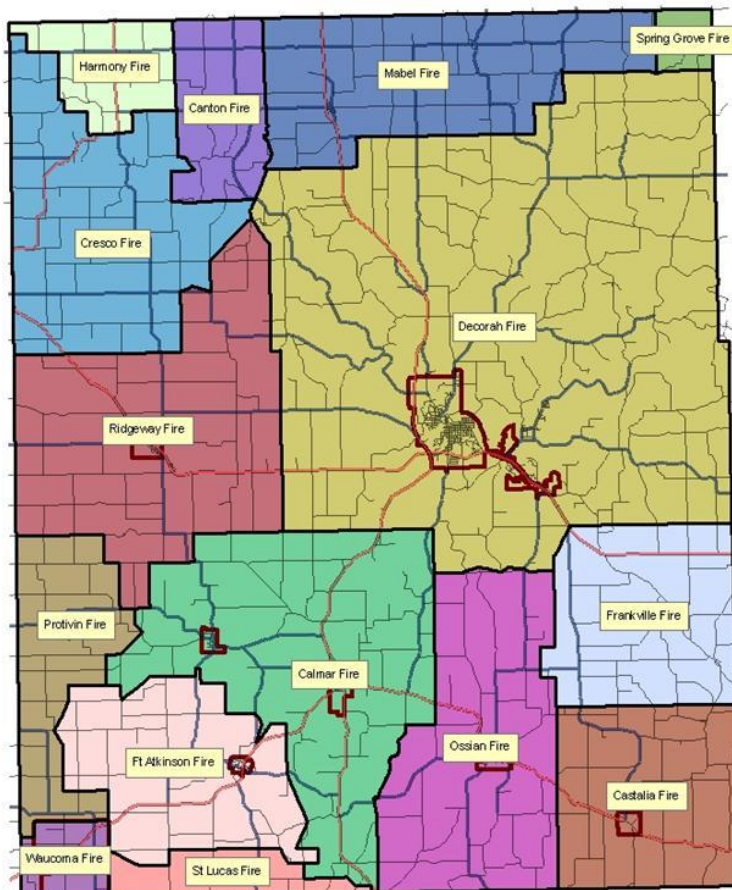
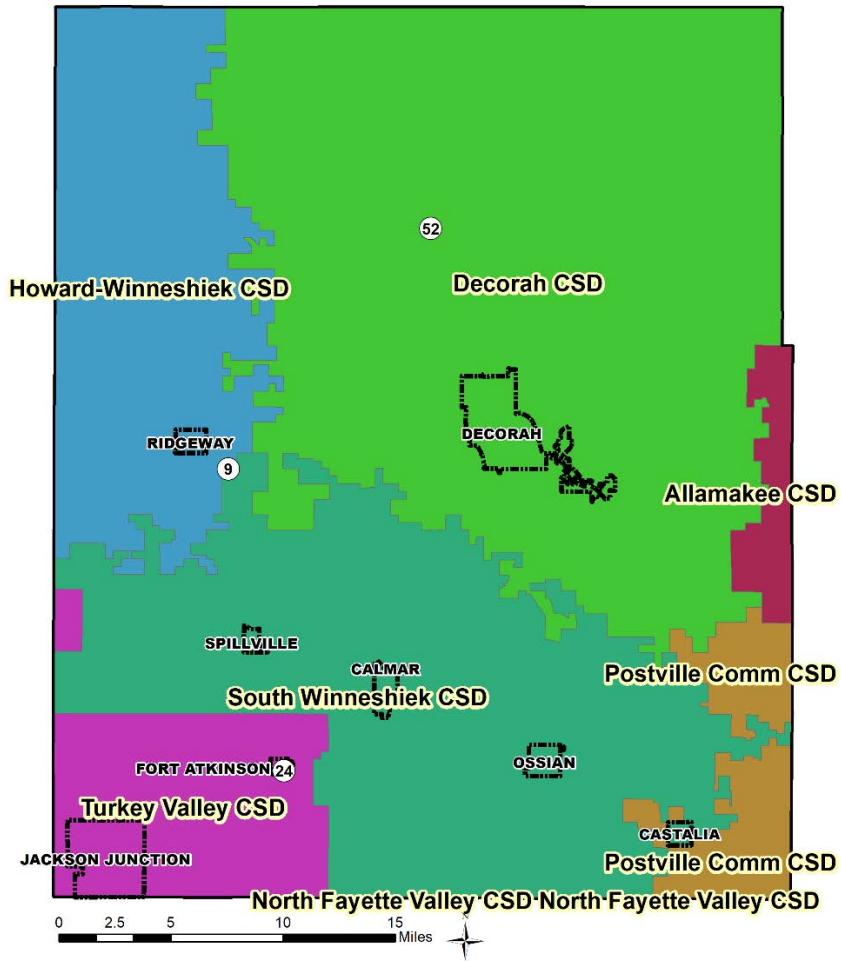


Figure 3: Winneshiek County School District Boundaries



Mitigation Activities

Status and Progress on Previous Mitigation Actions

1. Promote the Winneshiek County Hazard Mitigation Plan to the public
 - Ongoing.
2. Ensure the Winneshiek County Hazard Mitigation Plan is reviewed and kept current
 - Ongoing. The review process is started approximately a year and a half prior to the 5-year completion requirement.
3. Acquisition and demolition of damaged structures
 - Completed. After the 2016 flood Winneshiek County bought out a total of 5 homes and had them removed from the floodplain.
4. Improve data collection software and technology resources:
 - Interagency VoIP phone systems: Completed.
 - Provide stability to countywide technology resources through the addition of suitable back-up power at Decorah Middle School/Carrie Lee Campus. Not completed, ongoing. Still a priority.
 - Computer mobile data terminals: Completed.
5. Evaluate and purchase automated reverse 911 system
 - Ongoing
6. Purchase generator for Frankville Community Center
 - Ongoing. There is still a request from the Frankville Fire Department, but the county is still assessing if the size of the community versus the need would allow it to meet the mitigation grant requirements.
7. Construct FEMA-compliant tornado safe room(s)
 - Not completed. This request will not meet the FEMA grant requirements so cannot be pursued at this time.
8. Purchase and implement countywide interagency portable mobile data
 - Ongoing.
9. Purchase mobile generators for deployment countywide as needed
 - Ongoing. County Emergency Management continues to look for funding options but due to costs associated with this have not purchased one yet. It is currently easier to have Memorandums of Understanding (MOUs) in place.
10. Improve land use management to minimize water runoff and soil conservation
 - Completed and Ongoing. The County makes annual financial and in kind contributions to make the landscape more resilient to flooding, including contributing to the Turkey River Watershed Mgt. Agency, the Upper Iowa Watershed Mgt. Agency, the Winneshiek Co. Soil & Water Conservation District, and Northeast Iowa Resource Conservation and Development, for planning studies that have a land use component. The County Engineer is aggressively exploring the installation of Road Structures and the County Roadside Vegetation Manager has set decreasing runoff from county road ditches as a major goal. The County Conservation Board also leads by example in the management of its properties.
11. Develop an Emergency Operations Center (EOC) as a safe room site

- Completed. A new EOC is located at the Winneshiek County Annex Building. It is not designed as a safe room.
12. Training for health care coalition members
- Ongoing. The Winneshiek Emergency Planning Committee (WEPC) meets every other month.
13. Develop mass notification system for schools
- Completed. All schools have their own mass notification systems, and each have been offered use of the Wireless Emergency Notification System (WENS).
14. Purchase additional stream gauges
- Completed. Three new stream sensors through Iowa Flood Information System (IFIS) have been purchased and the county is awaiting deployment this year.

Mitigation Actions to Pursue Through MJ-9 Implementation:

- Implement codes and policies to better address hazard issues:
 - Draft and adopt ordinance to prohibit building in the 100 yr. and 500 yr. floodplain
- Maintain/improve flood mitigation equipment:
 - Purchase additional stream gauges
 - Upgrade Iowa Flood Information System (IFIS) gauge at Cardinal Marsh to a USGS gauge
 - Work with Howard Co. to place a new flood gauge at a bridge crossing the Turkey River (within Howard Co., west of the Winneshiek Co. border)
- Promote the Winneshiek County Hazard Mitigation Plan to the public
- Flood reduction practices: Store excess runoff:
 - Create flood protection for downstream communities by expanding & improving existing retention basins located south of Co. Rd. A46 (near the Turkey River), in the Otter Creek-Turkey River HUC 12 subwatershed
 - Create flood protection for downstream communities by implementing wetlands and riparian buffers near Ten Mile Creek in the Ten Mile Creek HUC 12 subwatershed
 - Work with private landowners to implement detention structures in cropland and pasture areas in the Nordness and Trout Creek HUC 12 subwatersheds to help mitigate flooding/protect homes in Freeport
 - Implement on-road structures in the Nordness and Trout Creek HUC 12 subwatersheds to help mitigate flooding in Freeport
 - Research potential impact of a detention pond uphill from the community of Freeport in the Freeport HUC 12 subwatershed, to protect residences downhill in Freeport. Consider implementing detention ponds uphill from Freeport community.
- Expand/improve communications/technology infrastructure and equipment:
 - Improve data collection software and technology resources
 - Evaluate and purchase automated reverse 911 system
 - Purchase and implement countywide interagency portable mobile data
 - Upgrade to public safety software (e.g. CAD)
- Generators/Transfer Switches:
 - Purchase a generator for the Frankville Community Center
 - Purchase mobile generators for deployment countywide as needed

- Provide stability to countywide technology resources through the addition of suitable back-up power at Decorah Middle School/Carrie Lee Campus (500 KVA generator)
- Improved/upgraded water/sewer/storm sewer facilities:
 - Sanitary sewer improvements to better accept increasing sewage from Freeport. Consider funding options for sliplining (Freeport Utility Board action).
- Consider membership in the National Flood Insurance Program (NFIP). Adopt floodplain regulations that meet or exceed minimum State of Iowa regulations. Establish the work of a floodplain administrator, to be identified in floodplain regulations.
- Ensure that the Winneshiek County MJ-9 Hazard Mitigation plan remains current and is updated and submitted for approval every 5 years

Geography and Environment

CRS Step 5(d)

5(d) Areas that provide natural floodplain functions

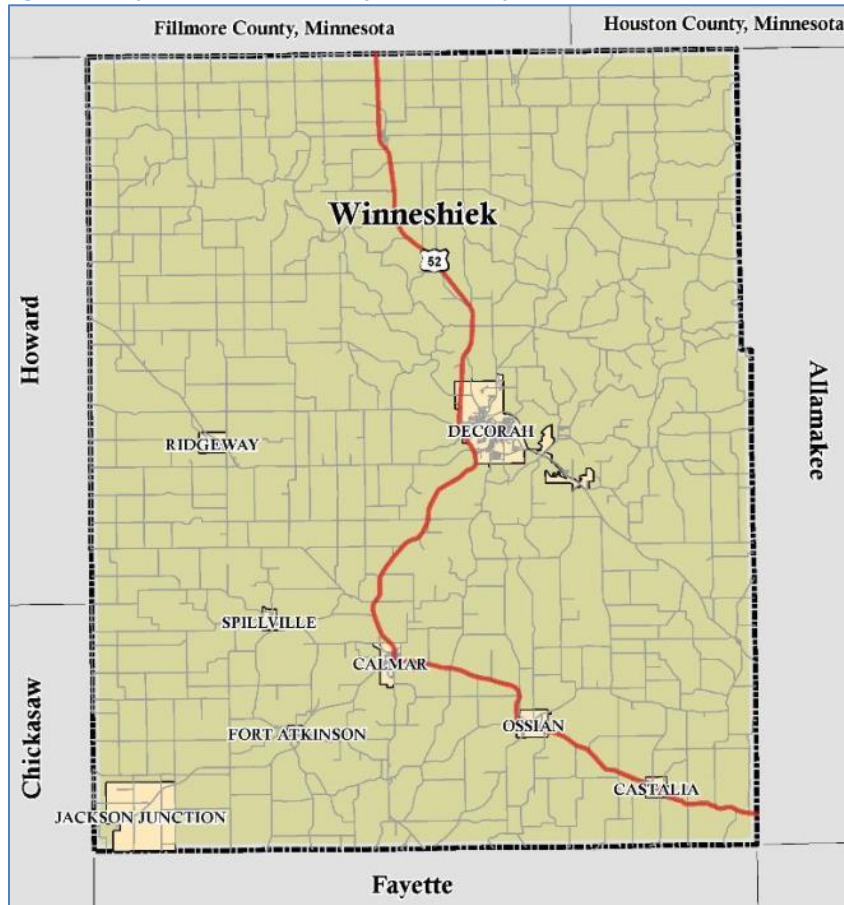
Location

Winneshiek County is located in the scenic northeast corner of Iowa. Its location is marked by interesting geologic formations, topographic variation and native cover. Winneshiek County is approximately 24 miles by 30 miles in linear dimension and contains a total area of 690 square miles. Figure 4 illustrates the location of the county within the State of Iowa. The county is bounded on the north by the Minnesota state line, on the east by Allamakee County, on the south by Fayette County and on the west by Howard and Chickasaw Counties. Figure 5 illustrates the location of the incorporated communities within the county, and the bordering counties.

Figure 4: Location of Winneshiek County in Iowa



Figure 5: Map of Winneshiek County and its Incorporated Communities



Land Cover and Land Use

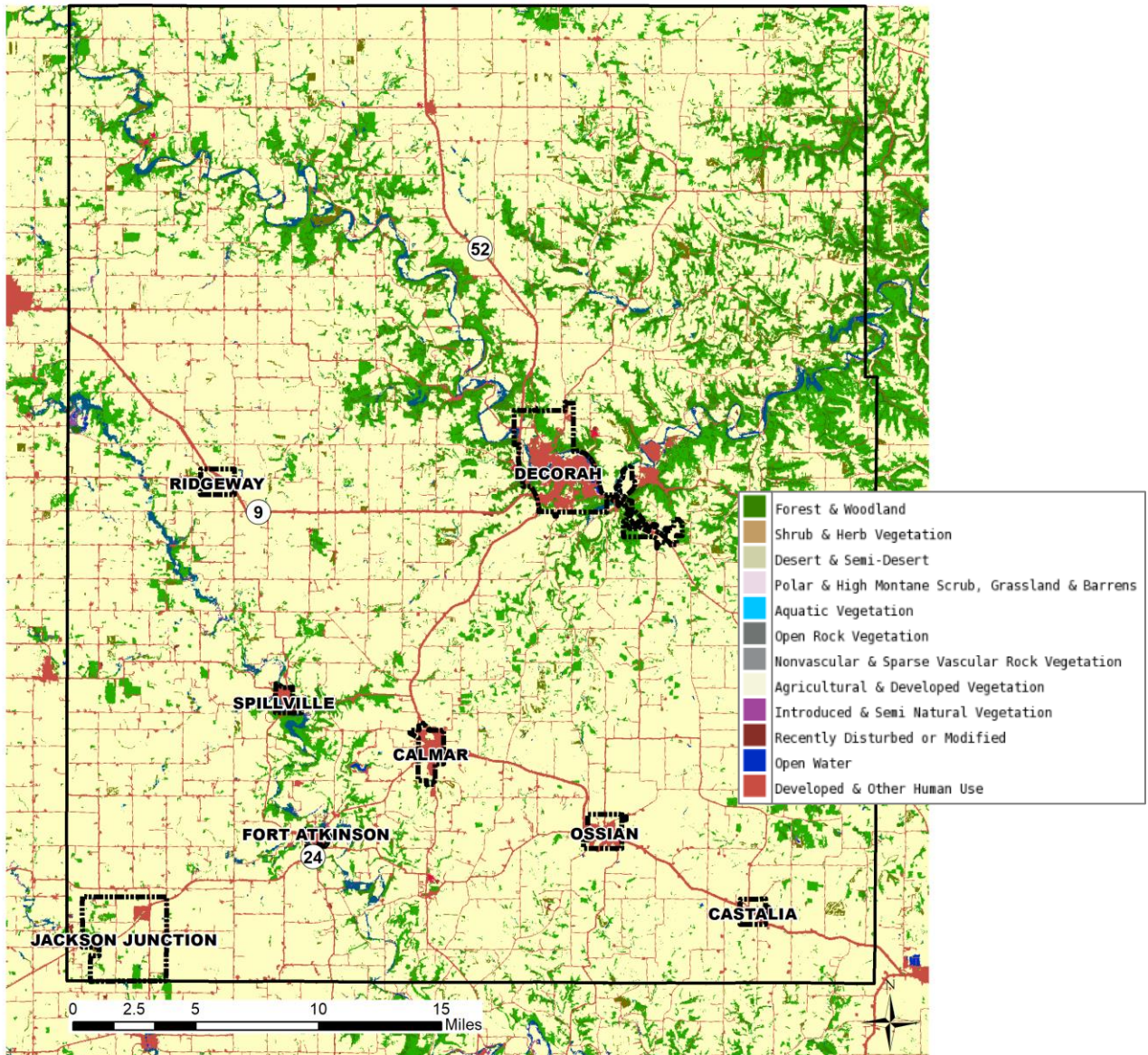
Originally, the land surrounding and including Winneshiek County was covered with prairie grass and light forestation. Modern agricultural practices have changed this setting to predominately row crop and pasture settings in the rural areas. Agricultural operations utilize 343,354 acres of land in the county, nearly 78% of the total land cover (USGS, 2019). Table 3 breaks down the land cover by type for Winneshiek County. Figure 6 illustrates the land cover for the county, with a clear majority in agricultural vegetation.

Table 3: Land Cover for Winneshiek County

Land Cover Type:	Acres	% Total Area
Agricultural & Developed Vegetation	343,354	78%
Developed & Other Human Use	27,158	6%
Forest & Woodland	69,716	16%
Introduced & Semi Natural Vegetation	419	.09%
Open Water	692	.16%
Recently Disturbed or Modified	217	.05%
Shrub & Herb Vegetation	128	.03%

Source: (USGS, 2019)

Figure 6: Land Cover, Winneshiek County



Source: (USGS, 2019)

Today’s forestland, and historically prairie as well, offer scenic and natural benefits to the residents of Winneshiek County. These ecosystems help decrease soil erosion on bluff lands and play a role in preventing pollution from reaching streams, rivers and watersheds. They are also necessary for wildlife habitat within the county. And the recreational benefits from these ecosystems are also important for the county as it provides great opportunities for hunting, hiking, camping and many other outdoor activities. In recent years the County has been working to take the approximate 11,000 acres of County right of way and restore it back to more of the native perennial vegetation that was here historically. Natives are one of the best ways to help with flooding, and also provide the other wildlife and ecosystem benefits.

Land use differs from land cover in that various land covers could potentially fall under the same land use (agriculture, for example). The current land uses in Winneshiek County, as categorized by the County Assessor for taxing purposes, are identified in Table 4. While not completely accurate as actual use and classification may differ slightly, the data provides a snapshot of how the land in the county is being utilized and taxed. The largest land use category is agricultural, accounting for 92% of the land area. After “other” uses, the next largest categories are exempt, residential, commercial and industrial.

Table 4: Land Use Breakdown by Property Tax Classification

Land Use Classification	Acres	Percent
Agriculture	405,463	91.5%
Residential	9964	2.25%
Commercial	1403	.32%
Industrial	125	.03%
Exempt Properties (non-taxable properties e.g. churches, government buildings and nonprofits)	11,964	2.71%
Other (right-of-ways)	13,975	3.16%
Total	442,894	100%

Source: (Winneshiek County, GIS Coordinator. (2019))

Elevation

The topography of Winneshiek County ranges from relatively flat farm land to hilly terrain with bluffs. The lowest elevation in Winneshiek County is approximately 615 feet and the highest elevation is approximately 1360 feet. The highest point in the county is located near Burr Oak (Peakbagger, 2012). Table 5 indicates the elevation for each community within the county.

Table 5: Community Elevations

City	Elevation	City	Elevation
Calmar	1,260	Jackson Junction	1,150
Castalia	1,247	Ossian	1,220
Decorah	900	Ridgeway	1,208
Fort Atkinson	1,020	Spillville	1,060

Source: (Onboard Informatics, 2019)

Rivers, Streams and Lakes

The Upper Iowa River, Turkey River and Lake Meyer are the largest surface waters in Winneshiek County. The Yellow River originates in the county and there are many additional tributaries, small creeks and streams found throughout the county. Small constructed surface waters include a few quarry lakes and municipal wastewater treatment lagoons.

The Upper Iowa River winds 156 miles from southeastern Minnesota and Northeast Iowa through Howard, Winneshiek and Allamakee counties to the Mississippi River. The river travels through Kendallville, Bluffton and Decorah and with its tributaries, drains most of the county. The Turkey River is a 153 mile long tributary of the upper Mississippi River. It flows from the northwest starting north of Cresco in Howard County and flows southeast through Winneshiek County before entering Fayette County, joining the Little Turkey River in Eldorado. The Turkey River and its tributaries drain the

southwest corner of the county. The Yellow River drains part of the county around Ossian, Frankville and Castalia.

Lake Meyer is a 38- acre artificial lake managed by the Winneshiek County Conservation Board. The lake has a maximum depth of 25 feet and supports a diverse stocked fish population including Northern Pike, Bluegill, Black Crappie, Largemouth Bass and Channel Catfish. The Turkey River is fed by Lake Meyer.

The following list indicates some additional popular water bodies within the county:

- Bohemian Creek
- Canoe Creek
- Cardinal Marsh
- Casey Springs
- Coldwater Creek
- Coon Creek
- Dry Run
- Dunning Spring
- East Pine Creek
- Malanaphy Springs
- North Bear Creek
- Pine Creek
- Silver Creek
- Silver Springs Pond
- South Bear Creek
- Ten Mile Creek
- Trout Creek
- Trout River
- Twin Springs

Streams and rivers naturally wind through the landscape and change their course over time. The streams and rivers of the county have, for the most part, been allowed to evolve naturally without channelization (straightening of a stream). Some areas around the community of Decorah, such as “The Cut” have been channelized as part of flood prevention efforts. The county has seen the replacement of surrounding natural vegetation with row crops, with a majority of streams and rivers having agricultural vegetation as near as 10 to 20 feet from the stream beds (Reis, 2013). This not only eliminates habitat but also reduces the water retention ability of the land, promoting faster runoff of water (with contribution to flooding) and less cleansing and cooling before discharge into the streams and rivers.

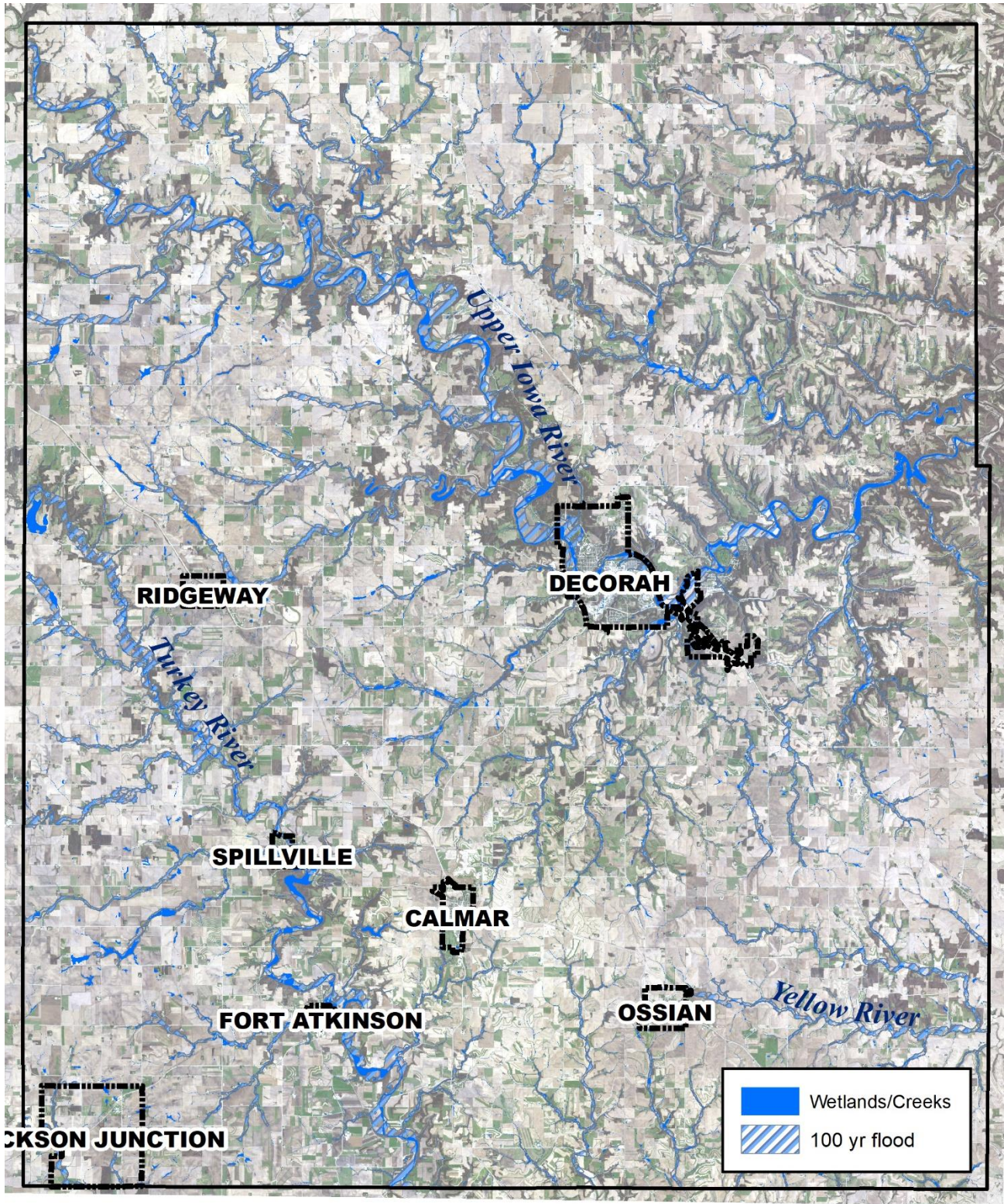
The County’s floodplain areas and major waterways are illustrated in Figure 7.

Ponds and Wetlands

Ponds and wetlands also play a key role in water retention, cleansing and cooling. Winneshiek County has several small farm ponds, generally less than 10 acres in size, that dot the countryside and are fed by field tile in many locations. Most wetlands, or potential wetlands, within the county are located on private land. Publicly held Cardinal Marsh is a DNR Wildlife Management Area located northwest of Ridgeway. The county is fortunate to have some Oxbow wetland areas. These remnant wetlands with unique micro ecosystems can be found in their most pristine state along the Turkey and Yellow Rivers. Other wetlands include wet meadows, bogs and fens and wet prairies. Fens are formed only under very specific conditions and no known fens exist in the county at this time. According to Winneshiek County Soil and Water Conservation District (SWCD), the county has lost approximately 99% of its original wetlands (Meyer, 2013).

It is widely understood that pond and wetland areas can also benefit flood mitigation as a form of retention to capture, slow and potentially infiltrate water runoff. To this end, the County has been focusing in recent years on building retention structures using the public roadways as the retention structure. This strategy, along with implementation of other protected, restored or created pond and wetland areas, will be continued in the future for both their flooding and ecosystem benefits.

Figure 7: Winneshiek County Floodplains

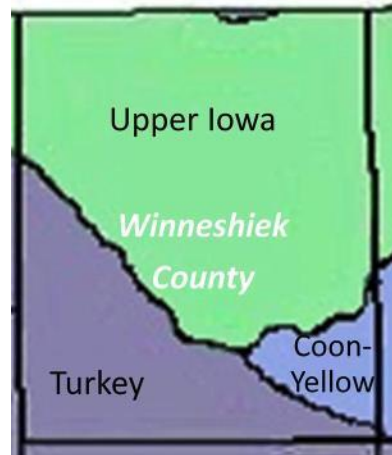


Source: (UERPC, 2019)

Watersheds

Watersheds are divided and subdivided into successively smaller units; each is given a number, called a Hydrologic Unit Code, or HUC. Eight-digit HUCs, called sub-basins, are the largest watershed units. As illustrated in Figure 8, Winneshiek County crosses three watershed sub-basins: Upper Iowa, Coon-Yellow and Turkey. A negligible portion of the Root Watershed falls within the county on the very north edge. The Upper Iowa watershed covers the largest area within the county and consists of five 10-digit HUCs. They are: Cold Water Creek, Trout Creek, Canoe Creek, Bear Creek, and Upper Iowa River. The Turkey watershed has nine smaller HUCs, only three of which fall within the southeastern corner of the county, called the Little Turkey River, the Headwaters Turkey River and the Otter Creek - Turkey River sub-basins. The Coon-Yellow watershed juts into Winneshiek County on the southeastern corner and is further divided into ten smaller HUCs, only one that falls within the county, the Yellow River watershed.

Figure 8: Watersheds in Winneshiek County



Climate and Weather

The area experiences a temperate climate with both warm and cold season extremes. The summer high is around 83 degrees in July and the winter low is 6 in January. Winter months can bring occasional heavy snows, intermittent freezing precipitation or ice and prolonged periods of cloudiness. On average, there are 176 cloudy days per year in the county. While true blizzards are rare, winter storms impact the area about four times per season. The average cumulative snowfall for the county is nearly 40 inches. The recorded temperatures in the county have ranged from -43 degrees Fahrenheit to 111 degrees Fahrenheit in 1936 (NOAA, 2010).

Table 6: Climate Statistics (long term averages 1981-2010)

Climate Average:	1971 - 2000	1981 - 2010	Change in 30 Year Average
Average Temperature December/January/February	19.2	20.9	+1.7
Average Temperature March/April/May	46.7	47.8	+1.1
Average Temperature June/July/August	70.3	70.7	+0.4
Average Temperature September/October/November	48.9	49.8	+0.9
Average Annual Temperature	46.3	47.4	+1.1
Average Precipitation December/January/February	2.88	1.0	-1.88
Average Precipitation March/April/May	9.39	3.2	-6.19
Average Precipitation June/July/August	13.23	4.7	-8.53
Average Precipitation September/October/November	7.96	2.6	-5.36
Average Annual Precipitation	33.48	34.68	+1.2
Average Annual Snowfall	39.6	40	+0.4

Source: (National Oceanic and Atmospheric Administration (NOAA), n.d.)

Population and Households

CRS Step 5(e) (Also found in Jurisdictional Descriptions)

5(e) Development/population trends

Population

The population of Winneshiek County as of the 2010 Census was 21,056, ranking 29th out of 99 counties in Iowa. In the last century, the County's population declined from a high in 1900 of 23,731 to a low of 20,847 in 1990, noting an overall decline to 2010 of 11%. Table 7 compares the population growth or decline for each of the county's jurisdictions from 1980 to 2010 to the county as a whole and the state. The County's largest community is Decorah, the county seat. Calmar and Ossian are the next largest communities.

Table 7: Population Comparison, 1980-2010, All Cities, County and State

Community	1980	1990	2000	2010	% Change 1980-2010
Calmar	1,053	1,026	1,058	978	-7.1%
Castalia	188	177	175	173	-8.0%
Decorah	8,068	8,063	8,172	8,127	0.7%
Fort Atkinson	374	367	389	349	-6.7%
Jackson Junction	94	87	60	58	-38.3%
Ossian	829	810	853	845	1.9%
Ridgeway	308	295	293	315	2.3%
Spillville	415	387	386	367	-11.6%
Winneshiek County	21,876	20,847	21,310	21,056	-3.7%
State of Iowa	2,913,808	2,776,831	2,926,324	3,046,355	4.5%

Source: (State Data Center of Iowa, n.d.); (U.S. Census Bureau, 2010 Decennial, n.d.)

The county is projected to reach a population of 21,268 by 2030 if the 20-year annualized growth rate of .05% is maintained. Table 8 illustrates the population projections for each of the communities within the county. The population density in the County is 30.5, compared to 54.5 statewide.

Table 8: Population Projections, Winneshiek County and Communities

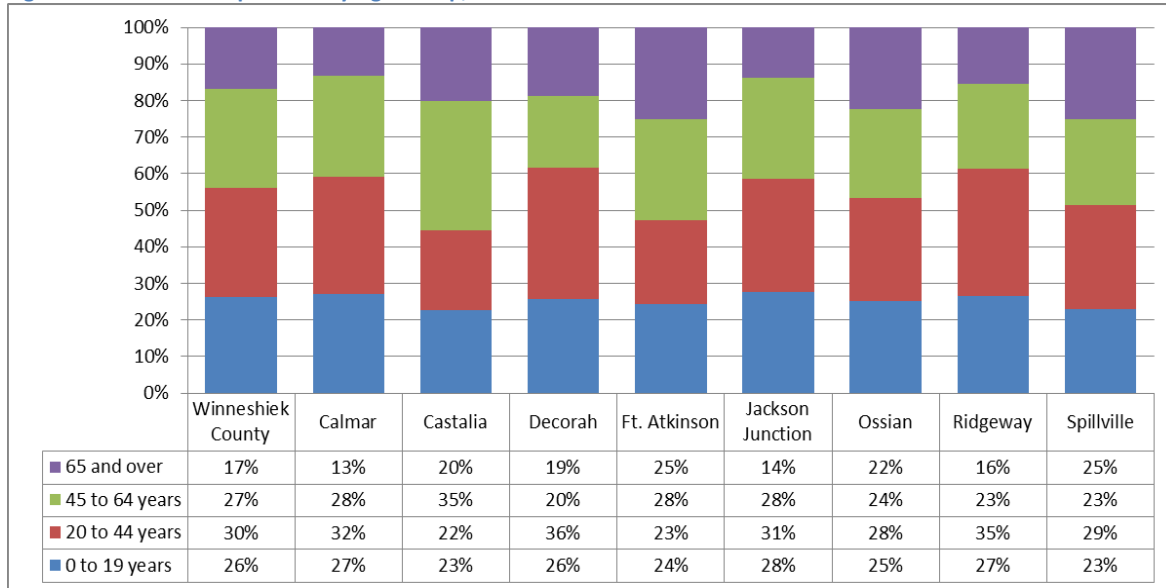
Community	2010	Annualized 20-year Growth Rate	2030 Projection
Calmar	978	-.23%	934
Castalia	173	-.11%	169
Decorah	8,127	.04%	8192
Fort Atkinson	349	-.25%	332
Jackson Junction	58	-1.65%	41
Ossian	845	.22%	883
Ridgeway	315	.34%	337
Spillville	367	-.26%	348
Winneshiek County	21,056	.05%	21,268

Source: (U.S. Census Bureau, 2012; State Data Center of Iowa, n.d.; UERPC, 2012)

Winneshiek County has little diversity in race, with 97% of the population self-identifying as “white” in the 2010 Census.

Figure 9 Illustrates the population breakdown by age group for the county and each community. In all jurisdictions but Castalia and Fort Atkinson, less than 50% of the population is over the age of 45.

Figure 9: Percent of Population by Age Group, 2010



Source: (U.S. Census Bureau, 2010 Decennial, n.d.)

Households

As of the 2010 Census, there were nearly 8,000 households in the county. Of these households overall, 65% were families and 35% represented non-families. In the incorporated communities, only Jackson Junction and Ossian had higher percentages of family households. Spillville and Fort Atkinson have the highest percentages of householders over the age of 65 living alone. Table 9 provides additional household and family data for each jurisdiction.

Table 9: Household Data, Winneshiek County and Communities

	Total households	Family households		Non-family households		Householder living alone		Householder 65 years and older (living alone)		Average household size	Average family size
	Number	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Number
Winneshiek County	7997	5193	65%	2804	35%	2304	29%	1004	13%	2.35	2.9
Calmar	444	252	57%	192	43%	140	32%	48	11%	2.2	2.84
Castalia	82	49	60%	33	40%	29	35%	15	18%	2.11	2.71
Decorah	2855	1527	53%	1328	47%	1099	38%	532	19%	2.09	2.76
Ft. Atkinson	160	102	64%	58	36%	55	34%	32	20%	2.18	2.78
Jackson Junction	21	18	86%	3	14%	3	14%	2	10%	2.76	3
Ossian	339	223	66%	116	34%	97	29%	43	13%	2.36	2.91
Ridgeway	138	77	56%	61	44%	48	35%	19	14%	2.28	3.03
Spillville	168	96	57%	72	43%	60	36%	36	21%	2.18	2.9

Source: (U.S. Census Bureau, 2010 Decennial, n.d.)

Housing

As of the 2010 Census, there were 8,721 housing units in the county. Of these units, 38% were in the urban clusters of the county. This is an increase from 33% in the urban clusters in 2000, indicative of where the newer housing is being constructed within the county (U.S. Census Bureau, 2010 Decennial, n.d.). Table 10 demonstrates the change in the number of housing units in each of the jurisdictions.

Table 10: Number of Housing Units and Percent Change from 1990-2010

Community	1990	2000	2010	% Change, 1990 - 2010
Calmar	438	482	492	12.3%
Castalia	83	81	84	1.2%
Decorah	2,836	2,968	3,121	10.0%
Fort Atkinson	166	169	170	2.4%
Jackson Junction	32	24	23	-28.1%
Ossian	333	350	360	8.1%
Ridgeway	127	137	147	15.7%
Spillville	179	184	182	1.7%
Winneshiek County	7,726	8,204	8,721	12.9%
State of Iowa	1,143,669	1,232,511	1,336,417	16.9%

Source: (State Data Center of Iowa, n.d.; U.S. Census Bureau, 2010 Decennial)

Public and Private Infrastructure

Highways and Roads

Winneshiek County roads consist of approximately 1,175 total miles of roadway. The Winneshiek County Road Department is responsible for the maintenance of all county roads with the exception of state highways and roads and streets within the boundaries of incorporated cities in the county, this is approximately 1,056 miles. There are about 250 miles of paved roads under the county’s jurisdiction and include over 400 bridges, 328 of which are on the National Bridge Inventory. As of 2014, 99 of the bridge structures are posted with weight restrictions and six are closed to traffic (Winneshiek County Engineer's Office, 2019). There are 15,255 licensed drivers in the county (Iowa DOT, 2019). Between the years of 2008 and 2018, the county experienced 4,192 crashes, 171 of them major crashes resulting in 25 fatalities (Iowa DOT, 2019).

Rural roads are labeled, and jurisdiction is determined, by the following classifications: local roads, minor collectors, major collectors, minor arterials, other principal arterials and interstates. Federal aid money is available to maintain major collectors, minor arterials and principal arterials. Table 11 indicates the classifications and jurisdictions of the county’s “federal aid” roadways and provides a description of each classification as defined by the Federal Highway Administration.

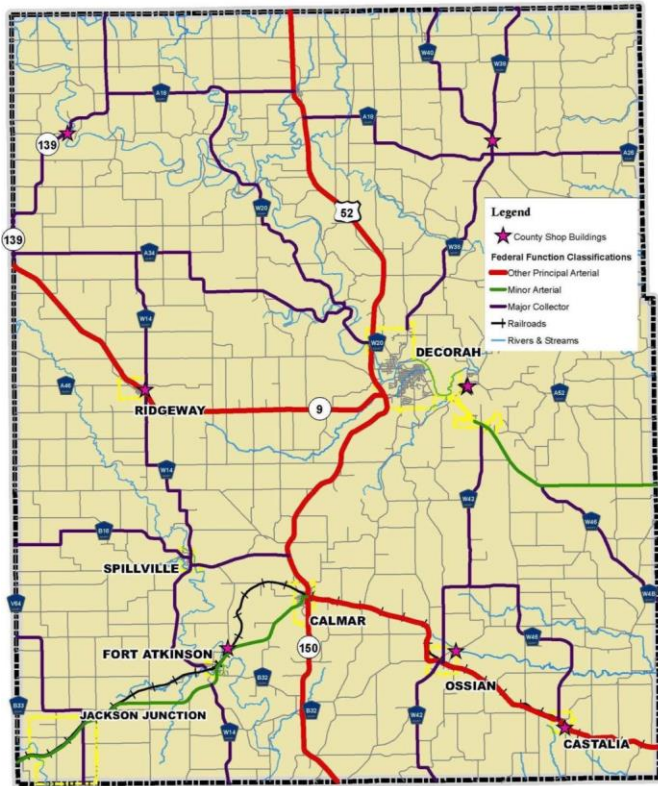
Table 11: Federal Functional Classifications, Winneshiek County

Roadway	Classification	Jurisdiction	Miles	Classification Description
US Hwy 52	Principal Arterial	State	62	Consists of a connected network of continuous routes that have substantial trip length and travel density for statewide or interstate travel.
State Hwy 150	Principal Arterial	State		
State Hwy 9 (west of Decorah)	Principal Arterial	State		
State Hwy 9 (east of Decorah)	Minor Arterial	State	21	With the principal arterials, form rural networks that link cities and larger towns and provide interstate and inter-county service. These roads are spaced so that all developed areas of the State are within a reasonable distance of an arterial highway.
State Hwy 24	Minor Arterial	State		
State Hwy 139	Major Collector	State		
A18 (from 139 to 52)	Major Collector	County	155	These routes, also known as farm to market roads, provide service to any county seat not on an arterial route, to the larger towns not directly served by the higher systems, and to other traffic generators, such as schools, shipping points, county parks, important mining and agricultural areas and link these places with nearby larger towns or cities, or with routes of higher classification. Federal aid can be used by the county in conjunction with farm to market funds to maintain these roads.
W20 (from A18 to Decorah)	Major Collector	County		
W14 (from A34 So.)	Major Collector	County		
W40	Major Collector	County		
W38	Major Collector	County		
A26	Major Collector	County		
A34	Major Collector	County		
W42	Major Collector	County		
W4B	Major Collector	County		
B16	Major Collector	County		
V64	Major Collector	County		
W46	Major Collector	County		

Source: (Iowa Department of Transportation, 2011; Federal Highway Administration, 2012)

There are several minor collectors throughout the county that account for about 216 miles of roadway. Minor collectors are typically, but not always, farm to market roads and are spaced at intervals, consistent with population density, to collect traffic from local roads and bring all developed areas within a reasonable distance of a collector road. They also provide service to the remaining smaller communities and link the locally important traffic generators with the rural areas. Local roads constitute the rest of the roadways in the county, with over 804 miles. The rural local road system provides access to adjacent land and provides service to travel over relatively short distances as compared to collectors or other higher systems. There are no interstates or divided highways within the county boundaries. Figure 10 illustrates the FCC roads in the county in addition to the County Road Department Shop locations.

Figure 10: FFC Classification Map



Source: (Iowa Department of Transportation, n.d.); (Winneshiek County Engineer's Office, 2019)

Trails

Winneshiek County has several walking and biking trails as well as snowmobile trails as options for non-vehicular transportation. The Prairie Farmer Recreation Trail stretches 20 miles from Calmar to Cresco through the community of Ridgeway. The Trout Run Trail in Decorah is an 11 mile urban trail system that complements the existing sidewalk infrastructure to create a safe environment for walking and biking around the community. There are existing plans to expand The Prairie Farmer Trail to connect to the Trout Run Trail via the “Dry Run Trail.”

Railway

The Canadian Pacific Railroad, owner of Dakota, Minnesota & Eastern Railroad Corp. (DME) has been operating a line through Winneshiek County since 2008 when it acquired DME. The railroad operates track running parallel to the Mississippi River through Iowa as well as the line across Northern Iowa. Total Iowa operations consist of about 654 miles of rail and in Winneshiek County it runs through the communities of Jackson Junction, Fort Atkinson, Calmar, Ossian and Castalia. The main products handled by the rail include coal, farm products, food products, chemicals and allied products, wasted scrap products, primary metal products, nonmetallic minerals (Iowa Department of Transportation, 2019). From 1998 through 2018 there were six railway accidents reported. They were derailments that resulted in two injuries (Federal Railroad Administration, 2019)

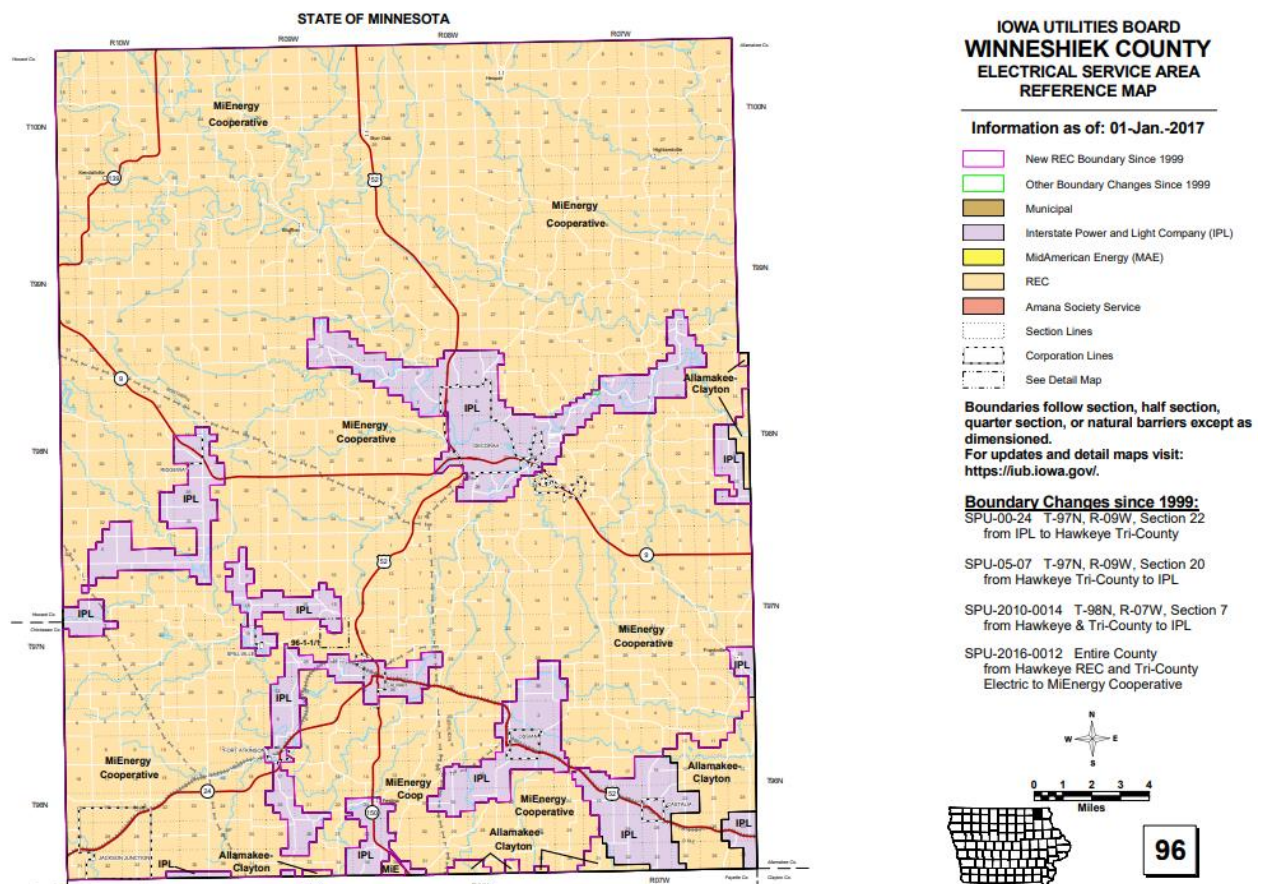
Airports

Winneshiek County has one publicly owned general aviation airport, the Decorah Municipal Airport. Located southeast of the city along Highway 9, the airport is an "uncontrolled" facility with a fulltime Fixed Based Operator available 24/7 to service any aviation need. The Airport runway system consists of a lighted 4,000' long by 75' wide runway with a load bearing strength of 28,000 pounds single wheel load. The facilities include the terminal with office, a maintenance hangar and three T-hangars. The facility offers jet fuel and aviation gas for purchase, a tie-down area and 16 rental hangers. The airport has 31 aircraft based on the field, 28 single engine planes, 1 multi engine plane, 1 helicopter, and one ultralight. The airport averages around 25 operations per day, 55% of which are local general aviation and 45% transient general aviation (AirNav, LLC, n.d.), (City of Decorah, n.d.). The Decorah Municipal Airport maintains and regularly updates an Airport Layout Plan which includes an inventory of existing conditions and issues and outlines short and long term capital improvement plans.

Utilities and Pipelines

Residents in the county are provided electrical service from a mixture of investor-owned utilities (IOU) and rural electric cooperatives (REC). The largest power suppliers for the county are MiEnergy Electric Cooperative and Interstate Power and Light (Alliant Energy). Figure 11 delineates the electrical service area for the county and indicates the provider responsible for that area. Recent Census data indicates that nearly 14.5% of county residents utilize electricity for home heating.

Figure 11: Electrical Service Area Map by Provider

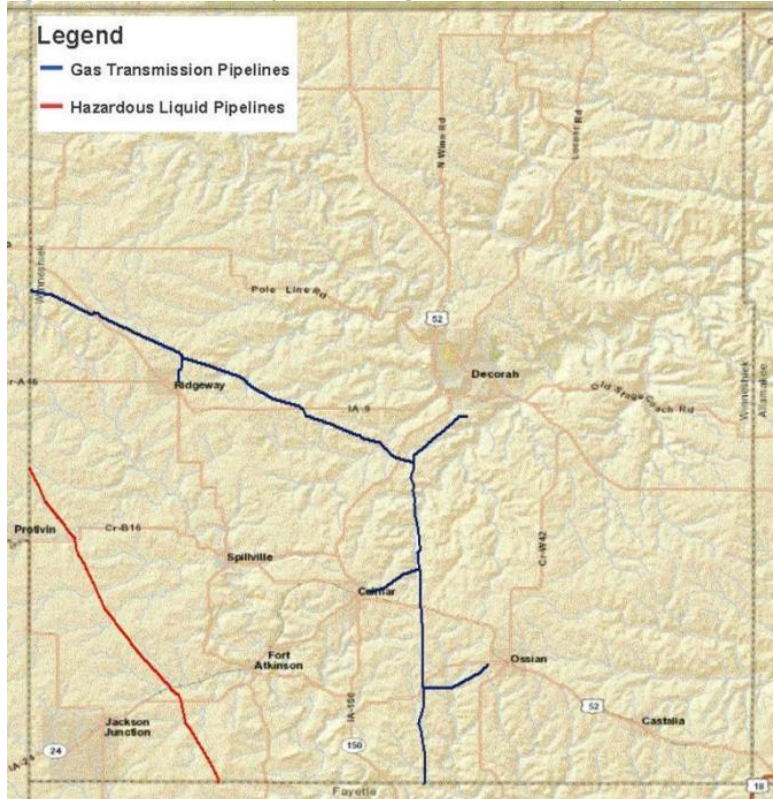


Source: (Iowa Utilities Board, 2017)

Natural gas is not available in all parts of the county. Black Hills Energy provides natural gas service to the communities. Residents also have access to LP gas from a variety of private providers. Over 42% of the county's residents rely on natural gas for home heating and 34.2% on bottled, tank or LP gas.

There are two pipelines through the county, one is a gas transmission pipeline operated by Northern Natural Gas Co. and the other a hazardous liquid pipeline operated by Amoco Oil (Pipeline and Hazardous Materials Safety Administration, 2019). Figure 12 illustrates the general location of these lines within the county.

Figure 12: Transmission Pipelines through Winneshiek County



Source: (Pipeline and Hazardous Materials Safety Administration, 2019)

Dams

There are 17 dams within Winneshiek County, each with a low hazard potential. Three of the dams are concrete or masonry gravity dams and the others are earthen dams. The primary purposes of the dams within the county are flood control, recreational or for small fish ponds. (U.S. Army Corps of Engineers, 2019)

Source Water

The water supply for Winneshiek County residents comes from two sources, public or private systems, depending on the location. Both public and private systems operate on groundwater wells located throughout the county and draw from several aquifers, depending on the depth of the well. For the most part, water is drawn from the Galena, St. Pete or Jordan Aquifers (Groux, 2013). Municipal water

systems provide water to over 12,000 residents and include the following systems (DNR, Iowa; Lynam, Anne, Environmental Specialist Sr, 2019):

Calmar Water Supply	Freeport Water District
Castalia Water Works	Ossian Water Supply
Decorah Water Department	City of Ridgeway
Fort Atkinson Water Works	Spillville Water Supply
Frankville Water System	

Several rural locations that serve the public outside of municipal service areas operate water systems regulated by the DNR as well. They include:

Barneys Bar And Grill	McCaffrey's Dolce Vita
Burr Oak Lutheran Church	North Winneshiek Com. School
Big Springs Well	Our Lady of Seven Dolours Parish
Bluffton Store	Pine Bluff 4H Camp
Camp Justice	Pinters Garden Center & Pumpkin Patch
Decorah Fish Hatchery	Plantation Country View Subdivision
Decorah Implement Company	Pulpit Rock Campgrounds
Decorah Sales Commission	Scenic View Estates
Deerfield Heights Association	Seed Savers Exchange
Henning Commercial Subd.	Shermans Water & Road, Inc.
Hesper Lutheran	Silvercrest Golf & Country Club, Inc.
Highland General Store & Campground	South Winn Golf Club
Jackson Heights Golf Course	The Country Express
Jewels Skate Country	The Zipper
Kendallville Park	Turkey Valley Community School
K-Town Tap	Twin Springs Camp Area
Lake Meyer Park	Washington Prairie Lutheran Church
Laura Ingalls Wilder Museum Well	Windridge Implements

Wastewater

Winneshiek County household wastewater is treated by either public sanitary systems or a private sewage disposal system such as a septic system. The following communities maintain public sewer systems:

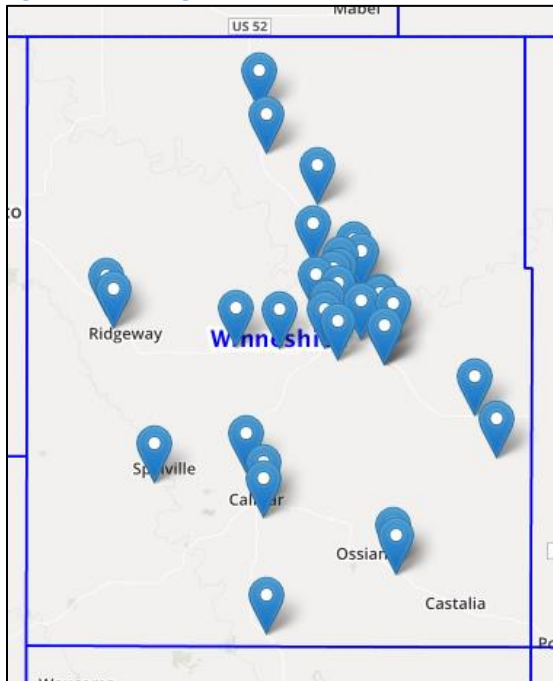
Burr Oak	City of Decorah	City of Ridgeway
City of Calmar	City of Fort Atkinson	City of Spillville
City of Castalia	City of Ossian	Festina

Communications

Landline telephone service is provided throughout the county by a variety of telecommunications companies depending on location. Landline telephone service has decreased from 99.1% of households in 2000 to 98.6% in 2011 (U.S. Census Bureau, 2010 Decennial, n.d.). According to the FCC, there are cellular towers in Calmar, Decorah, Fort Atkinson, Ossian, Ridgeway and Spillville. Internet service is

available at some level throughout most of the county. Decorah MetroNet is fiber optic infrastructure that runs through the community of Decorah. This project also addresses the community’s needs for disaster recovery opportunities and network sharing. County residents also have access to local radio, newspaper and website resources for communications. Figure 13 maps out all FCC registered towers in the county. Table 12 provides a list of county communication providers.

Figure 13: FCC Registered Towers



Source: (Federal Communications Commission, n.d.)

Table 12: Communications Provider List

Provider:	Type:
AcenTek	Landline Telephone, Internet
Century Link	Landline Telephone, Internet
Harmony Telephone Company	Landline Telephone, Internet
Mabel Cooperative Telephone Company	Landline Telephone, Internet
NE Iowa Telephone	Landline Telephone, Internet
Windstream	Landline Telephone, Internet
Hawkeye Telephone Company	Landline Telephone, Internet
AT&T Mobility	Cellular Telephone, Internet
U.S. Cellular	Cellular Telephone, Internet
Verizon	Cellular Telephone, Internet
Decorah MetroNet	Internet
Earth Link	Internet
Hughes Net Systems	Internet
LTD Broadband in Decorah	Internet
Mediacom	Internet
Skycasters	Internet
ViaSat	Internet
Decorah Broadcasting, Inc. (KDEC AM/FM)	Commercial Radio

Wennes Communications, Inc. (KVIK-FM, KHPP/KNEI)	Commercial Radio
Hawk Hawk (KDHK)	Commercial Radio
MPR (KLCD)	Noncommercial Radio
MPR (KLNI)	Noncommercial Radio
Luther College (KWLC)	Noncommercial Radio
KPVL-FM	Noncommercial Radio
Calmar Courier	Newspaper
Decorah Journal	Newspaper
Decorah Public Opinion	Newspaper
Ossian Bee	Newspaper
Decorahnews.com	News Website

In addition to these local communication systems, several regional television stations from Iowa and Minnesota broadcast to the county. Most commonly watched local channels are broadcast from Cedar Rapids, Waterloo, Mason City, Iowa Public Television, Rochester, MN and La Crosse, WI.

Care Facilities

Medical and Hospital Facilities

One hospital and several clinics serve the residents of Winneshiek County. The hospital is located in Decorah. Clinics can be accessed in Decorah, Calmar and Ossian.

The Winneshiek Medical Center is a Critical Access Hospital located in Decorah. The hospital is owned by Winneshiek County and is governed by an elected Board of Trustees. The Winneshiek Medical Center has professional and management agreements with Mayo Clinic Health System. The Center offers many services and programs including primary and specialty care, emergency services, urgent care, obstetrics, rehabilitation and sports medicine, surgery, radiology, home health care and hospice.

Table 13 lists the clinics, home health agencies and specialty care available to county residents within the county:

Table 13: Health Care Entities in Winneshiek County

Facility Name	Facility Type	City
Gundersen Health System - Calmar Clinic	Rural Health Clinic	Calmar
Gundersen Health System - Decorah Clinic	Rural Health Clinic	Decorah
Winneshiek County Public Health Nursing Service	Home Health Agency	Decorah
Winneshiek Medical Center	Critical Access Hospital	Decorah
Mayo Clinic Dialysis	Rural Health Clinic	Decorah
Winneshiek Medical Center – Ossian Clinic	Rural Health Clinic	Ossian

Source: (Iowa DIA, Health Facilities Division, 2012;

Child and Senior Care Facilities

Winneshiek County has 20 registered home care and 10 licensed child care centers in the county. Table 14 lists the child care centers, their locations and licensed capacities.

Table 14: Child Care Providers and Early Childcare Programs, Winneshiek County

Community	Provider Name	Provider Capacity
Calmar	NICC Child Development Center	90
Calmar	St Teresa of Caluctta Preschool - Calmar	25
Decorah	Kinderhaus	15
Decorah	Little Farmers, LLC	54
Decorah	NEICAC Child Development Center	20
Decorah	Nisse Preschool and Kid’s Place	29
Decorah	Northeast Iowa Montessori School	30
Decorah	Sunflower Child Care	123
Ossian	St Teresa of Calcutta Child Care Center	93
Ossian	South Winneshiek Early Childhood Program	18

Source: (Iowa DHS, n.d.)

Senior care within the county ranges from assisted living facilities to skilled nursing facilities. Table 15 lists the senior care facilities which are located in two of the county’s communities.

Table 15: Senior Care Facilities, Winneshiek County

Facility Name	Facility Type	City
Aase Haugen Assisted Living	Assisted Living Program	Decorah
Aase Haugen Home	Free Standing Nursing Facility/Skilled Nursing Facility	Decorah
Arlin Falck Assisted Living	Assisted Living Program	Decorah
Barthell OES Home	Licensed Only Entity	Decorah
Oneota Village	Assisted Living Program	Decorah
Ossian Senior Hospice	Free Standing Nursing Facility/Skilled Nursing Facility	Ossian
Wellington Place	Free Standing Nursing Facility/Skilled Nursing Facility	Decorah
Wellington Place	Assisted Living Programs	Decorah

Source: (Iowa DIA, Health Facilities Division, 2019)

Economy

The two leading employment industries in the county are “Educational services, health care and social services” and “Manufacturing,” together employing over 45% of the employed labor force.

Table 16: Economic Base of Winneshiek County in 2017

Industry Category	Winneshiek County	
	Number	Percent
Agriculture, forestry, fishing, mining	1,061	8.9%
Construction	753	6.3%
Manufacturing	1,523	12.7%
Wholesale trade	446	3.7%
Retail trade	1,160	9.7%
Transportation, warehousing and utilities	400	3.3%
Information	150	1.3%
Finance and insurance, real estate, rental and leasing	518	4.3%
Professional, scientific, management, admin and waste services	534	4.5%
Educational services, health care and social assistance	3,894	32.6%

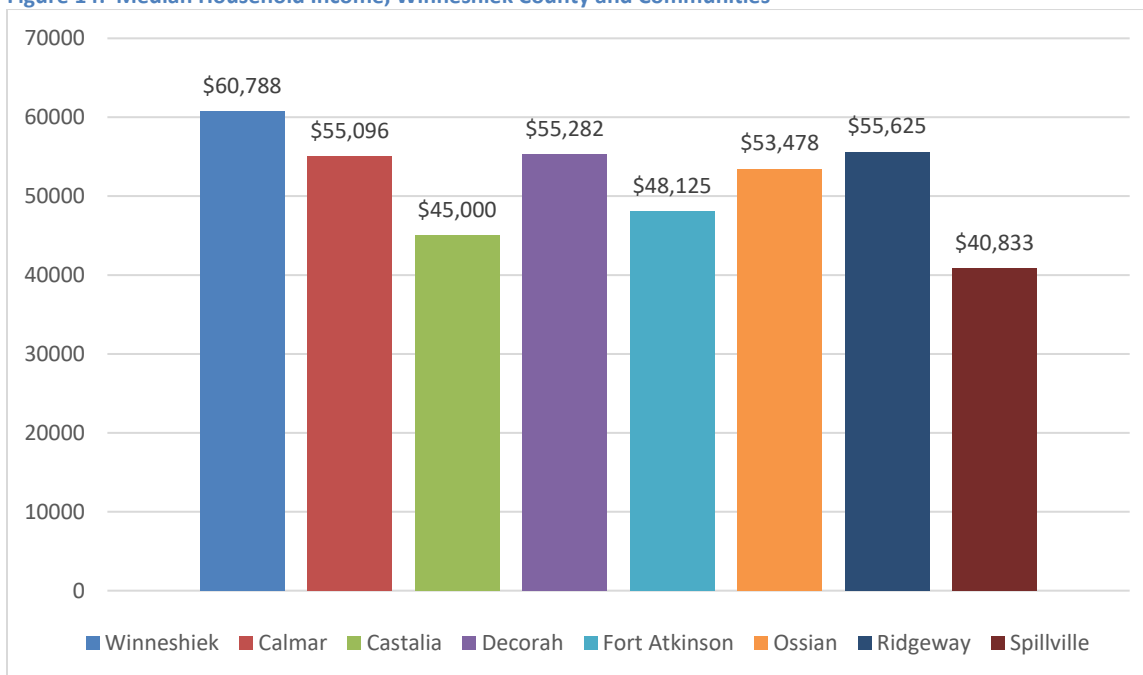
Arts, entertainment, recreation, accommodation and food	699	5.8%
Other services, except public administration	563	4.7%
Public administration	256	2.1%
Total Employed Persons	11,957	100.0

Source: (U.S. Census Bureau, ACS 2013 - 2017, 2017)

Income and Poverty

The median household income in Winneshiek County is higher than its neighboring counties and the state at \$60,788. Figure 14 compares the median household incomes for each of the incorporated communities and the county, with the exclusion of Jackson Junction because of extreme margins of error (over \$50,000) in the available data.

Figure 14: Median Household Income, Winneshiek County and Communities



Source: (U.S. Census Bureau, ACS 2013 - 2017, 2017)

In the county the percentage of families whose income is below the poverty level is 4.4%, the percentage of all people below poverty level is 8%, and the percentage of people 65 years and over below poverty level is 9.1% (U.S. Census Bureau, ACS 2013 - 2017, 2017).

Brief History

Possibly as early as 1000 AD, Native American tribes had lived in the northeastern part of Iowa. Archeological sites of past Oneota/Ioway tribes have been dated to between 1000 and 1700 AD. These sites include the Lower Dam Group, the Bluffton Mound Group and the Freeport Prehistoric Indian Burial Mounds. According to some residents, there are also sites near Festina, in Washington Township. The Oneota relied on agriculture, plant gathering and hunting for their subsistence. Archaeologists have determined that the Oneota diet consisted of corn, squash, beans and even some plants now considered weeds, like pigweed and goosefoot. The main sources of meat were deer and bison. The Oneota stored

food and other items in large bell-shaped pits dug into the ground. These pits have offered much information about the Oneota to archaeologists. It is thought that the Oneota tribes in this area became the loway tribes (Fishel, 1996).

These Late Prehistoric tribes eventually gave way to later groups such as the Sauk, Fox, Winnebago and Potawatomi tribes. The area of Winneshiek County became the home of the Winnebago Indian tribe. The county is named for a celebrated chief of the tribe. Fort Atkinson was built in 1840 to provide a headquarters for government in its supervision of the Winnebago reservation. In 1842, the government appointed the Reverend D. Lowery to act as Indian Agent for the Winnebago Indian reservation. Rev. Lowery directed the building of a Mission and farm on the reservation. The "Old Mission" was located about five miles southeast of Fort Atkinson. After a treaty in 1848, the Winnebago Indians were removed from the area and the first permanent white settlers to the area arrived, initially settling near Fort Atkinson and the Old Mission. In 1849, the first settlers arrived in Decorah and Moneek and a small mill was constructed in Decorah. In 1850, the first Norwegian immigrants arrived in the area. As the population grew, Winneshiek County was formally organized in 1851 and the election of officers soon followed. The first Census of population in Winneshiek County occurred in 1850 and totaled 546 people. By 1880, the population had reached 23,938, the highest ever recorded in the county's history. The location of the county seat was contentious, with Lewiston, Moneek and Decorah as contenders. After an initial faulty election determined that Decorah should be the county seat location, residents of Freeport petitioned from 1854 to 1856 for another election to relocate the county seat. In the end, no second election was called and the county seat location remained in Decorah. (Alexander, 1882) The City of Calmar also made an attempt to secure the county seat in 1898, but that too, failed. The first courthouse was built in 1858 and housed the sheriff's residence, the jail, offices and a courtroom until 1902. The second courthouse was built in 1903 and is still in use today. New windows were installed in the 1970s and the second and third floors were renovated in 1990 and 1991. A new jail was constructed in 2000 (Winneshiek County, 2012). Over time, a few villages have disappeared, such as Lewiston, Moneek and Plymouth Rock and the towns of Decorah and West Decorah merged in 1902. Today, Decorah remains the County Seat and the communities Calmar, Castalia, Fort Atkinson, Jackson Junction, Ossian, Ridgeway and Spillville remain incorporated.

Jurisdictional Descriptions and Capabilities

Requirement §201.6(c)(3):

[The plan shall] 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(d)(3):

[The plan shall] be revised to reflect changes in development, progress in local mitigation efforts and changes in priorities

The mitigation capabilities for each city jurisdiction are profiled in the section that follows. This profile includes an overview of the jurisdictions and their organizational structure; a description of staff, fiscal, and technical resources; and information regarding existing hazard mitigation capabilities such as adopted plan policies and regulations, if any. The descriptions and capabilities assessments are based on available and applicable data, including information provided by the jurisdictions collected during the planning process. School District information and any unique risks are included within the jurisdictions in which school district buildings are located. In our rural environment, there have been no significant changes in development that have occurred in hazard prone areas.

City of Calmar

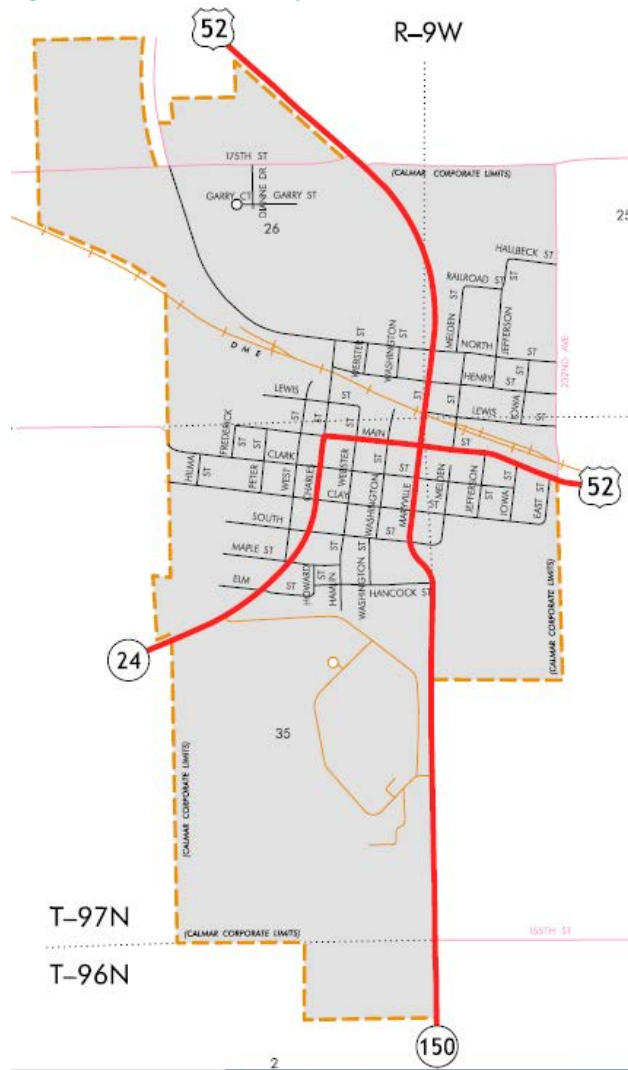
History and Overview

In 1850, a Norwegian family headed by Thore P. Skotland, was the first recorded group of people to settle in the area that later became Calmar. They were joined by other settlers rather quickly and in the 1870s and 1890s, Calmar recorded a population growth from 700 to nearly 1,100 people.

When the use of railways was common for both passengers and freight, Calmar was a major railroad hub of the Milwaukee Road. Passengers and those shipping freight had access to and from several locations in Iowa, Minnesota, Wisconsin, Illinois (Chicago), and South Dakota. This made Calmar a central market place as area farmers no longer had to travel over 40 miles to purchase supplies. Passenger trains were active on Calmar’s railroads until the 1960s and freight transport is still active through town today (City of Calmar, 2012)

Calmar is located in south central Winneshiek County at the intersection of U.S. Highway 52 and state Highways 150 and 24. The total land area of city limits is 1.05 square miles and is laid out as shown in Figure 15. The 2010 Census count for the City of Calmar is 978, and the Census 2018 Annual Estimate for the community was 923.

Figure 15: Calmar Street Map



Source: (Iowa Department of Transportation, n.d.)

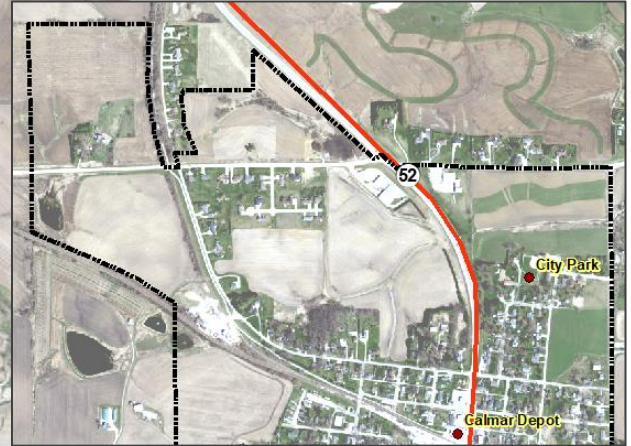
Environment

Only a small portion in the southern section of the community lies within any floodplain and it is well beyond any structures. Figure 16 illustrates the 100 Yr. floodplain in the community based on the 2019 FEMA Preliminary Flood Insurance Rate Maps (FIRMS), as well as the location of key community facilities.

Figure 16: Floodplain, City of Calmar (South)



Figure 17: Floodplain, City of Calmar (North)



Source: (Federal Emergency Management Agency (FEMA), 2019); (UERPC, 2019)

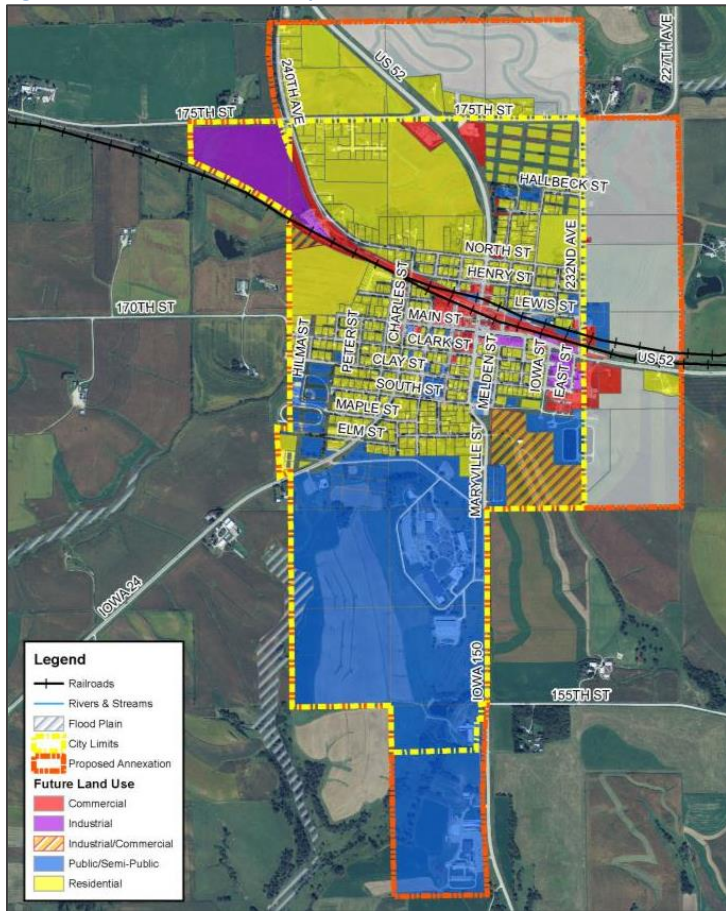
National Flood Insurance Program

FEMA has not completed a study to determine flood hazard in Calmar, and the City of Calmar is not listed in FEMA’s Community Status Book Report (Federal Emergency Management Agency, 2019). The community does not participate in the National Flood Insurance Program (NFIP) and has no repetitive loss properties. The City does not undergo Community Assistance Visits (CAVs).

Changes in Development/Future Land Use

The 2000 Census recorded a population of 1,058 for Calmar, and the 2010 Census recorded a slight decrease in population to 978. The 2000 Census recorded 452 households in Calmar, and the 2010 Census recorded a slight decrease in households to 444. City boundaries have shifted minimally since the 2015 county hazard mitigation plan. It appears the boundary was adjusted out slightly along the city’s northern extent. The Winneshiek County 2012 Comprehensive Plan includes a Future Land Use Map (see Figure 18). Possible annexation areas north and south of the city contain no floodplain area. Any further feedback the city had regarding the impacts of hazards to specific locations or development in the community is further addressed in Key Issues.

Figure 18: Future Land Use Map, Calmar



Governance, Facilities, and Services

The governing body includes one mayor and five council members. City employees include:

- City Clerk/Treasurer
- Street Superintendent
- Water/Wastewater Superintendent
- Police Chief
- Library Director

City contracted services include:

- City Engineer
- City Attorney
- City Health Officer
- Civil Defense Director

Calmar contracts with the Winneshiek County Sheriffs Office for a patrol officer. Calmar Police Department consists of a Police Chief. The Calmar Police Department also provides service to the community of Ossian through a shared services agreement.

The Calmar Fire Department consists of approximately 26 volunteer members and is funded by the City of Calmar along with township trustees in the department’s service area. The Calmar Fire Station is located on the corner of Main and Charles (Highway 24) and serves the communities of Calmar and

Spillville, along with most of Calmar Township and sections of Springfield, Military and Washington Townships.

The South Winn First Responders operate out of the Calmar Fire Station and have about 15 trained volunteers able to respond to any trauma or medical emergency. The South Winn Responders are a collaboration of the communities of Calmar, Fort Atkinson and Spillville. The group consists of Emergency Medical Responders (EMRs), Emergency Medical Technicians (EMTs) and Paramedics. Ambulance services are provided by Winneshiek Medical Center.

School Facilities

The South Winneshiek High School and administrative offices are located in Calmar and share the same hazard risks. South Winneshiek schools noted the following mitigation measures as ways they work to reduce the impact of hazards to their students, staff and facilities: weather radios, fire suppression system in kitchen, intruder drills, evacuation and tornado drills, emergency information binders and response kits in each classroom, and regular staff safety trainings. The school district adheres to an emergency plan and crisis plan. Currently, Dave Orvis serves as the facility manager.

Northeast Iowa Community College (NICC) has one of its two main campus facilities in Calmar. The Dairy Center adjoins the NICC campus, and the Beef Education Center was added just north of the Dairy Center in 2016. The NICC campus includes an educational facility, a milking parlor, a free-stall barn and calf barn. A renovation was done to the Dairy Center parking lot in 2019. Included in the renovation was the relocation of the entrance from Hwy 150. This resulted in increased visibility and safety for those entering and exiting. In addition, exterior lighting on campus has been upgraded to LED, resulting in an improvement to evening lighting quality.

NICC has one campus emergency plan and follows the incident command system. The Associate VP of Operations (currently Rhonda Siebert) is in charge of security and emergency preparedness. NICC maintains emergency information binders, emergency kits, emergency shelter kits, weather radios, a radio communication system, internal communication system, and are up to fire code. NICC practices regular fire and weather drills, participates in FEMA's incident command practices, and provides information to students and staff on Shelter In Place ad Run, Hide, Fight procedures. NICC is in the process of installing security cameras at the entrances to all buildings. Emergency plans are reviewed yearly and they work with Winneshiek County on county wide drills and training.

Technical Resources

Winneshiek County Emergency Management provides technical resources and services to the City of Calmar and its emergency responders. The City has an outdoor warning system that is automatically activated by the County's 911 dispatch center. Winneshiek County contracts with the Northeast Iowa Response Group (NIRG), a specialized HAZMAT Team from the Waterloo Fire Department, to provide technician-level incident response throughout the county.

Existing Plans and Policies

The City of Calmar utilizes a City Code and zoning ordinances to control land use, direct decision-makers and protect the quality of life for its residents. The City is part of the Winneshiek County Comprehensive

Plan 2012 which outlines goals, strategies and actions for future growth and development. Calmar utilizes the Winneshiek County Emergency Operations Plan and the Winneshiek County Recovery Plan. All City Response Personnel follow appropriate protocol and guidance.

Key Issues

- Hazardous Materials – related to the train traffic and semi traffic through the middle of town, the cargo through town is becoming increasingly more volatile (often ethanol)
- Flash Floods – some poor city drainage causes flash flooding in some areas of town during large storms (e.g. in the vicinity of Main St.)
- Hailstorm – along with other weather events, can be destructive, with no ability for avoidance
- Severe Winter Storms – a regular occurrence, strains city budget when frequent and severe

Mitigation Activities

Status and Progress on Previous Mitigation Actions

1. Need generator for NE lift station and the water tower
 - Completed. Also got a generator for the sewer plant.
2. Storm shelter – FEMA compliant safe room – for community and students of South Winn and NICC
 - Not completed, and don't anticipate completing this in the next 5 years.
3. Maintain/improve emergency responder equipment and training
 - Ongoing, but removed as mitigation action because is emergency response/operational preparedness.
4. Identify/develop safe routes for vehicle and pedestrian traffic – educate the public
 - Completed, to key community locations (E.g. pool and parks)

Mitigation Actions to Pursue Through MJ-9 Implementation:

- Implement codes and policies to better address hazard issues:
 - Updates to disaster procedures & materials (add emergency kits in rooms, reunification binders w/children's pictures at each fire station, etc.) (South Winneshiek CSD)
- Flood reduction practices: Increase infiltration/Green Infrastructure:
 - Incorporate stormwater management practices in the vicinity of Main St. to minimize flash flooding during large storm events. Potential practices include raingardens, bioswales, pervious pavers, native turf/grasses, etc.

Other Local Mitigation Efforts:

- The fire station serves as a community shelter location.
- The city has two portable generators, one for its own use, and one for the fire department.
- New sirens at the post office and Lion's Park/ball field, and updated sirens at the athletic fields and swim park
- Purchased property across from the Fire Department for equipment storage
- Attended trainings at Northeast Iowa Community College (NICC) this year
- Purchased 1st response equipment and complete ongoing upgrades to the fire station
- Upgraded sewer infrastructure and lagoon upgrades

- Upgraded hydrants and got a new well

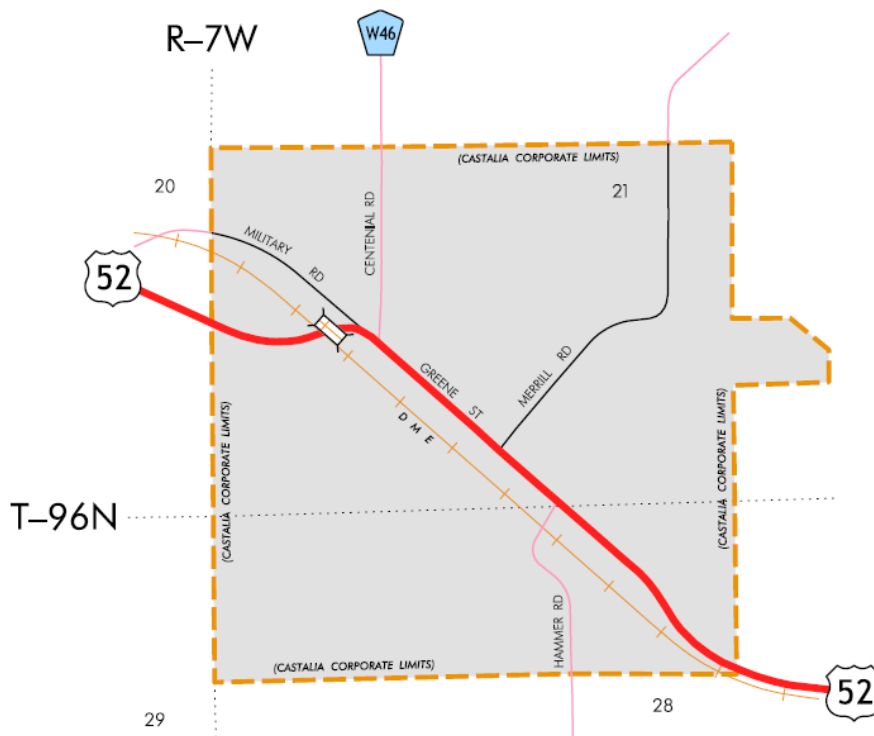
City of Castalia

History and Overview

In 1864, the Chicago, Milwaukee and St. Paul Railroad reached Castalia. The community was small with few buildings, but included two churches, post office and a general store. The population in 1880 was 108 (Alexander, 1882).

Castalia is located in southeast Winneshiek County on U.S. Highway 52 between Ossian and Postville. The total land area of city limits is .58 square miles and is laid out as shown in Figure 19. The 2010 Census count for the City of Castalia is 173 and the Census 2018 Annual Estimate for the community was 158.

Figure 19: Castalia Street Map

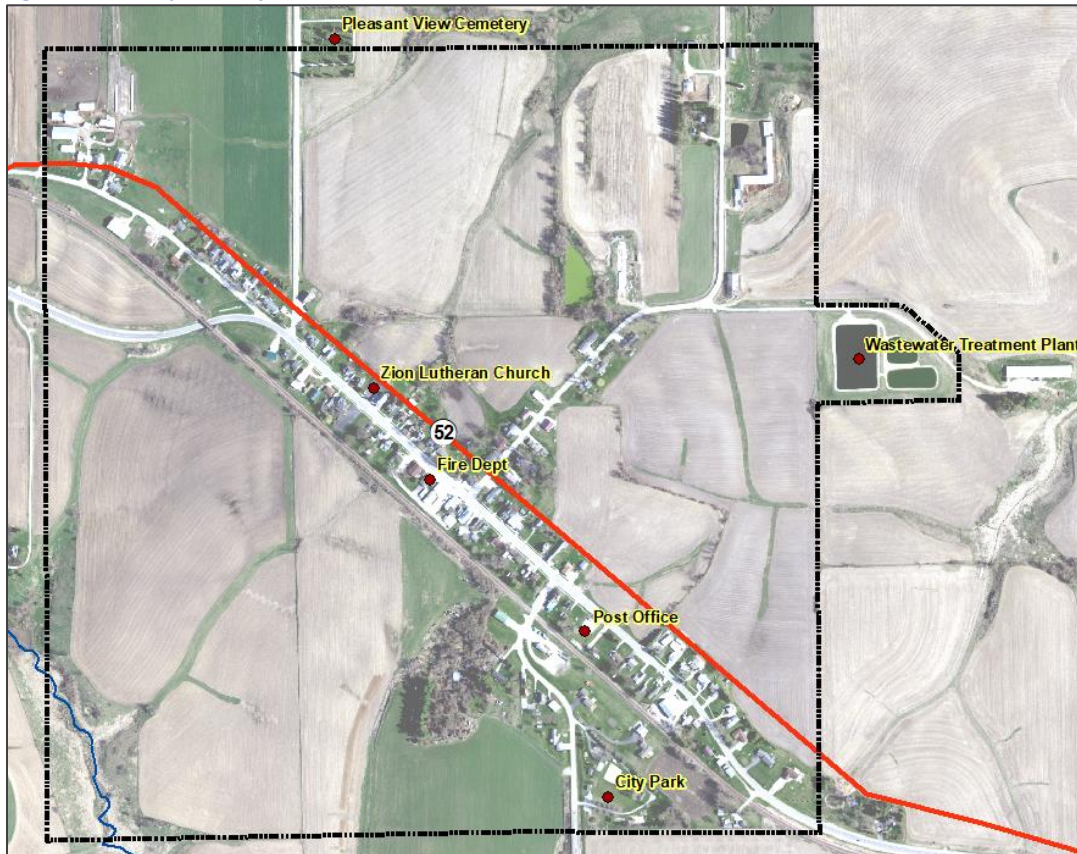


Source: (Iowa Department of Transportation, n.d.)

Environment

Figure 20 identifies the 100 Yr. floodplain based on the 2019 FEMA Preliminary Flood Insurance Rate Maps (FIRMS), as well as the location of key community facilities in Castalia. None of the community lies within the floodplain.

Figure 20: Floodplain, City of Castalia



Source: (Federal Emergency Management Agency (FEMA), 2019)

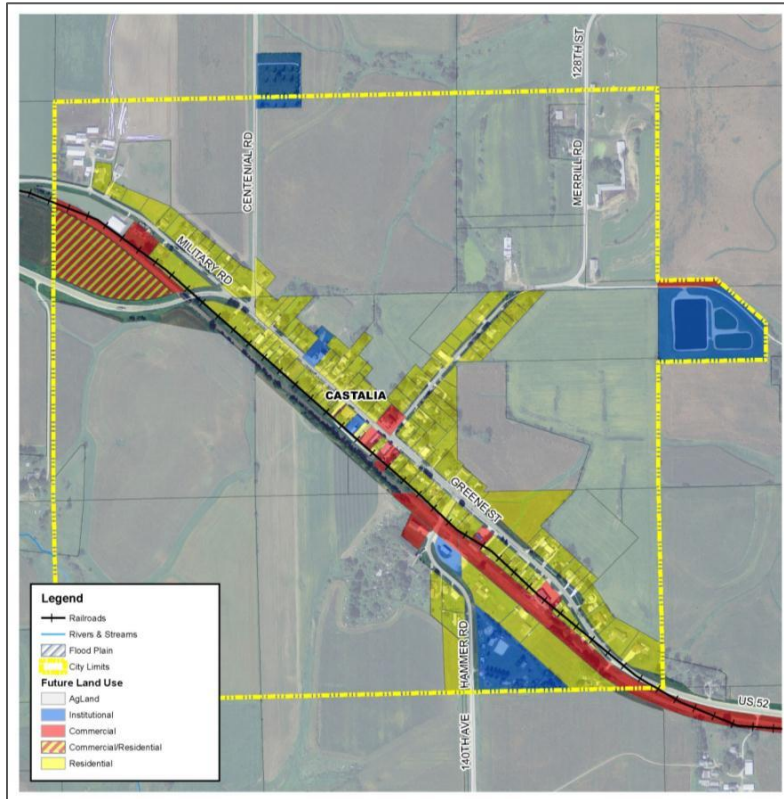
National Flood Insurance Program

FEMA has not completed a study to determine flood hazard in Castalia, and the City of Castalia is not listed in FEMA's Community Status Book Report (Federal Emergency Management Agency, 2019). The community does not participate in the National Flood Insurance Program (NFIP) and has no repetitive loss properties. The City does not undergo Community Assistance Visits (CAVs).

Changes in Development/Future Land Use

The 2000 Census recorded a population of 175 for Castalia, and the 2010 Census recorded a slight decrease in population to 173. The 2000 Census recorded 79 households in Castalia, and the 2010 Census recorded a slight increase in households to 82. City boundaries have not changed since the 2015 county hazard mitigation plan. The Winneshiek County 2012 Comprehensive Plan includes a Future Land Use Map (see Figure 21). Proposed future land uses are not located in floodplain areas. Any further feedback the city had regarding the impacts of hazards to specific locations or development in the community is further addressed in Key Issues.

Figure 21: Future Land Use Map, City of Castalia



(Upper Explorerland Regional Planning Commission, 2012)

Governance, Facilities and Services

The governing body includes one mayor and five council members. City employees include:

- City Clerk
- Water/Wastewater Superintendent
- 2 part time maintenance employees
- 1 water meter reader

Law enforcement is provided to the residents of Castalia by the Winneshiek County Sheriff's Office.

The Castalia Fire Department consists of approximately 24 volunteer members. The City supplies and maintains the Fire Station in exchange for fire protection within the corporate limits. The Castalia Fire Station adjoins City Hall on Greene Street (Hwy. 52) and serves the community and Bloomfield Township.

Emergency Medical Responders (EMRs), Emergency Medical Technicians (EMTs) and Paramedics with the Postville Ambulance service respond to any trauma or medical emergency.

The City of Castalia is located in the Postville Community School District. Castalia children attend either the elementary/middle school or the high school, both of which are located in the nearby community of Postville. No school buildings are located in Castalia.

Technical Resources

Winneshiek County Emergency Management provides technical resources and services to the City of Castalia and its emergency responders. The City has an outdoor warning system that is automatically activated by the County's 911 dispatch center or can be manually activated at the City's Fire Station. The City's community shelter location is the fire station. Winneshiek County contracts with the Northeast Iowa Response Group (NIRG), a specialized HAZMAT Team from the Waterloo Fire Department, to provide technician-level incident response throughout the county.

Existing Plans and Policies

The City of Castalia utilizes a City Code to control land use, direct decision-makers and protect the quality of life for its residents. The City is part of the Winneshiek County Comprehensive Plan 2012 which outlines goals, strategies and actions for future growth and development. Castalia utilizes the Winneshiek County Emergency Operations Plan and the Winneshiek County Recovery Plan. All City Response Personnel follow appropriate protocol and guidance.

Key Issues

- Hazardous Materials - related to the train traffic and semi traffic through the town, the cargo is becoming increasingly more volatile (often ethanol) which worries city leaders.
- Infrastructure Failure – the cost of needed sewer and water infrastructure improvements a concern for the community

Mitigation Activities

Status and Progress on Previous Mitigation Actions

1. Keep up training hours for emergency responders
 - Ongoing, but removed as mitigation action because is emergency response/operational preparedness.
2. Replace existing siren with a siren that has a stronger coverage area
 - Completed.
3. Purchase new fire truck
 - Not completed. The fire department is still working on this.
4. Expand station size to accommodate new truck sizes
 - Not completed. No longer a priority.
5. Continue to update existing equipment
 - Ongoing, but was removed as mitigation action because is emergency response/operational preparedness.
6. Purchase portable generator for lift stations
 - Not completed. No longer a priority.
7. Transfer switches and wiring for generators
 - Not completed. No longer a priority.
8. Develop an evacuation plan for community members
 - Completed/not completed. First responders now have training on evacuation protocol, but they would like to have a recorded evacuation plan to share with community members.

9. Inform community members of suitable actions to take in the event of a rail/road/hazardous materials incident
 - Not completed. Still a priority.
10. Promote the use/purchase of all-hazard radios – consider a purchase plan or subsidy to help with the cost.
 - Completed. Purchased what was needed.
11. Construct FEMA-compliant tornado safe room and storm shelter
 - Not completed. No longer a priority.

Mitigation Actions to Pursue Through MJ-9 Implementation:

- Complete rail accident evacuation plan then inform community members

Other Local Mitigation Efforts:

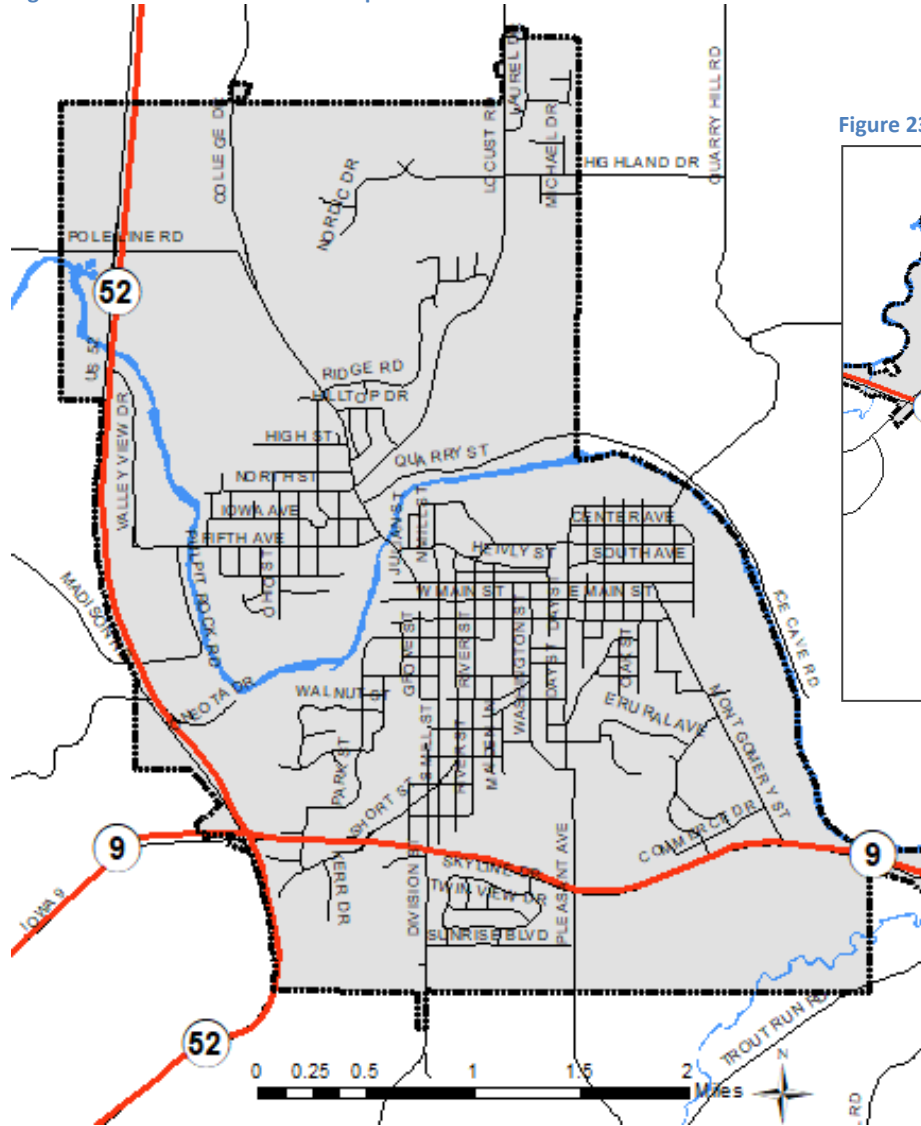
- Have a fixed generator at the city well that also powers the siren
- Fire department trainings pertaining to HAZMAT incidents
- Fire station serves as a community shelter location

City of Decorah

History and Overview

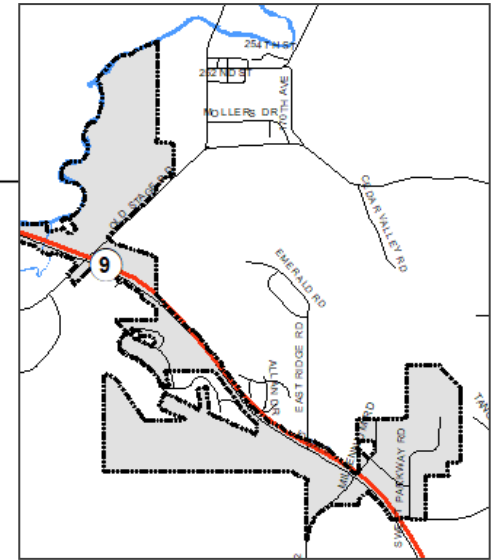
The City of Decorah is named after Waukon-Decorah, a prominent Chief of the Winnebago Indian Tribe. Nine members of the William Day family are credited with being the first settlers of Decorah, arriving around 1849. The first plat of the city was made in 1853 and Decorah was incorporated as a city in 1857. Luther College, a private four year liberal arts school, was established in Decorah in 1862 with the purchase of 32 acres for the college. The railroad reached Decorah in 1869 and provided transportation for passengers and freight through February of 1979. Decorah is located in the center of the County on U.S. Highway 52 and Iowa Highway 9. Total land area of city limits is 7.13 square miles, with nearly 62 miles of roadways as shown in Figure 22. The 2010 Census count for the City of Decorah is 8,127 and the 2018 Annual Estimate was 7,594.

Figure 22: Decorah West Street Map



Source: (Iowa Department of Transportation, n.d.)

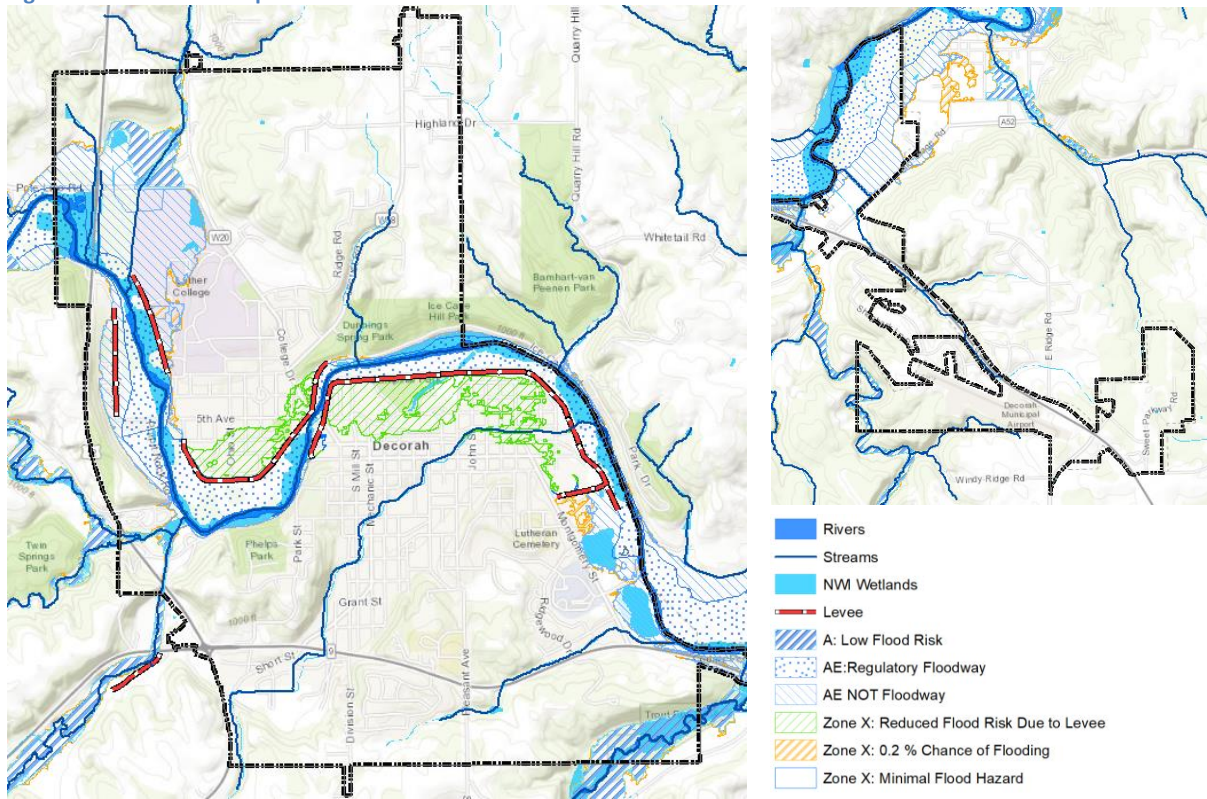
Figure 23: Decorah East Street Map



Environment

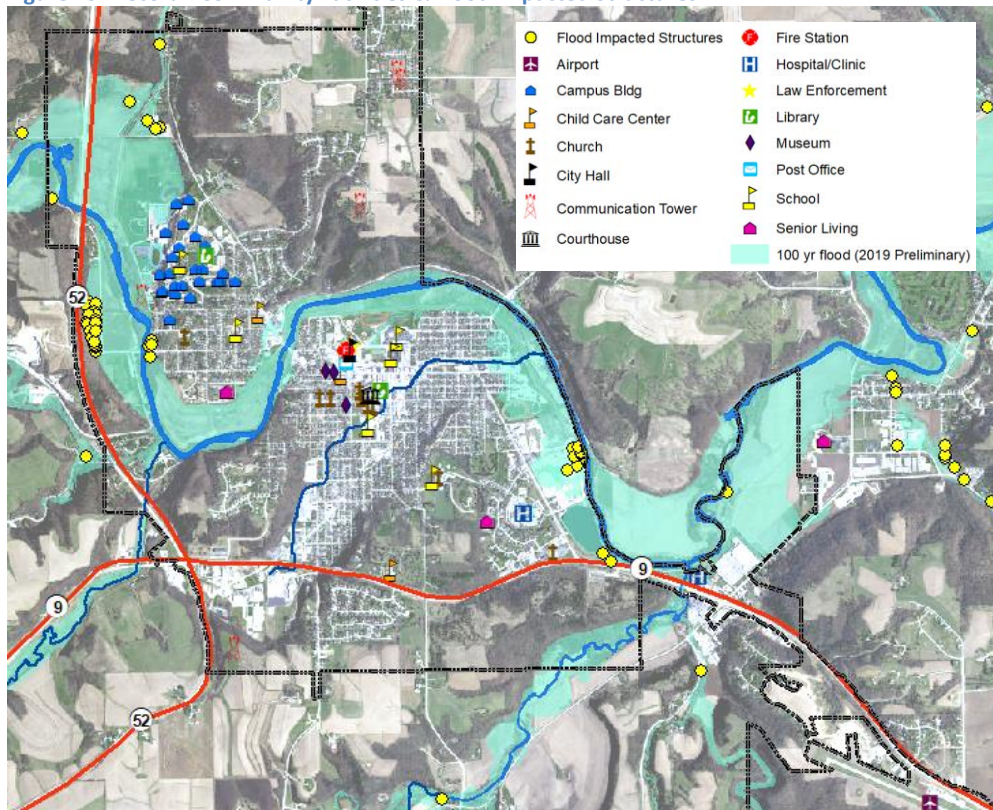
The City has many areas prone to flooding and has a floodplain ordinance in effect. Figure 24 illustrates 2019 FEMA Preliminary Flood Insurance Rate Maps (FIRMS) flood zones, and Figure 25 illustrates the location of community facilities and services in relation to the 100 year floodplain, as well as identifying all structures impacted by the 100 year floodplain. No community facilities are located within the 100 year floodplain, but overall 42 structures land within the 100 year floodplain, including a variety of residential, commercial, industrial, and other general structures (e.g. garage/sheds, etc.) (Winneshiek County, GIS Coordinator. (2019))

Figure 24: Decorah Floodplain



Source (Fig. 24 & 25): (Federal Emergency Management Agency (FEMA), 2019); (UERPC, 2019)

Figure 25: Decorah Community Facilities & Flood Impacted Structures



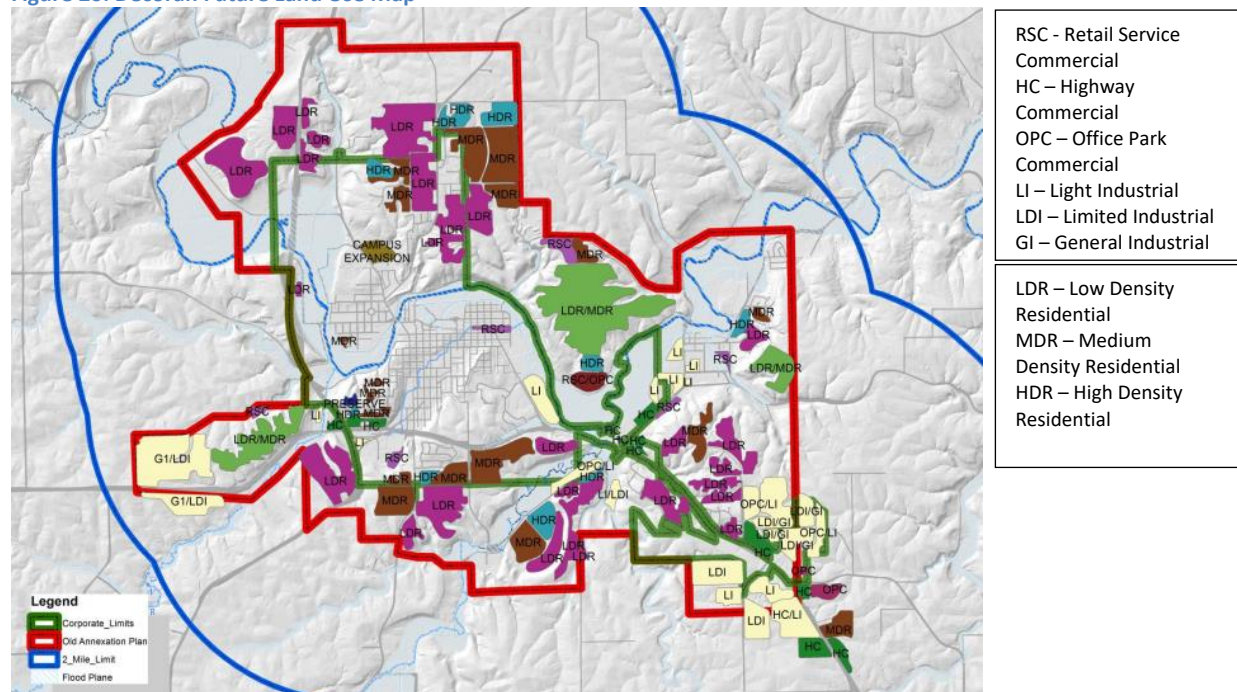
National Flood Insurance Program

The City of Decorah participates in the National Flood Insurance Program (NFIP) and is considered compliant. The community had an initial Flood Insurance Rate Map (FIRM) identified on May 1, 2011 (which is the current effective map date). The community has adopted a floodplain ordinance, which meets minimum State of Iowa floodplain regulations (which exceed minimum FEMA regulations). The floodplain administrator is the zoning administrator. The permitting process by the floodplain administrator includes a determination as to whether proposed floodplain development meets applicable standards of the floodplain ordinance. The floodplain administrator responsibilities and floodplain development permitting process identified in the floodplain ordinance will be implemented by the community in moving ahead to maintain compliance with the NFIP. The City voluntarily requested and underwent a Community Assistance Visits (CAVs) in October of 2019. As shown on Table 34 Decorah has one repetitive loss property through 2019.

Changes in Development/Future Land Use

The 2000 Census recorded a population of 8,172 for Decorah, and the 2010 Census recorded a slight decrease in population to 8,127. The 2000 Census recorded 2,819 households in Decorah, and the 2010 Census recorded a slight increase in households to 2,855. City boundaries have shifted minimally since the 2015 hazard mitigation plan, with small annexations on the west and southeast boundaries. The Decorah 2012 Comprehensive Plan includes a Future Land Use Map (see Figure 26). The City is trying to focus residential growth to the North along Locust Road and College Drive, and commercial growth along the Iowa Highway 9 East corridor (primarily in the Decorah Business Park), both locations largely outside of the floodplain area. While some future annexation areas do contain floodplain, the City's Planning & Zoning Commission and City Council are reluctant to consider development in the F-1 Floodplain zoning district or FIRM mapped flood areas.

Figure 26: Decorah Future Land Use Map



(Upper Explorerland Regional Planning Commission, 2012)

Governance, Facilities and Services

The governing body includes one mayor and seven council members. Key city employees include:

- City Administrator
- City Clerk/Treasurer
- Deputy City Clerk
- Water Superintendent
- Wastewater Superintendent
- Street Commissioner/City Engineer
- Library Director
- Park and Recreation Director
- Police Chief
- Fire Chief
- IT Manager

Commissions and Boards include:

- Planning and Zoning
- Board of Adjustment and Zoning
- Airport Commission
- Library Board of Trustees
- Park & Recreation Commission
- Civil Service Commission
- Low Rent Housing Agency
- TIF/LMI Board
- Decorah Tree Committee
- Solid Waste Commission
- Cable TV Commission
- Human Rights Commission
- Historical Preservation Commission
- Telecommunications Utility Commission

The Decorah Police Department consists of a Police Chief and 13 sworn officers, 1 clerical and 3 reserve officers.

The Decorah Fire Department consists of 32 volunteers and three paid staff. Most members are Firefighter I and Hazardous Materials Operation certified. The Department has one station, located at 400 Claiborne Drive. The Decorah Fire Department serves the community of Decorah and the townships of Decorah, Glenwood, Pleasant and Canoe; along with portions of Madison, Springfield, Bluffton, Hesper and Highland Townships.

The Winneshiek Medical Center of Decorah provides ambulance services.

The Decorah Community School District serves Decorah and a surrounding area encompassing nearly 175 square miles. The district includes the incorporated city of Decorah, and the unincorporated communities of Freeport, Locust, and Nordness. Decorah CSD operates an early childhood center, two elementary schools, a middle school and a high school, all located in the City of Decorah, and share the same hazard risks.

The high school building has a FEMA approved safe room . Kurt DeVore, Director of Information, Systems, and Instructional Technology, is in charge of Emergency Planning for the district, assisted by the district superintendent and district facilities manager.

They meet regularly with the Decorah Police Chief and Winneshiek County Sheriff for the City of Decorah to coordinate safety and security as well as to ensure proper communication with emergency

and crisis planning. All building principals have developed their individual plans for each of their respective building in coordination with Kurt DeVore.

Administratively, the district meets to ensure all the plans are aligned and coordinated in the case of a district wide emergency, and for communication purposes. All buildings have weather radios and conduct regular planning and drills, have building fire suppression systems, regular lockdown, evacuation, tornado, and fire drills, emergency information binders in each classroom, emergency response backpacks and buckets in each classroom, and regular staff training on school safety.

St. Ben's is a parochial school in Decorah and has constructed a FEMA compliant safe room for students and staff. St. Ben's has a weather radio and has worked to mitigate the impact of hazards by having an emergency warning system and sirens, fire suppression system in the kitchen, emergency information binders and emergency response kits in each classroom, regular lockdown, evacuation and tornado drills, and regular staff training on school safety. The school maintains an emergency plan, master plan, capital plan, crisis plan and a full emergency procedures plan.

Luther College, a private liberal arts campus, is also located in Decorah and shares the same hazard risks. Information was not available as to Luther's mitigation efforts.

Technical Resources

Winneshiek County Emergency Management provides technical resources and services to the City of Decorah and its emergency responders. The City has six outdoor warning sirens that are automatically activated by the Decorah Law Enforcement Center. Winneshiek County contracts with the Northeast Iowa Response Group (NIRG), a specialized HAZMAT Team from the Waterloo Fire Department, to provide technician-level incident response throughout the county.

Existing Plans and Policies

The City of Decorah utilizes a City Code, zoning ordinance, subdivision ordinance, tree trimming ordinance, nuisance ordinance and floodplain ordinance to control land use, direct decision-makers and protect the quality of life for its residents. The City has a Source Water Protection Plan completed in 2014. The City's Comprehensive Plan was adopted in 2012, which outlines goals, strategies and actions for future growth and development. Decorah utilizes the Winneshiek County Emergency Operations Plan and the Winneshiek County Recovery Plan. All City Response Personnel follow appropriate protocol and guidance.

Key Issues

- Flash Floods – Heavy rains strain the storm drainage system – certain areas prone to flash flooding.
 - Need to address water management and flooding of Dry Run Creek through town
 - Need to address upstream retention/infiltration to protect downstream populations and structures in Decorah and Freeport
- Landslides – Decorah sits among many bluffs, development on tops and heavy rains can make bluffs more susceptible to landslides. Dug Road in Decorah has experienced landslides in recent years, and will need to continue to be addressed in the future.

- River Floods – river runs through town, is mostly contained by levees or flood walls now, but climate change and surrounding development could impact future flood levels
 - Need to consider long term safety and maintenance of levee system, and to consider ideal land uses and bank stabilization on the river side of the levee
- Levee Failure – This is a significant concern. The levee along the Upper Iowa River through town is getting old, and long-term inspection, maintenance, updating or raising is a consideration for the safety of homes and businesses on the other side of the levee. Inspection is needed to determine whether the internal structure and height of the levee is appropriate for today’s weather events.
- Animal/Plant/Crop Disease –
 - Concern regarding trucks carrying farm animals through town and potential health impacts (e.g. MRSA and other antibiotic-resistant organisms).
 - Concern regarding the ongoing impacts of the Emerald Ash Borer on the city’s tree inventory.
 - Concern regarding chronic wasting disease’s impacts on local deer populations.
- Human Disease - Concern regarding trucks going through town and potential impact to air quality and human health; and the overall impacts of vehicle idling on air quality and human health (especially near children/schools). The hilly topography creates a “bowl” effect, and air quality needs to be more carefully monitored and mitigated.
- Terrorism – domestic terrorism in the form of shootings and public misbehavior and/or violence; training and preparation for potential active shooter events in local schools still a key concern

Mitigation Activities

Status and Progress on Previous Mitigation Actions

- 1) Continue to maintain and improve flood mitigation equipment and related safety measures
 - Ongoing.
 - a. Continue to equip and train community emergency responders
 - Ongoing, but removed as mitigation action because is emergency response/operational preparedness.
 - b. New boat or rescue raft and new motor for the boat
 - Completed.
- 2) Purchase and install generators and related equipment:
 - a. Permanent generator for the Carrie Lee Campus/Middle School
 - Not completed, ongoing. The Decorah CSD is still working on this.
 - b. Permanent generator for the water department at the main pumping station
 - Not completed and ongoing. The city would still like to work on this.
 - c. Smaller permanent generator for the bus repeater
 - Completed.
- 3) Expand and maintain the Metronet fiber optic cable and related equipment – consolidate projects where feasible (i.e. lay conduit when city infrastructure projects occur)
 - Completed and ongoing. Three expansions completed since 2015, will continue more expansions in the future.

- 4) Continue to address waterway/infrastructure issues to minimize flooding
 - Completed and ongoing. Portable pump purchased; still need a permanent pump (e.g. for Dry Run)
- 5) Upgrade all sirens to be radio controlled and address all gaps in the city
 - Completed. One siren was upgraded.
- 6) Cleanup/maintain the Dry Run levee
 - Ongoing. Work is progressing. Still a priority.
- 7) Construct upstream water retention structures on Dry Run to control quantity and velocity of water
 - Not completed. Still a priority.
- 8) Improve the emergency alert notification system for the Decorah Community School District
 - Not completed, ongoing. Decorah CSD is still working on this and would like to upgrade mass notification system and digital two-way communication system.
- 9) Continue participation in the National Flood Insurance Program (NFIP)
 - Ongoing.
- 10) New well needed on west side of city – in remote and elevated area
 - Ongoing.
- 11) Enlarge the well at the business park
 - Completed. Business park was connected to city’s main, and well in business park was capped and abandoned.
- 12) Continue to work on wastewater system to reduce inflow and infiltration and reline sewers
 - Ongoing. Work is progressing.
- 13) Continue to improve city and countywide interagency portable mobile data by implementing new technologies
 - Ongoing.
- 14) Develop truck routes that designate hazmat routes and safe harbors for parking
 - Not completed. No longer a priority.
- 15) Develop codes that encourage buildings with tornado-safe areas
 - Not completed.
- 16) Construct another FEMA-compliant storm shelter/safe room
 - a. Decorah Community School District would like to construct one at the Carrie Lee Campus / Middle School
 - Not completed, ongoing. Decorah CSD would still like to pursue this.

Mitigation Actions to Pursue Through MJ-9 Implementation:

- Flood reduction practices: Floodplain restoration and streambank stabilization:
 - Cleanup/maintain the Dry Run diversion channel
 - Identification and acquisition of all Dry Run Creek property
 - Acquisition of parcels at the end of Water St. prone to flooding, and other individual flood prone parcels
 - Pursue options for converting acquired Dry Run Creek land to city open space amenity, flood control, stormwater management and/or conservation uses.
 - Improvements and continued maintenance to levee system

- Streambank stabilization along Upper Iowa River & levee
- Flood reduction practices: Watershed and flood prevention planning & initiatives:
 - Support/partner with the Upper Iowa River Watershed Management Authority (UIRWMA) on implementing objectives of the Upper Iowa River Watershed Plan, and stay involved in future meetings and planning of the UIRWMA
- Implement city codes and policies to better address hazard issues:
 - Approve a stormwater ordinance to manage stormwater runoff on sites over 2 ac. Consider ordinance to address sites under 2 ac. as well.
 - Use stormwater utility funds to provide incentives for homeowners and businesses to implement onsite stormwater Best Management Practices (BMPs), and to create city demonstration BMPs. Increase stormwater utility fee.
- Flood reduction practices: Increase infiltration/Green infrastructure:
 - Incorporate stormwater management in upcoming projects, as recommended by City's existing stormwater management plan
- Maintain and improve flood mitigation equipment and related safety measures:
 - Acquire permanent hydraulic pumps to be used along the Upper Iowa River during flooding
 - Acquire additional USGS or Iowa Flood Center (or other) river gauges to monitor flooding along Trout Run and Dry Run creeks
- Flood reduction practices: Store excess runoff:
 - Construct upstream water retention structures on Dry Run to control quantity and velocity of water
 - Partner with Winneshiek County Conservation to examine opportunities for the planned Dry Run Trail to serve for stormwater management, to help mitigate downstream flooding impacts to Decorah.
- Expand/improve communications/technology infrastructure and equipment:
 - Expand and maintain the Metronet fiber optic cable and related equipment – consolidate projects where feasible (i.e. lay conduit when city infrastructure projects occur)
 - Continue to improve city and countywide interagency portable mobile data by implementing new technologies
 - Upgrade digital two-way communication system to interface with fire, life, safety personnel (Decorah CSD)
 - Upgrade of mass notification system for the school district (Decorah CSD)
- Sirens – additions/replacements/upgrades:
 - Upgrade all warning sirens to battery backup
- Improvements to transportation safety and response:
 - In coordination with County, re-route truck traffic so it doesn't go through downtown (excepting necessary local service trucks, but not excepting animal trucks)
- Generators and transfer switches:
 - Purchase and install permanent generator for the water department at the main pumping station

- Transfer switch purchase for city hall
- Purchase & install 500 KVA generator for Decorah Middle School (Decorah CSD)
- NFIP Participation
 - Maintain membership in NFIP. Update floodplain regulations to continue to meet or exceed minimum State of Iowa regulations. Maintain work of floodplain administrator as identified in floodplain regulations.
- Improved/upgraded water/sewer facilities:
 - New well needed on west side of city – in remote and elevated area
 - Work on wastewater system to reduce inflow and infiltration and re-line sewers
- Storm shelter/FEMA safe rooms:
 - Construction of a safe room on the DMS/CLE campus (Decorah CSD)
 - Construction of a safe room on the new elementary campus (Decorah CSD)
 - Establish a safe room location for the Pulpit Rock Campground and soccer field areas; consider feasibility of using existing concrete block restroom facility

Other Local Mitigation Efforts:

- Designated community shelters are located at Aase Haugen (Vennehjem parking garage), Christian Life Center, Decorah Covenant Church, Decorah Lutheran Church, Decorah Middle School, First Lutheran Church, Luther College, Decorah Senior Center, Stone Ridge Church, The Spectrum Network.
- The City is undergoing an update to a city sustainability plan, which addresses water and infrastructures issues, amongst others, and will make specific recommendations regarding flooding mitigation actions.

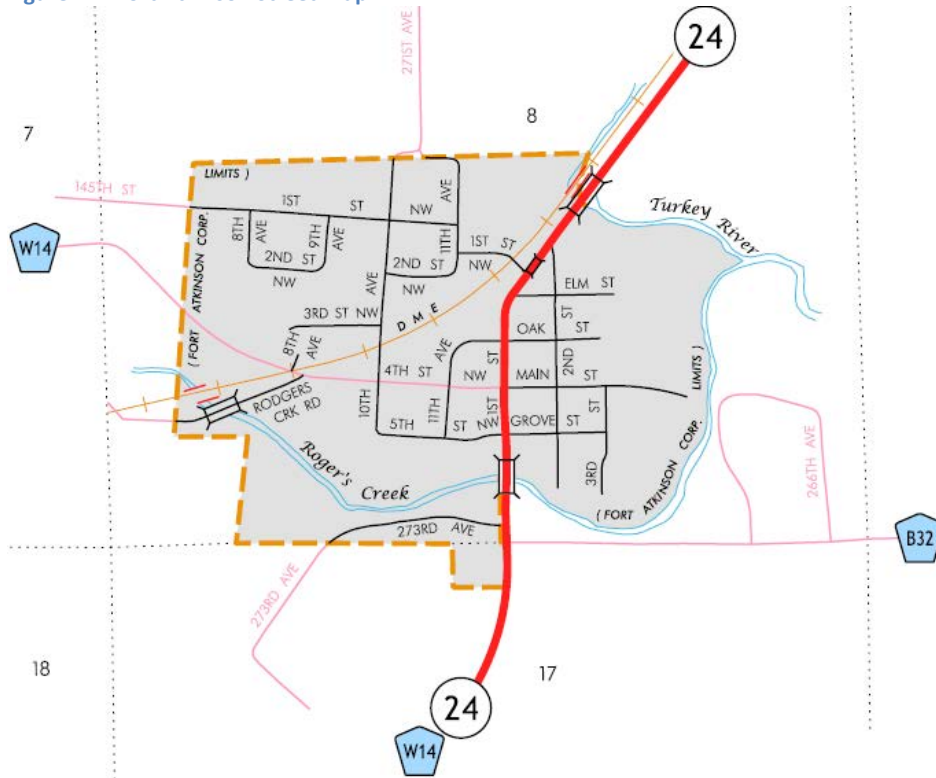
City of Fort Atkinson

History and Overview

Fort Atkinson, the fort constructed in 1842 by the US Army, is the namesake to the City of Fort Atkinson. The fort was built to maintain peace among the Indian tribes and to monitor any pioneer settlers that may try to claim land that belonged to the Winnebago tribe. In 1848, the Winnebago tribe was relocated out of the area at the insistence of white settlers and the impending statehood of Iowa. The first white settlers of the area were from South Germany, and the first house was built in 1847. A railroad was constructed in the area in 1869 and the town began to develop after. (Becker, 2011); (State Archaeologist, University of Iowa, 2012)

Fort Atkinson is located in southwest Winneshiek County along State Highway 24. The total land area of within the city limits is .313 square miles and is laid out as shown in Figure 27. The 2010 Census count for the City of Fort Atkinson is 349, and the Census 2018 Annual Estimate for the community was 322.

Figure 27: Fort Atkinson Street Map



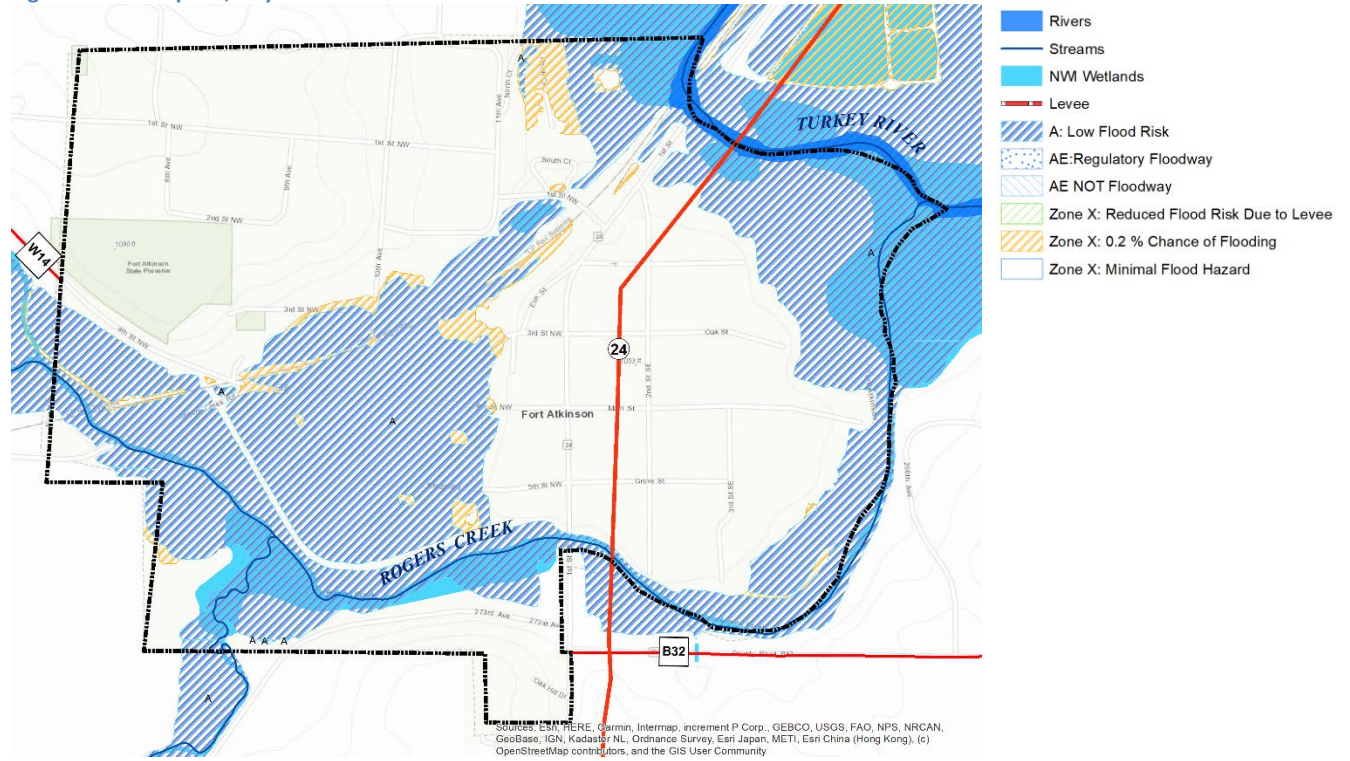
Source: (Iowa Department of Transportation, n.d.)

Environment

The City has many areas prone to flooding and has a floodplain ordinance in effect. The City relies on a levee built in 1940 on the southwest side of the City for some flood control. Figure 28 illustrates the 100 year floodplain area in Fort Atkinson, from FEMA’s 2019 Preliminary Flood Insurance Rate Map (FIRM), and Figure 29 illustrates the location of community facilities and services in relation to the 100 year floodplain, as well as identifying any structures impacted by the floodplain. The City’s lift station falls within the 100 year floodplain, but the City has raised the land around the lift station to mitigate flooding. No other community facilities fall in the 100-year floodplain. Overall 40 structures within City limits are located in the 100 year floodplain, including a variety of agricultural, residential, commercial and other general structures (e.g. garage/sheds, etc.) (Winneschek County, GIS Coordinator. (2019))

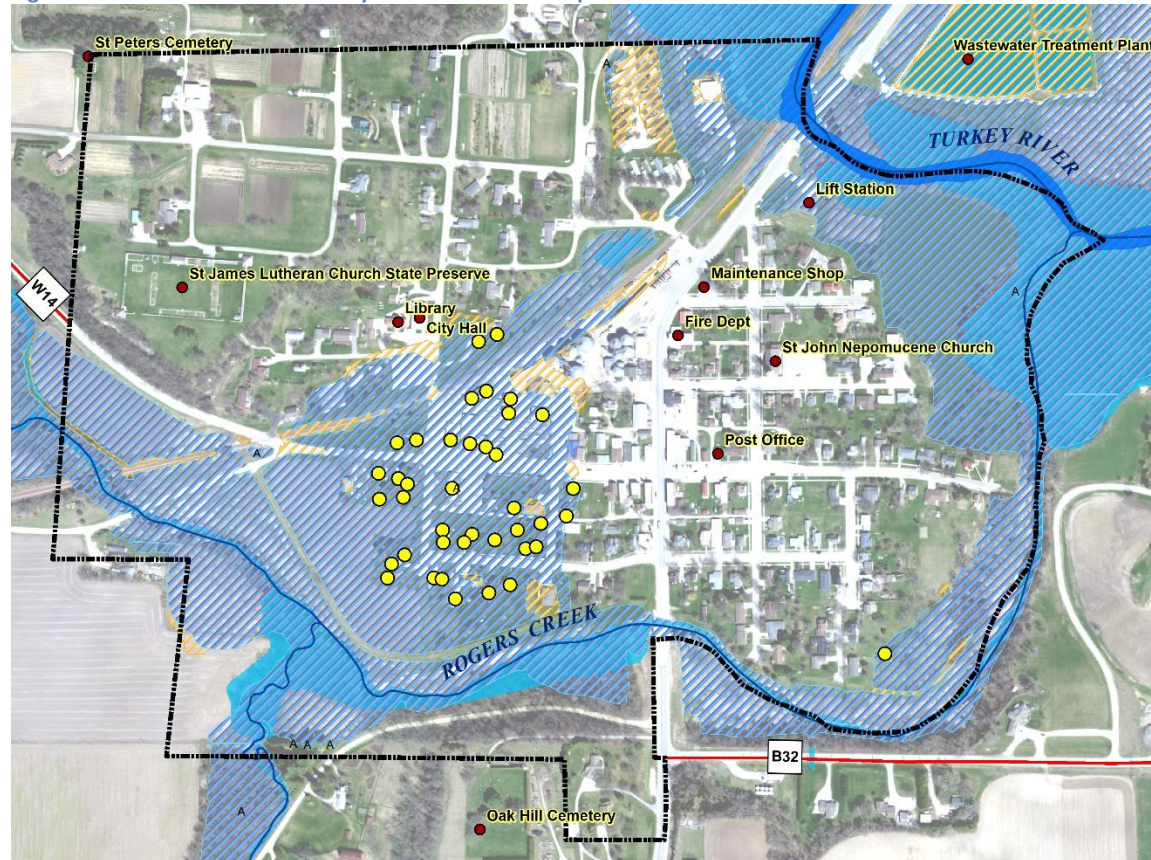
Flooding is an urgent concern for Fort Atkinson. In 2008 and 2016 the City’s lagoon system was flooded. The City is making plans to upgrade the lagoon system by relocating it and building up around it. In addition, the City would like to use the area of the old lagoon as a green space to function as overflow during flooding events, which they anticipate will help protect both the town to the south and the new lagoon system.

Figure 28: Floodplain, City of Fort Atkinson



Source (Figure 28 & 29): (Federal Emergency Management Agency (FEMA), 2019); (UERPC, 2019)

Figure 29: Fort Atkinson Community Facilities & Flood Impacted Structures



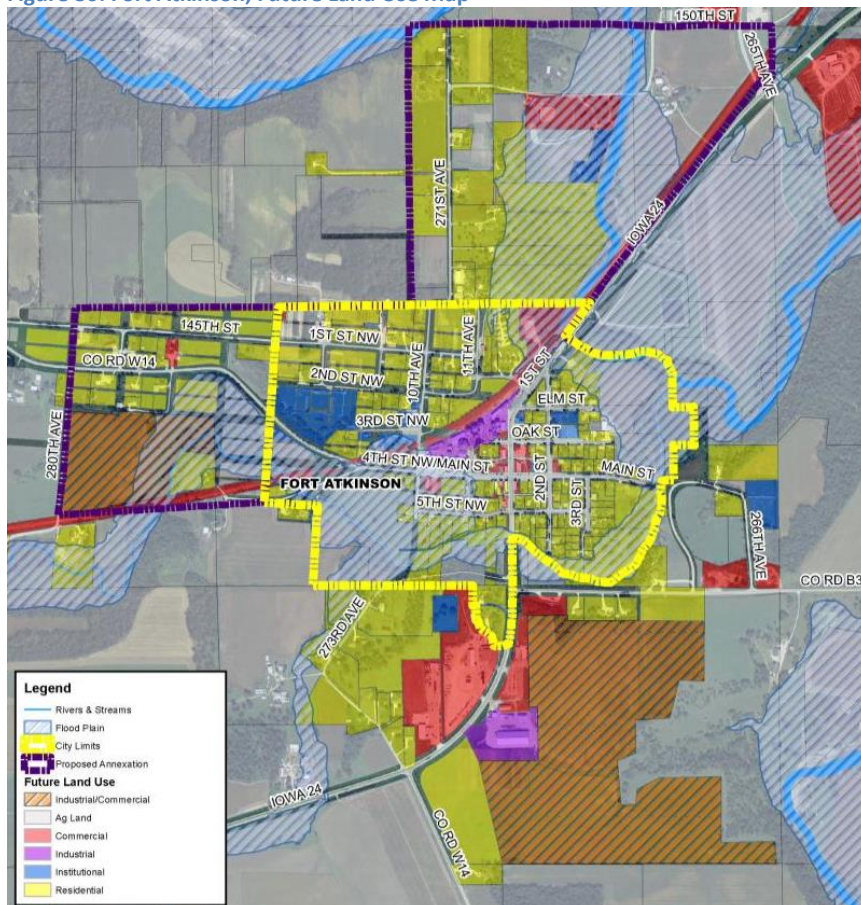
National Flood Insurance Program

The City of Fort Atkinson participates in the National Flood Insurance Program (NFIP) and is considered compliant. The community had an initial Flood Insurance Rate Map (FIRM) identified on August 4, 1987 (which is the current effective map date). As required by the NFIP, the community has adopted a floodplain ordinance. The ordinance meets minimum State of Iowa floodplain regulations (which exceed minimum FEMA regulations). The floodplain administrator is the Mayor. The permitting process by the floodplain administrator includes a determination as to whether proposed floodplain development meets applicable standards of the floodplain ordinance. The floodplain administrator responsibilities and floodplain development permitting process identified in the floodplain ordinance will be implemented by the community in moving ahead to maintain compliance with the NFIP. The City is not required to undergo Community Assistance Visits (CAVs) and has no repetitive loss properties.

Changes in Development/Future Land Use

The 2000 Census recorded a population of 389 for Fort Atkinson, and the 2010 Census recorded a slight decrease in population to 349. The 2000 Census recorded 165 households in Fort Atkinson, and the 2010 Census recorded a slight decrease in households to 160. City boundaries have not changed since the 2015 county hazard mitigation plan. The 2012 Winneshiek County Comprehensive Plan includes a Future Land Use Map (see Figure 30). Possible annexation areas contain floodplain areas and a variety of land uses, however the City has no significant annexation or new development planned at this time.

Figure 30: Fort Atkinson, Future Land Use Map



(Upper Explorerland Regional Planning Commission, 2012)

Governance, Facilities and Services

The governing body includes one mayor and five council members. Key city employees include:

- City Clerk/Treasurer
- Public Works Director
- Library Director
- Fire Chief

Commissions and Boards include:

- Library Trustees
- Historical Preservation Commission

Law enforcement for the community is provided by the Winneshiek County Sheriff's office.

The Fort Atkinson Fire Department consists of approximately 18 volunteer members and is funded by the City of Fort Atkinson along with township trustees in the department's service area. The Fort Atkinson Fire Department serves the communities of Fort Atkinson, along with most of Washington Township and sections of Jackson, Sumner and Calmar Townships.

The South Winn First Responders operate out of the Fort Atkinson Fire Station and have about 15 trained volunteers able to respond to any trauma or medical emergency. The South Winn Responders are a collaboration of the communities of Calmar, Fort Atkinson and Spillville. The group consists of Emergency Medical Responders (EMRs), Emergency Medical Technicians (EMTs) and Paramedics.

The City of Fort Atkinson is located in the Turkey Valley School District. Fort Atkinson children attend the school campus located in the nearby community of Jackson Junction. There are no district buildings in Fort Atkinson

Technical Resources

Winneshiek County Emergency Management provides technical resources and services to the City of Fort Atkinson and its emergency responders. The City has two outdoor warning sirens, one of which is automatically activated by the county's 911 dispatch center and the second of which is manually activated from the fire station. Winneshiek County contracts with the Northeast Iowa Response Group (NIRG), a specialized HAZMAT Team from the Waterloo Fire Department, to provide technician-level incident response throughout the county.

Existing Plans and Policies

The City of Fort Atkinson utilizes a City Code, several ordinances including a floodplain ordinance to control land use, direct decision-makers and protect the quality of life for its residents. The City is part of the Winneshiek County Comprehensive Plan 2012 which outlines goals, strategies and actions for future growth and development. Fort Atkinson utilizes the Winneshiek County Emergency Operations Plan and the Winneshiek County Recovery Plan. All City Response Personnel follow appropriate protocol and guidance.

Key Issues

- River Floods – The Turkey River runs north of town, and Rogers Creek runs south of town, so that a significant portion of the community is in the 100 year floodplain. The city’s lift station was impacted by flooding in recent years and the city has attempted to mitigate this. Also, the city will be looking at relocation and upgrades to the lagoon system that will create green space and flood overflow area, and help mitigate flooding from the Turkey River.
- Levee Failure – a concern where levees exist, the city inspects regularly
- Dam Failure – city leaders expressed concern about the dam at Lake Meyer; should it fail water may wash through the community.

Mitigation Activities

Status and Progress on Previous Mitigation Actions

1. Purchase and install power supply transfer switches
 - Completed
2. Upgrades to water and wastewater treatment infrastructure
 - Ongoing. Lagoon project needed through 2021, and possible new water projects as well.
3. Continue to maintain city warning system
 - Ongoing, but removed as mitigation action because not action-oriented.
4. Purchase and manage flood mitigation equipment
 - Completed and ongoing. Got portable generator and have access to county pump. Will continue purchase and manage additional flood mitigation equipment.
5. Create and maintain a communication system along the Turkey River Corridor
 - Completed and ongoing. The city continues to give funding towards a gauge system along the Turkey River.
6. Continue to take actions that contain the river and creek within designated boundaries
 - Completed and ongoing. Added rip rap in areas. Still need railroad’s assistance in cleaning up vegetation adjacent to the railroad.
7. Construct FEMA-compliant storm shelter/safe room
 - Not completed. No longer a priority – will not be able to address in next 5 years.
8. Maintain membership in NFIP
 - Completed and ongoing.

Mitigation Actions to Pursue Through MJ-9 Implementation:

- Flood reduction practices: Floodplain restoration and streambank stabilization:
 - Take actions that contain the river and creek within designated boundaries (including getting railroad’s assistance in cleaning up vegetation along rail)
- Flood reduction practices: Watershed and flood prevention planning & initiatives:
 - Continue participation in Turkey River Watershed Management Authority & related planning.
- Flood reduction practices: Increase infiltration/Green infrastructure:
 - Consider opportunities for implementing community project ideas for stormwater management/flood mitigation listed in Figure 6.G.1 of the Turkey River Watershed Mgt.

Authority Flood Reduction Plan: 1) Rain barrel program, 2) Permeable pavers, 3) Native turf/native grasses, 4) Bio-swales, 5) Bank stabilization/stream meander

- Maintain/improve flood mitigation equipment:
 - Purchase and manage flood mitigation equipment
 - Maintain a communication system along the Turkey River Corridor (continue payment for gauges)
- NFIP participation/consideration:
 - Maintain membership in NFIP. Update floodplain regulations to continue to meet or exceed minimum State of Iowa regulations. Maintain work of floodplain administrator as identified in floodplain regulations.
- Improved/upgraded water/sewer/storm sewer facilities:
 - New lagoon project through 2021, which will be designed to mitigate flooding issues around the community. The city will build a waterway alongside the new lagoon to bypass flood water away from the town.
 - New well and/or pump house

Other Local Mitigation Efforts:

- The Fort Atkinson Community Center is a community shelter location.
- There is a generator located at the lift station.
- The city elevated land around the current lift station to help mitigate flooding.

City of Jackson Junction

History and Overview

Jackson Junction is located in Jackson Township. The first settler and recorded taxpayer in the township was Joseph Spielman, or Spillman, who arrived in the area in 1851 and was namesake for the community of Spillville. A station called Jackson Station was established in the Township by the railroad in 1881 (Alexander, 1882). The community of Jackson Junction was incorporated in 1897. (Iowa Secretary of State, 2012)

Jackson Junction is located in southwestern corner Winneshiek County on Highway 24. The total land area of city limits is 5.991 square miles and is laid out as shown in Figure 31. The 2010 Census count for the City of Jackson Junction is 58, and the Census 2018 Annual Estimate was 54.

Figure 31: Jackson Junction Street Map

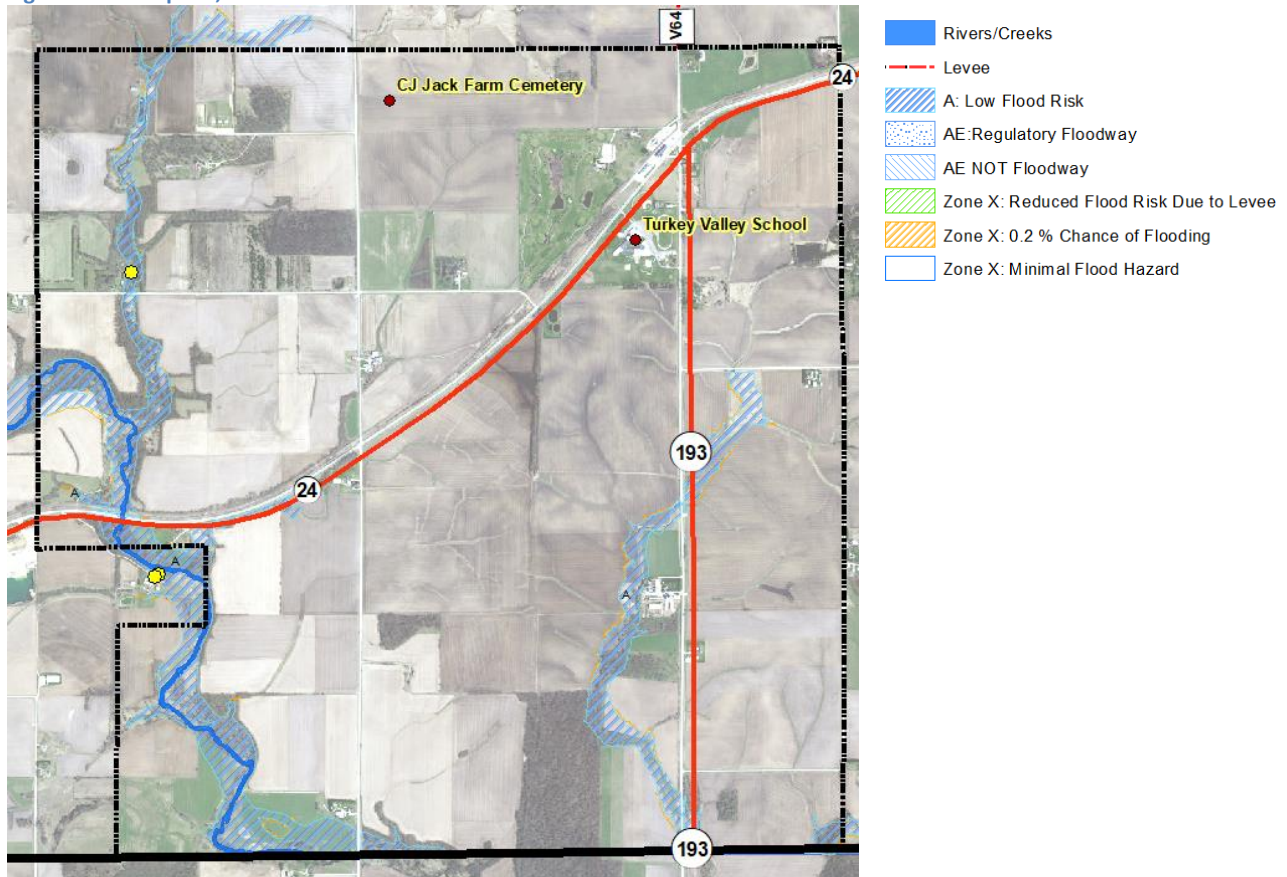


Source: (Iowa Department of Transportation, n.d.)

Environment

The City has many areas prone to flooding, but generally away from structures. Most significant impacts are from flash flooding, and occur around local roads, bridges and culverts. Figure 32 illustrates the 100-year floodplain area in Jackson Junction (from FEMA's 2019 Preliminary Flood Insurance Rate Map (FIRM)) in relation to the location of community facilities and services. The map also identifies any structures impacted by the 100-year floodplain. No community facilities fall in the 100-year floodplain, and there is only one flood impacted structure in city limits, which is agricultural (Winneshiek County, GIS Coordinator. (2019))

Figure 32: Floodplain, Jackson Junction



National Flood Insurance Program

The City of Jackson Junction does not participate in the National Flood Insurance Program (NFIP) but flood hazard areas have been mapped by FEMA. The current effective map date of the City's Flood Insurance Rate Map (FIRM) is June 25th, 1976. The City is not required to undergo Community Assistance Visits (CAVs).

Changes in Development/Future Land Use

The 2000 Census recorded a population of 60 for Jackson Junction, and the 2010 Census recorded a slight decrease in population to 58. The 2000 Census recorded 24 households in Jackson Junction, and the 2010 Census recorded a slight decrease in households to 21. City boundaries have not shifted since the 2015 county hazard mitigation plan and are not anticipated to change in the near future. The city does not have a future land use map and is not anticipating growth in the next five years.

Governance, Facilities and Services

The governing body includes one mayor and five council members. Key city employees include:

- City Clerk/Treasurer

Law enforcement for the community is provided by the Winneshiek County Sheriff's office.

The Waucoma Fire Department provides service to the City of Jackson Junction. There are a few first responders who live in the Jackson Junction area and ambulance services are provided by the Winneshiek Medical Center.

Jackson Junction is home to the Turkey Valley Community School District which covers an area of approximately 170 square miles in the southwestern corner of the county. The district includes the incorporated communities of Jackson Junction and Fort Atkinson. The campus is laid out with an elementary school and a middle/high school all in one location in Jackson Junction and shares the same hazard risks. The campus has a weather radio and maintains an emergency plan and crisis plan. The crisis team is led by Rhonda Drilling. The school has an emergency warning system as part of their bell system for fire and announcements for fire or tornado, fire extinguishers throughout the building, regular intruder drills, bus and site evacuation drills, mock disasters, 2-way radios, and has automated security doors and cameras at entrances. All rooms, the office and bus barn have emergency information and response kits. Staff members undergo regular school safety training, including shelter in place and stop the bleed training.

The Turkey Valley school no longer has underground fuel tanks. They now use above ground LP.

Technical Resources

Winneshiek County Emergency Management provides technical resources and services to the City of Jackson Junction and its emergency responders. The community has an outdoor warning siren that is automatically activated by the county's 911 dispatch center. Winneshiek County contracts with the Northeast Iowa Response Group (NIRG), a specialized HAZMAT Team from the Waterloo Fire Department, to provide technician-level incident response throughout the county.

Existing Plans and Policies

The City is part of the Winneshiek County Comprehensive Plan 2012 which outlines goals, strategies and actions for future growth and development. Jackson Junction utilizes the Winneshiek County Emergency Operations Plan and the Winneshiek County Recovery Plan. All City Response Personnel follow appropriate protocol and guidance.

Key Issues

- Hazardous Materials – The highway, railroad and co-op all bring the potential of hazardous material spills to the community and school district; ethanol train car derailment is a concern with an increase in that type of transportation through the community
- Transportation Incident - A concern with the highway and railroad. There have been derailments in the past, and rail crossing is especially a concern with regards to school traffic.

Also, snow on the road is an issue on Co. Rd. V64 south of Highway 24 and can impede students getting to the school.

- Severe Winter Storms – treacherous travel, students come from a good distance to the school, strains city budget when frequent and severe
- Infrastructure Failure - related to transportation infrastructure
- Hailstorm – city sits high in elevation; hail and storm hazards can come from all directions
- Tornadoes – athletic fields are out in the open with no shelter.
- Flash Floods – Roads can washout after heavy rains, many roads in town are gravel, and culverts have been impacted. Recently impacted areas include near the Jackson Heights Golf Course (since being converted from farmland), north of Hwy 24 on Co. Rd. V64 and south of 118th St. (flooding issues in 2015), south of Hwy 24 on Co. Rd. V64 (2019 flooding caused washouts – more culverts are needed), and on 118th St. on the west edge of town.
- Terrorism – related to school incidents
- Thunderstorms and Lightning – severe weather concerns – at athletic fields and in farm fields
- River Floods – can cause washouts and damage to roadways
- Windstorms – city sits high in elevation so wind hazards can come from all directions; the roof of the school has been impacted by wind damage in the past

Mitigation Activities

Status and Progress on Previous Mitigation Actions

1. Replace existing fixed generator at Turkey Valley school for compatibility with new boiler system (boiler system is being changed from fuel oil to LP)
 - Completed.
2. Construct a FEMA-compliant storm shelter/safe room
 - Not completed. No longer a priority.
3. Maintain partnerships to ensure swift and effective emergency response to community needs
 - Ongoing, but removed as mitigation action because is emergency response/operational preparedness.
4. Continue to consider joining the National Flood Insurance Program (NFIP)
 - Not completed. No longer a priority.
5. Consider a program to subsidize the purchase of All-Hazards radios for all households and businesses in the community.
 - Completed/not completed. The radios they have, and what can be shared from the county, is sufficient for now. Removed as mitigation action.

Mitigation Actions to Pursue Through MJ-9 Implementation:

- Maintain/improve flood mitigation equipment:
 - New flood mitigation equipment, including sawhorses with flashing lights to put on the road to warn of flooded areas, especially where roads are getting washed out during flooding
- Improved/upgraded water/sewer/storm sewer facilities:

- Add new culverts, and update existing culverts, in central/SW side of city to deal with flash flooding
- Upgrade and improve wastewater treatment/lagoon system (sanitary sewer improvements) for Turkey Valley CSD

Other Local Mitigation Efforts:

- The Jackson Junction community center is a community shelter location. It has a portable generator.
- Upgraded waterways and culverts to decrease flash flooding north of Highway 24 on Co. Rd. V64, and cleaned out and made ditches deeper in areas south of Highway 24
- Removed a fence near Co. Rd. V64 south of Highway 24 to attempt to reduce snow on the road
- The city put in a railroad crossing with a barrier and lights

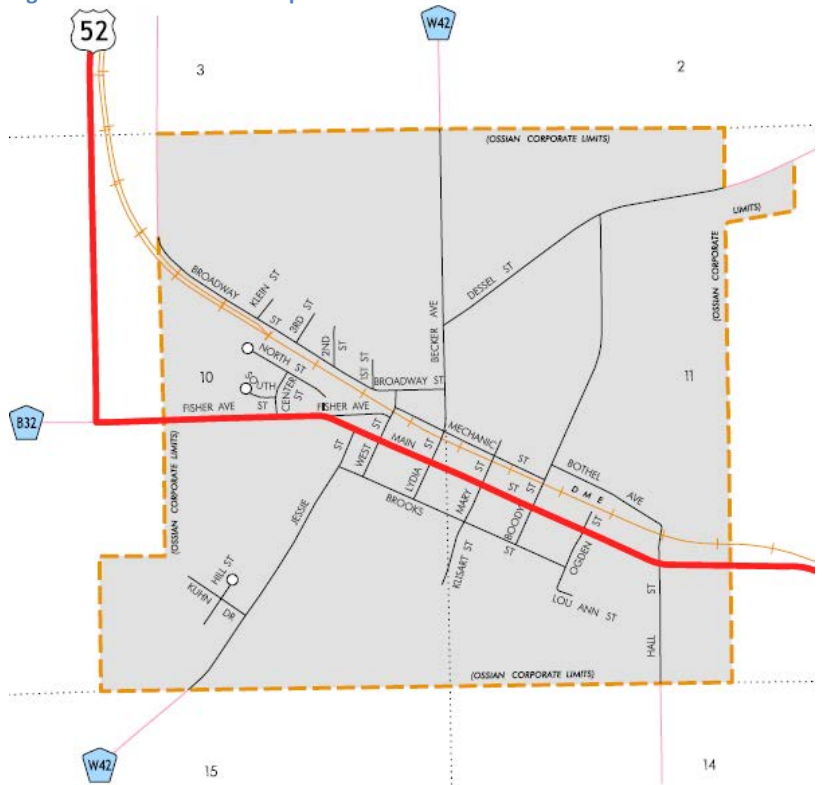
City of Ossian

History and Overview

John Ossian Porter, a native of Pennsylvania, settled the second village in the County, Ossian, in 1850. The village was incorporated in 1876. In 1865, the railroad was constructed through town and by 1880, the population had reached 444. At this time, the thriving community had one bank, a hotel, two churches, a public school, a creamery and two newspapers. (Alexander, 1882)

Ossian is located in southeast Winneshiek County along US Highway 52. The total land area of within the city limits is 1.11 square miles and is laid out as shown in Figure 33. The 2010 Census count for the City of Ossian is 845, and the Census 2018 Annual Estimate for the community was 782.

Figure 33: Ossian Street Map



Source: (Iowa Department of Transportation, n.d.)

Environment

Only a small portion in the northeastern section of the community lies within any floodplain and it is well beyond any structures. None of the school buildings are located in or near the floodplain area. Figure 34 illustrates the floodplain in the community, as well as key community facilities.

Figure 34: Floodplain, City of Ossian



Source: (Federal Emergency Management Agency (FEMA), 2019)

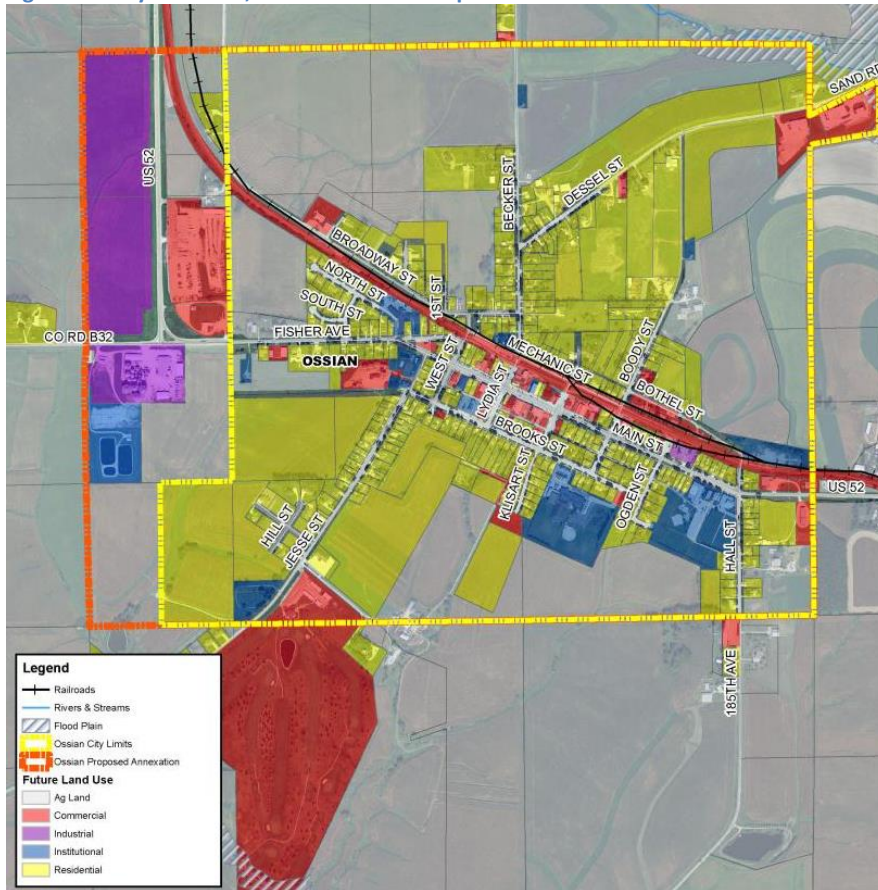
National Flood Insurance Program

FEMA has not completed a study to determine flood hazard in Ossian, and the City of Ossian is not listed in FEMA's Community Status Book Report (Federal Emergency Management Agency, 2019). The community does not participate in the National Flood Insurance Program (NFIP) and has no repetitive loss properties. The City does not undergo Community Assistance Visits (CAVs).

Changes in Development/Future Land Use

The 2000 Census recorded a population of 853 for Ossian, and the 2010 Census recorded a slight decrease in population to 845. The 2000 Census recorded 330 households in Ossian, and the 2010 Census recorded a slight increase in households to 339. City boundaries have not changed since the 2015 county hazard mitigation plan. The Winneshiek County 2012 Comprehensive Plan includes a Future Land Use Map (see Figure 35). Recent residential development and proposed future land uses are not located in floodplain areas. Any further feedback the city had regarding the impacts of hazards to specific locations or development in the community is further addressed in Key Issues.

Figure 35: City of Ossian, Future Land Use Map



(Upper Explorerland Regional Planning Commission, 2012)

Governance, Facilities and Services

The governing body includes one mayor and five council members. City employees include:

- City Clerk/Treasurer
- Public Works Assistant
- Water/Wastewater Superintendent
- Library Director

Law enforcement for the community is provided by the Calmar Police Department and assisted by the Winneshiek County Sheriff's Office.

The City of Ossian is served by the Tri-Township Fire Department housed in Ossian. The Department consists of approximately 30 volunteer members and is funded by the City of Ossian along with township trustees in the department's service area. The Tri-Township Fire Department serves the communities of Ossian, Military and Springfield Townships and a portion of Dover Township.

Ossian has a volunteer ambulance service with EMTs to respond to medical emergencies.

The City of Ossian is located in the South Winneshiek Community School District. The early childhood program, elementary school and middle school are located in Ossian. The school maintains an emergency plan, capital plan and crisis plan. South Winn works to reduce the impact of hazards by having a weather radio, tornado and fire drills, emergency contact information in all classrooms and

office, emergency response kits in classrooms, regular Run, Hide, Fight staff training on lockdowns/intruders, locked outside doors/security cameras and a security system to enter building.

The St. Teresa of Calcutta Catholic School is also located in Ossian and enrolls children grades pre-K through 2, and 5 - 8. St. Teresa has a storm shelter in the basement for students and staff, fire alarms and on call system, a fire suppression system in the kitchen, regular tornado and fire drills, lockdown and evacuation plans, and Run, Hide, Fight training for all school staff. St. Teresa maintains an Emergency Operations Plan.

Technical Resources

Winneshiek County Emergency Management provides technical resources and services to the City of Ossian and its emergency responders. The City has an outdoor warning system that is automatically activated by the County's 911 dispatch center. Winneshiek County contracts with the Northeast Iowa Response Group (NIRG), a specialized HAZMAT Team from the Waterloo Fire Department, to provide technician-level incident response throughout the county.

Existing Plans and Policies

The City of Ossian utilizes a City Code and various ordinances to control land use, direct decision-makers and protect the quality of life for its residents, including a subdivision ordinance, tree trimming ordinance, nuisance ordinance, site plan requirements, restricted residence district, and building and land use regulations. The City is part of the Winneshiek County Comprehensive Plan adopted in 2012 which outlines goals, strategies and actions for future growth and development. Ossian utilizes the Winneshiek County Emergency Operations Plan and the Winneshiek County Recovery Plan. All City Response Personnel follow appropriate protocol and guidance.

Key Issues

- Hazardous Materials – related to the train traffic and semi traffic through the middle of town, the cargo through town is becoming increasingly more volatile which worries city leaders and community members
- Windstorms – potentially damaging, unavoidable
- Tornadoes - located on flat terrain with little protection, tornadoes can spring up easily and unpredictably
- Transportation Incident – heavy truck and train traffic through town and many children crossing highways to get to schools and parks
- Terrorism – related to active shooting incidents that have occurred during the school day, domestic violence
- Severe Winter Storms – treacherous travel, students come from a good distance to the school, strains city budget when frequent and severe
- Hailstorm - potentially damaging, unavoidable
- Flash Floods – a problem in some areas of the community, poor drainage has caused wet basements
- Droughts – could impact the ag. economy

Mitigation Activities

Status and Progress on Previous Mitigation Actions

1. Purchase portable generator for lift stations
 - Ongoing. Will be completed once all stations are wired for generators.
2. Purchase generator for community center
 - Completed and ongoing. The city wired the community center for a generator, and now have to purchase the generator.
3. Continue to wire lift stations for generator
 - Completed and ongoing. The city already wired 3 out of 7 stations, will need to wire the last 4, and then will purchase the generator(s)
4. Pursue crossing arms or signals for rail crossings on Hall, West and Lydia streets
 - Completed and ongoing. Lydia Street has signals now. The city is still working on Hall and West Streets.
5. Encourage and educate residents to utilize “all-hazards” radios
 - Ongoing.
6. Construct FEMA-compliant storm shelter/safe room
 - Not completed. The city would still like to work on this.

Mitigation Actions to Pursue Through MJ-9 Implementation:

- Expand/improve communications/technology infrastructure and equipment:
 - Encourage and educate residents to utilize “all-hazards” radios
- Improvements to transportation safety and response:
 - Pursue crossing arms or signals for rail crossings on Hall and West streets
- Generators/Transfer Switches:
 - Continue to wire last four remaining lift stations for portable generator and then purchase the generator(s)
 - Purchase generator for community center
 - Purchase generator for South Winneshiek Elementary & Middle School to continue operations during disasters & support Ossian Senior Hospices if need be
- Storm shelter – FEMA compliant safe room:
 - Construct shelter/safe room or retrofit Community Center safe room to meet FEMA standards

Other Local Mitigation Efforts:

- Community center building is a community shelter location, along with the maintenance shop/fire station if needed
- There is a generator at the water treatment facility

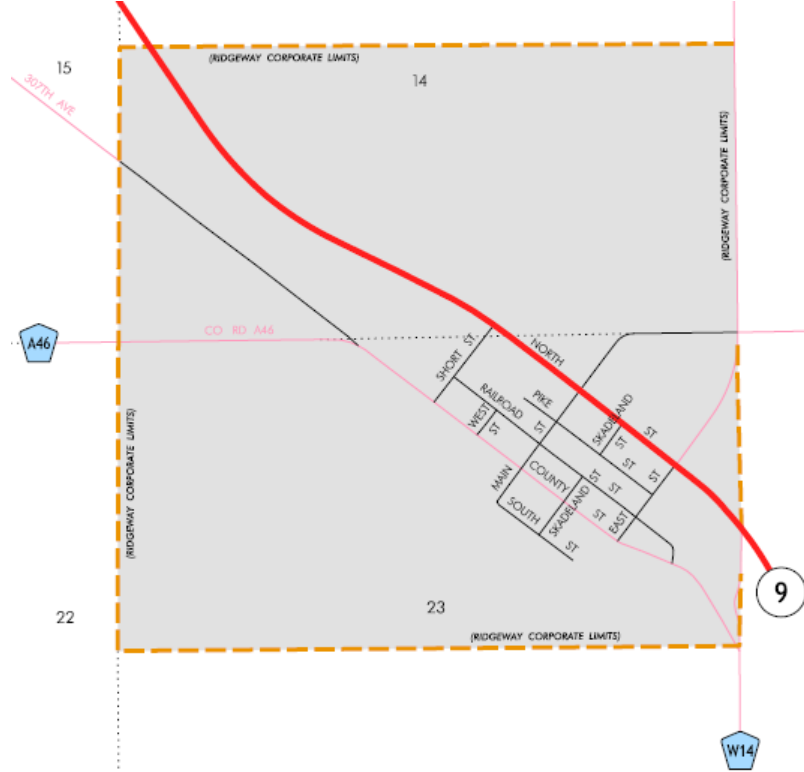
City of Ridgeway

History and Overview

The first settlement in what later became Ridgeway was in the spring of 1852. In 1857, the Chicago, Milwaukee and St. Paul Railroad built a small depot in Ridgeway and in 1866, a house. After a road was completed to Cresco more development began. In 1867, a grain warehouse, drug store, general store and post office were constructed. The community took a devastating blow on May 9, 1874, when the village of Ridgeway was swept by a fire that destroyed 34 of 89 existing buildings. Immediately a new depot was constructed and the rest of the town soon followed to recover quickly (Alexander, 1882). The City was incorporated on March 15, 1894.

Ridgeway is located in western Winneshiek County on Highway 9 between Decorah and Cresco. The total land area of city limits is 1.02 square miles and is laid out as shown in Figure 36. The 2010 Census count for the City of Ridgeway is 315, and the Census 2018 Annual Estimate for the community was 287.

Figure 36: Ridgeway Street Map

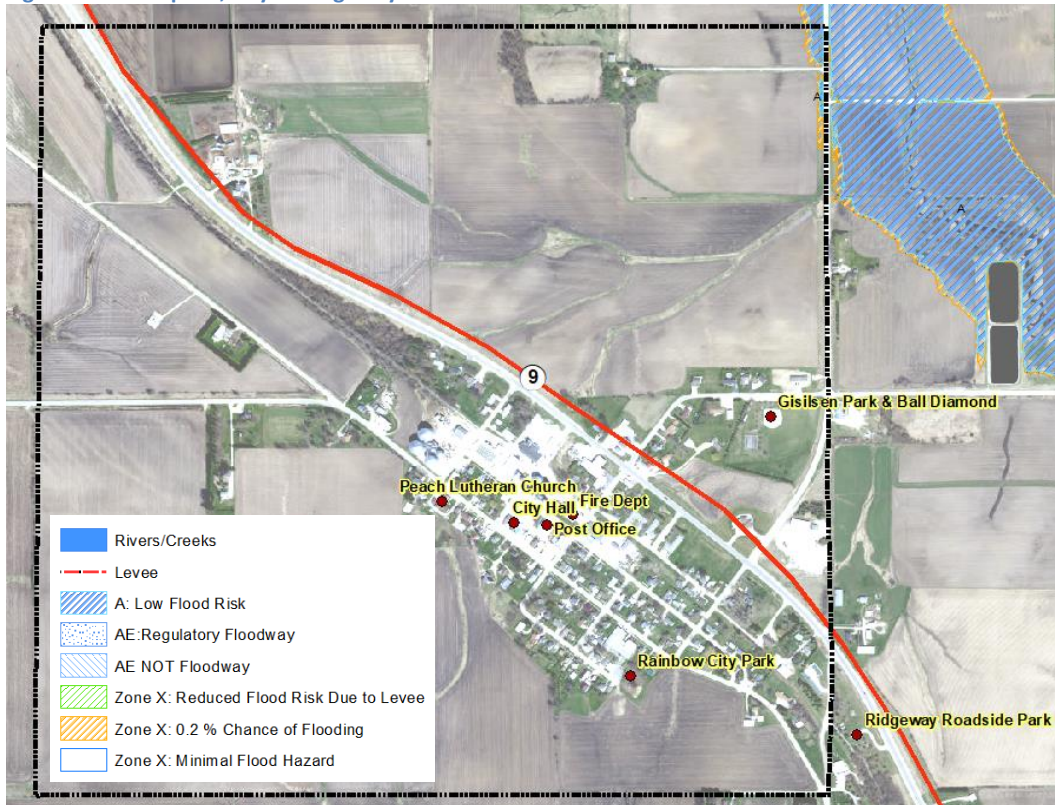


Source: (Iowa Department of Transportation, n.d.)

Environment

Figure 37 identifies the 100 Yr. floodplain based on the 2019 FEMA Preliminary Flood Insurance Rate Maps (FIRMS), as well as the location of key community facilities in Ridgeway. Only a sliver of the northeast corner of the community falls within the floodplain; no structures are impacted.

Figure 37: Floodplain, City of Ridgeway



Source: (Federal Emergency Management Agency (FEMA), 2019)

National Flood Insurance Program

FEMA has not completed a study to determine flood hazard in Ridgeway, and the City of Ridgeway is not listed in FEMA's Community Status Book Report (Federal Emergency Management Agency, 2019). The community does not participate in the National Flood Insurance Program (NFIP) and has no repetitive loss properties. The City does not undergo Community Assistance Visits (CAVs).

Changes in Development/Future Land Use

The 2000 Census recorded a population of 293 for Ridgeway, and the 2010 Census recorded a slight increase in population to 315. The 2000 Census recorded 124 households in Ridgeway, and the 2010 Census recorded a slight increase in households to 138. City boundaries have not changed since the 2015 county hazard mitigation plan. The Winneshiek County 2012 Comprehensive Plan includes a Future Land Use Map (see Figure 38). A small area of proposed future residential land use in the northeast corner of the City is located where FEMA's 2019 preliminary FIRM shows floodplain area, but the city has no plans for development so structures are not anticipated to be impacted.

Figure 38: City of Ridgeway, Future Land Use Map



(Upper Explorerland Regional Planning Commission, 2012)

Governance, Facilities and Services

The governing body includes one mayor and five council members. City employees include:

- City Clerk/Treasurer
- City Maintenance

Law enforcement is provided to the community by the Winneshiek County Sheriff's Office.

The Ridgeway Fire Department consists of approximately 24 volunteer members and is funded by the City of Ridgeway along with township trustees in the department's service area. The Ridgeway Fire Station is located on Main Street and serves the community and most of Lincoln Township along with sections in Sumner, Madison and Bluffton Townships.

There are four first responders who live in the Ridgeway area and ambulance services are provided by the Winneshiek Medical Center.

The City of Ridgeway is located in the Howard-Winneshiek Community School District. Ridgeway children attend the campus in Cresco. Many families have chosen to open enroll their children in the Decorah Community School District, but bus service is not provided to the community.

Technical Resources

Winneshiek County Emergency Management provides technical resources and services to the City of Ridgeway and its emergency responders. The City has an outdoor warning system that is automatically activated by the County's 911 dispatch center. Winneshiek County contracts with the Northeast Iowa Response Group (NIRG), a specialized HAZMAT Team from the Waterloo Fire Department, to provide technician-level incident response throughout the county.

Existing Plans and Policies

The City of Ridgeway utilizes a City Code (including tree trimming and nuisance ordinances), subdivision and zoning ordinances, stormwater and drainage ordinances, and site plan review requirements to control land use, direct decision-makers and protect the quality of life for its residents. The City is part of the Winneshiek County Comprehensive Plan adopted in 2012 which outlines goals, strategies and actions for future growth and development. Ridgeway utilizes the Winneshiek County Emergency Operations Plan and the Winneshiek County Recovery Plan. All City Response Personnel follow appropriate protocol and guidance.

Key Issues

- Windstorms – unpredictable, potentially damaging weather event (and specific concerns around susceptibility of ball field area and of multi-family housing development in town)
- Thunderstorms and Lightning – unpredictable, potentially dangerous weather event (and specific concerns around susceptibility of ball field area)
- Hailstorm – unpredictable, potentially damaging weather event (and specific concerns around susceptibility of ball field area)
- Tornadoes – unpredictable, potentially dangerous weather event (and specific concerns around susceptibility of ball field area and of multi-family housing development in town)
- Hazardous Materials – with co-op and highway in town, more hazardous materials in the area; there is concern around anhydrous ammonia tanks (the largest tank at the co-op is within 100 ft. of Highway 9)
- Infrastructure Failure – city sewer and storm water system are a concern; a new lagoon will need to be added by 2024, and will likely be the next large project for the City

Mitigation Activities

Status and Progress on Previous Mitigation Actions

1. Purchase and install a fixed generator for the water tower and a portable or fixed generator for the community center
 - Completed, purchase and install fixed generator for water tower.
 - Ongoing, purchase and install portable or fixed generator for community center.
2. Construct a FEMA-Compliant storm shelter/tornado safe room for residents
 - Not completed, ongoing. The city will focus on constructing a shelter/safe room for the apartment complex and ball fields.
3. Develop safe pedestrian and bicycle routes/crossings and provide information to residents about their locations and proper use

- Completed, for trail alone. Installed signage and pavement markings for regional trail.
4. Continue to improve and maintain emergency response capabilities – in training and equipment
- Ongoing, but removed as mitigation action because is emergency response/operational preparedness.

Mitigation Actions to Pursue Through MJ-9 Implementation:

- Generators/Transfer Switches:
 - Purchase and install a portable or fixed generator for the community center (city hall)
- Improved/upgraded water/sewer/storm sewer facilities:
 - Complete necessary lagoon expansion for wastewater treatment infrastructure
- Storm shelter – FEMA compliant safe room:
 - Construct a shelter/safe room for the apartment complex and ball fields

Other Local Mitigation Efforts:

- City hall is a community shelter location, along with the fire station
- Fire trucks have a portable generator, and there is a fixed generator at the city maintenance shop
- The oldest part of the of the City’s water system was just updated in 2019 (pipes and hydrants)

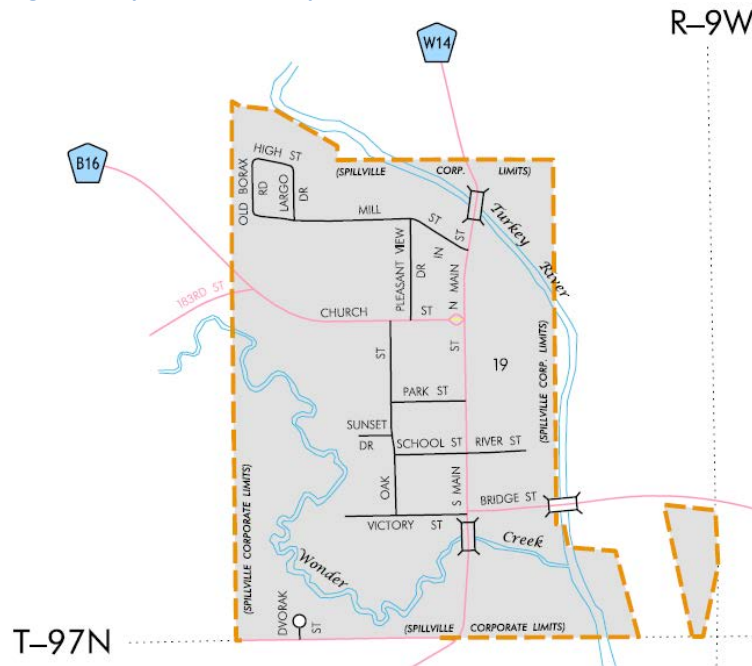
City of Spillville

History and Overview

The village of Spillville was first settled in 1851 by Joseph Spielman, or Spillman. Mr. Spielman platted the village in 1860 and operated a mill which had become the Spillville Mill Co. by 1882. The community was a refuge for Czech immigrants and has developed a strong Czech heritage. By 1860, St. Wenceslaus Catholic Church was completed and is now the oldest Czech Catholic church in the United States. A pipe organ was installed in 1876 and remains to this day. Famous Czech composer Antonin Dvorak played the organ while spending a summer in the community in 1893. Spillville was incorporated on December 5, 1894. (Alexander, 1882); (City of Spillville, n.d.)

Spillville is located in southwest Winneshiek County at the intersections of County Roads W14 and B16. The total land area of within the city limits is .42 square miles and is laid out as shown in Figure 39. The 2010 Census count for the City of Spillville is 367, and the Census 2018 Annual Estimate for the community was 347.

Figure 39: Spillville Street Map



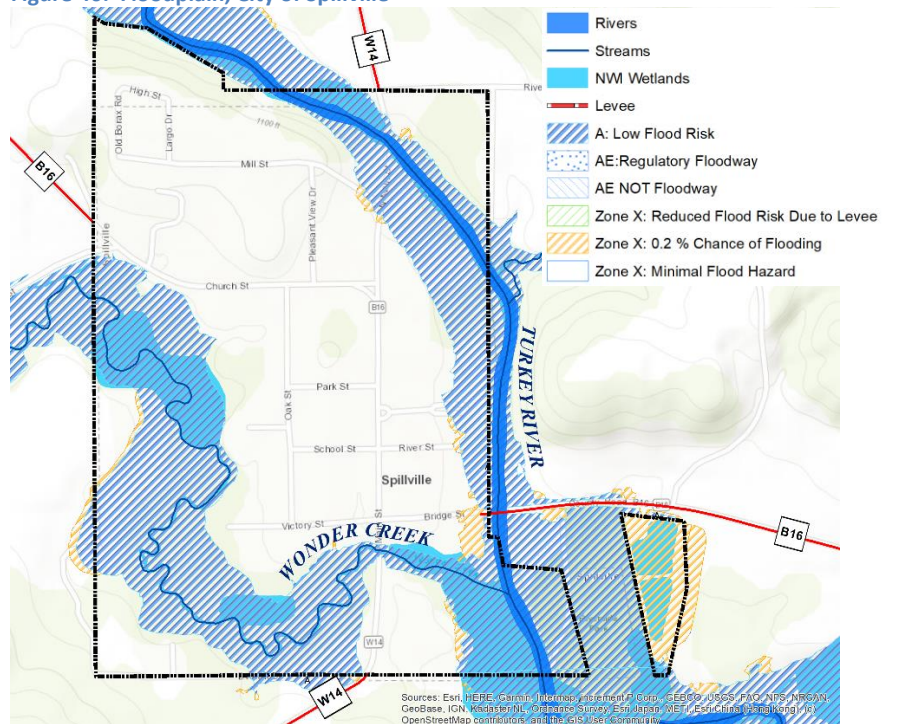
Source: (Iowa Department of Transportation, n.d.)

Environment

The City has many areas prone to flooding and has a floodplain ordinance in effect. Figure 40 illustrates the 100 year floodplain area in Spillville, from FEMA’s 2019 Preliminary Flood Insurance Rate Map (FIRM), and Figure 41 illustrates the location of community facilities and services in relation to the 100 year floodplain, as well as identifying any structures impacted by the floodplain. The City’s lift station falls within the 100 year floodplain, but the City has raised the land around the lift station to mitigate flooding. No other community facilities fall in the 100-year floodplain. Overall 40 structures within City limits are located in the 100 year floodplain, including a variety of agricultural, residential,

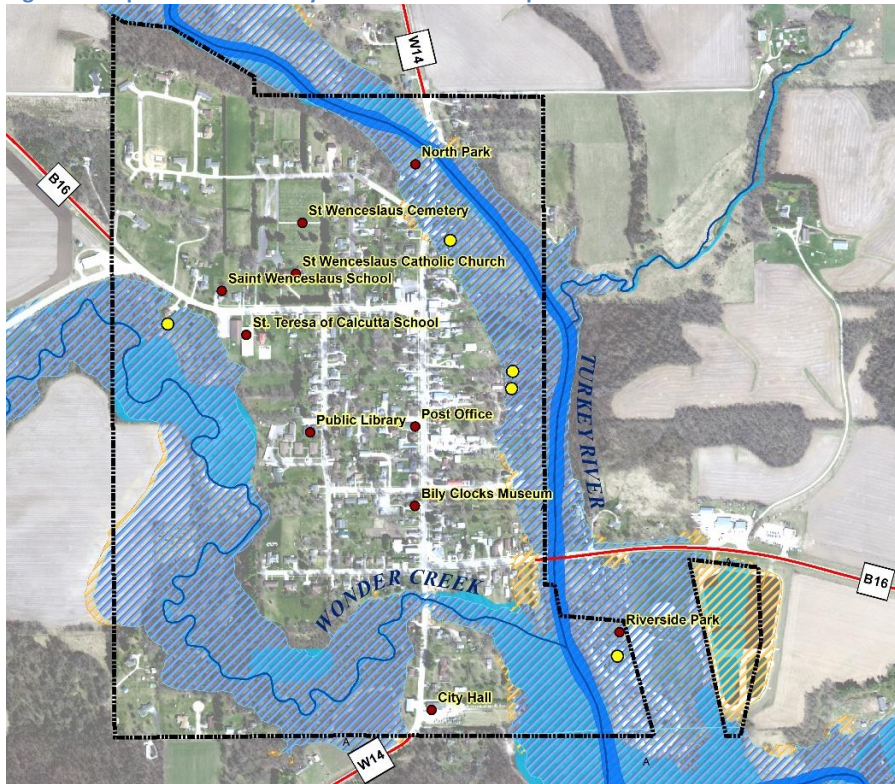
commercial and other general structures (e.g. garage/sheds, etc.) (Winneshek County, GIS Coordinator. (2019))

Figure 40: Floodplain, City of Spillville



Source (Figure 40 & 41): (Federal Emergency Management Agency (FEMA), 2019); (UERPC, 2019)

Figure 41: Spillville Community Facilities & Flood Impacted Structures



National Flood Insurance Program

The City of Spillville participates in the National Flood Insurance Program (NFIP) and is considered compliant. The community had an initial Flood Insurance Rate Map (FIRM) identified on October 29, 1976 (which is the current effective map date), and an Emergency Program date of September 3, 2010. As required by the NFIP, the community has adopted a floodplain ordinance. The ordinance meets minimum State of Iowa floodplain regulations (which exceed minimum FEMA regulations). The floodplain administrator is the Mayor. The permitting process by the floodplain administrator includes a determination as to whether proposed floodplain development meets applicable standards of the floodplain ordinance. The floodplain administrator responsibilities and floodplain development permitting process identified in the floodplain ordinance will be implemented by the community in moving ahead to maintain compliance with the NFIP. The City is not required to undergo Community Assistance Visits (CAVs) and has no repetitive loss properties.

Changes in Development/Future Land Use

The 2000 Census recorded a population of 386 for Spillville, and the 2010 Census recorded a slight decrease in population to 376. The 2000 Census recorded 172 households in Spillville, and the 2010 Census recorded a slight decrease in households to 168. City boundaries have not changed since the 2015 county hazard mitigation plan. The 2012 Winneshiek County Comprehensive Plan includes a Future Land Use Map (see Figure 42). The City has discussed annexing properties across from Riverside Park, north of B16, which is largely out of the floodplain. There are no other immediate plans for development.

Figure 42: City of Spillville, Future Land Use Map



(Upper Explorerland Regional Planning Commission, 2012)

Governance, Facilities and Services

The governing body includes one mayor and five council members. Key city employees include:

- City Clerk/Treasurer
- Public Works Director
- Library Director

Commissions and Boards include:

- Library Trustees
- Senior Housing Board
- Planning and Zoning

Law enforcement for the community is provided by the Winneshiek County Sheriff's office.

The Calmar Fire Department provides firefighting services to the community.

The South Winn First Responders operate out of the Calmar Fire Station and have about 15 trained volunteers able to respond to any trauma or medical emergency. The South Winn Responders are a collaboration of the communities of Calmar, Fort Atkinson and Spillville. The group consists of Emergency Medical Responders (EMRs), Emergency Medical Technicians (EMTs) and Paramedics. Ambulance service is provided by the Winneshiek Medical Center.

The City of Spillville is located in the South Winneshiek School District. Spillville children either attend the school campus located in Calmar or Ossian, depending on grade level. The St. Teresa of Calcutta Catholic School has its grade K-3 campus in Spillville and shares the same hazard risk as the community. St. Teresa maintains an emergency plan and crisis plan. The building has a weather radio, and emergency warning system and siren, a fire suppression system in the kitchen and emergency information binders and response kits in each classroom. The school conducts regular evacuation and tornado drills, and staff members are provided regular school safety training.

Technical Resources

Winneshiek County Emergency Management provides technical resources and services to the City of Spillville and its emergency responders. The City has two outdoor warning sirens that are automatically activated by the county's 911 dispatch center. The community has a portable generator, and fixed generators at the water tower and lift station. Winneshiek County contracts with the Northeast Iowa Response Group (NIRG), a specialized HAZMAT Team from the Waterloo Fire Department, to provide technician-level incident response throughout the county.

Existing Plans and Policies

The City of Spillville utilizes a City Code, several ordinances including a floodplain ordinance to control land use, direct decision-makers and protect the quality of life for its residents. The City is part of the 2012 Winneshiek County Comprehensive Plan which outlines goals, strategies and actions for future growth and development. Spillville utilizes the Winneshiek County Emergency Operations Plan and the Winneshiek County Recovery Plan. All City Response Personnel follow appropriate protocol and guidance.

Key Issues

- River Floods – much of the city is in a floodplain, so is a continual issue for community leaders and residents; also concerns regarding flooding upstream/upriver, and timely notification regarding flood conditions
- Flash Floods – heavy rains cause washouts and pooling water in certain locations in town
- Transportation Incident - highway comes through town, traffic doesn't slow down enough for city comfort
- Infrastructure Failure - storm sewer issues during heavy rains and flooding – also protecting the water/sewer system from flood waters; and updating water system in the future
- Tornadoes – unpredictable, potentially dangerous weather event

Mitigation Activities

Status and Progress on Previous Mitigation Actions

1. Purchase and install generators as needed for replacements and new needs
 - Ongoing.
2. Purchase and install power supply transfer switch for the Community Center
 - Ongoing.
3. Obtain responder boat and life jackets
 - Not completed. The city would still like to work on this.

4. Purchase portable flood barriers
 - Not completed. The city would still like to work on this.
5. Continue armoring assets and installing rip-rap along the river
 - Ongoing. Installed some rip-rap. Will continue to add more by north park.
6. Increase the number of gauges within the watershed
 - Ongoing.
7. Monitor and maintain manhole covers to avoid floodwater in the sanitary sewer system
 - Ongoing. Finished some, have more to do.
8. Purchase flood-proof covers for manholes
 - Not completed, ongoing. The city raised some manhole covers instead – they would like to continue to raise more in the future.
9. Maintain membership in NFIP
 - Ongoing.
10. Construct new or improve existing tornado shelter (in library basement) to be FEMA-compliant
 - Ongoing.
11. Improve roadway safety by adding additional speed limit signs and road markings
 - Not completed. No longer a priority.
12. Purchase a portable speed monitor sign
 - Ongoing.
13. Purchase and install warning siren near lagoon, upgrade all warning sirens to battery backup
 - Not completed. The city would still like to work on this.
14. Consider water conservation strategies and programs to prepare and/or react to drought
 - Not completed. No longer a priority.
15. Prepare for probable damage to city trees from the Emerald Ash Borer by setting aside funds for replacement and research Alliant Energy’s tree program
 - Ongoing. Got 200 trees from Dept. of Natural Resources. May continue to address issue.
16. Update existing wells to increase depth in response to falling water table
 - Not completed. No longer a priority.
17. Review water study and implement the recommendations
 - Ongoing.

Mitigation Actions to Pursue Through MJ-9 Implementation:

- Flood reduction practices: Floodplain restoration and streambank stabilization:
 - Address trees and junk causing dam up near Riverside Park
 - Install rip-rap along the river (north park area, etc.)
- Flood reduction practices: Watershed and flood prevention planning & initiatives:
 - Continue participation in Turkey River Watershed Management Authority and related planning.
- Maintain/improve flood mitigation equipment:
 - Purchase portable flood barriers
 - Increase the number of gauges within the watershed
 - Obtain responder boat and life jackets

- Sirens – additions/replacements/upgrades:
 - Purchase and install warning siren near lagoon, upgrade all warning sirens to battery backup
- Improvements to transportation safety and response:
 - Purchase a portable speed monitor sign
- Generators/Transfer Switches:
 - Purchase and install generators as needed for replacements and new needs
 - Purchase and install power supply transfer switch for the Community Center
- NFIP participation/consideration:
 - Maintain membership in NFIP. Update floodplain regulations to continue to meet or exceed minimum State of Iowa regulations. Maintain work of floodplain administrator as identified in floodplain regulations.
- Improved/upgraded water/sewer/storm sewer facilities:
 - Monitor and maintain manhole covers to avoid floodwater in the sanitary sewer system, including raising covers as needed
 - Review water study and update the water supply based on recommendations (including water tower)
- Develop plans to address hazard issues:
 - Continue to prepare for probable damage to city trees from the Emerald Ash Borer by setting aside funds for replacement, researching Alliant Energy’s tree program, etc.
- Storm shelter – FEMA compliant safe room:
 - Construct new or improve existing tornado shelter (in library basement) to be FEMA-compliant

Other Local Mitigation Efforts:

- Library is a community shelter location
- Acquired a pump to be used during flooding
- Raised several manhole covers

Risk Assessment

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The goal of the risk assessment is to estimate the potential loss in the County, including the loss of life, personal injury, property damage, and economic loss from a natural hazard event. The risk assessment process allows the community to better understand their potential risk from natural hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

The risk assessment for the County followed the methodology described in FEMA publication 386-2, Understanding Your Risks: Identifying Hazards and Estimating Losses (2001), which includes a four-step process:

1. Identify Hazards
2. Profile Hazards
3. Inventory Assets
4. Estimate Losses

This section is divided into four parts:

- **Hazard Identification** – Identifies the types of natural hazards that threaten the planning area and describes why some hazards have been omitted from further consideration.
- **Hazard Profiles** – Describes the location and extent of each natural hazard that can affect the planning area and describes previous occurrences of hazard events and the probability of future occurrences.
- **Vulnerability Assessment** – Assesses the County’s vulnerability to hazards, considering the impact of each identified hazard on the communities’ critical facilities and other identified assets.
- **Repetitive Loss** – Addresses the NFIP insured structures within each jurisdiction that have been repetitively damaged by floods.

Multi-Jurisdictional Risk Assessment

For this county-wide, multi-jurisdictional plan, the risk assessment assesses the entire geographic area of the planning area’s risks. Should the risks deviate for a participating jurisdiction; the location-specific information will be included in each identified hazard’s profile. The participating jurisdictions are all located within Winneshiek County; Winneshiek County is not a large county geographically (690 square miles) and is fairly uniform in terms of climate. Accordingly, overall hazards and vulnerability do not vary greatly across the planning area for most hazards. Weather-related hazards, such as drought, extreme heat, hailstorm, lightning, severe winter storm, tornado, and windstorm affect the entire planning area. Hazards that do vary across the planning area include flooding, dam or levee failure and landslides.

Hazard Identification

Requirement §201.6(c)(2)(i):

[The risk assessment shall include a] description of the type...of all natural hazards that can affect the jurisdictions...

Selection Process

The countywide Hazard Mitigation Planning Committee (HMPC) and other meeting attendees reviewed data and discussed the impacts of the hazards listed alphabetically below:

- Animal/Plant/Crop Disease
- Dam/Levee Failures
- Drought
- Earthquakes
- Expansive Soils
- Extreme Heat
- Flash Floods
- Grass or Wild Land Fire
- Hailstorms
- Hazardous Material Events
- Human Disease
- Infrastructure Failure
- Landslides
- Nuclear/Radiological Accidents
- River Flooding
- Severe Winter Storms
- Sinkholes
- Terrorism
- Thunderstorms and Lightning
- Tornadoes
- Transportation Incident
- Windstorms

Data on the past occurrences, impacts and future probability, and vulnerability for hazards in the planning area was collected from several sources including the following:

- Iowa Hazard Mitigation Plan, September 2010 and 2018
- Information on past extreme weather and climate events from the National Oceanic and Atmospheric Administration’s (NOAA) National Centers for Environmental Information (NCEI)
- Federal Disaster Declarations from the Federal Emergency Management Agency (FEMA)
- USDA Farm Service Agency (FSA) Disaster Declarations
- Various websites, articles and publications (sources are referenced where data is cited)
- County Auditor
- County Assessor
- County GIS data (base layers and assessor’s data)
- Written descriptions of assets and risks provided by the Participating Jurisdictions
- Existing plans and reports
- Personal interviews with HMPC members and other stakeholders

The HMPC eliminated certain hazards from further profiling due to no known history of occurrence in the planning area and/or their impacts were not considered significant in relation to other hazards. Table 17 lists alphabetically the hazards not profiled in the plan and provides the explanation for their omission.

Table 17: Hazards Considered, But Not Profiled in the Plan

Hazard	Explanation for Omission
Avalanche	There are no mountains in the planning area
Coastal Erosion	Planning area is not near coastal areas
Coastal Storm/Tsunami	Planning area is not near coastal areas
Debris Flow	Will be covered through river flooding
Expansive Soils	There are no known expansive soils in the planning area and no known historical occurrences of this hazard
Fires	Will be covered through infrastructure failure
Hurricane/Tropical Cyclones	Planning area is not near coastal areas

Land Subsidence	There are no known subsurface void spaces in the planning area and no known historical occurrences of this hazard
Volcano	There are no volcanic mountains in the planning area

After review of the existing data on the remaining hazards, the HMPC considered and agreed upon the hazards to be included in the county list of identified hazards. Several hazards were consolidated into general categories for the purpose of the risk assessment. The hazards of human disease incident and pandemic human disease were combined into human disease. Fixed hazardous materials incidents, pipeline incidents, and transportation hazardous materials incidents were combined into hazardous material events. Communication failures, massive power or energy failures, structural failures, and structural fires were combined into infrastructure failure. Roadway transportation incidents and railway transportation incidents were combined into transportation incident. Biological terrorism, agricultural terrorism, domestic terrorism and active shooting incidents were combined into terrorism. The following 22 hazards were identified by the HMPC as significant to the planning area. Profiles of each follow.

- Animal/Plant/Crop Disease
- Dam Failures
- Drought
- Earthquakes
- Extreme Heat
- Flash Floods
- Grass or Wild Land Fire
- Hailstorms
- Hazardous Material Events
- Human Disease
- Infrastructure Failure
- Landslides
- Levee Failure
- Nuclear/Radiological Accidents
- River Flooding
- Severe Winter Storms
- Sinkholes
- Terrorism
- Thunderstorms and Lightning
- Tornadoes
- Transportation Incident
- Windstorms

The State of Iowa Hazard Mitigation Plan covers all natural and human caused/comboination hazards identified for the State of Iowa. Accordingly, the State of Iowa hazard information, details, and risk assessment prevails for hazards not discussed for the County.

Disaster Declaration History

One method used by the county to identify hazards was to examine events that triggered federal and/or state disaster declarations. Federal and/or state declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government’s capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state governments’ capacities are exceeded; a federal emergency or disaster declaration may be issued, allowing for the provision of federal assistance for affected areas.

The federal government may issue a disaster declaration through FEMA and the U.S. Department of Agriculture (USDA). FEMA also issues emergency declarations, which are more limited in scope and do not include the long-term federal recovery programs of major disaster declarations. Determinations for declaration type are based on the scale and type of damages, and institutions or industrial sectors affected.

A USDA disaster declaration certifies that the affected county has suffered at least a 30 percent loss in one or more crop or livestock areas and provides affected producers with access to low-interest loans and other programs to help mitigate disaster impacts. In accordance with the Consolidated Farm and Rural Development Act, counties neighboring those receiving disaster declarations are named as contiguous disaster counties and are eligible for the same assistance.

Table 18 reflects FEMA presidentially declared disasters received by Winneshiek County and the Participating Jurisdictions from 1990 to the present.

Table 18: Presidential Disaster Declarations Including Winneshiek County, 1990-2019

Declaration Number	Declaration Date	Disaster Description	Counties in NE Iowa Region Included
DR-4421-IA	3/23/2019	Severe Storms And Flooding	Allamakee, Clayton, Fayette, Howard, <u>Winneshiek</u>
DR-4386-IA	8/20/2018	Severe Storms, Tornadoes, Straight-line Winds, And Flooding	Howard, <u>Winneshiek</u>
DR-4334-IA	8/27/2017	Severe Storms, Tornadoes, Straight-line Winds, And Flooding	Allamakee, Clayton, Fayette, <u>Winneshiek</u>
DR-4289-IA	10/31/2016	Severe Storms and Flooding	Allamakee, Clayton, Fayette, Howard, <u>Winneshiek</u>
DR-4281-IA	9/29/2016	Severe Storms, Straight-line Winds, and Flooding	Allamakee, Clayton, Fayette, Howard, <u>Winneshiek</u>
DR-4234-IA	7/31/2015	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	Allamakee, Clayton, <u>Winneshiek</u>
DR-4184-IA	7/24/2014	Severe Storms, Tornadoes, Straight-line Winds, and Flooding	Allamakee, Fayette, <u>Winneshiek</u>
DR-4135-IA	7/31/2013	Severe Storms, Tornadoes and Flooding	Allamakee, Clayton, Howard, <u>Winneshiek</u>
DR-1763-IA	5/27/2008	Severe Storms, Tornadoes and Flooding	Allamakee, Clayton, Fayette, Howard, <u>Winneshiek</u>
DR-1727-IA	9/14/2007	Severe Storms, High Winds and Flooding	Allamakee, <u>Winneshiek</u>
DR-1688-IA	3/14/2007	Severe Winter Storms	Fayette, Howard, <u>Winneshiek</u>
EM-3239-IA	9/10/2005	Hurricane Katrina Evacuation	<u>All</u>
DR-1518-IA	5/25/2004	Severe Storms, Tornadoes and Flooding	Allamakee, Clayton, Fayette, Howard, <u>Winneshiek</u>
DR -1420-IA	6/1/2002	Severe Storms, Tornadoes and Flooding	Allamakee, Clayton, Fayette, <u>Winneshiek</u>
DR-1230-IA	7/1998	Severe Storms	Allamakee, Clayton, Fayette, Howard, <u>Winneshiek</u>
DR-996-IA	6/1993	Flooding	<u>All</u>
DR-879-IA	9/1990	Flooding	Clayton, Fayette, Howard, <u>Winneshiek</u>

Source: (FEMA, 2019)

Table 19 reflects U.S. Department of Agriculture disaster declarations and their related causes for Winneshiek County, which includes the Participating Jurisdictions, from 2005 to the present.

Table 19: USDA Declared Disasters, 2005 to Present

USDA Disaster Number	Start Date	Causes						
		Hail	Drought	Tornadoes	Severe Storms	Winter Storms	Excessive Moisture	Frosts Freezes
M1688	2/23/2007					X		
M1717	8/18/2007				X		X	
M1727	8/17/2007				X		X	
S2898	5/15/2009	X			X		X	
S3264	4/6/2012							X
S3305	7/17/2012		X					
S3553	1/1/2013						X	X
S3605	4/1/2013						X	
S3618	7/15/2013		X					

Hazard Profiles

Requirement §201.6(c)(2)(i):

[The risk assessment shall include a] description of the...location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Requirement §201.6(c)(2)(ii):

[The risk assessment shall include 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; and address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods.

Each hazard that can affect the jurisdiction is profiled individually in this section. The level of information presented in the profiles varies by hazard based on the information available. This plan update has incorporated new information when available to aid in the current evaluation and prioritization of the hazards that affect the county. Detailed profiles for each of the identified hazards include information on the following characteristics of the hazard:

Hazard Description

This section consists of a general description of the hazard and the types of impacts it may have on a community.

Previous Occurrences

This section includes information on historic incidents and their impacts to the affected area.

Location, Probability and Extent

The geographic extent or location of the hazard in the Planning Area; the strength or magnitude of the hazard (described in terms of a scientific scale and/or other hazard factors, such as duration and speed of onset); and information on future probability if available. When applicable, a specific jurisdiction’s risks are noted if it varies from the risks facing the entire Planning Area. Where available, maps are utilized to indicate the areas of the Planning Area that are vulnerable to the subject hazard.

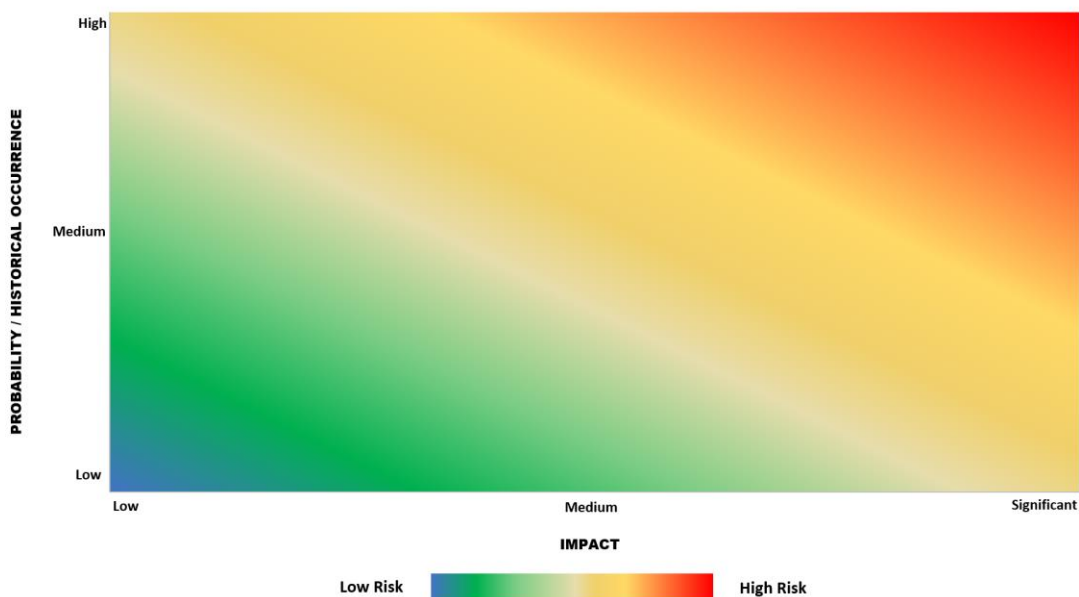
Summary of Vulnerability and Potential Losses

The vulnerability to each hazard identified and profiled in the plan. Where available the vulnerability summary includes evaluation of vulnerable buildings, infrastructure and critical facilities in hazard-prone areas, including a review of previous and ongoing losses, damages, human impacts, etc.

Hazard Summary

In the 2015 plan, a mathematical methodology was used to prioritize the hazards. This prioritization was based on a Calculated Priority Risk Index (CPRI) that considered five elements of risk: probability, magnitude, warning time, duration, and spatial extent. This plan update ranks risk according to methodology used in the 2018 Iowa Hazard Mitigation Plan, which rates hazards in terms of risk in relation to each other. To do this a **risk grid methodology** was used to determine and illustrate risk of each of the hazards.

According to FEMA’s 2015 State Mitigation Plan Review Guide risk, for the purposes of hazard mitigation planning, is defined as “the potential for damage or loss created by the interaction of natural hazards with assets, such as buildings, infrastructure, or natural and cultural resources.” Many people would describe the interaction of a single hazard event with assets on the ground, such as buildings or people, as the impact of the hazard event. Thus one axis of the risk grid was labeled “impact.” The potential of multiple hazard events interacting with assets can then be illustrated on a grid where the x axis represents the impact of the hazard, and the y axis represents the probability of the particular hazard. Plotting a hazard at a point in relation to these two axes represents the risk, or the potential for damage or loss created by the interaction of the hazard with assets. Below is an example of the risk grid used to map relative hazard risk according to impact and probability:



The risk grid is colored as a heat map, with the warmer colors (orange and red) on the top right to represent highest risk, and the coolest colors (blue and green) on the bottom left to represent lowest risk. When a hazard’s risk was not easily illustrated well by a single point on the grid, the location of the trend curve for the hazard was considered and a point within the heat map was then derived from that.

To complete risk grouping, the Hazard Mitigation Planning Committee (HMPC) broke apart into groups to discuss hazard profile information and complete the risk grid methodology. Groups were asked to list hazards in the red and orange areas of their risk grid as risk Group 1, which are those that pose the highest risk. Mitigation actions that address these hazards will be given more weight and priority. Hazards located in the yellow zone were listed as Group 2, and hazards plotted in the low-risk blue-green zone are in Group 3. Mitigation actions that address only a Group 3 hazard will have the least weight and priority. The entire Hazard Mitigation Planning Committee then came together to review the risk grid results and arrive at a final list of hazards to be identified under risk Group 1 (High Risk), Group 2 (Medium Risk) or Group 3 (Low Risk). The results are as follows:

HIGH RISK	MEDIUM RISK	LOW RISK
<ul style="list-style-type: none"> • Flash Flood • River Flood • Winter Storm • Hailstorm • Infrastructure Failure • Sinkholes 	<ul style="list-style-type: none"> • Drought • Extreme Heat • Levee Failure • Tornadoes • Hazardous Materials • Human Disease • Terrorism • Animal/Plant/Crop Disease • Windstorms 	<ul style="list-style-type: none"> • Dam Failure • Earthquakes • Landslides • Radiological Incidents • Transportation • Grass / Wildland Fires • Thunderstorm / Lightning

Community Assets

This section describes (or provides a plan reference to) the assets at risk in the Participating Jurisdictions. This purpose being provision of an overall hazard vulnerability for buildings, infrastructure, and critical facilities located in hazard areas in the county.

Overall building and valuation counts by jurisdiction can be found on **Table 29** in the Flood profile. The counts and values for religious/non-profit and government structures are also identified as available.

A map of key community facilities and critical facilities for each jurisdiction can be found by community in the **Jurisdictional Descriptions and Capabilities** section.

Table 44 in the Terrorism profile provides information on school district buildings throughout the county and highlights the location of each building and other information pertinent to assessing vulnerability.

A critical facility is defined as one that provides essential public safety or mitigation functions during response or recovery operations. Table 20 offers examples of critical facilities separated by categories of essential, high loss potential and infrastructure.

Table 20: Critical Facility Examples by Type

Essential Facilities	High Potential Loss Facilities	Transportation and Lifelines
Police Stations	Dams and levees	Highways, bridges and tunnels
Fire Stations	Military installations	Railroads and facilities
Emergency Operations Centers	Hazardous material sites	Airports
Hospitals and other medical facilities	Elder Care Facilities/Long Term Care Facilities	Natural gas pipelines and distribution stations
	Schools	Water and wastewater treatment facilities
	Storm Shelters	Petroleum pipelines and distribution stations
	Child care centers	Communications facilities
	Main government buildings	Power plants, transmission lines and distribution stations

Critical facilities by participating geographic jurisdiction are inventoried in Table 21 below.

Table 21: Critical Facilities by Jurisdiction

Facility	Calmar	Castalia	Decorah	Fort Atkinson	Jackson Junction	Ossian	Ridge-way	Spill-ville	Uninc. Areas
Police Stations	1	0	1	0	0	0	0	0	0
Fire Stations	1	1	1	1	0	1	1	0	1
Emergency Operations Centers	0	0	1	0	0	0	0	0	0
Hospitals and other medical facilities	1	0	2	0	0	1	0	0	0
Dams	0	0	0	0	0	0	0	0	17
Military installations	0	0	0	0	0	0	0	0	0
Tier II Chemical Storage - Hazardous material sites	1	0	5	0	1	1	2	1	33
Elder Care Facilities/Long Term Care Facilities	0	0	3	0	0	1	0	0	0
Schools	3	0	6	0	1	2	0	1	0
Storm Shelters	0	0	1	0	0	0	0	0	0
Childcare centers	1	0	3	0	0	2	0	0	0
Main government buildings	1	1	2	1	1	1	1	1	0
Railroad/loading facilities	1/0	1/0	0/0	0	1/1	1/1	0/0	0/0	1/0
Airports/Heliports	0/0	0/0	1/1 ¹	0/0	0/0	0/0	0/0	0/0	0/0
Natural gas pipelines and distribution stations	1/1	0	1	0	0	1	1	0	1

¹ Winneshiek Medical Center operates a heliport in Decorah

Water Systems/wastewater treatment facilities	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	2 ² /2 ³
Petroleum pipelines and distribution stations	0	0	0	0	0	0	0	0	1
Communications facilities ⁴	4	0	21	1	0	1	2	1	0
Power plants and distribution stations	0	0	1	0	0	1	0	0	0

Table 22 provides the participating jurisdictions' assessed railroad and utility infrastructure valuations.

Table 22: Railroad and Utility Valuations, AY2018 / FY 2020

Jurisdiction:	Railroad Valuations	Utilities without Gas & Electric	Gas & Electric Utility Valuation
City of Calmar	169,951	173,673	4,420,346
City of Castalia	201,039	11,151	344,866
City of Decorah	0	1,130,908	31,261,981
City of Fort Atkinson	134,717	21,232	866,478
City of Jackson Junction	615,554	73,425	433,475
City of Ossian	234,201	46,501	1,600,271
City of Ridgeway	0	116,338	658,002
City of Spillville	0	45,547	1,102,104
Unincorporated Areas	4,665,643	15,546,770	35,289,966

Source: (Iowa Department of Management, 2018)

² Frankville and Freeport

³ Burr Oak and Festina

⁴ Includes radio station/cell phone towers (according to FCC address, not location in city limits)

Hazard Risk and Vulnerability Information

CRS Step 4(d)

4(d) Plan describes other natural hazards, including a description of magnitude/severity, history & probability of future events

CRS Step 5(b)

5(b) Description of the impact of hazards on life, safety, health, infrastructure, the economy, and structures

Animal/Plant/Crop Disease

Risk Group 2: Medium Risk

Description

Any outbreak of disease that can be transmitted from animal to animal or plant to plant is an animal/crop/plant disease. An animal or plant disease outbreak could have serious economic or public health impacts, could cause significant production losses, and could result in significant environmental damage. The HMPC include invasive species, pests and noxious weeds within this hazard element.

The introduction of some high-consequence animal diseases could significantly limit or eliminate our ability to move, slaughter, and export animals and animal products. Response from and recovery to infectious animal disease outbreaks will be lengthy, and many producers may never be able to return to business. There would also be many indirect effects on our economy. Rumors of an infectious animal disease outbreak could cause significant damage to the markets, as occurred in the 2009 H1N1 (swine flu) influenza outbreak, where lack of understanding about the transmission of the virus caused market loss in Iowa's pork markets.

Pest infestations can cause widespread crop/plant loss and resulting economic hardships on farmers, landowners, and related businesses. Once infestation occurs, the pest may become endemic, causing repeated losses in subsequent growing years. Loss of production could affect all related industries including fuel, food, synthetics, processors, etc.

Previous Occurrences

Records regarding specific occurrences of animal, plant or crop disease within the county were difficult to attain. The 2018 Iowa Hazard Mitigation Plan describes the following statewide incident:

“In 2015, Iowa experienced significant impacts to our avian populations when highly pathogenic avian influenza (HPAI) affected 77 sites in Iowa in 18 counties across the state. The more than 33 million affected birds had to be euthanized and disposed of, the facilities had to be sanitized, and the stocks replaced once assurances were made that the disease would not recur. The direct economic impact of replacing the affected birds was in excess of \$83.6 million. This figure does not include unemployment during the timeframe of the disaster nor the cost of euthanizing and disposal of the carcasses” (Iowa Homeland Security and Emergency Management, 2018).

Location, Probability and Extent

Animal, plant or crop disease can occur anywhere within the planning area.

Certain environmental conditions in Iowa may be increasing the probability that animal or crop disease occur. The 2018 Iowa Hazard Mitigation Plan describes that surface wind speeds (standard

measurement height of 32 feet) over Iowa have been declining, which provides less crop ventilation and more heat stress for plants and animals. In addition, reduced winds create favorable conditions for survival and spread of unwanted weeds, fungi, pests, and pathogens. Waterlogged soil conditions during early plant growth often result in shallower root systems that are more prone to disease, nutrient deficiencies, and drought stress later in the season. In 2010 wet soil conditions are cited as cause for the epidemic of soybean sudden death syndrome that occurred that year.

Members of the public who attended HMPC meetings also noted concern over the potential human health impacts of Confined Animal Feeding Operations (CAFOs) on people living in the County, resulting from exposure to potential diseases carried by CAFO animals and their waste. For example, attendees shared several research studies and legal findings addressing increased risk of humans acquiring Methicillin-Resistant Staphylococcus Aureus (MRSA) from proximity to CAFO animals and/or operations. Current manure collection technology at CAFOs may create an environment for MRSA and other antibiotic-resistant organisms to flourish. These health risks could be localized – neighbors living near a CAFO, or a concentrated downtown area where CAFO trucks are routed – or it may be more distributed, if for example waste from CAFO operations made its way into the ground or surface water system. One study provided by participants reviewed VA health records, and found that the risk of MRSA colonization at admission nearly tripled for rural Iowa veterans whose residence was within 1 mile of large swine CAFOs with more than 2,500 mature swine or greater numbers of immature swine (Margaret Carrel, Marin L. Schweizer, Mary Vaughan Sarrazin, & Tara, 2014).

Summary of Vulnerability and Potential Losses

As climate change occurs, animal, plant and crop diseases are likely to increase as changes such as earlier springs and warmer winters create conditions that increase the survival rate of pathogens and parasites (Cho, Jinxiu, McCarl, & Yu, 2011). Disease can occur anywhere in the planning area, but would most likely have an economic impact, with no lasting damage to infrastructure or buildings. Crop/plant pest infestations can cause widespread crop/plant loss and severe economic hardship for farmers and related businesses. And loss of production has a trickle-down effect on related industries and nearby communities. Table 23 illustrates crop loss from plant disease between 2007 – 2018.

Table 23: Crop Loss Due to Plant Disease, 2007-2018

Year	Crop	Hazard	Claims Paid (\$)
2007	All Other Crops	Plant Disease	15,506
2009	All Other Crops	Plant Disease	45,553
2010	All Other Crops	Plant Disease	5,768
2015	Corn and Soybeans	Plant Disease	65,255
2016	Soybeans	Plant Disease	8,685
2017	Soybeans	Plant Disease	2,144
Total			142,911

Source: (USDA Risk Management Agency, 2007 - 2018)

Also, with increasing confined animal feeding operations animals may be more vulnerable to disease, and as described earlier, humans exposed to affected animals may be at risk of health impacts.

Dam Failure

Risk Group 3: Low Risk

CRS Step 4(b)(1)b.

4(b) Plan includes assessment of less frequent floods

4(b)(1)b. Prepare an inventory of dams that would result in a flood of developed areas if they failed;

4(b)(2) Map the area(s) affected

4(b)(3) Summarize the hazard(s) in lay terms

Description

Dam failure is the uncontrolled release of impounded water that can result in flooding. Dams are built for a variety of reasons such as flood control, erosion control, water supply storage, power generation, and recreation.

Dam failures can be caused by several events including flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation and poor construction, vandalism, or terrorism. Failure of earthen dams occurs through three scenarios: overtopping, seepage, and/or structural issues. Overtopping failures result from the erosive action of water on the embankment. Erosion is due to uncontrolled flow of water over, around and adjacent to the dam. Earth embankments are not designed to be overtopped and therefore are particularly susceptible to erosion. Once erosion has begun during overtopping, it is almost impossible to stop. A well vegetated earth embankment may withstand limited overtopping if its crest is level and water flows over the crest and down the face as an evenly distributed sheet without becoming concentrated.

All earth dams have seepage resulting from water permeating slowly through the dam and its foundation. Seepage must be controlled in both velocity and quantity. If uncontrolled, it can progressively erode soil from the embankment or its foundation, resulting in rapid failure of the dam. Erosion of the soil begins at the downstream side of the embankment, either in the dam proper or the foundation, progressively works toward the reservoir, and eventually develops a direct connection to the reservoir. This phenomenon is known as "piping." Piping action can be recognized by an increased seepage flow rate, the discharge of muddy or discolored water, sinkholes on or near the embankment or a whirlpool in the reservoir. Once a whirlpool (eddy) is observed on the reservoir surface, complete failure of the dam will probably follow in a matter of minutes. As with overtopping, fully developed piping is virtually impossible to control and will likely cause failure. Seepage can cause slope failure by creating high pressures in the soil pores or by saturating the slope. The pressure of seepage within an embankment is difficult to determine without proper instrumentation. A slope which becomes saturated and develops slides may be showing signs of excessive seepage pressure.

Structural failures can occur in either the embankment or the appurtenances⁵. Structural failure of a spillway, lake drain or other appurtenance may lead to failure of the embankment. Cracking,

⁵ Structures associated with dams such as spillways, gates, outlet works, ramps, docks, etc. that are built to allow proper operation of dams.

settlement, and slides are the more common signs of structural failure of embankments. Large cracks in either of an appurtenance or the embankment, major settlement and major slides will require emergency measures to ensure safety, especially if these problems occur suddenly.

The three types of failure described are often interrelated in a complex manner. For example, uncontrolled seepage may weaken the soil and lead to a structural failure, structural failure may shorten the seepage path and lead to piping failure, and surface erosion may result in structural failure.

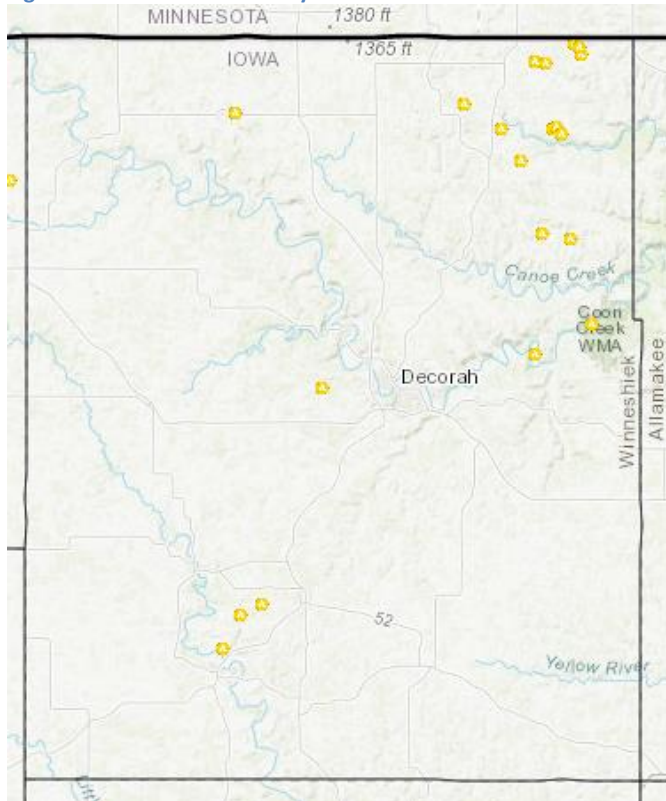
Previous Occurrences

There has never been a dam failure within the county.

Location, Probability and Extent

There are 17 dams within Winneshiek County, as illustrated in Figure 47 below. Three of the dams are concrete or masonry gravity dams and the others are earthen dams. Four are privately owned, two are state-owned and the rest are owned by county governmental entities. The primary purposes of the dams within the county are flood control, recreational or for small fish ponds. All of the dams in county have a low hazard potential (U.S. Army Corps of Engineers, 2019).

Figure 43: Winneshiek County Dam Sites



(Iowa Homeland Security and Emergency Mgt., n.d.)

Probability of future dam failure could be impacted by dam age. By 2025, 29% of the existing dams will be more than 50 years old (the normal design life of a dam), and probability of failure could increase if maintenance or updates aren't implemented on a timely basis.

Also, long term climate patterns are a consideration with regards to the probability of dam failure. Precipitation extremes and increased frequency of precipitation that lead to flooding may put stress on dam structures for a variety of reasons. More extreme precipitation events could increase the frequency of intentional discharges. Many other climate-related impacts, including shifts in seasonal and geographic rainfall patterns, could also cause the flow behavior of rivers to deviate from previous hydrographs. When flows are greater than expected, spillway overflow events (often referred to as design failures) can occur. These overflows result in increased discharges downstream and increased flooding potential. Although climate change will not increase the probability of catastrophic dam failure, it may increase the probability of design failure.

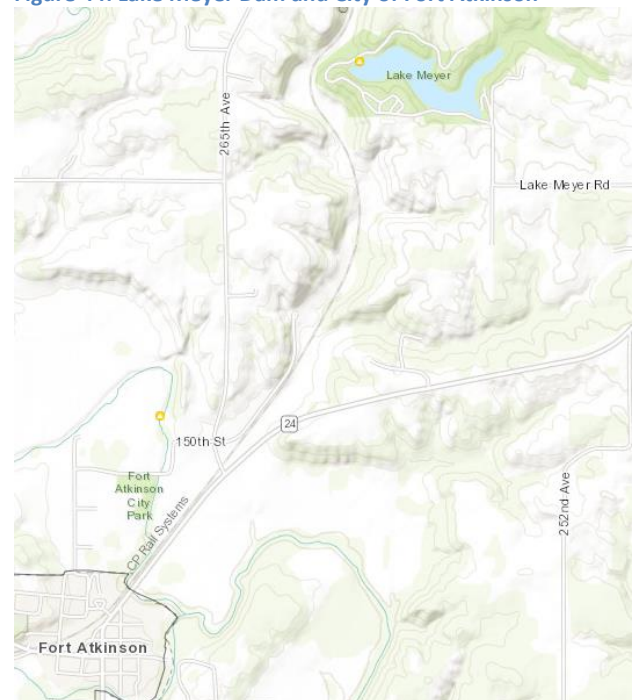
Summary of Vulnerability and Potential Losses

All of the dams in the county have a low hazard potential. Dam hazard potential classifications have to do with 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. Based on this, it would seem that overall vulnerability to dam failure in the county is minimal.

The Lake Meyer Dam (built in 1966) is one of the older dams, and is an intermediate-sized dam⁶ with the largest normal storage space in the county. Lake Meyer is located approximately 2.5 miles to the northeast of the City of Fort Atkinson (see . Residents in Fort Atkinson expressed concern about a breach at Lake Meyer. Due to topography, if the dam were to fail the water would enter a stream which crosses Iowa Highway 24 and heads directly towards the City on the northerly side of Iowa Hwy 24. There it would enter the Turkey river near Fort Atkinson's trailer court, as well as the Turkey River on the South side of the highway, resulting in backflow on Roger's creek. This is a worse-case scenario, however a possibility. No dams in Winneshiek County require an Emergency Action Plan (EAP), and an EAP has not been created for the Lake Meyer Dam. The Winneshiek County Conservation

Board is the owner of the dam. Should something go wrong the staff are trained to alert the City of Fort Atkinson and the railroad. In addition, the dam is regularly inspected by conservation staff and occasionally by the Iowa Department of Natural Resources (DNR).

Figure 44: Lake Meyer Dam and City of Fort Atkinson



(Iowa Homeland Security and Emergency Mgt., n.d.)

⁶ Structures that are 40 to 100 feet high or that impound 1,000 to 50,000 acre-feet of water (U.S. Fish & Wildlife Service, 2008)

Drought

Risk Group 2: Medium Risk

Description

Drought is generally defined as a period of prolonged lack of precipitation for weeks at a time producing severe dry conditions. There are three types of drought in Iowa: Meteorological drought, which refers to precipitation deficiency; hydrological drought, which refers to declining surface water and ground water supplies; and agricultural drought, which refers to soil moisture deficiencies.

Periods of drought are normal occurrences in all parts of Iowa. Drought in Iowa is caused by severely inadequate amounts of precipitation that adversely affect farming, surface and ground water supplies, and uses of surface waters for navigation and recreation. Drought can cause significant economic and environmental impacts and also create favorable conditions for wildfires and wind erosion. While droughts are generally associated with extreme heat, droughts can and do occur during cooler months. Drought can lead to shortages in municipal water supplies due to deficiency of the raw water supply and greatly increased customer water demand. In other cases the raw water supply may remain adequate, but problems can be encountered due to limited treatment or distribution capacity.

Previous Occurrences

According to the 2018 Iowa Hazard Mitigation Plan, Iowa had 14 periods of drought from 1995-2017. During that period, there was \$4.612 billion in crop damage resulting from drought periods and over \$645 million in property damage. The most common trend was the consistency of drought periods during the month of August. While some may have been more severe than others, agricultural areas were impacted much more than urbanized areas were impacted. The National Centers for Environmental Information (NCEI) Storm Events Database indicates that two of these events directly impacted Winneshiek County and provides the following details:

- **September 19, 2017 – October 1, 2017.** Persistent below normal precipitation since July 2017 allowed severe drought conditions to expand across portions of northeast Iowa. By late September, the drought conditions also covered a portion of northeast Winneshiek County.
- **July 17, 2012 – October 31, 2012.** Severe drought conditions developed because of a persistent lack of precipitation. Effects included damaged crops, pastures that stopped growing, river flows that were less than 20% of normal on the Turkey River and falling ground water levels. In mid-September, the USDA declared County a federal disaster area due to the drought.

Location, Probability and Extent

Drought can impact the planning area in localized sections or be widespread, and the duration of a drought can last from weeks to years. The Palmer Drought Severity Index helps communicate the extent and probability of drought in the county. According to the Palmer Drought Severity Index 1895-1995, Winneshiek County experienced severe and extreme drought 10-14.9 percent of the time during that 100-year period. The index defines severity according to the index shown in Figure 45.

Figure 45: Palmer Drought Severity Index

Drought Severity	Return Period (years)	Description of Possible Impacts	Drought Monitoring Indices		
			Standardized Precipitation Index (SPI)	NDMC ^a Drought Category	Palmer Drought Index
Minor Drought	3 to 4	Going into drought; short-term dryness slowing growth of crops or pastures; fire risk above average. Coming out of drought; some lingering water deficits; pastures or crops not fully recovered.	-0.5 to -0.7	D0	-1.0 to -1.9
Moderate Drought	5 to 9	Some damage to crops or pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water use restrictions requested.	-0.8 to -1.2	D1	-2.0 to -2.9
Severe Drought	10 to 17	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.	-1.3 to -1.5	D2	-3.0 to -3.9
Extreme Drought	18 to 43	Major crop and pasture losses; extreme fire danger; widespread water shortages or restrictions.	-1.6 to -1.9	D3	-4.0 to -4.9
Exceptional Drought	44+	Exceptional and widespread crop and pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells creating water emergencies.	less than -2	D4	-5.0 or less

^aNDMC - National Drought Mitigation Center

Summary of Vulnerability and Potential Losses

Drought impacts are wide-reaching and may be economic, environmental, and/or societal.

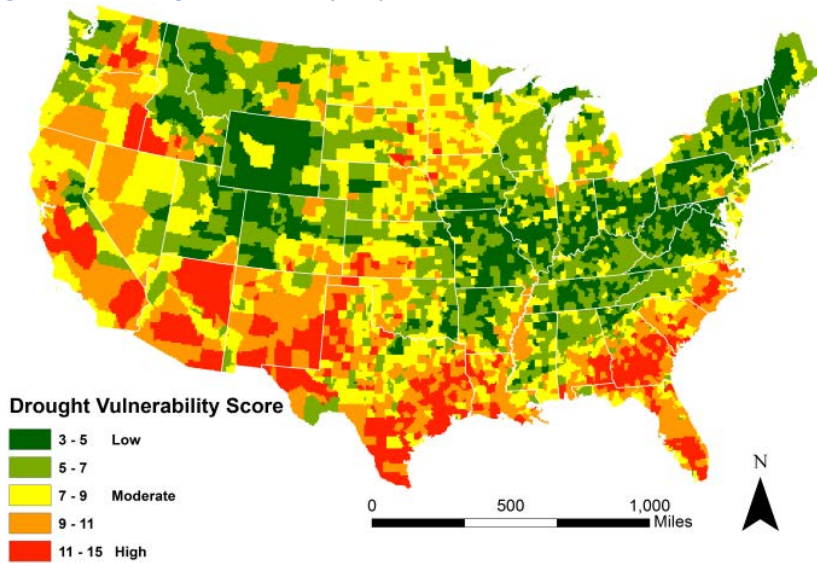
The overall economic impact of a drought depends on the severity and length of the occurrence. In 2012, drought was the nation’s second most costly weather event overall, and the most costly in terms of crop damage. Drought caused over \$5.7 billion in property and crop damage (National Weather Service, 2013). The economic impact of droughts on agriculture are a particular concern in Iowa and Winneshiek County, where the agricultural industry still provides an economic base. And any reduction in agricultural income can affect revenues in the agricultural, retail and service sectors.

According to USDA Risk Management Agency (RMA) Cause of Loss Historical Data Files, Winneshiek County crop loss from drought between 2007 – 2018 totaled \$32,725,487 (USDA Risk Management Agency, 2007 - 2018). For the twelve-year period, this is an annual average crop loss from drought of approximately \$2,727,124 for the county. Other long-term economic impacts to agriculture can result from drought as well. Droughts that carry over from year to year can impact the health of the subsoil. And drought conditions can cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. Winneshiek County already struggles with river and flash flooding, which could be exacerbated.

A prolonged drought can also have serious impacts on a community. Drought triggers an increased demand for water and electricity which can result in shortages. Food shortages may occur if agricultural production is damaged or destroyed by a loss of crops or livestock. Droughts rarely result in the loss of life, although high heats that contribute to droughts may also contribute to heat related illnesses and even death. Property damage is not a direct impact of droughts, but drought conditions may increase the likelihood of fires.

Overall vulnerability of the county to drought can be illustrated by the Tufts University map of nationwide drought vulnerability shown in Figure 46. Winneshiek County has a drought vulnerability score of low to moderate (Tufts University, 2012)

Figure 46: US Drought Vulnerability Map



Earthquake

Risk Group 3: Low Risk

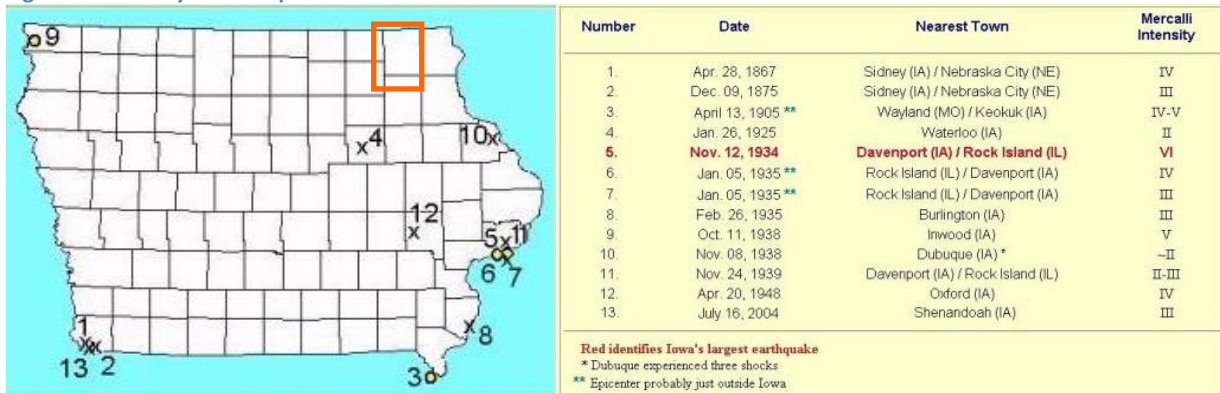
Description

An earthquake is sudden motion of trembling of the ground caused by shifting tectonic plates. Earthquakes are potentially catastrophic, capable of causing multiple fatalities and major structural and infrastructure damage including disruption of utilities, communications, and transportation systems. Secondary affects can include landslides, seiches, liquefaction, fires, and dam failure. Earthquakes occur very abruptly with little or no warning. However, seismic monitoring in certain cases can detect increases in the geologic and seismic activity that precedes an earthquake event. Duration typically ranges from a few seconds to a minute or two, but aftershocks can occur during the hours and weeks after the quake, usually with diminishing frequency and intensity.

Previous Occurrences

Iowa has experienced 13 earthquakes with epicenters located in the state over its history. Geologically, the epicenter of an earthquake is the point of the earth's surface directly above the focus of an earthquake. The first known earthquake occurred in Southwest Iowa in 1876, near Sidney. The latest earthquake to shake the state also happened in Southwest Iowa in 2004, near Shenandoah. The largest earthquake, of a Mercalli magnitude VI, occurred in Southeast Iowa in 1934, near Davenport. Only the most recent of these events was instrumentally recorded. Figure 47 illustrates where earthquakes have occurred in Iowa.

Figure 47: History of Earthquakes in Iowa

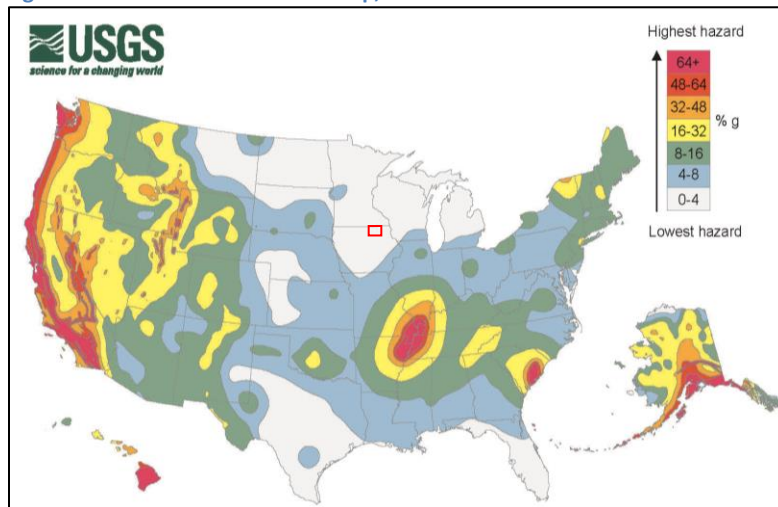


Source: (Iowa Department of Natural Resources, n.d.)

Location, Probability and Extent

Overall, the County is in an area of relatively low seismic activity. The following U.S. Geological Survey (USGS) National Seismic Hazard Map displays earthquake ground motions for various probability levels across the United States and is used to develop building codes, insurance rate structures, risk assessments, and other public policy. Winneshiek County lies in an area with the lowest hazard. The closest fault zone is the New Madrid Seismic Zone which follows the Mississippi River valley from southeastern Missouri to northwestern Mississippi, noted in red on the map, roughly 550 miles south of the County.

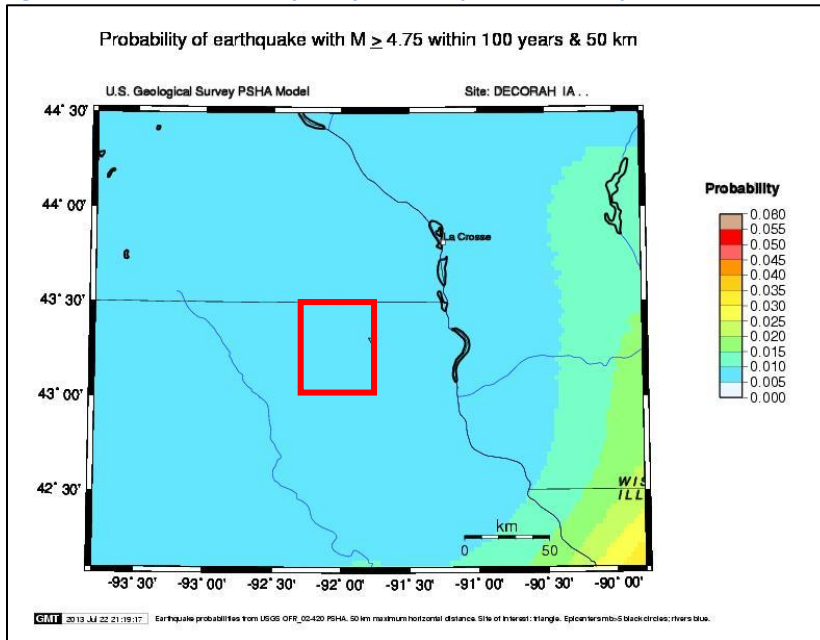
Figure 48: USGS Seismic Hazard Map, 2008



Source: (USGS, 2014)

Previous occurrences would indicate a very low probability of an earthquake occurring in any given year. Winneshiek County's probability of a magnitude 4.75+ earthquake over a 100 year time period is estimated to be 0.5 to 1.0 percent (see Figure 49). Similar probabilities equate this to roughly a 10,000 year recurrence interval. Based on these estimates the probability of a significant earthquake in any given year is unlikely.

Figure 49: Winneshiek County 100-year Earthquake Probability



Source: (USGS, 2014)

Summary of Vulnerability and Potential Losses

Winneshiek County is located in Seismic Zone 0, the lowest risk zone in the United States. Most structures 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 amount of energy released during an earthquake is most commonly expressed on the moment magnitude scale and is measured directly from energy released from the fault or epicenter as recorded on seismographs. Another measure of earthquake magnitude is intensity. Intensity is an expression of the amount of shaking at any given location on the surface as felt by humans and defined by the Modified Mercalli Intensity Scale. It is typically the greatest cause of losses to structures during earthquakes and is determined by many factors including distance from epicenter and soil types. Table 24 features abbreviated descriptions of the 12 levels of earthquake intensity.

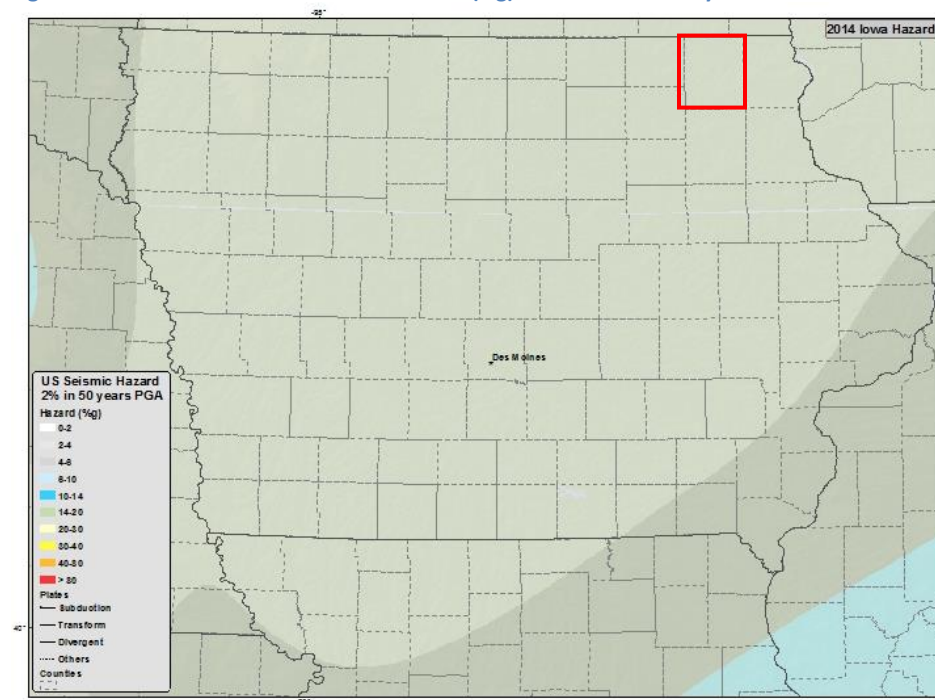
Table 24: Modified Mercalli Intensity (MMI) Scale

MMI	Felt Intensity
I	Not felt except by very few people under special condition. Detected mostly by instruments.
II	Felt by a few people, especially those on upper floors of building. Suspended objects may swing.
III	Felt noticeably indoors, by a few outdoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors, by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable damage in buildings of poor construction
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
XI	Few, if any masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

Source: (USGS, 2014)

Typically, significant earthquake damage occurs when accelerations are greater than 30 percent gravity. Figure 50 indicates that there is a 2 percent chance of a peak acceleration of 4.0 gravity (light perceived shaking, low potential damage) within the next 50 years for Winneshiek County.

Figure 50: Seismic Hazard – Peak Acceleration (%g) with 2% Probability of Occurrence in 50 Years



Source: (USGS, 2014)

Based on recurrence intervals for small earthquakes, scientists estimate a 90% chance of a Richter magnitude 6.0 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. (Iowa Department of Natural Resources, n.d.)

Extreme Heat

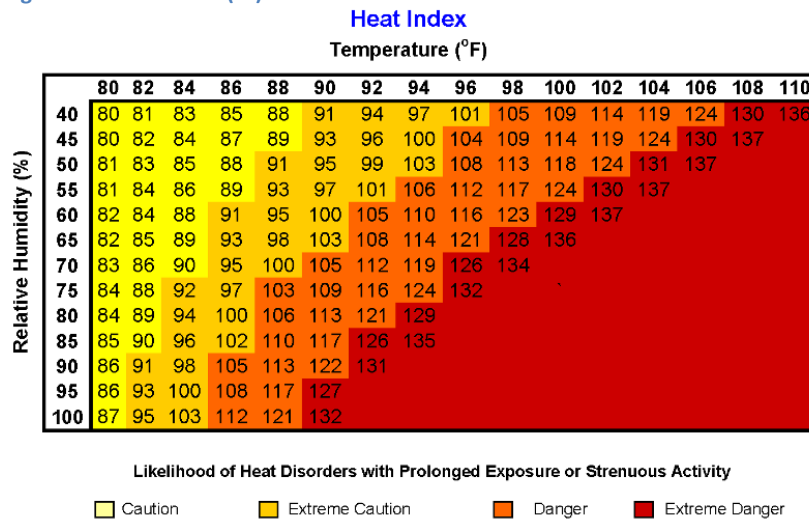
Risk Group 2: Medium Risk

Description

Extreme temperature events, both hot and cold, can have severe impacts on human health and mortality, natural ecosystems, agriculture, and other economic sectors. Conditions for extreme heat are defined by summertime weather that is substantially hotter and/or more humid than average for a location at that time of year. This includes temperatures (including heat index) in excess of 100 degrees Fahrenheit (°F) or at least three (3) successive days of 90+ °F. Ambient air temperature is one component of heat conditions, with relative humidity being the other. The relationship of these factors creates what is known as the apparent temperature, often referred to as the heat index.

Figure 51 reflects the National Weather Service Heat Index chart, producing a guide for the apparent temperature or relative intensity of heat conditions.

Figure 51: Heat Index (HI) Chart



Source: (National Weather Service, 2019)

Note: Since heat index values were devised for shady, light wind conditions, exposure to full sunshine can increase heat index values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

Table 25 lists typical symptoms and health impacts of exposure to extreme heat based on the heat index.

Table 25: Typical Health Impacts of Extreme Heat

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

Source: (National Weather Service, 2005)

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

Previous Occurrences

During the period from 1998-2018, the National Centers for Environmental Information (NCEI) Storm Events Database lists seven heat incidents and two excessive heat incidents of in Winneshiek County. Details were provided for the following events:

- **June 29, 2018.** June ended with two days of excessive heat across northeast Iowa. Heat indices topped out between 105 and 110 on both June 29th and 30th, although the high heat indices were more widespread on the 29th. Air temperatures in the upper 80s to middle 90s with dew points in the middle 70s combined to create the excessive heat.
- **July 21, 2016.** A two-day period of heat and humidity affected Northeast Iowa in the middle of July. Heat indices on the 21st and 22nd topped out between 105 and 115.
- **July 2, 2012.** An upper level ridge of high pressure dominated Northeast Iowa and brought an extreme long duration heat wave from July 2nd through July 7th. The maximum apparent temperatures recorded at automated weather observing systems across Northeast Iowa ranged from 100 to 110 each day during this period. Other impacts from the heat included stimulating algae growth on area waterways which depleted oxygen levels leading to fish kills.
- **July 17, 2011.** For an extended period between the 17th and 20th, afternoon heat indices routinely topped out between 110 and 115 with overnight low temperatures remaining above 75 degrees. The highest recorded heat index at Decorah was 114 on the 19th.
- **August 1, 2001.** The excessive heat that began in July continued through the first part of August, with afternoon temperatures reaching into the middle to upper 90s. The heat combined with high humidity produced dangerous heat indices of 110 to 120.
- **July 31, 2001.** High humidity combined with temperatures in the middle to upper 90s produced heat indices of 105 to 115. The dangerous heat continued to affect northeast Iowa during the first week and a half of August.
- **July 28, 1999.** Yet another period of excessive heat and humidity affected northeast Iowa. Afternoon highs reached the middle 90s to 100, while heat indices of 110 to 120 were common. No deaths directly related to the oppressive heat and humidity were reported.
- **July 23, 1999.** Excessive heat and humidity affected northeast Iowa for three consecutive days. Afternoon highs reached into the 90s, producing afternoon heat indices of 105 to 115. No deaths directly related to the heat were reported.

- **July 4, 1999.** High humidity combined with afternoon temperatures of 95 to 100 produced heat indices of 105 to 115. There were no deaths directly related to the excessive heat and humidity.

Location, Probability and Extent

The entire planning area is subject to extreme heat.

Periods of high heat generally occur on an annual basis, while currently events that cause significant health impacts occur less frequently. However, based on past occurrences and future changing climate conditions, the probability of future extreme heat is likely. According to the Fourth Annual Climate Assessment, warm-season temperatures are projected to increase more in the Midwest than any other region of the United States. By the middle of this century (2036–2065), 1 year out of 10 is projected to have a 5-day period that is an average of 13°F warmer than a comparable period at the end of last century (1976–2005) ((USGCRP), 2018).

Summary of Vulnerability and Potential Losses

Extreme heat can impose stress on humans and animals. Heatstroke, sunstroke, cramps, exhaustion, and fatigue are possible with prolonged exposure and/or physical activity due to the body’s inability to dissipate the heat. Those at greatest risk for heat-related illness include infants and children up to four years of age, people 65 years of age and older, people who are overweight, and people who are ill or on certain medications (CDC, 2012). However, even young and healthy individuals are susceptible if they participate in strenuous physical activities during hot weather. In agricultural areas, the exposure of farm workers, as well as livestock, to extreme temperatures is a major concern. And urban areas are generally more vulnerable due to an increase in heat absorbing surfaces.

In Winneshiek County, public health, economic impacts in the agricultural community, and impacts to transportation infrastructure (roads, bridges, rail) are the primary concerns with extreme heat. With regards to public health, segments of the county most at risk from extreme heat are the elderly, the very young and individuals living below the poverty line. Table 26 records the estimated number of affected people in Winneshiek County vulnerable to an extreme heat event based on these variables.

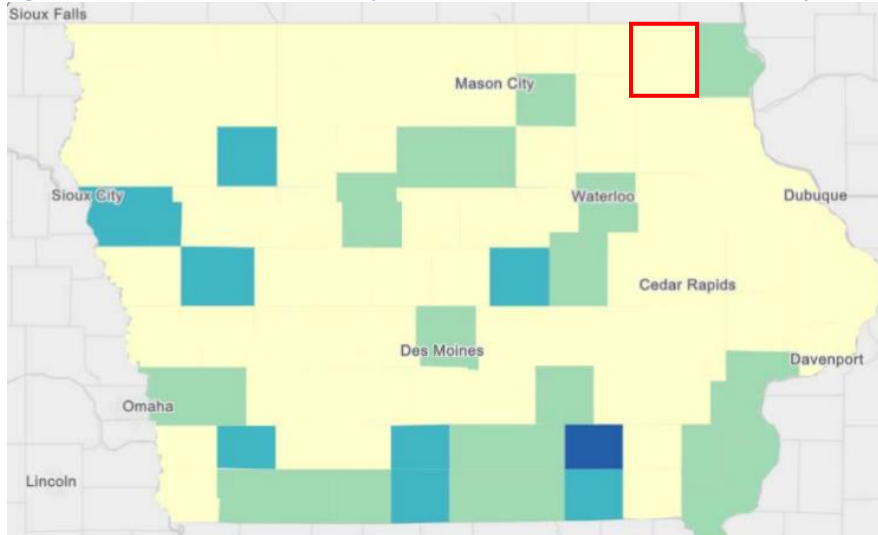
Table 26: Vulnerable Population Data for Winneshiek County

	Number	Percent
Population 65 years and over	3,843	18.7%
Population 5 years and younger	920	4.5%
Population whose income is below the poverty level	1,455	8.0%
Population 65 years and over below poverty level	331	9.1%

Source: (U.S. Census Bureau, ACS 2013 - 2017, 2017)

However, when social vulnerability variables for extreme heat are considered for counties throughout Iowa, Winneshiek County is found to be less vulnerable. Figure 52 shows extreme heat vulnerability based on the Center for Disease Control’s (CDC’s) Social Vulnerability Index (SVI), which reviews a variety of variables, such as poverty and income, seniors, young and disabled individuals, home type (mobile, multi-family), etc. Winneshiek County is in pale yellow, considered to be the least vulnerable counties (Future Heat Events and Social Vulnerability, 2014).

Figure 52: Extreme Heat Vulnerability in Iowa based on CDC's Social Vulnerability Index



Extreme heat can result in an economic impact to the agricultural sector as a result of livestock and crop loss. According to USDA Risk Management Agency (RMA) Cause of Loss Historical Data Files, Winneshiek County crop loss from Excess Heat between 2007 – 2018 totaled \$977,649 (USDA Risk Management Agency, 2007 - 2018).

Flood (Flash and Riverine)

Risk Group 3: High Risk

CRS Step 4(a) and 4(c) (Also found in Jurisdictional Descriptions)

4(a) Plan includes an assessment of the flood hazard with:

- (1) A map of known flood hazards*
- (2) A description of known flood hazard*
- (3) A discussion of past floods*

4(c) Plan includes assessment of areas likely to flood

CRS Step 5(c) and 5(f)

5(c) Review of all damaged buildings/flood insurance claims

5(f) Impact of future flooding conditions outlined in 4(c) on people, property, and natural floodplain functions

As done in the 2018 Iowa Hazard Mitigation Plan, the hazards of flash flooding and riverine flooding are discussed together here because often people just refer to “flooding”, especially when referring to the damage they cause. In fact, FEMA disaster declarations usually do not designate in the title of a disaster whether flooding was flash or riverine.

Also note, this flood analysis references the Upper Iowa River Flood Resiliency Plan. When this is the case, chapter and section of the watershed plan is denoted.

Description

Except fire, floods are the most common and widespread of all-natural disasters. Flood events are becoming more frequent in Northeast Iowa with more frequent heavy rainfall events. While mean precipitation totals have not significantly changed in the last 50 years, the intensity of individual precipitation events has increased and is trending upward. Each of the three large flooding events in

Winneshiek County in the last ten years, June 2008, June 2013, and August 2016, were associated with 7–10 inches of rainfall over a one or two-day period. ([UIR Watershed Plan, Ch. 3 Challenges and Opportunities / 3.1 Increased Flood Frequency](#)) (Upper Iowa River Watershed Management Authority, 2019). Further, 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.

A flash flood is an event that occurs with little or no warning where water levels rise at an extremely fast rate. Flash flooding results from intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area. Flash flooding is an extremely dangerous form of flooding which can reach full peak in only a few minutes and allows little or no time for protective measures to be taken by those in its path. Flash flood waters move at very fast speeds and can move boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. The duration of flash flood conditions is generally less than one day, but in exceptional cases can extend for much longer periods. Flash flooding often results in higher loss of life, both human and animal, than slower developing river and stream flooding.

River flooding is a natural and expected phenomenon that occurs annually, usually restricted to specific streams, rivers or watershed areas. River flooding is defined as when a watercourse exceeds its “bank-full” capacity and is the most common type of flood event. River flooding generally occurs as a result of prolonged rainfall, or rainfall that is combined with solids already saturated from previous rain events. The area adjacent to a river channel is its floodplain. In its common usage, “floodplain” most often refers to that area that is inundated by the 100-year flood, the flood that has a 1 percent chance in any given year of being equaled or exceeded. The 1 percent annual flood is the national standard to which communities regulate their floodplains through the National Flood Insurance Program (NFIP).

Previous Occurrences

An analysis of FEMA declarations conducted by the Iowa Flood Center found that Iowa has experienced more federal flood disasters than the majority of other states in the Nation. The State of Iowa ranked fourth in the number of flood related disaster declarations from 1988-2016. It also found that many of the FEMA declarations were in Northeast Iowa ([UIR Watershed Plan / Ch. 3 Challenges and Opportunities / 3.3 Impact of Flooding / 3.3.1.5](#)) (Upper Iowa River Watershed Management Authority, 2019).

In Winneshiek County there have been 14 federal disaster declarations involved with flooding since 1990, 50% of which occurred in the last five years. And from 2005 to 2013, Winneshiek County received five USDA declarations that involved excessive moisture or flash flooding (no new USDA disasters have been declared for the county since 2014).

The National Centers for Environmental Information (NCEI) reports 30 flash flood events and 24 other flood events (mainly watercourse) in Winneshiek County between 1998 and 2018 (National Centers for Environmental Information (NCEI), 2019). 67% of recorded river flood events in this time period occurred in the last three years. Notable details available from NCEI regarding these flood events follow. They demonstrate a variety of potential impacts and vulnerabilities associated with flooding:

- **August 23, 2016.** Repeated rounds of thunderstorms with heavy rains moved across portions of northeast Iowa during the evening of August 23rd into the early morning hours of the 24th. This heavy rain produced flash flooding across portions of Mitchell, Howard, Chickasaw, Winneshiek and Allamakee Counties. One person drowned north of Lawler (Chickasaw County) when a vehicle was swept off the road by flood waters from the Little Turkey River. Two people had to be rescued from a cabin near Lansing (Allamakee County). Flood waters caused a basement to collapse in Calmar (Winneshiek County) and evacuations were performed east of Decorah (Winneshiek County) because of rapidly rising flood waters along the Upper Iowa River. A Flash Flood Emergency was issued for these extreme events....the Governor of Iowa issued a disaster proclamation for Allamakee, Chickasaw, Clayton, Fayette, Floyd, Howard, Mitchell and Winneshiek Counties. Damages from the flooding to public infrastructure was estimated at \$2.4 million for Winneshiek County and another \$1 million for Decorah (Winneshiek County).
- **June 23-24, 2013.** Heavy rain caused flash flooding to occur across Winneshiek County, especially the northern sections. Rapidly rising waters along the Upper Iowa River caused a campground in Bluffton to be evacuated and covered numerous roads in Burr Oak Township stranding residences. More thunderstorms with heavy rain moved across northeast Iowa during the evening of June 24th into the early morning hours of June 25th. The heavy rain produced yet more flash flooding with a railroad bridge washed out west of Fort Atkinson.
- **June 8, 2008.**
 - A warm front extended east to west across the Upper Mississippi Valley on June 7, which provided the focus for thunderstorms producing excessive rainfall...1 to 2 inch rainfall amounts in an hour. As the storms congealed into a larger scale line of thunderstorms, they continued to move over the same areas, which led to significant flash flooding through the evening and overnight. On June 8...copious amounts of moisture lead to periods of heavy rain. The heavy rainfall on June 8 enhanced the already dangerous flooding conditions across parts of northeast Iowa.
 - Many roads were already closed from the June 7 rains due to water over the roadways, mudslides, or partial washouts. Conditions only worsened on June 8th, leading to more road closures, sandbagging, and some evacuations.
 - While the rain was tapering off and moving east Sunday night, June 8, the rivers continued to rise, and some extremely quickly. Some rivers responded with a foot per hour rises, while others eventually exceeded their river gauges ability to record the river levels. These gauges were under water themselves! All-time record crests were set at a few locations, with top 5 records at many others.
 - Damage to infrastructure and crops was preliminarily estimated at 70 to 80 million dollars.
 - As a result, Mitchell, Floyd, Howard, Chickasaw, Winneshiek, Fayette, Allamakee and Clayton Counties were all declared federal disaster areas. Several civil emergency messages were issued for evacuations in the county. Nursing homes and residences in the lower areas on the west side of the city of Decorah were evacuated. Ponding of water in Decorah could not be stopped even with pumps running.
 - In Fort Atkinson, the supports to a train bridge gave way in addition to damage to Highway 24 near town.
 - In Spillville, flood waters covered many of the streets and the wastewater treatment plant. Sand bagging efforts were halted as flood waters continued to rise. The Turkey River flooded in Spillville and Fort Atkinson and damaged railroad bridges. The Highway 24 bridge over the Turkey was heavily damaged and had to be closed for repairs following the flood.

- **August 21, 2007.** County Road W14, County Road W20, and Scenic River Road were damaged due to heavy rainfall and flash flooding. A low pressure system moved over northeast Iowa during the late evening hours of August 21. Thunderstorms developed along and ahead of this system, producing rainfall rates of an inch per hour. This caused flooding of roadways across parts of northeast Iowa.
- **May 8, 2002.** Thunderstorms produced 4 inches of rain in about an hour, causing flash flooding. Law enforcement officials reported numerous roads washed out, while 1 to 2 feet of water covered roads. Some farmers reported substantial losses to cattle in flooded river bottoms.
- **June 1, 2000.** The Upper Iowa River rose quickly after flooding rains fell across northeast Iowa. The river crested at 17.53 feet, more than 3 feet above flood stage, at Dorchester (Allamakee County). Residents in Kendallville, Bluffton and Decorah (Winneshiek County) sandbagged for several hours to protect homes and businesses from the rising water. Several acres of farmland along the river were covered by flood waters, which resulted in a total loss of crops.

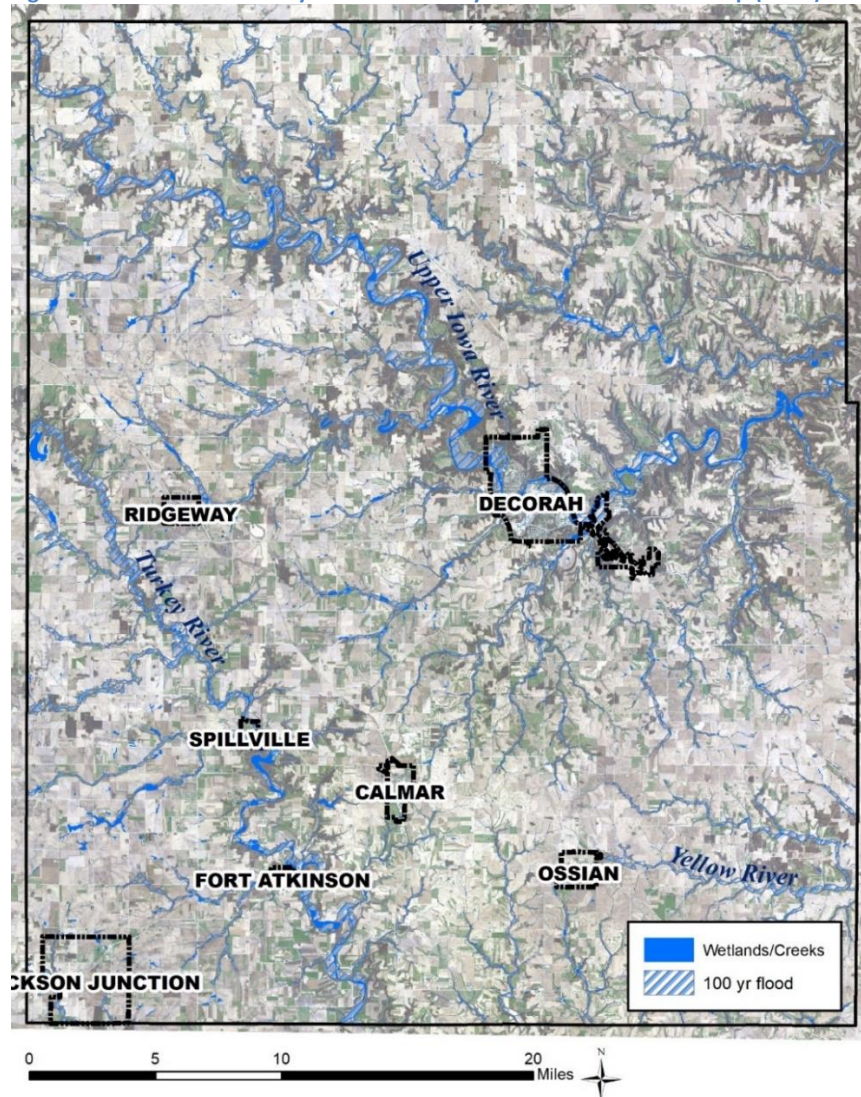
Location, Probability and Extent

Some key factors affecting the amount of flood runoff include precipitation, location of waterways and low areas, the amount of soil surface or vegetation intercepting floodwaters, and impervious surface/development. Other physical factors influencing the impact of flooding in local watersheds includes soil health, land use, topography, conservation practice location, and even road, culvert and bridge size and placement. The presence, absence and extent of karst development and how karst features influence runoff direction, quantity and intensity are also important ([UIR Watershed Plan / Ch. 3 Challenges and Opportunities / 3.3 Impact of Flooding / 3.3.1.2](#)) (Upper Iowa River Watershed Management Authority, 2019).

With regards to watercourses, the Upper Iowa River flows through the Decorah, and the Turkey River flows through the Fort Atkinson and Spillville and near the city limits of Jackson Junction. In addition, small creeks and streams weave throughout the planning area. The low-lying areas along these watercourses are most vulnerable to damage from river flooding. Many structures, homes, roadways, bridges and agricultural areas are threatened by river flooding and related damages. River flood events between 1998 – 2018 occurred mainly in unincorporated areas and in the communities of Decorah (17% of events) and Spillville (38% of events) (National Centers for Environmental Information (NCEI), 2019).

All flood hazard boundary maps (2019 Preliminary FIRMs) for individual jurisdictions in Winneshiek County are found in the Jurisdictional Descriptions and Capabilities section, which also further elaborate on current and future land use relative to the floodplain in these communities. Generally, development is not occurring fast, and is not planned for the floodplain in urban areas. Figure 53 below illustrates the 2019 Preliminary FIRM for the entire County. This map shows the 100-year flood, the flood that has a 1% chance in any given year of being equaled or exceeded, adjacent to streams and rivers throughout the County. In addition, the 10-year and 500-year flood inundations for the Upper Iowa River can be viewed in the [Upper Iowa River Watershed Resiliency Plan \(UIR Watershed Plan / Ch. 3 Challenges and Opportunities / 3.2 Breakdown of Upper Iowa Flood Events / 3.2.1\)](#).

Figure 53: Winneshiek County 2019 Preliminary Flood Insurance Rate Map (FIRM)



As Earth’s climate changes, extreme floods now described as “100-year” and “500-year” events are expected to become more frequent. According to Iowa Flood Center modeling, the strength of the flow measured in cubic feet/second and the height of water during flood events is increasing over the past 50 years, causing increases in the severity of 50, 100 and 500 year floods. These increases in strength of floods are predicted to continue in the next 50 years ([UIR Watershed Plan / Ch. 3 Challenges and Opportunities / 3.2 Breakdown of Upper Iowa Flood Events / Understanding Flood Probability 3.2.1.4](#)) (Upper Iowa River Watershed Management Authority, 2019). The next two tables, pulled from the [Upper Iowa River Watershed Resiliency Plan](#) (UIR Watershed Plan / Ch. 3 / 3.2 / 3.2.1), breakdown historic crests, and peak stages and streamflows for the Upper Iowa River. The two highest recorded crests ever on the Upper Iowa River occurred just since 2008 at the Dorchester gauge station, and streamflow highs (cfs) occurred in 2008 and 2016 at the Decorah and Dorchester gauge stations.

Table 27: Historic Crests of the Upper Iowa River

at Dorchester	at Decorah	at Bluffton
(1) 24.30 ft on 08/25/2016	(1) 17.90 ft on 06/09/2008	(1) 18.30 ft on 03/27/1961
(2) 22.46 ft on 06/09/2008	(2) 15.20 ft on 05/29/1941	(2) 15.49 ft on 06/09/2008
(3) 22.20 ft on 02/28/1948	(3) 14.35 ft on 08/17/1993	(3) 15.35 ft on 06/21/1954
(4) 21.80 ft on 05/30/1941	(4) 13.68 ft on 08/24/2016	(4) 14.41 ft on 08/24/2016
(5) 20.89 ft on 03/05/1937	(5) 13.08 ft on 03/27/1961	(5) 13.56 ft on 06/23/2013
(6) 20.02 ft on 06/23/2013	(6) 12.31 ft on 06/01/2000	(6) 12.66 ft on 08/22/2007
(7) 20.00 ft on 08/17/1993	(7) 12.20 ft on 03/17/1945	(7) 12.24 ft on 07/25/2005
(8) 19.34 ft on 03/07/1950	(8) 12.10 ft on 01/05/1946	(8) 10.54 ft on 09/25/2010
(9) 19.20 ft on 07/26/1953	(9) 11.85 ft on 02/28/1948	(9) 10.48 ft on 03/24/2011
(10) 18.95 ft on 09/06/1946	(10) 11.67 ft on 06/23/2013	(10) 10.26 ft on 05/23/2004

Table 28: Upper Iowa River Summary of Peak stages, streamflows and flood probability estimates

Site Name	Date	Stage (ft)	Streamflow (cfs)	25-yr flood (estimated cfs)	50-yr flood (estimated cfs)	100-yr flood (estimated cfs)	500-yr flood (Estimated cfs)
UIR at Bluffton	06/2008	15.49	16,600	16,300	19,300	22,300	29,600
UIR at Bluffton	06/2013	13.56	12,000				
UIR at Bluffton	08/2016	14.41	13,800				
UIR at Decorah	06/2008	17.90 *	34,100	19,200	22,800	26,400	35,300
UIR at Decorah	06/2013	11.67	17,000				
UIR at Decorah	08/2016	13.68	19,800				
UIR at Dorchester	06/2008	22.46	31,200	21,800	26,500	31,200	42,800
UIR at Dorchester	06/2013	20.02	25,500				
UIR at Dorchester	08/2016	24.30 *	38,000				

*Gage record high Blue: stream flow levels above 100-year flood

Flooding in the United States Midwest, 2008 Professional Paper 1775 U.S. Department of the Interior U.S. Geological Survey By Robert R. Holmes, Jr., Todd A. Koenig, and Krista A. Karstensen

The Participating Jurisdictions of Calmar, Castalia, Jackson Junction, Ossian, and Ridgeway are not near a major river or creek and are relatively flat communities so the threat of flooding is less yet can occur in the form of flash flooding (which can also impact river communities). Flash flooding can frequently impact developed areas where land is converted from fields or woodlands to roads, parking lots, buildings and mowed lawn. With this conversion land loses its ability to absorb and slow rainfall. Urbanization increases runoff 2 to 6 times over what would occur on natural terrain. As more development occurs in watersheds, the amount of runoff produced also increases, along with flash flooding conditions. Flash flood events between 1998 – 2018 occurred throughout the county and in the communities of Decorah, Ridgeway, Calmar, Ft. Atkinson, Castalia, and Ossian.

Previous occurrences would indicate a strong probability of a flash flood occurring in any given year. Flash flooding occurs on close to an annual basis over the span of Winneshiek County, and can also

quickly inundate areas thought to be out of flood-prone areas. Based on this level of frequency, probability of future flash flooding with significant impacts in the Participating Jurisdictions is considered highly likely.

Previous occurrences would indicate a chance of river flooding occurring at least every few years (river flooding events have been much more numerous in the last few years according to NCEI).

Summary of Vulnerability and Potential Losses

Safety concerns, long-term health consequences and loss of life; property damage and destruction; damage and disruption of communications, electric service, community services and water treatment or wastewater treatment facilities; impacts to transportation, including closed or damaged roads and bridges; crop and livestock damage and loss; and interruption of business are common impacts from flooding. Downstream residents can be impacted as floodwaters carry hazardous material and debris into fields and backwaters, impacting downstream farms and natural areas, and overall ecological impacts can include water quality degradation, terrestrial and aquatic habitat loss, and soil and nutrient loss and loading ([UIR Watershed Plan / Ch. 3 Challenges and Opportunities / 3.1 Increased Flood Frequency + 3.3 Impact of Flooding](#)) (Upper Iowa River Watershed Management Authority, 2019). And beyond the immediate effects of flooding, the resulting damage can lead to limited access to homes and businesses, including critical services, post-flood isolation, as well as other unexpected costs that are incurred.

In a recent survey of Upper Iowa River watershed landowners, 38% of respondents reported having their home, land or business directly impacted by flooding in the past 5 years, and over 75% have been impacted more than 2 times in the past five years. 83% of respondents reported knowing others impacted by flooding and 56% of respondents reported that a road or bridge they use regularly was closed due to flooding ([UIR Watershed Plan, Ch. 3 Challenges and Opportunities / 3.1 Increased Flood Frequency](#)) (Upper Iowa River Watershed Management Authority, 2019).

Table 29 reflects the building vulnerability for river flooding events based on the Special Flood Hazard Areas (100-year floodplain) in each jurisdiction. The table shows the overall number of structures in each community and their assessed value (by use type), as well as the number and replacement value of structures located in the 100-year floodplain. Not all replacement values could be attained for structures in the floodplain (data was available for 85% of impacted structures), so actual value of structures in the floodplain may be slightly higher. Also note, the County's valuation data should not be considered granular or detailed in nature. Instead the values are aggregated by the parcel boundary with totals for building counts and values, along with land value and yard extras lumped into two basic categories, those being land and building(s) value. While it's relatively easy, using GIS, to pinpoint a building's location in relation to the flood impact zone, it's extremely difficult to tie a specific building's value to that particular point (Winneshiek County, GIS Coordinator. (2019)). To summarize, the information in the below table demonstrates a potential dollar loss for structures in the floodplain and points to which land uses could be most impacted. Figure 54 provides a map of the 100-year floodplain and structures in the floodplain throughout the County (city-level maps of this same data can be found in the Jurisdictional Descriptions and Capabilities section).

Table 29: Flood Vulnerability by Jurisdiction, 2019

City of Calmar						
Structure Type:	Number of Structures			Value of Structures		
	In Community	In Hazard Area	% In Hazard Area	\$ Value in Community	\$ Value in Hazard Area	% In Hazard Area
Residential	406	0	0	43,641,060	0	0
Commercial	42	0	0	5,739,027	0	0
Industrial	4	0	0	884,250	0	0
Agricultural	11	0	0	216,420	0	0
Religious/ Non-Profit	4	0	0	225,280	0	0
Government	6	0	0	163,200	0	0
TOTAL	473	0	0	50,869,237	0	0
City of Castalia						
Structure Type:	Number of Structures			Value of Structures		
	In Community	In Hazard Area	% In Hazard Area	\$ Value in Community	\$ Value in Hazard Area	% In Hazard Area
Residential	75	0	0	4,733,090	0	0
Commercial	3	0	0	98,290	0	0
Industrial	0	0	0	0	0	0
Agricultural	4	0	0	161,260	0	0
Religious/ Non-Profit	2	0	0	97,720	0	0
Government	10	0	0	302,040	0	0
TOTAL	94	0	0	5,392,400	0	0
City of Decorah						
Structure Type:	Number of Structures			Value of Structures (Replacement)		
	In Community	In Hazard Area	% In Hazard Area	\$ Value in Community	\$ Value in Hazard Area	% In Hazard Area
Residential	2322	25	1%	366,623,560	2,061,040	.6%
Commercial	456	3	.7%	157,264,520	304,949	.2%
Industrial	16	9	56%	5,715,720	Unknown	Unknown
Agricultural	62	4	6%	873,500	10,000	1%
Religious/ Non-Profit	17	0	0	433,680	0	0
Government	13	0	0	2,079,530	0	0
TOTAL	2886	41	1.4%	532,990,510	2,375,989	.4%
City of Fort Atkinson						
Structure Type:	Number of Structures			Value of Structures		
	In Community	In Hazard Area	% In Hazard Area	\$ Value in Community	\$ Value in Hazard Area	% In Hazard Area
Residential	139	31	22%	13,625,240	1,530,947	11%
Commercial	18	9	50%	2,006,697	449,204	22%
Industrial	0	0	0	0	0	0
Agricultural	8	0	0	85,570	0	0
Religious/ Non-Profit	2	0	0	NA	0	0
Government	5	0	0	24,470	0	0
TOTAL	172	40	23%	15,741,977	1,980,151	12.6%
City of Jackson Junction						
Structure Type:	Number of Structures			Value of Structures		
	In Community	In Hazard Area	% In Hazard Area	\$ Value in Community	\$ Value in Hazard Area	% In Hazard Area
Residential	11	0	0	1,472,370	0	0
Commercial	7	0	0	377,140	0	0

Industrial	7	0	0	1,572,860	0	0
Agricultural	172	1	0	1,347,790	5,177	.4%
Religious/ Non-Profit	0	0	0	0	0	0
Government	0	0	0	0	0	0
TOTAL	197	1	.5%	4,770,160	5,177	.1%

City of Ossian

Structure Type:	Number of Structures			Value of Structures		
	In Community	In Hazard Area	% In Hazard Area	\$ Value in Community	\$ Value in Hazard Area	% In Hazard Area
Residential	315	0	0	34,471,730	0	0
Commercial	48	0	0	4,336,303	0	0
Industrial	1	0	0	100,210	0	0
Agricultural	36	0	0	413,010	0	0
Religious/ Non-Profit	5	0	0	NA	0	0
Government	3	0	0	44,930	0	0
TOTAL	408	0	0	35,029,880	0	0

City of Ridgeway

Structure Type:	Number of Structures			Value of Structures		
	In Community	In Hazard Area	% In Hazard Area	\$ Value in Community	\$ Value in Hazard Area	% In Hazard Area
Residential	112	0	0	10,689,210	0	0
Commercial	260	0	0	101,988,114	0	0
Industrial	4	0	0	5,715,720	0	0
Agricultural	37	0	0	1,780,940	0	0
Religious/ Non-Profit	1	0	0	502,480	0	0
Government	8	0	0	2,015,570	0	0
TOTAL	422	0	0	122,692,034	0	0

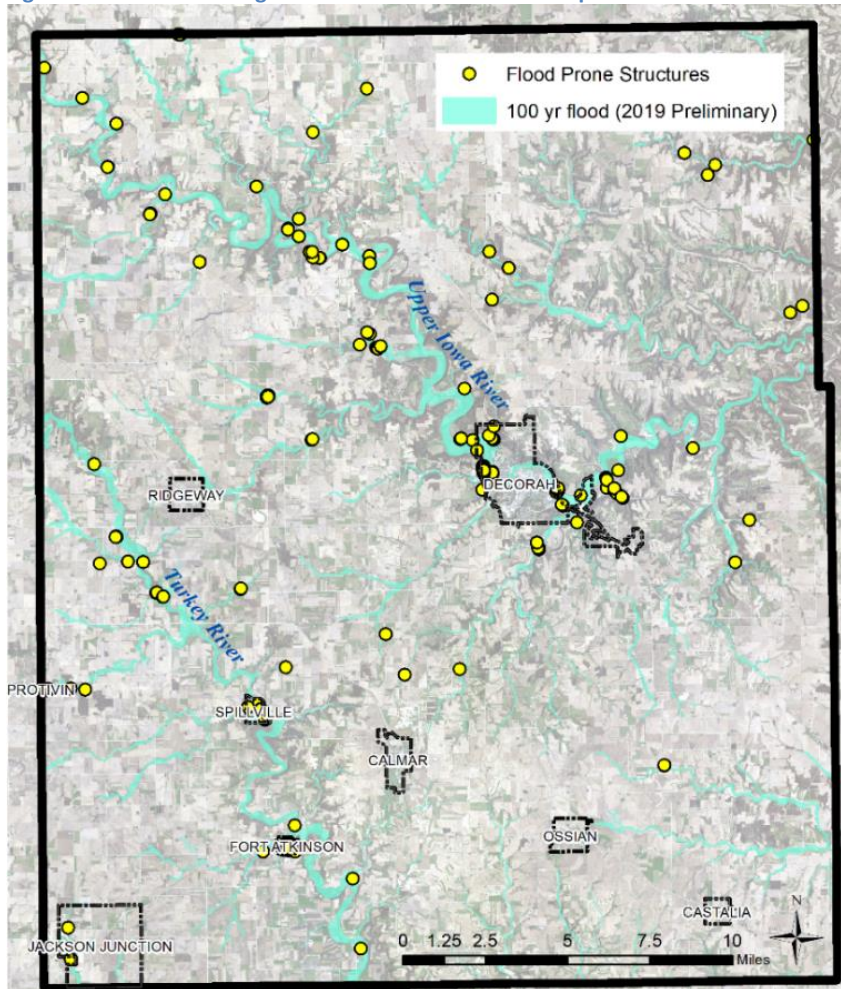
City of Spillville

Structure Type:	Number of Structures			Value of Structures		
	In Community	In Hazard Area	% In Hazard Area	\$ Value in Community	\$ Value in Hazard Area	% In Hazard Area
Residential	183	2	1%	15,305,960	23,087	.2%
Commercial	37	3	8%	840,230	368,594	44%
Industrial	0	0	0	0	0	0
Agricultural	0	0	0	0	0	0
Religious/ Non-Profit	NA	0	0	NA	0	0
Government	6	0	0	195,680	0	0
TOTAL	226	5	2%	16,341,870	391,681	2.4%

Unincorporated Areas

Structure Type:	Number of Structures			Value of Structures		
	In Community	In Hazard Area	% In Hazard Area	\$ Value in Community	\$ Value in Hazard Area	% In Hazard Area
Residential	2,058	36	1.7%	331,871,080	1,672,335	.5%
Commercial	95	7	7.4%	40,878,851	363,192	.9%
Industrial	9	0	0	10,954,230	NA	NA
Agricultural	23,074	80	.3%	286,900,363	2,105,314	0.7%
Religious/ Non-Profit	NA	NA	NA	NA	NA	NA
Government	NA	NA	NA	NA	NA	NA
TOTAL	25,236	123	.5%	670,604,524	4,140,841	.6%

Figure 54: At-Risk Buildings Located in the 100-Year Floodplain



Source: (Federal Emergency Management Agency (FEMA), 2019); (UERPC, 2019)

In reviewing the location of structures in the 100-year floodplain by subwatershed, certain subwatersheds were found to be more vulnerable. The Upper Iowa River and Turkey River basins cover the majority of the County. In the Upper Iowa River basin, the City of Decorah HUC 12 subwatershed had the highest rate of flood prone structures, as shown in Table 30, followed by the Community of Freeport and Ten Mile Creek subwatersheds. In the Turkey River Watershed, the Rogers Creek HUC 12 subwatershed had the highest rate of flood prone structures, followed by the Otter Creek-Turkey River subwatershed, as shown in Table 31. In planning meetings held between HMPC and Upper Iowa River and Turkey River Watershed Authority representatives, it was largely these subwatersheds (or subwatersheds upstream from them) that were focused on for flood mitigation actions.

Table 30: Vulnerable Sub-Watersheds in the Upper Iowa River Basin

HUC 12 Sub-watershed:	# of Structures in 100 Yr. Floodplain	# of Structures Missing Replacement Value	Replacement Value of Structures (for those counted)	Land Use Classification & Replacement Values
<i>City of Decorah</i>	45	5	\$2,757,049	7 Ag (\$222,357) 12 Comm (\$470,046) 25 Res (\$2,064,646)
<i>Ten Mile Creek</i>	16	1	\$278,105	16 Ag (\$278,105)

<i>Community of Freeport</i>	15	0	\$718,574	3 Ag (\$77,979) 1 Comm (\$178,530) 11 Res (\$462,065)
<i>Martha Creek</i>	12	6	\$118,247	5 Ag (\$12,765) 7 Res (\$105,482)
<i>Falcon Springs</i>	11	0	\$210,375	8 Ag (\$201,405) 3 Res (\$8,970)
<i>Trout Creek</i>	7	3	\$223,382	5 Ag (\$49,035) 1 Comm (\$12,566) 1 Res (\$161,781)
<i>Cold Water Creek</i>	6	5	\$7,775	6 Ag (\$7,775)
<i>Silver Creek</i>	5	0	\$257,571	5 Ag (\$257,571)
<i>Daisy Valley</i>	5	2	\$90,541	4 Ag (\$10,544) 1 Res (\$79,997)
<i>Bear Creek</i>	4	0	\$118,876	4 Res (\$118,876)
<i>Pine Creek</i>	3	0	\$45,250	3 Ag (\$45,250)
<i>Canoe Creek</i>	3	1	\$30,466	2 Ag (\$28,346) 1 Res (\$2,120)
<i>Paint Creek</i>	2	0	\$451,210	1 Ag (\$424,990) 1 Res (\$26,220)
<i>Dry Run</i>	2	1	\$407,602	1 Ag 1 Res (\$407,602)
<i>Trout River</i>	2	0	\$ 147,577	1 Ag (\$27,600) 1 Res (\$119,977)
<i>Community of Nordness</i>	0	0	NA	NA
<i>Coon Creek</i>	0	0	NA	NA
<i>North Bear Creek</i>	0	0	NA	NA
<i>North Canoe Creek</i>	0	0	NA	NA
<i>Trout Creek / Trout River</i>	0	0	NA	NA

Table 31: Vulnerable Sub-Watersheds in the Turkey River Basin

HUC 12 Sub-watershed:	# of Structures in 100 Yr. Floodplain	Replacement Value of All Structures	Land Use Classification & Replacement Values
<i>Rogers Creek</i>	41	\$1,996,049	9 Comm (\$449,204) 32 Res (\$1,546,845)
<i>Otter Creek – Turkey River</i>	11	\$176,693	10 Ag (\$168,597) 1 Res (\$8,096)
<i>Burr Oak Creek – Turkey River</i>	8	\$464,626	3 Ag (\$71,285) 4 Comm (\$374,354) 1 Res (\$18,987)
<i>Bohemian Creek</i>	5	\$214,830	2 Ag (\$25,518) 3 Res (\$189,312)
<i>Brockamp Creek</i>	2	\$203,701	2 Ag (\$203,701)
<i>Middle Little Turkey River</i>	2	\$55,071	2 Ag (\$55,071)
<i>Wonder Creek</i>	1	\$4,100	1 Res (\$4,100)
<i>Upper Little Turkey River</i>	1	\$5,177	1 Ag (\$5,177)
<i>Chihaks Creek – Turkey River</i>	0	0	NA
<i>Dry Branch</i>	0	0	NA
<i>Nutting Creek</i>	0	0	NA
<i>Fitzgerald Creek-Turkey River</i>	0	0	NA
<i>Dibble Creek</i>	0	0	NA

Table 32 and Table 33 take the vulnerability analysis a step further by considering both structural and content loss estimates for buildings in the 100-year floodplain, as well as annual average loss for all flood events, sorted by watershed and flood prone community. This data was provided by the Iowa Homeland Security and Emergency Management Department, and took into consideration building design/type (e.g. foundation, stories), occupancy class, building cost, content cost, and damage percentages by building or content loss. All values for the structures are based on current assessed values (structures only, no land) and not based on replacement values. Content cost calculations were 100% of the building for commercial and industrial, and 50% of the building for residential (Iowa Homeland Security and Emergency Mgt., 2019). According to IHSEMD’s loss analysis, combined average annual countywide structure and content loss estimates from flood events in the Upper Iowa River and Turkey River Basins total \$893,410, while 100-year flood loss in both basins could exceed \$20 million.

Table 32: Structure & Content Loss Estimates by Watershed

Upper Iowa River Basin		Turkey River Basin	
<i>100 Year Flood Loss</i>		<i>100 Year Flood Loss</i>	
Building Loss Estimate	\$10,618,938	Building Loss Estimate	\$1,159,762
Content Loss Estimate	\$7,984,999	Content Loss Estimate	\$584,823
Total:	\$18,603,938	Total:	\$1,744,586
<i>Annual Average Flood Loss</i>		<i>Annual Average Flood Loss</i>	
Building Loss Estimate	\$448,822	Building Loss Estimate	\$74,518
Content Loss Estimate	\$332,122	Content Loss Estimate	\$37,946
Total:	\$780,945	Total:	\$112,465

Source Table 32 and Table 33: (Iowa Homeland Security and Emergency Mgt., 2019)

Table 33: Structure & Content Loss Estimates by Flood Prone Jurisdiction

Decorah		Fort Atkinson		Spillville	
<i>100 Year Flood Loss</i>		<i>100 Year Flood Loss</i>		<i>100 Year Flood Loss</i>	
Building Loss Estimate	\$10,014,562	Building Loss Estimate	\$342,887	Building Loss Estimate	\$34,546
Content Loss Estimate	\$4,723,005	Content Loss Estimate	\$116,577	Content Loss Estimate	\$30,350
Total:	\$14,737,567	Total:	\$459,464	Total:	\$64,896
<i>Annual Average Flood Loss</i>		<i>Annual Average Flood Loss</i>		<i>Annual Average Flood Loss</i>	
Building Loss Estimate	\$437,089	Building Loss Estimate	\$19,044	Building Loss Estimate	\$3,775
Content Loss Estimate	\$212,335	Content Loss Estimate	\$6,531	Content Loss Estimate	\$1,982
Total:	\$649,424	Total:	\$25,575	Total:	\$5,757

Some structures in the floodplain areas end up being insured through the National Flood Insurance Program (NFIP). Table 34 reflects NFIP status and Repetitive Loss (RL) Flood Property counts for eligible communities within the Planning Area. The County is currently not participating in the NFIP. Cost and a lack of interest or perceived need are potential reasons for non-participation in the NFIP by certain jurisdictions.

Table 34: NFIP and RL Information, 2019

Participating Jurisdiction	Community Identification (CID) Number	NFIP Status	Repetitive Loss (RL) Properties
City of Decorah	190532	Participating	1
City of Fort Atkinson	190284	Participating	0
City of Spillville	190285	Participating	0

Source: (FEMA, 2019); (IDNR, Bill Cappuccio, Flood Plain Management Engineer, 2019)

Table 35 reflects the National Flood Insurance Program (NFIP) policy statistics and claims within those eligible communities participating in the NFIP. Policies have increased by 22 in Decorah, by 2 in Fort Atkinson, and by 3 in Spillville since the 2015 county hazard mitigation plan update.

Table 35: Winneshiek County NFIP Policy Statistics & Claims, June 2019

Participating Jurisdiction	Policies in Force	Total Coverage (\$)	Total Premium	Total Claims Since 1978	Total Paid Since 1978
City of Decorah	63	\$19,900,400	\$64,125	15	\$169,077
City of Fort Atkinson	6	\$392,000	\$4,381	3	\$11,899
City of Spillville	9	\$291,000	\$3,889	7	\$172,114

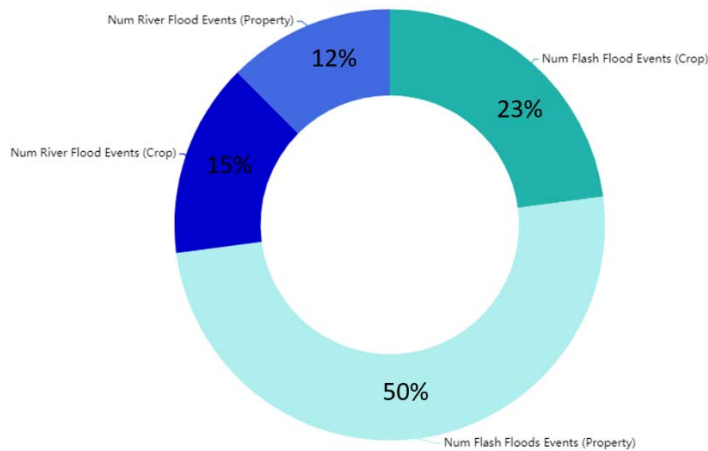
Source: (IDNR, Bill Cappuccio, Flood Plain Management Engineer, 2019)

Historic property, crop and infrastructure losses from flooding demonstrate the ongoing economic impacts and vulnerabilities of floods in the region.

Crop losses related to flooding in the County are significant. According to the USDA Risk Management Agency, insured crop losses in Winneshiek County as a result of flood conditions and excessive moisture from 2013 to 2018 totaled \$26,940,376, an average of \$449,006 per year over the 6-year period (USDA Risk Management Agency, 2007 - 2018). While the NCEI reports that property damages from flooding between 2013 – 2018 totaled \$5,937,000, an average of \$989,500 per year over the same period (National Centers for Environmental Information (NCEI), 2019).

According to the Iowa Homeland Security Emergency Management Dept. (IHSEMD) Hazard Mitigation Viewer website, approximately 50% of flood loss in the county results from river flooding and another 50% results from flash flooding (Iowa Homeland Security and Emergency Mgt., n.d.). Figure 55 demonstrates how IHSEMD damage estimates are impacting either crops or property. Flash floods have a noticeably higher rate of impact to property, and river floods have a slightly higher rate of impact to crops.

Figure 55: % Flash or River Flood Events by Damage Type



Due to the winding, hilly terrain and high number of road miles in the County, many roads intersect with surface water, including stormwater runoff. Bridges and roadways adjacent to water courses or stormwater runoff are often at risk of washouts during large rain events. In the Winneshiek County section of the Upper Iowa River watershed alone there are 12 roads that frequently wash out during large rain events. Flood impacts to county road and bridge infrastructure can have a very high price tag. County Engineers estimated damage to county roads and bridges in the UIR Watershed at \$3.4 million for the 2008 flood, and \$2.1 million for the 2016 flood ([UIR Watershed Plan / Ch. 3 Challenges and Opportunities / 3.1 Increased Flood Frequency / Flood of 2008 3.2.1.5 & Flood 2016 3.2.1.6 + 3.3 Impact of Flooding / 3.3.1.14](#)) (Upper Iowa River Watershed Management Authority, 2019).

Grass and Wild Land Fire

Risk Group 3: Low Risk

Description

Since protecting people and structures takes priority, a wildfire’s cost to natural resources, crops, and pastured livestock can be ecologically and economically devastating. In addition to the health and safety impacts to those directly affected by fires, the state is also concerned about the health effects of smoke emissions to surrounding areas.

Grass and wild land fires in Iowa are frequently associated with lightning and drought conditions, as dry conditions make vegetation more flammable. As new development encroaches into the wild land-urban interface (areas where development occurs within or immediately adjacent to wild lands, near fire-prone trees, brush, and/or other vegetation), more and more structures and people are at risk. On occasion, farmers intentionally ignite vegetation to restore soil nutrients or alter the existing vegetation.

Previous Occurrence

The State of Iowa’s 2018 Hazard Mitigation Plan reports Iowa experienced 2,438 wildfires spanning 69,583 acres from 2013 – 2017. No event reported in the state has been a historically-significant wildfire. When compared to other states, the number of wildfires in Iowa is very small. For the period

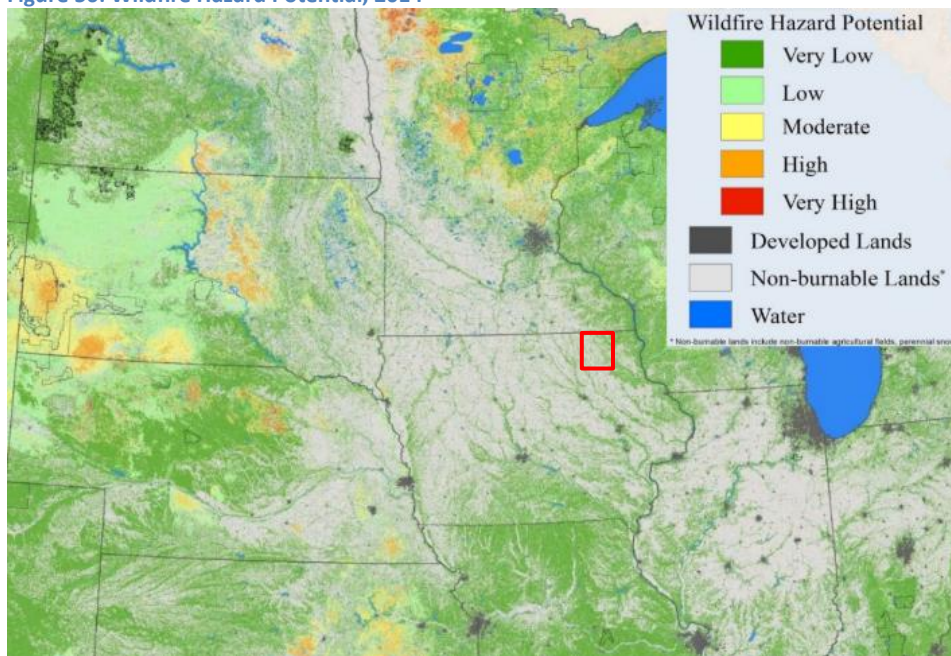
2013 to 2017 Iowa was 34th in number of fires across the U.S. The National Centers for Environmental Information (NCEI) Storm Events Database records no previous occurrences of wildfire specific to Winneshiek County.

Location, Probability and Extent

The Participating Jurisdictions consist of and/or are surrounded by rural area which is vulnerable to grass and wildland fire given the supporting conditions. High winds can turn a small flame into a multi-acre grassfire within a matter of minutes. The extent is dependent upon conditions such as land use/land cover, moisture, and wind. However, previous occurrences would indicate a probability of little chance of a grass and wildland fire occurring in any given year in the county.

The wildfire hazard potential (WHP) map shown in Figure 56, developed by the USDA Forest Service’s Fire Modeling Institute, depicts the relative potential for wildfire that would be difficult for suppression resources to contain. Areas mapped with higher WHP values represent fuels with a higher probability of experiencing torching, crowning, and other forms of extreme fire behavior under conducive weather conditions, based primarily on 2010 landscape conditions. The map does not illustrate what is vulnerable to wildfire, just the locations where wildfire is most likely, or probable, to occur. According to this map Winneshiek County has very low wildfire potential.

Figure 56: Wildfire Hazard Potential, 2014



(USDA Forest Service, 2014)

Summary of Vulnerability and Potential Losses

According to the 2018 Iowa Hazard Mitigation Plan, Iowa and Illinois have the smallest percentage of wildland in all of the United States. Northeast Iowa is one of the few areas with more wildland relative to the rest of the state. However, wildfire potential in the county is still very low and there are few urbanized or highly developed areas vulnerable to wildfires, it being a more rural area.

Should wildfire occur, property damage is usually limited to grass, small trees, agricultural fields, etc.

Hailstorm

Risk Group 1: High Risk

Description

Hailstorms in Iowa cause damage to property, crops, and the environment, and harm livestock. Because of the large agricultural industry in Iowa, crop damage and livestock losses due to hail are of great concern to the state. Even relatively small hail can cause serious damage to crops and trees. Vehicles, roofs of buildings and homes, and landscaping are the other things most commonly damaged by hail. Hail has been known to cause injury and the occasional fatality to humans, often associated with traffic accidents.

Hail is associated with thunderstorms that can also bring powerful winds and tornadoes. A hailstorm forms when updrafts carry raindrops into extremely cold areas of the atmosphere where they condense and freeze. Hail falls when it becomes heavy enough to overcome the strength of the updraft and is pulled by gravity towards the earth. The onset of hailstorms is generally rapid. Table 36 describes typical damage impacts due to various sizes of hail.

Table 36: Tornado and Storm Research Organization Hailstorm Intensity Scale

Intensity Category	Diameter (mm)	Diameter (inches)	Size Description	Typical Damage Impacts
Hard Hail	5	0.2	Pea	No damage
Potentially Damaging	5-15	0.2-0.6	Mothball	Slight general damage to plants, crops
Significant	10-20	0.4-0.8	Marble, grape	Significant damage to fruit, crops, vegetation
Severe	20-30	0.8-1.2	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
Severe	25-40	1.0-1.6	Pigeon's egg > squash ball	Widespread glass damage, vehicle bodywork damage
Destructive	30-50	1.2-2.0	Golf ball > Pullet's egg	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
Destructive	40-60	1.6-2.4	Hen's egg	Bodywork of grounded aircraft dented, brick walls pitted
Destructive	50-75	2.0-3.0	Tennis ball > cricket ball	Severe roof damage, risk of serious injuries
Destructive	60-90	2.4-3.5	Large orange > Softball	(Severest recorded in the British Isles) Severe damage to aircraft bodywork
Super Hailstorms	75-100	3.0-4.0	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Super Hailstorms	>100	4.0+	Melon	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: (TORRO, 2019)

Note: In addition to hail diameter, factors including number and density of hailstones, hail fall speed and surface wind speeds affect severity.

Previous Occurrences

The National Centers for Environmental Information (NCEI) Storm Events Database reports 135 hail events in Winneshiek County from 1998-2018. Table 37 shows, by the size of hail, the number of hail reports in Winneshiek County from 1998 to 2018.

Table 37: Reports of Winneshiek County Hail, 1998-2018

Hail Size (inches)	Number of Reports, 1998-2018
0.75	43
0.88	13
1.00	42
1.25	6
1.50	4
1.75	20
2.00	4
2.25	0
2.50	0
2.75	2
3.00	0
4.25	1

Source: (National Centers for Environmental Information (NCEI), 2019) *Note: There can be multiple reports of hail within the same storm*

Notable hailstorm event details affecting Winneshiek County provided by the NCEI are summarized below:

- **May 15, 2017.** Severe thunderstorms moved across northeast Iowa during the evening of May 15th...Large hail was also common with Fort Atkinson getting hit especially hard. The large hail shredded the siding and damaged the roofs on an estimated 70 to 80 percent of the buildings in the town.
- **June 29, 2014.** Severe thunderstorms developed during the evening of June 29th ahead of a cold front. As these storms moved across northeast Iowa they produced large hail and damaging winds....In Calmar (Winneshiek County), several trees were blown down and golf ball sized hail damaged several vehicles. Golf ball sized hail fell in Fort Atkinson.
- **August 9, 2012.** A line of thunderstorms along a cold front moved across Northeast Iowa during the late afternoon hours on August 9th. The thunderstorms produced hail up to egg size near Decorah and wind gusts of 70 miles per hour near Calmar.
- **July 24, 2009.** This was the second round of large hail to fall in five hours, damaging many of the same fields and properties. Clusters of severe thunderstorms generated by an approaching cold front affected part of northeast Iowa during the afternoon and early evening of July 24. Reports of hail up to 2 inches in diameter were common from storm spotters, law enforcement officials and the public, with a report of close to softball size hail near Ossian. Winneshiek County...Two sets of storms about five hours apart hit Fayette and Winneshiek Counties exceptionally hard with hail damage to buildings and many corn and bean fields stripped clean. In Winneshiek County, loss was estimated at 30,000 acres. Total damage costs combined with Fayette and Winneshiek Counties could have reached \$169 million. The Farm Service Agency director said both counties were decimated by the storm damage.
- **June 28, 2008.** An upper level disturbance moved across portions of northeast Iowa during the early afternoon hours on June 28th. Scattered severe thunderstorms developed across parts of northeast Iowa and produced nickel to one inch size hail. A trained spotter reported penny to nickel size hail covering the ground. They also reported small branches down and extensive crop damage.
- **July 31, 2003.** Numerous reports of large hail were received from storm spotters, amateur radio operators, law enforcement officials and the general public. Hail ranged in size from dimes to

golf balls and ping-pong balls. Several farmers reported severe hail damage to corn and soybean fields. There were also several vehicles damaged by the large hail.

- **April 18, 2002.** Numerous reports of large hail were received from law enforcement officials, storm spotters and the public. The hail ranged in size from dimes to as large as golf balls.
- **June 15, 2000.** Spotters and law enforcement officials estimated wind gusts as high as 70 mph, which blew down trees and power lines. Hail the size of dimes and nickels was also reported.

Location, Probability and Extent

The entire planning area is at risk to hailstorms, but certain communities have historically experienced more. Table 38 illustrates how many hail events participating jurisdictions in the county experienced between 1998 – 2018 (National Centers for Environmental Information (NCEI), 2019).

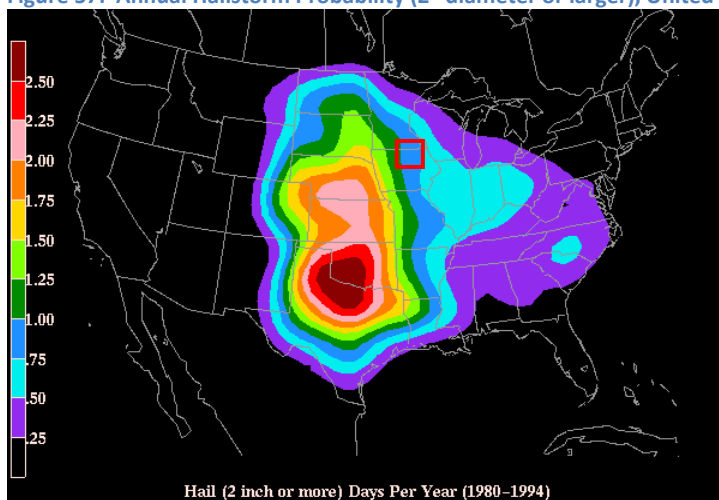
Table 38: Hail Events by Jurisdiction (1998 - 2018)

Community	# Hail Events
Decorah	35
Calmar	26
Ridgeway	10
Castalia	7
Fort Atkinson	7
Jackson Junction	6
Spillville	5

Based on NCEI data, there were 135 hail reports in Winneshiek County between 1998 and 2018, an average of 6.3 each year. However, it is important to note that there can be multiple reports of hail within the same storm. Overall there were 49 days with hail events in the same period. Hail reports indicate hail 1.75 inches and larger occurred 27 times over the same 21-year period. There were seven reports during this period of hail two inches or larger.

Figure 57 reflects the United States’ probability of hailstorm occurrence, 2” diameter or larger, based on number of days per year within a 12.5 mile radius of a given point on the map, from 1980 to 1994.

Figure 57: Annual Hailstorm Probability (2” diameter or larger), United States, 1980-1994



Source: (National Severe Storms Laboratory, 2011)

Winneshiek County is located where the probability of a hailstorm with hail two inches or more is between .75 and 1 days per year. There has been one USDA disaster declaration from hail in the past 10 years. Given the information at hand, the probability of a hailstorm in the county is highly likely.

Summary of Vulnerability and Potential Losses

In addition to concerns for public safety, assets that are vulnerable to hail damage include crops and built structures. Of these, crop damage from hailstorms is the most common and the most costly. Large hail can devastate crops that are at vulnerable stages in the plant/harvest cycle, and it is possible for a great percentage of crop yields to be lost as a result of even a single hail event. Structural damage to roofs, siding and windows occurs frequently with hail and is usually covered under private insurance. According to the National Centers for Environmental Information (NCEI) Storm Events Database, the 135 hail events in Winneshiek County between 1998 – 2018 resulted in approximately \$5 million in property damages and \$9 million in crop damages.

Personal injury, although rare, can also occur as a result of very large hail if individuals are outdoors during a hail event. Planners were not able to attain information on personal injury resulting from hail.

Hazardous Materials

Risk Group 2: Medium Risk

Description

This hazard incorporates Fixed Hazardous Materials Incidents, Pipeline Transportation Incidents, and Hazardous Materials Transportation Incidents. This includes 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 Materials (HAZMAT) Incident is the accidental release of chemical substances or mixtures, which presents a danger to the public health or safety, during production or handling at a fixed facility. 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 as many as 500,000 products pose physical or health hazards and can be defined as “hazardous chemicals.” Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive.

A HAZMAT Transportation Incident is the accidental release of chemical substances or mixtures, which presents a danger to the public health or safety, during transport via air, roadway, railway, or waterway.

Previous Occurrences

From 2000 to 2019, the Iowa Department Natural Resources (DNR) reports 86 hazardous spills in Winneshiek County (Iowa DNR, 2020). Of those, 28 (or 33%) were transportation spill or railroad incidents. The Iowa DOT ICAT (Crash Analysis Tool) records up to 109 vehicle accidents in the county between 2008 – 2018 that were categorized as possibly involving hazardous materials (while only one of those accidents was confirmed to have released HAZMAT). There were six railway accidents in the

county between 1998 – 2018 (Federal Railroad Administration, Office of Safety Analysis, 2019), two of which involved hazardous materials (Iowa DNR, 2020).

The US DOT National Pipeline Mapping System Public Viewer records no gas or hazardous liquid pipeline accidents in Winneshiek County.

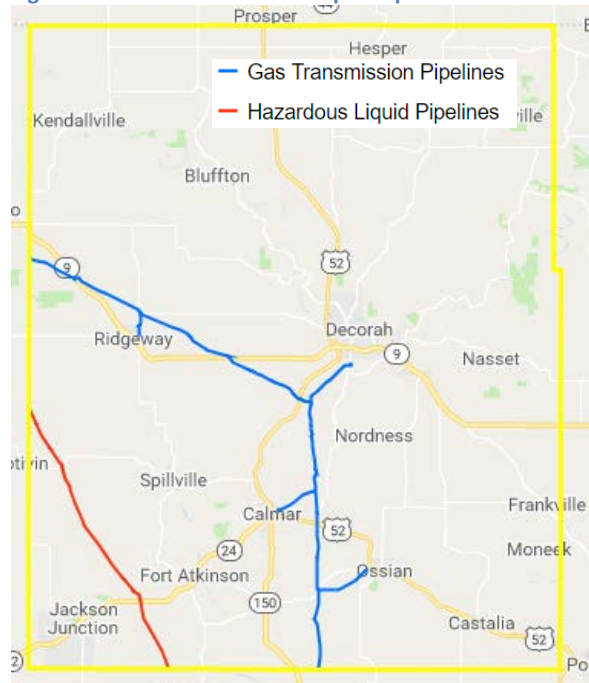
Location, Probability and Extent

In the event of a HAZMAT incident, most are localized and are quickly contained or stabilized by the highly trained fire departments and HAZMAT teams. Depending on the characteristic of the HAZMAT 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. The occurrence of a HAZMAT incident many times shuts down transportation corridors for hours at a time while the scene is stabilized, the product is off-loaded, and reloaded on a replacement container. More widespread effects occur when spilled product contaminates the municipal water supply or water system such as a river, lake, or aquifer.

Despite increasing safeguards, more and more potentially hazardous materials are being used in commercial, agricultural, and domestic uses and are being transported on Iowa roads and railways. Given the history of previous occurrences in Winneshiek County and the increase in hazardous material moving through the county, it is probable that future HAZMAT incidents could occur.

Pipelines - There are 35 miles of transmission pipelines for gas and 14 miles of transmission pipelines for hazardous liquids in Winneshiek County (Pipeline and Hazardous Materials Safety Administration, 2019). Figure 58 illustrates their location in the county, and the communities served in the case of natural gas.

Figure 58: Gas and Hazardous Liquid Pipelines



Source: (Pipeline and Hazardous Materials Safety Administration, 2019)

Fixed HAZMAT Sites - The fixed HAZMAT sites are filled by highway tankers, so hazardous materials are frequently on Winneshiek County roadways. There are peak periods for certain agricultural chemicals and heating products, but hazardous materials are a risk year-round. There are 33 sites in Winneshiek County that because of the volume or toxicity of the materials on site are designated as Tier Two facilities under the Superfund Amendments and Reauthorization Act. All communities in the county, with the exception of Castalia, have at least one Tier II site (Iowa DNR, 2019). The largest community, Decorah, has five Tier II sites.

HAZMAT Transportation - The Participating Jurisdictions are located along U.S., State, or County Highways and the transportation of hazmat will often stay on these main roads for travel efficiency as much as possible. Thus, all communities in the county have the potential of being exposed to hazardous materials should a transportation incident occur.

The Canadian Pacific/Dakota, Minnesota & Eastern Railroad (DME) operates in Winneshiek County, passing through the communities of Jackson Junction, Fort Atkinson, Calmar, Ossian and Castalia. Some of the products handled by the rail, including certain chemicals and allied products and waste products, are considered hazardous should an accident occur.

Summary of Vulnerability and Potential Losses

Immediate dangers from hazardous materials include fires and explosions. The release of some toxic gases may cause immediate death, disablement, or sickness if absorbed through the skin, injected, or inhaled. Some chemicals cause painful and damaging burns if they come in direct contact with skin. Contamination of air, ground, or water may result in harm to fish, wildlife, livestock, and crops. The release of hazardous materials into the environment may cause debilitation, disease, or birth defects over a long period of time. A HAZMAT accident can occur almost anywhere, so any area is considered vulnerable to an accident. People, pets, livestock, vegetation, structures and infrastructure in close proximity to facilities, rail or roadways producing, storing, or transporting hazardous substances are at higher risk.

Concern over the increase in rail traffic carrying potential hazardous materials was expressed by several communities in the county. The Canadian Pacific Railroad runs through the southern part of the county through five communities and trains can be carrying chemicals and waste products. Derailments and collisions with vehicles can cause spills of these products. Depending on where accidents might occur, an incident could impact communities anywhere from 58 people in Jackson Junction to 978 people in Calmar. In addition, there are schools within a quarter mile of the rail line in Jackson Junction, Calmar and Ossian. Table 39 indicates the number of children, pre-K through 12th grade potentially at risk in each community.

Table 39: Potential Student Exposure to Railway Incidents

Community:	School District(s):	Enrollment in Community:
Calmar	South Winneshiek HS	192
Jackson Junction	Turkey Valley	342
Ossian	South Winneshiek MS & Elem, St. Teresa of Calcutta	401

Source: (Iowa Department of Education, 2018 - 2019)

Human Disease

Risk Group 2: Medium Risk

Description

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

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). As of 2018, there were 74 infectious diseases that are designated as notifiable at the national level. 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 (Centers for Disease Control and Prevention, 2018). Table 40 lists the more numerous cases of acute infectious diseases found in Iowa.

Table 40: Top Acute Diseases Reported in Iowa, 2019

Infectious Disease:	Reported Cases:	Infectious Disease:	Reported Cases:
Campylobacteriosis	1,293	Lyme Disease	296
Salmonellosis	774	Hepatitis B	260
E-Coli	545	Giardiasis	240
Cryptosporidiosis	516	Pertussis	219

Source: (Iowa Dept. of Public Health (IDPH), 2019)

A pandemic human disease is defined as a disease that has spread around the world to many people, causing illness in a person on nearly every continent. Examples include HIV/AIDS/Influenza.

Previous Occurrences

The Iowa Department of Public Health identifies the following common reportable diseases for Winneshiek County (Iowa Dept. of Public Health (IDPH), 2017):

Disease:	Reported Cases:	Disease:	Reported Cases:
Cryptosporidiosis	16	Lyme Disease	8
Campylobacteriosis	15	Salmonellosis	6
Mumps	11		

There have been annual outbreaks of influenza that have affected Iowans. IDPH reports show that the peak impact of the various strains of the flu occur from January through March with an occasional occurrence from August through October.

Location, Probability and Extent

Human disease can occur anywhere within the planning area.

The Iowa Department of Public Health tracks epidemiological statistics in Iowa. Public health agencies work to protect Iowans from infectious diseases and preserve the health and safety of Iowans through

disease surveillance, investigation of suspect outbreaks, education and consultation to county, local and health agencies. Historically pandemics occur every 30 years.

Summary of Vulnerability and Potential Losses

Typically people who become ill are the elderly, the very young and people with chronic medical conditions and high risk behaviors. Table 41 identifies these populations within Winneshiek County where data was available.

Table 41: Vulnerable Population Data for Winneshiek County

	Number	Percent
Population 65 years and over	3,843	18.7%
Population 5 years and younger	920	4.5%

Source: (U.S. Census Bureau, ACS 2013 - 2017, 2017)

Infrastructure Failure

Risk Group 1: High Risk

Description

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

Communication failure is the widespread breakdown or disruption of normal communication capabilities. 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.

Energy failure is an extended interruption of service of either electric, petroleum or natural gas, which by an actual or impending acute shortage of usable energy. Disruptions and failures 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 collapse (part or all) of any public or private structure including roads, bridges, towers, and buildings is considered a structural failure. A road, bridge, or building may collapse due to the failure of the structural components or because the structure was overloaded. Natural events such as heavy snow may cause the roof of a building to collapse (under the weight of snow). Heavy rains and flooding can undercut and washout a road or bridge. The age of the structure is sometimes independent of the cause of the failure.

An uncontrolled structural fire in populated areas that threatens life and property may be 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.

Previous Occurrence

No widespread communication failures have occurred in Iowa. 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. In 2007 ice storms and a blizzard caused power outages throughout the western part of the county as power lines were damaged. Local communication failures are likely to affect small areas of a county. Some areas in Winneshiek County, especially those located in valleys, experience communication disruptions frequently.

There have been several sporadic structural failures in Winneshiek County, especially roads and bridges, many due to flooding. Structural deficiencies have caused the closure of 16 bridges since 2000. Of those 16, seven remain closed and two have no plans to be replaced. Four structures have collapsed, three because they were struck by a vehicle and one due to deterioration. Fortunately, this bridge was closed just days before it collapsed (Winneshiek County Engineer's Office, 2019). Structural fires are a regular occurrence in Winneshiek County, as with all counties. Nearly all are quickly extinguished by on-site personnel or local fire departments.

Location, Probability and Extent

Communications, energy and structural failures, as well as fires, can occur in any area of the county for a variety of reasons.

Communication Failure - Previous occurrences would indicate no probability of a major communications failure occurring in any given year, but a high probability of road or bridge failure. Localized incidents of communication failure due to weather, etc. are likely to occur on a yearly basis, but it is unlikely that these incidents would last long-term. Widespread communication losses are unlikely due to backup systems and redundant system designs.

Energy Failure - Natural events, human destruction, price escalation, and national security energy emergencies can cause unavoidable energy shortages. The State of Iowa and the federal government have strategies to limit the likelihood of an energy shortage or failure and keep energy supply and demand in check. Storm-related energy failures may impact a few homes or the entire community and surrounding areas. But because the distribution systems are very developed, local shortages can quickly be covered.

Structure Failure - The cause of structure failure is often found in deficiencies of design, material, or inspection. With the aging structures in Winneshiek County structural failures will continue to occur. Efforts to inspect and maintain these structures will lessen the probability of a failure.

Structural Fire - Much of the fire prevention efforts have gone into nonresidential fires and the results have been highly effective. However, even with an increase in the prevention efforts in residential fires, both residential and nonresidential fires will continue to occur. Structural fires with the potential to

exceed local fire department response resources and their mutual aid partners are unlikely in any given year.

Summary of Vulnerability and Potential Losses

Communication Failure Vulnerability - Communication failure could include 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 systems to effectively protect citizens. Business and industry rely on continuous communications to conduct business.

Energy Failure Vulnerability - Because Iowa is almost entirely dependent on out-of-state resources for energy, 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. Agricultural, industrial, and transportation sectors are also vulnerable to supply, consumption, and price fluctuations. Individual consumers such as commuters are also vulnerable.

Extended interruption of electric, petroleum or natural gas service could also create potential safety and health problems for county residents, who rely on these for heating, cooling, cooking, etc...

Structure Failure Vulnerability - The impacts of the failed structure would be contained to the immediate area and adjacent properties. This could be as small as a house with a fallen chimney, or the area could be relatively extensive if the structure that failed was a multi-story building or bridge. Dam and levee failures would affect a much larger area and are discussed as separate hazards.

Table 42 summarizes the amount of each type of structure in the county.

Table 42: Structure Inventory

Structure Type:	Amount:
Roads	1,175 miles
Bridges	351 (includes NBI bridge listings) ⁷
Buildings	Over 8,000 (does not include agricultural buildings) ⁸
Towers	30 ⁹

Nearly 42% of the dwellings in the county were built prior to 1940. Older homes are at increased risk of structural failure. Bridges are a concern as over 21% are ranked in poor condition (U.S. DOT , 2018).

Structural fires can and do occur in the county. Rural areas are especially susceptible to total losses given the distance a fire department might need to travel to respond.

⁷ Source: (U.S. DOT , 2018)

⁸ Source: (Winneshiek County, GIS Coordinator. (2019))

⁹ Source: (Federal Communications Commission, n.d.)

Landslide

Risk Group 3: Low Risk

Description

Landslides occur when susceptible rock, earth, or debris moves down a slope under the force of gravity and water. Landslides may be very small or very large, and can move at slow to very high speeds. A natural phenomenon, small scale landslides have been occurring in slide-prone areas of Iowa long before human occupation. New landslides can occur because of rainstorms, fires, earthquakes, and various human activities that modify slope and drainage.

Previous Occurrences

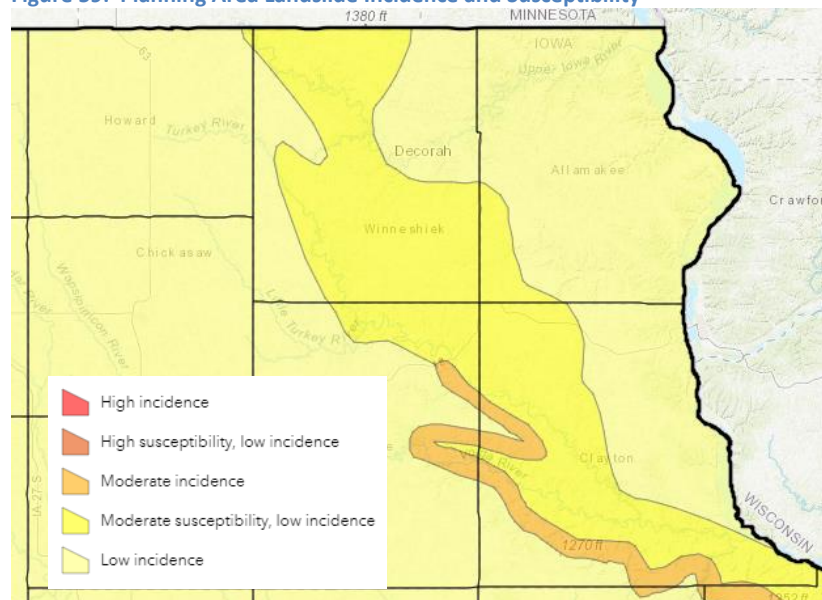
There have been numerous small-scale landslide events in Iowa, none resulting in injury or death. The geographic extent of the historic events has been limited to less than a city block in size and has “run out” over the stretch of less than 100 yards.

No known agency documents historical data on landslides, so county level data was difficult to attain. The best available data was personal knowledge of the HMPC, particularly the Winneshiek County Emergency Coordinator and Winneshiek County Engineer. It was noted that numerous landslides have occurred in the past, but not on a regular basis.

Location, Probability and Extent

The participating cities of Calmar, Castalia, Decorah, Fort Atkinson, Ossian, Ridgeway and Spillville are located in an area considered ‘moderate susceptibility – low incidence.’ These cities have locations where landslides are a risk with the characteristics of underlain rock and hilly terrain and bluff. The area shaded dark yellow in Figure 59 shows where landslides would be most likely to occur in Winneshiek County, particularly where structures overlook valleys and steep ravines, though incidence is still low. The City of Jackson Junction is located in an area that has a low landslide incidence.

Figure 59: Planning Area Landslide Incidence and Susceptibility



Source: (Iowa Homeland Security and Emergency Mgt., n.d.)

Given the insignificance of past landslides and landslide incidence and susceptibility information there is a low probability of a significant landslide event occurring in any given year.

Summary of Vulnerability and Potential Losses

A portion of the state is moderately susceptible to landslides; in northeastern Iowa, along the Silurian Escarpment you can find blocks of dolomite slumped onto the underlying Maquoketa Shale which creates situations vulnerable to landslides.

In Iowa, landslides occur on a localized scale. Injuries and deaths are very unlikely except in the case of undetected slope failure warning signs in structures overlooking steep slopes. Property damage would be limited to a very small percentage of structures. Infrastructure damages would be more significant. Utilities such as pipelines, cables, power poles, etc. are often vulnerable to downward movements of the soil. Transportation routes can be disrupted.

Levee Failure

Risk Group 2: Medium Risk

CRS Step 4(b)(1)a.

4(b) Plan includes assessment of less frequent floods

4(b)(1)a. Prepare an inventory of levees that would result in a flood of developed areas if they failed or were overtopped during a flood

4(b)(2) Map the area(s) affected

4(b)(3) Summarize hazard(s) in lay terms

Description

The failure of a levee can be attributed to the loss of structural integrity of a wall, dike, berms, or elevated soil by erosion, piping, saturation, or under seepage causing water to inundate dry areas.

Previous Occurrences

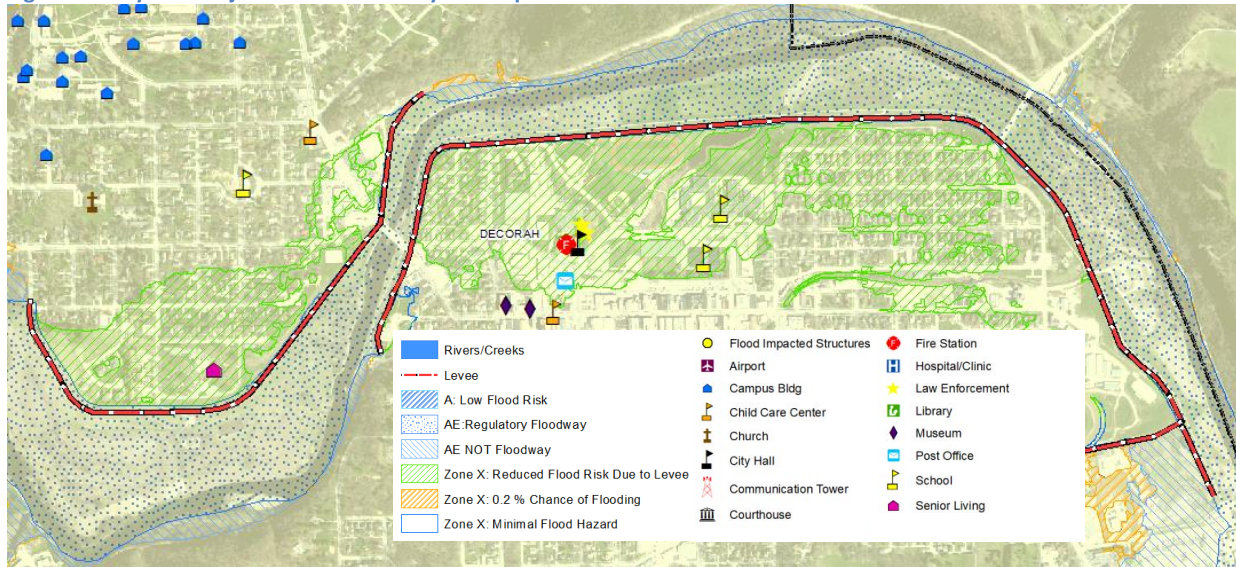
There have been no previous occurrence of levee failure of the Dry Run Project Levees in Decorah. While the water was believed to be close to overtopping the levee in 2008, the levee did serve its purpose of holding back water from inundating the city.

The lowest point of the dike in Fort Atkinson is near the junction of Rodgers Creek Road; that is where the City prioritizes sandbags when flooding is a risk. With those sandbags in place, the water overtopping the levee is less likely, but occurs with extreme flooding (with two occurrences since 1960).

Location, Probability and Extent

The City of Decorah has the Dry Run Flood Control Project (Army Corps of Engineers Levee System) known as the Dry Run Project. The Dry Run Project includes earthen levees to protect Decorah from flooding of the Upper Iowa River and an intermittent tributary stream – Dry Run. Approximately three miles of the levees are located along the Upper Iowa River in Decorah, as illustrated in Figure 60 below. Should the Dry Run Project levee fail, areas south of the levee that could be impacted include single family residential development, schools, city hall, police and fire departments, and post office facilities.

Figure 60: Dry Run Project Levees & Nearby Development



The City of Fort Atkinson also has an earthen levee built by a railroad company in the 1940's to protect the rail stockyard from Rodgers Creek flooding events. The earthen dike in Fort Atkinson is located on the southwest side of town and is approximately ½ mile long. It begins near the intersection of Rodgers Creek Road and County Highway W14 and was built along Rodgers Creek to the southeast until the bridge on Highway 24 crosses Rodgers Creek.

The rate of failure of a levee or floodwall is difficult to predict, and sudden failure is a possibility. Proper design and construction can limit the probability of a levee failure. Given that the Dry Run Project Levees in Decorah withstood the historic river crests in 1993 and 2008 and the dike in Fort Atkinson has only been overtopped twice in 50 years, the probability of future occurrence is unlikely.

Summary of Vulnerability and Potential Losses

Residents behind levees often have a false sense of security. If the actual risk is not communicated to the residents, the impacts of a failure could be devastating. In an urban setting the severity and duration may be important for life safety and health reasons, but in an agricultural area for economic reasons. In Decorah, the police department, fire department, and a water treatment facility, and many other vital structures could be affected by levee failure.

Water bursting through a narrow levee breach is moving much faster than the floodwaters in the main channel. The breaking out of this front water and its fast flow can cause more destruction to structures behind the levee than floodwaters in the main channel would have caused. A failed levee continues to cause damage long after it breaks. The breach allows large volumes of water to enter formerly dry areas, forming temporary lakes. Such lakes do not go away immediately, because the lake is blocked from returning to the main channel by levee segments that were not destroyed. Consequently, the water level drops along the main river days before it drops behind breached levees. Often, pumps behind the levees are needed to remove floodwaters that breach the levees. This alleviates some of the impacts associated with levee failures.

Due to these issues, and despite no known historic incidents of failure, the City of Decorah expressed concerns regarding potential vulnerability of the community should the Dry Run Project levee fail unexpectedly, and the need to understand more about the current structural integrity of the levee. These risks are communicated further in Decorah's jurisdictional section.

Radiological

Risk Group 3: Low Risk

Description

This hazard covers events of fixed radiological incidents and transportation radiological incidents. This includes an incident resulting in a release of radiological material in route or at a fixed facility such as a power plant or hospital. 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.

The term "nuclear accident" has no strict technical definition, but generally refers to events involving the release of significant levels of radiation. Most commercial nuclear facilities in the United States were developed in the mid-1960s and are designed to withstand aircraft attack and should withstand most natural hazards even though they may not have been specifically designed to do so.

Transportation incidents are described as an incident resulting in a release of radioactive material during transport. Transporting radioactive materials through Iowa over the interstate highway system is considered a radiological hazard and 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. Two types of radioactive materials are shipped over the interstate highways, low level and high level waste. Low level waste consists of materials that have been contaminated by low level radioactive substances, but generally pose no serious threat except through long term exposure. 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.

Previous Occurrences

An occurrence of this nature would occur within a certain perimeter of the location of an incident, either a fixed or transportation-based incident.

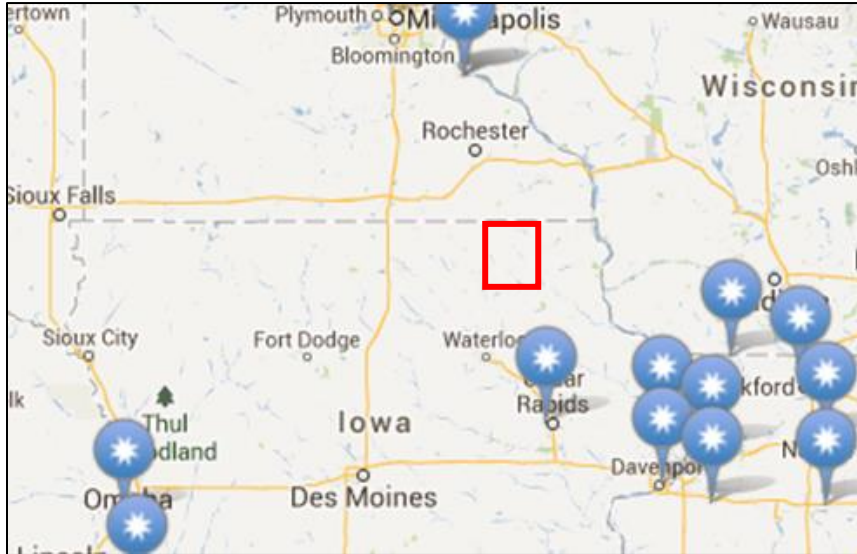
No incidents related to a release of radioactive materials beyond plant walls have been noted in the plants nearest the county. In over 50 years of nuclear power production in the U.S., no deaths or injuries from radiation have been recorded among the general public.

Since 1990, hundreds of radioactive shipments have been made through Iowa. There have been no occurrences of a radiological transportation incident in Iowa. Transportation accidents are the most common type of incident involving radioactive materials because of the sheer number of radioactive shipments. The rail and highway routes used in Iowa largely follow the interstate highway system; however state highways are also used in the transportation of this material.

Location, Probability and Extent

The nuclear facilities nearest Winneshiek County include the Prairie Island Nuclear Facility in southeastern MN in Welch, and the Duane Arnold Energy Center in Palo, IA. Figure 61 illustrates the locations of plants in and around Iowa.

Figure 61: Operating Nuclear Power Reactors in and Around Iowa



Source: (U.S. NRC, 2013)

Previous occurrences would indicate no probability that a radiological incident will occur in any given year. Operators of facilities that use radioactive materials and transporters of radioactive waste are closely regulated by a variety of federal, state and local organizations, making the likelihood of an incident remote.

Summary of Vulnerability and Potential Losses

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.

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. 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.

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.

Each of the nuclear facilities in the country identifies a 10-mile radius Emergency Planning Zone and a 50-mile radius Ingestion Pathway Zone; Winneshiek County sits beyond these zones in the plants

nearest it, so local vulnerability to fixed plant incidents is low. In addition, the rail and highway routes used in Iowa for transportation of nuclear waste largely follow the interstate highway system, of which there are none in the Northeast Iowa region.

Severe Winter Storm

Risk Group 1: High Risk

Description

Winter storms in Iowa typically involve snow, extreme cold, and/or freezing rain (ice storms). These conditions pose a serious threat to public safety, disrupt commerce and transportation, and can damage utilities and communications infrastructure. Winter storms can also disrupt emergency and medical services, hamper the flow of supplies, and isolate homes and farms.

The National Weather Service describes different types of winter storm conditions as follows:

- **Blizzard** – Winds of 35 mph or more with snow and blowing snow reducing visibility to less than 1/4 mile for at least three hours.
- **Blowing Snow** – Wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- **Snow Squalls** – Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.
- **Snow Showers** – Snow falling at varying intensities for brief periods of time. Some accumulation is possible.
- **Freezing Rain** – Measurable rain that falls onto a surface whose temperature is below freezing. This causes the rain to freeze on surfaces, such as trees, cars, and roads, forming a coating or glaze of ice. Most freezing rain events are short lived and occur near sunrise between the months of December and March.
- **Sleet** – Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects.

Wind can greatly amplify the impact of cold ambient air temperatures and accordingly, the severity of winter storms.

Duration of the most severe impacts of winter storms is generally less than one week, though dangerous cold, snow, and ice conditions can remain present for longer periods in certain cases. Weather forecasts commonly predict the most severe winter storms at least 24 hours in advance, leaving adequate time to warn the public.

Previous Occurrences

The National Centers for Environmental Information (NCEI) Storm Events Database states that 82 winter weather or winter storm events were reported between 1998 – 2018. Summaries of selected winter storm events available from the NCEI are listed below:

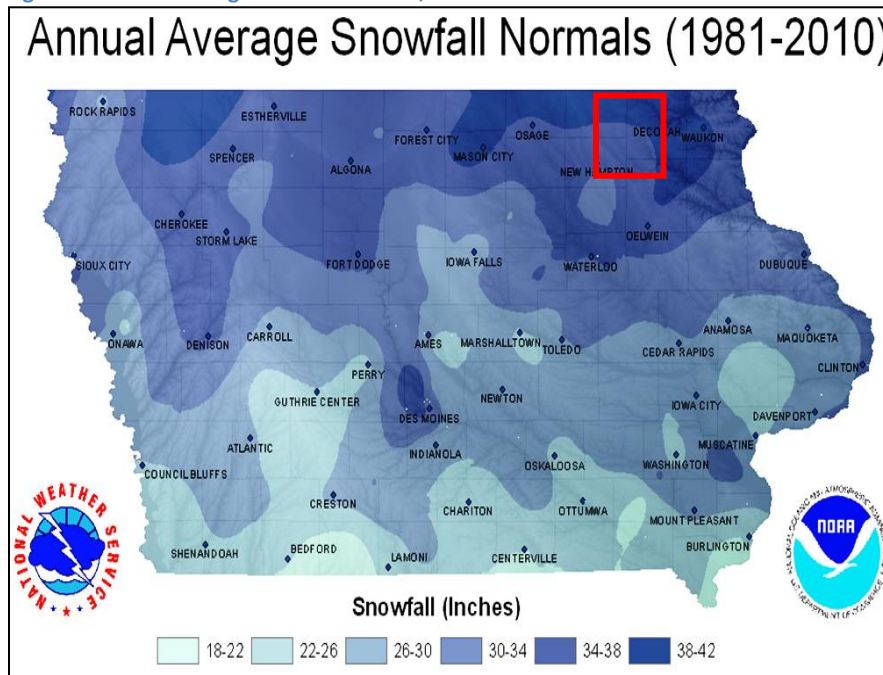
- **February 3, 2018.** Two sisters were killed in a two vehicle accident that occurred on slippery roads as a result of snow that fell two days prior to the accident. Roads were still partially snow covered and slippery at the time of the accident. The driver of one vehicle lost control, crossed the center line and was sliding sideways when struck by the second vehicle. The two sisters that were killed were in the first vehicle along with three brothers who all sustained injuries in the accident. The driver of the second vehicle also was injured as a result of the crash.
- **February 20, 2011.** Freezing rain developed across the county during the early morning hours of the 20th with ice accumulations up to a quarter of an inch on exposed surfaces. The freezing rain then changed over to snow with storm total accumulations of 1 to 3 inches through the 21st. The ice accumulations were responsible for downed power and telephone lines, vehicle accidents and school cancellations. Power outages were reported throughout the county affecting over 1000 customers.
- **January 28, 2011.** A light snow event on the 28th transitioned to freezing drizzle before ending during the early morning hours of the 29th. The freezing drizzle created icy roads and six people were injured in an accident on U.S. Highway 52 south of Decorah (Winneshiek County).
- **February 23, 2007.** A combination of freezing rain, sleet and heavy snow, virtually paralyzed northeast Iowa. Widespread power outages and tree damage were caused by ice accumulations of 1 to 2 inches. Several roads had downed power lines across them and in fact, thousands of power poles were downed due to ice. Heavy snow also accompanied the storm. Accumulations ranged from 6 to 18 inches, with highest totals near the Minnesota-Iowa border. Some of the highest totals included 18.8 inches near Decorah. Thousands of people were without power for several days and emergency shelters were provided to accommodate those needing assistance. Travel was dangerous or impossible throughout northeast Iowa.

There has been one USDA declared disaster issued because of a winter storm in Winneshiek County, including the Participating Jurisdictions; the declared disaster was in effect from February 23 – March 2, 2007.

Location, Probability and Extent

The entire State of Iowa is vulnerable to heavy snow and freezing rain. The extreme northern portion of Winneshiek County is among the region that receives the greatest average annual snowfall, but the majority of Winneshiek County receives an average annual snowfall of 34 to 42 inches per year. Figure 62 reflects the State of Iowa average annual snowfall from 1981 to 2010.

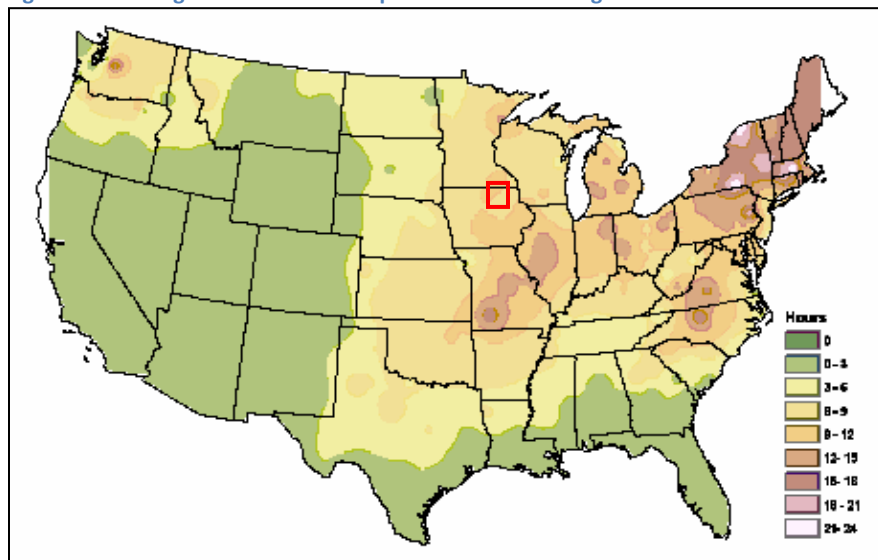
Figure 62: Iowa Average Annual Snowfall, 1981-2010



Source: (National Weather Service, 2012)

The segment of Northeastern Iowa that includes the Participating Jurisdictions receives 8-9 hours of freezing rain on average per year. Surrounding areas not far from the Participating Jurisdictions receive the most (9-12) hours of freezing rain on an annual average in Iowa. Figure 63 reflects United States zones for annual average hours of freezing rain.

Figure 63: Average Number of Hours per Year with Freezing Rain in the United States



Source: (Houston & Cnangnon, 2003)

Previous occurrences would indicate a high probability of winter storm occurring in any given year. Heavy snow and winter weather occurs annually and the ramifications of such weather are considered a normal part of life in Winneshiek County.

Summary of Vulnerability and Potential Losses

Injury or even death is possible when proper shelter is not available to protect against severely cold temperatures. For humans, extreme cold can cause hypothermia (an extreme lowering of the body's temperature) and permanent loss of limbs due to frostbite. Infants and the elderly, or those without shelter or who live in a home that is poorly insulated or without heat, are particularly at risk. Extreme cold conditions can also stress or kill unprotected livestock. Other potential health and safety threats include toxic fumes from emergency heaters and household fires caused by fireplaces or emergency heaters.

During periods of icing and/or heavy snow fall, transportation can be treacherous. Severe winter storms increase the probability of automobile accidents which can also result in serious injury or death. Further, response personnel are exposed to cold temperatures and traffic accidents when responding to the victims' needs, operations can be limited or halted when critical services are not available, and workers may not be able to make it to their place of work, limiting the continuity of operations. Of the 82 winter weather/winter storm events that occurred in the county between 1998 - 2018, only four had recorded property damages, totaling \$20,000 (National Centers for Environmental Information (NCEI), 2019). However these same winter events resulted in at least two separate traffic accidents that injured ten people, and caused two deaths.

Fire during winter storms presents a great danger as water supplies can freeze and firefighting equipment may not function effectively, or personnel and equipment may be unable to get to the fire.

Rivers and lakes freeze and subsequent ice jams can create flooding problems as temperatures begin to rise. Ice coating at least one-fourth inch in thickness is heavy enough to damage trees, overhead wires, and similar objects and to produce widespread power outages.

Direct and indirect economic impacts of winter storms include cost of snow removal, damage repair, increased heating bills, business and crop losses, power failures and frozen or burst water lines. From 2007 to 2018 Winneshiek County's crop losses as a result of winter conditions totaled \$2,164,854 (USDA Risk Management Agency, 2007 - 2018). Average annual winter storm crop damage in the county is \$450,000 - \$600,000, and average annual winter storm property damage is \$125,000 - \$300,000 (Iowa Homeland Security and Emergency Mgt., n.d.).

The most significant damage during winter storm events occur when freezing rain and drizzle accumulate on utility poles and power lines causing widespread power outages. Since the power outages associated with winter storms occur during cold weather, the population is at risk to cold temperature exposures and pipes could freeze or burst. Again, the elderly and poverty populations are considered to be more vulnerable.

Table 43 reflects the percentage of persons over age 65 and the percentage of persons below the federal poverty level in the Participating Jurisdictions compared to the state and national averages.

Table 43: Selected Demographic and Economic Characteristics

Jurisdiction	2010 Population	2018 Population Estimate	65 Years and Over (%) (2017 Est.)	Persons Below Poverty (%) (2017 Est.)
Calmar	978	1,080	12.7%	14.3%
Castalia	173	200	24.5%	13%
Decorah	8,127	7,850	18.6%	11.5%
Fort Atkinson	349	277	29.6%	5.1%
Jackson Junction	58	44	4.5%	2.3%
Ossian	845	984	25.1%	11%
Ridgeway	315	235	11.9%	6%
Spillville	367	462	25.1%	8.2%
Winneshiek County	21,056	20,575	18.7%	8%
Iowa	3,046,355	3,118,102	16.1%	12%
United States	308,745,538	321,004,407	14.9%	14.6%

Source: (U.S. Census Bureau, 2010 Decennial, n.d.); (U.S. Census Bureau, ACS 2013 - 2017, 2017)

Sinkholes

Risk Group 1: High Risk

Description

Sinkholes are common where the rock below the land surface is limestone, carbonate, salt beds, or rocks that can naturally be dissolved by ground water circulating through them. As the rock dissolves, spaces and caverns develop underground. Sinkholes are dramatic because the land usually stays intact for a while until the underground spaces get too big. If there is not enough support for the land above the spaces then a sudden collapse of the land surface can occur. Sinkholes range from broad, regional lowering of the land surface to localized collapse. The primary causes of most sinkholes are human activities: Underground mining of coal, groundwater or petroleum withdraw, and drainage of organic soils. In addition, this is due to the erosion of limestone of the subsurface. Sinkholes can aggravate flooding potential, collapses such as the sudden formation of sinkholes or the collapse of an abandoned mine may destroy buildings, roads, and utilities.

Karst is a landscape formed from the dissolution of soluble rocks including limestone, dolomite and gypsum. Sinkholes are a common indication of karst; caves and underground drainage systems are other indicators. With limestone commonly found in northeast Iowa, sinkholes have the potential to occur.

Previous Occurrences

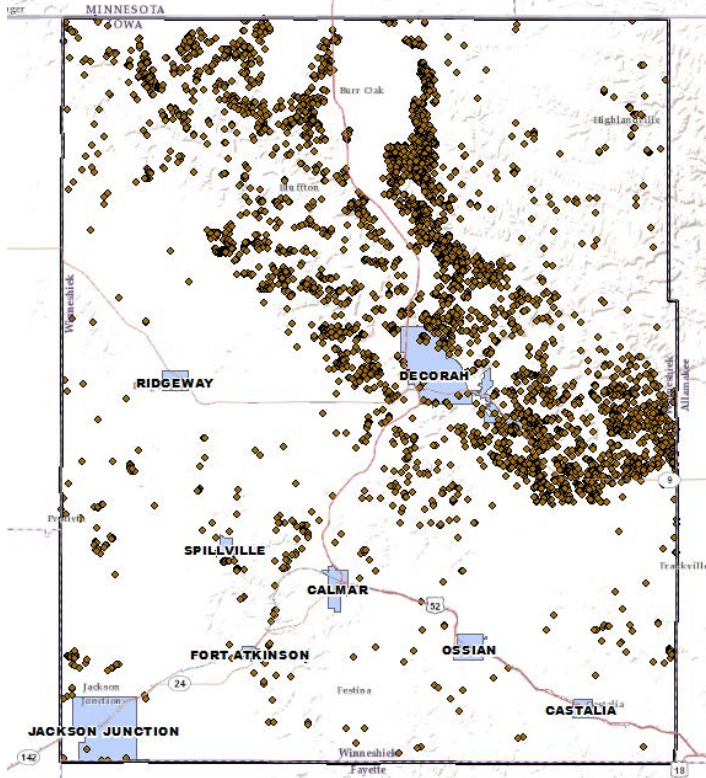
The HMPC noted there have been occurrences of sinkholes in the County. Official records of specific sinkhole occurrences throughout the County were not available.

Location, Probability and Extent

Data from the Iowa Department of Natural Resources (DNR) Geological Survey, illustrated in Figure 64, indicates there are 5,265 current and historic sinkhole and depression locations in Winneshiek County. Based on this graphic, heavy concentrations of sinkholes can be found largely in the unincorporated

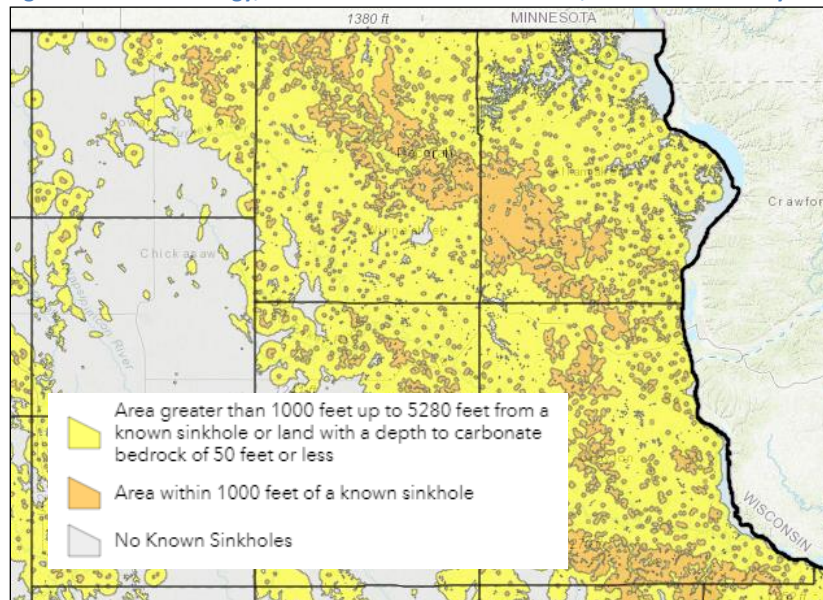
areas running northwest to southeast through the center of the county, as well as in and around the communities of Decorah, Jackson Junction and Spillville. Figure 65 reflects areas of karst (within 1,000 feet of known sinkhole) and potential karst (within 1,000 feet of known sinkhole) and potential karst in Winneshiek County, which includes the Participating Jurisdictions.

Figure 64: Current and Historic Sinkholes in Winneshiek County



(Iowa Geological Survey, DNR, 2009)

Figure 65: Karst Geology, Sinkhole Location and Potential, Winneshiek County



Source: (Iowa Homeland Security and Emergency Mgt., n.d.)

The Cities of Calmar, Castalia, Fort Atkinson, Jackson Junctions, Ridgeway and Spillville also have the potential for sinkholes given their terrain.

Previous occurrences would indicate a high probability of sinkholes occurring in the future.

Summary of Vulnerability and Potential Losses

Damage consists primarily of direct structural damage and property loss and depreciation of land values, and also includes business and personal losses that accrue during periods of repair. Damage to property, facilities, and infrastructure would only occur if the event undermined foundations.



Photo 1: Sinkhole located on an Iowa National Heritage Foundation conservation easement near Decorah, by Steve Carlson

Terrorism

Risk Group 2: Medium Risk

Description

This hazard includes the following: agro-terrorism, domestic terrorism, and public disorder. Additional terrorism hazards can affect Iowa on a larger scale and are included in the State Hazard Mitigation Plan.

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 not considered as a hazard unless they escalate into a threat to the community. Vandalism is usually initiated by a small number of individuals and limited to a small target group or institution. An active shooting incident can occur. Most events are within the capacity of local law enforcement.

Agro-terrorism is causing intentional harm to an agricultural product or vandalism of an agricultural/animal related facility. This category covers a large variety of incidents from potential to intentional introduction of disease; vandalism of facilities; theft of agricultural products, machinery, or chemicals; release of animals; and contamination of agricultural products. Depending upon the type of action taken, the implications will vary greatly.

Incidents such as this have occurred in the state of Iowa. Iowa has experienced incidents in which animal rights activists have vandalized or released animals from agricultural facilities and there has been vandalism to agricultural facilities or incidents of disgruntled employees causing damage to animals and animal products. There are frequent cases of theft of agricultural machinery, products, and chemicals.

The use of weapons and explosives against persons or property in violation of criminal laws is a form of domestic terrorism. Iowa has not been immune to this. The state has experienced many bomb threats in the distant and recent past. During the spring of 2002, 18 pipe bombs were found in mailboxes in five

states stretching from Illinois to Texas, including Iowa. Six people were injured in the bombings in Iowa and Illinois. In 2005 and 2006, pipe bombs were used in attempted murder cases in two Iowa cities.

Previous Occurrences

The following incidents were reported by the Winneshiek County Sheriff's Office:

- **January 25, 2019** – Bomb threat at business from caller who stated they were a member of ISIS
- **December 13, 2018** – Bomb threat at business
- **November 29, 2018** – Winneshiek Medical Center Threat of Terrorism
- **November 28, 2018** – Northeast Iowa Behavioral Health Threat of Terrorism
- **October 29, 2018**, Vague world terrorism threat received from person out of country
- **July 21, 2017**, Possible bomb making – potential for bomb at Nordic Fest
- **October 30, 2012**, Turkey Valley School lockdown due to shots being fired during the pursuit of two bank robbery suspects
- **October 16, 2012**, De Sales Catholic School and South Winneshiek School lockdown as a result of shots being fired in the community of Calmar, and later in Ossian
- **October 4, 2011**, person on campus (unnamed) with a long gun – no weapon was found or used in the incident.
- **April, 2008**, Turkey Valley School received three bomb threats, extra security was provided to the school
- **April, 2008**, South Winneshiek High School received a bomb threat, extra security was provided to the school

Location, Probability and Extent

An act of terrorism can occur anywhere within the planning area.

Previous occurrences would indicate a high probability that some form of an act of terrorism occurs in any given year, to every few years.

Summary of Vulnerability and Potential Losses

Innocent people are often victims of this type of activity, even when the target may be certain people, organizations or activities. Based on the method of delivery, the general public is vulnerable to terrorism. Because of the characteristics of the weapons or methods terrorists use, the area can be limited to a room, building or the entire community.

While nothing of severe consequence has occurred in the county to date in terms of agro-terrorism, bio-terrorism, domestic terrorism, workplace violence or public disorder, the HMPC members are very aware of the increasing incidence of events like this nationwide. Members also indicated an increase in bogus school bomb threats causing interruptions to the school day and unnecessary use of limited emergency services and personnel. In the event of a real or even false incident, school children and college students are perceived to be most vulnerable. Table 44 below illustrates the location and enrollments of schools in the planning area.

Table 44: School Enrollment by Building and Community, 2018 - 2019

Location	School District/ Building	Enroll- ment	In Flood Plain?	Mitigation Measures in Place
Calmar	South Winneshiek CSD/ High School	192	N	Weather radios, fire suppression system in kitchen, regular lock-down, evacuation and tornado drills, emergency information binders, response kits in each classroom, staff safety trainings, new security and camera system with entry system, Emergency Operations Plan (EOP), and reunification kits & manuals
Decorah	St. Benedict School	133	N	FEMA Compliant storm shelter, weather radio, emergency warning systems, fire suppression system in kitchen, regular lock-down, evacuation and tornado drills, emergency information binders and response kits in each classroom, regular staff safety training
Decorah	Decorah CSD/ High School	592	Y	Protected by levee, FEMA compliant storm shelter (structurally), weather radio, building fire suppression system, planning & drills including regular lockdown (Run, Hide, Fight), evacuation, fire, and tornado drills, emergency information binders and emergency backpacks and buckets in each classroom, staff training on school safety
Decorah	Decorah CSD/ Middle School	518	N	Weather radio, building fire suppression system, planning & drills including regular lockdown (Run, Hide, Fight), evacuation, fire, and tornado drills, emergency information binders and emergency backpacks and buckets in each classroom, staff training on school safety
Decorah	Decorah CSD/ Carrie Lee Elementary	227	N	Weather radio, building fire suppression system, planning & drills including regular lockdown (Run, Hide, Fight), evacuation, fire, and tornado drills, emergency information binders and emergency backpacks and buckets in each classroom, staff training on school safety
Decorah	Decorah CSD/ John Cline Elementary	299	Y	Protected by levee, weather radio, building fire suppression system, planning & drills including regular lockdown (Run, Hide, Fight), evacuation, fire, and tornado drills, emergency information binders and emergency backpacks and buckets in each classroom, staff training on school safety

Location	School District/ Building	Enroll- ment	In Flood Plain?	Mitigation Measures in Place
Decorah	Decorah CSD/ West Side Elementary	60	N	Weather radio, planning & drills including regular lockdown (Run, Hide, Fight), evacuation, fire, and tornado drills, emergency information binders and emergency backpacks and buckets in each classroom, staff training on school safety
Jackson Junction	Turkey Valley CSD/ Jr/Sr. High School	166	N	Emergency warning systems for fire/tornado, fire extinguishers throughout the building, regular lock-down, evacuation and tornado drills, staff has completed training, emergency information in all rooms, offices and the bus barn, emergency kits in all classrooms, intruder drills, Shelter in Place, Stop the Bleed Training (staff and students)
Jackson Junction	Turkey Valley CSD/ Elementary School	176		
Ossian	St. Teresa of Calcutta Catholic Grade School	109	N	Storm Shelter, fire alarm/on-call system, fire suppression kits (in kitchen), regular tornado, fire, lock-down, evacuation drills, Run, Hide, Fight training for school staff
Ossian	South Winneshiek CSD/ Middle School	100	N	Tornado and fire drills, emergency contact info in classrooms and office, emergency response kits in classrooms, Run, Hide, Fight staff training on lockdowns / intruders, locked outside doors / security cameras and security system to enter building
Ossian	South Winneshiek CSD/ Elementary School	192		
Spillville	St. Teresa of Calcutta Catholic School (also includes numbers from Calmar campus in 2018 – 2019)	147	N	Weather radio, emergency warning systems/sirens, fire suppression system (in kitchen), emergency binders and response kits in each classroom, regular evacuation and tornado drills, staff training on school safety
	TOTAL:	2,911		
Calmar	Northeast Iowa Community College	2,714	N	Emergency binders, kits, shelter kits, weather radios, radio communication system, internal communication system, regular fire and weather drills, and provide information to students and staff on Shelter In Place and Run, Hide, Fight procedures.
Decorah	Luther College	2,005	N	Not Available
	TOTAL ALL STUDENTS:	7,630		

Source: (Iowa Department of Education, 2018 - 2019); (Luther College, 2018); (Northeast Iowa Community College, 2019)

Thunderstorms and Lightning

Risk Group 3: Low Risk

Description

Atmospheric imbalance and turbulence may result in thunder, heavy rains (which may cause flooding), strong winds, microbursts, high straight-line winds (often mistaken for tornadoes), tornadoes, surface hail or lightning. Most thunderstorms produce only thunder, lightning and rain; thunderstorms can occur alone, in clusters or in lines. The National Weather Service considers a thunderstorm severe if it produces hail at least one inch in diameter, wind 58 mph or higher, or tornadoes.

Lightning is an electrical discharge between positive and negative regions of a thunderstorm. It is sudden, extremely destructive and potentially deadly. The National Weather Service reports that lightning caused 28 fatalities and 212 injuries nationwide in 2012. The 10-year average is 35 fatalities per year.

Due to its nature as a powerful electrical phenomenon, lightning causes extensive damage to electronic systems that it contacts. A particular concern in Iowa is the protection of facilities and communications systems that are critical for maintaining emergency response systems, protecting public health, and maintaining the state's economy.

Previous Occurrences

The National Fire Protection Association reports that between 2007 and 2011, local fire departments across the nation responded to an estimated average of 22,600 fires per year that were started by lightning. These fires caused an average of nine deaths, 53 injuries, and \$451 million in direct property damage per year. (Ahrens, 2012)

From January 2015 to December 2019, the National Centers for Environmental Information (NCEI) lists 53 lightning events, 2,272 thunderstorm wind events, and more than 1,710 heavy-rain events that have impacted Iowa. Because thunderstorms may occur singularly, in clusters, or in lines, it is possible that several thunderstorms may affect the area in the course of a few hours. One system may spawn multiple events.

The NCEI reports three lightning events in the county between 1998 and 2018 affecting the communities of Calmar and Decorah. In the same time period 87 thunderstorm wind events (48 separate days) are reported in the county, affecting unincorporated areas, and the communities of Calmar, Castalia, Decorah, Fort Atkinson, Ossian, Ridgeway and Spillville.

There have been thirteen Presidential Disaster Declarations between 1990 and 2018 related to severe storms in Winneshiek County, six (almost half) of which occurred since the last plan update in 2015.

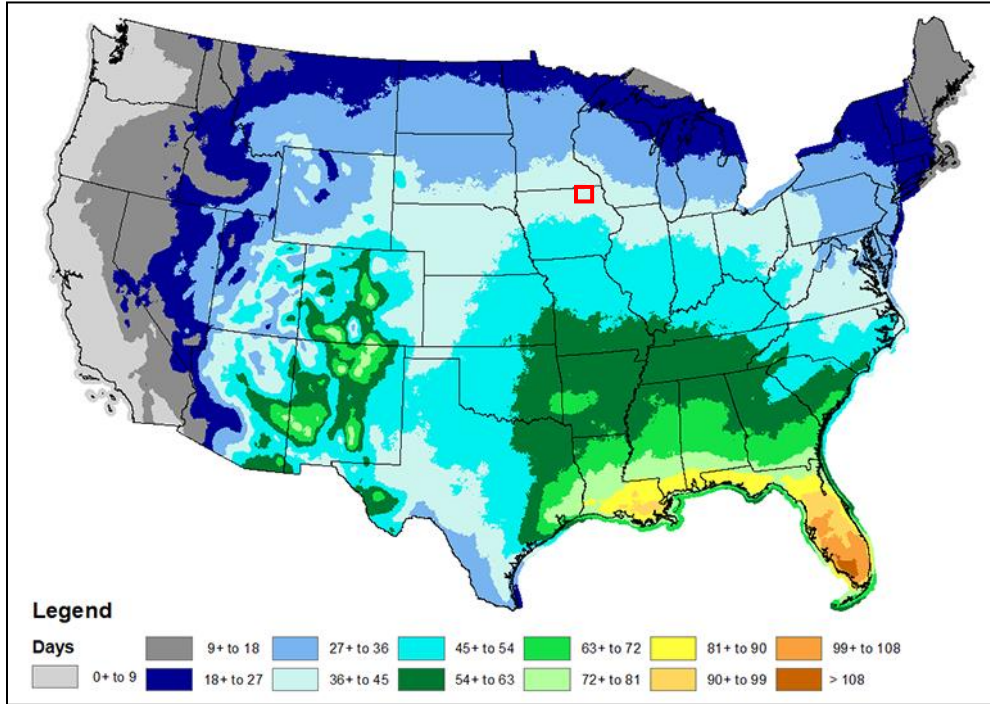
Location, Probability and Extent

Lightning affects broad regions. The county is similar to the surrounding area and the entire state of Iowa with the frequency of thunderstorms and lightning flashes. The region that includes Winneshiek County averages:

- 36-45 days with thunderstorms per year
- 6 - 12 lightning strikes per square mile per year

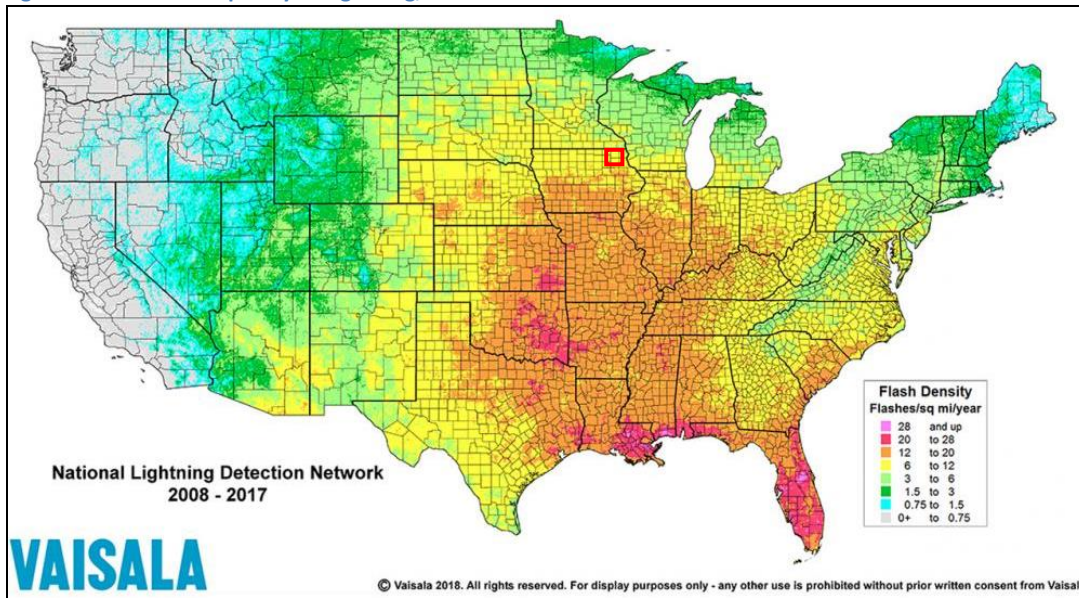
Figure 66 reflects the average number of thunderstorm days each year throughout the U.S. from 1993 – 2018, and Figure 67 reflects the United States annual frequency of lightning from 2008 - 2017.

Figure 66: Annual Mean Thunderstorm Days, 1993 - 2018



Source: (Koehler, Thomas L., 1993 - 2018)

Figure 67: Annual Frequency of Lightning, 2008 - 2017



Source: (Vaisala, 2008 - 2017)

Previous occurrences would indicate a high probability that a severe thunderstorm might occur in any given year. With Iowa's location in the interior of the U.S., the ingredients of a severe storm are often present (moisture, warm and unstable air, and a lifting mechanism). According to a Vaisala National Lightning Detection Network NLDN map, the County receives 6 to 12 lightning strikes per square mile per year (Vaisala, 2008 - 2017). As climate patterns change, there is a very high likelihood that a few of these summer storms will become severe and cause damage.

Summary of Vulnerability and Potential Losses

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, cause electrical failures and impact electronic equipment located inside buildings. Communications equipment and warning transmitters and receivers could be knocked out by lightning strikes. Thunderstorms can also bring large hail that can damage homes and businesses, break glass, destroy vehicles, and cause bodily injury to people, pets, and livestock. And other hazards resulting from a thunderstorm, such as high straight-line winds, microbursts, rain and flooding also bring risk for property damage and injury.

According to the National Centers for Environmental Information (NCEI) Storm Events Database, the 87 thunderstorm wind events in Winneshiek County between 1998 – 2018 resulted in approximately \$724.55K in property damages and \$299K in crop damages. 43 of 48 days of the thunderstorm wind events resulted in some degree of property damage. Three lightning events in the same period resulted in \$42K in property damage (all three days of the events resulted in property damages).

Tornado

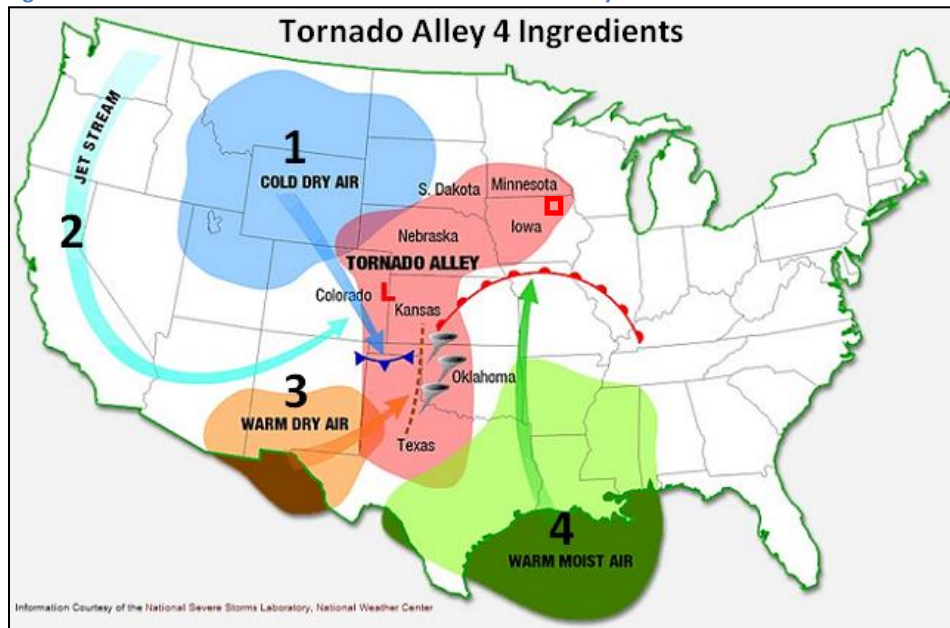
Risk Group 2: Medium Risk

Description

The National Weather Service defines a tornado as a “violently rotating column of air extending from a thunderstorm to the ground.” Tornadoes are the most violent of all atmospheric storms and are capable of tremendous destruction. Wind speeds can exceed 250 mph, and damage paths can be more than one mile wide and 50 miles long. Based on a 10-year average, more than 1300 tornadoes are reported in the United States, resulting in approximately 56 deaths and many injuries. High winds not associated with tornadoes are profiled separately in this document.

Although tornadoes have been documented on every continent, they most frequently occur in the United States east of the Rocky Mountains. According to National Severe Storms Laboratory, Northeast Iowa is located just on the edge of an area that is generally known as “Tornado Alley.” Climatological conditions are such that warm and cold air masses meet in the center of the country to create conditions of great instability and fast moving air at high pressure that can ultimately result in formation of tornado funnels. Figure 68 reflects the geographic location and the climatological conditions that create “Tornado Alley.”

Figure 68: Climate Conditions Which Produce “Tornado Alley”



Source: (Kirk, 2011)

In Iowa, most tornadoes occur during the months of April, May, and June. However, tornadoes can strike in any of the 12 months. Similarly, while most tornadoes occur between 4:00 and 9:00 p.m., a tornado can strike at any time.

Tornado intensity is measured by the Enhanced Fujita Scale (EF). This is a set of wind estimates (not measurements) based on damage. An EF Scale category is assigned based on the highest wind speed that occurred in three second gusts to a set of damage indicators (E.g. type of building impacted), and anticipated levels at which damage will occur for indicators. For additional information on the EF-scale, see <https://www.weather.gov/oun/efscale>. Table 45 illustrates the current EF-scale, as well as the Fujita (F) scale, which was the previous scale of measurement through 2007. The higher the (F) or (EF), the greater the potential damage.

Table 45: EF-Scale for Tornado Damage

Enhanced Fujita (EF) Scale (Current)		Fujita (F) Scale (Previous)	
EF Number	3 Second Gust (mph)	F Number	3 Second Gust (mph)
0	65-85	0	45-78
1	86-110	1	79-117
2	111-135	2	118-161
3	136-165	3	162-209
4	166-200	4	210-261
5	Over 200	5	262-317

Source: (National Weather Service, n.d.)

Previous Occurrences

According to the NCEI database, there were 19 tornadoes in Winneshiek County between 1964 and 2019, and three since the last plan update in 2015. Of these 19 tornadoes, four were rated F2 and one was rated F4. Table 46 reflects details of recorded Winneshiek County tornadoes from 1964 to 2019.

Table 46: Recorded Tornadoes in Winneshiek County, 1964-2019

Date	Time	Magnitude	Injuries	Estimated Damages (\$)
May 5, 1965	9:24 PM	F4	0	25,000
August 25, 1965	7:00 PM	F2	1	250,000
June 4, 1973	3:30 PM	F2	0	250,000
June 19, 1979	9:30 PM	F0	0	25,000
August 4, 1979	6:19 AM	F1	1	53,000
July 10, 1984	2:16 PM	F1	0	250,000
July 29, 1987	6:10 PM	F2	0	2,500,000
March 24, 1988	5:21 PM	F2	0	2,500,000
May 24, 1989	7:56 PM	F1	0	25,000
June 12, 1990	8:50 PM	F0	0	3,000
June 12, 1990	9:48 PM	F1	0	250,000
July 19, 1994	9:00 PM	F0	0	1,000
June 26, 2002	1:22 PM	F0	0	23,000
August 18, 2009	3:00 PM	F0	0	40,000
May 15, 2017	5:45 PM	EFO	0	4,000
May 17, 2017	5:50 PM	EFO	0	2,000
September 12, 2019	3:49 PM	EFO	0	60,000
Total:				6,216,500

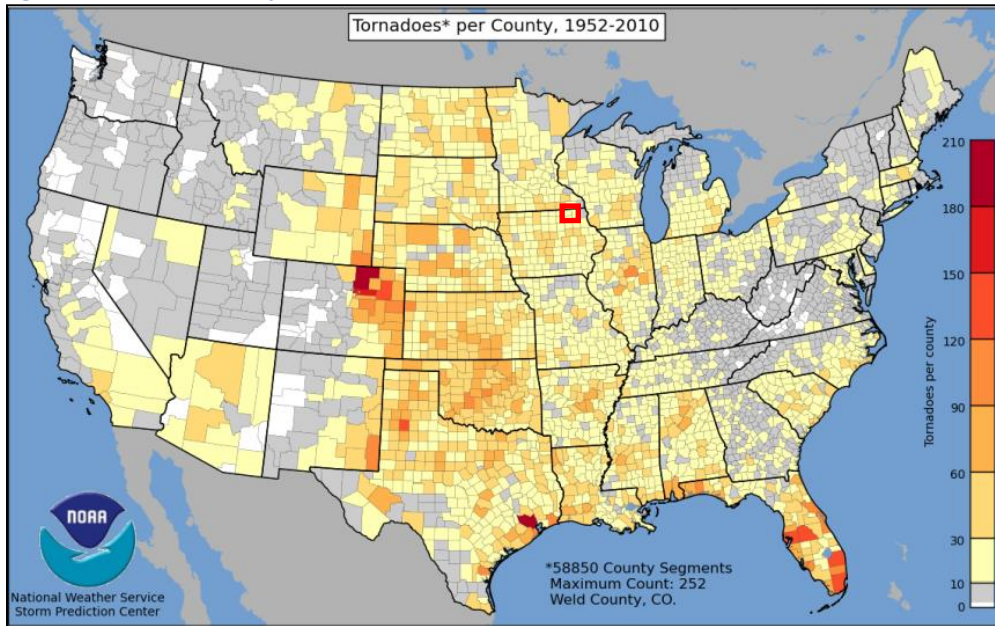
Source: (National Centers for Environmental Information (NCEI), 2019)

Eight Federal Disaster Declarations covering the county listed tornadoes from 1990 – 2018, including three since the last plan update in 2015.

Location, Probability and Extent

Based on a 10-year average from 2009 – 2018, Iowa experiences 54 tornadoes annually, resulting in an average of 10 injuries per year. While tornadoes can occur in all areas of the State of Iowa, historically, some areas of the state have been more susceptible to this type of damaging storm. Figure 69 illustrates the tornado activity per county in the U.S. from 1952 to 2010. Winneshiek County has had between 10 and 30 tornadoes within that time period.

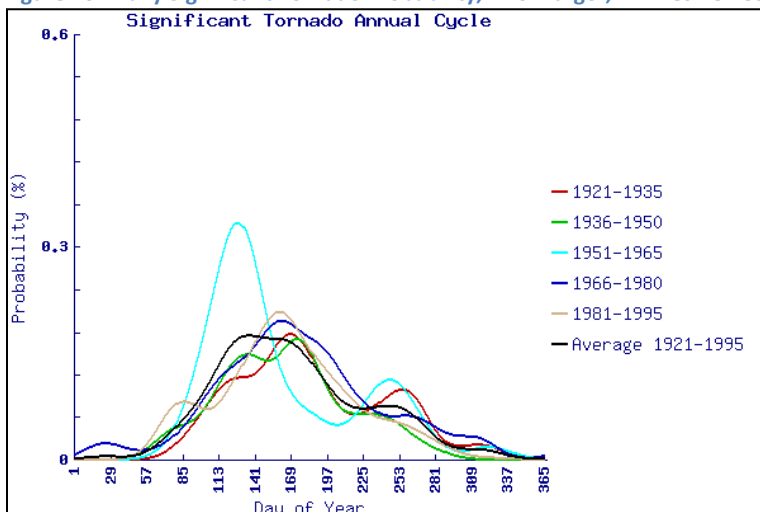
Figure 69: Tornado Activity in the United States, 1952-2010



Source: (National Weather Service, 2013)

The National Severe Storms Laboratory calculated probability of violent tornadoes based on time of year for the period 1921-1995. Figure 70 shows the probability of an F2 or larger tornado occurring on any given day at a location within a 25 mile radius Winneshiek County, which includes the Participating Jurisdictions. For example, a y-axis value of 2.0 would indicate a two percent chance of receiving the chosen type of severe weather on the date indicated by the x-axis. For both significant (F2 or larger) and violent (F4 or larger) tornadoes the 1951-1965 period was the peak in probability based on the data from previous occurrences, with the most recent reporting period (1981-1995) showing a probability right on track with the overall average. Significant tornadoes show a common peak in probability in late spring while violent tornadoes have an overall less probability, they do not have a distinct time of probability for them to occur from early spring through mid-autumn.

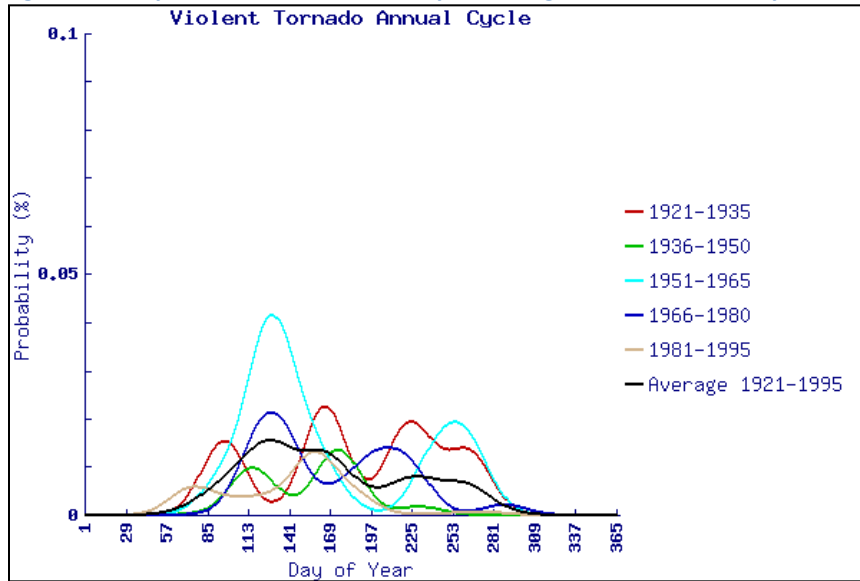
Figure 70: Daily Significant Tornado Probability, F2 or Larger, Winneshiek County, 1921-1995



Source: (National Severe Storms Laboratory, 2011)

Figure 71 reflects the daily probability for a violent tornado, rated F4 or larger, within a 25 mile radius of Winneshiek County.

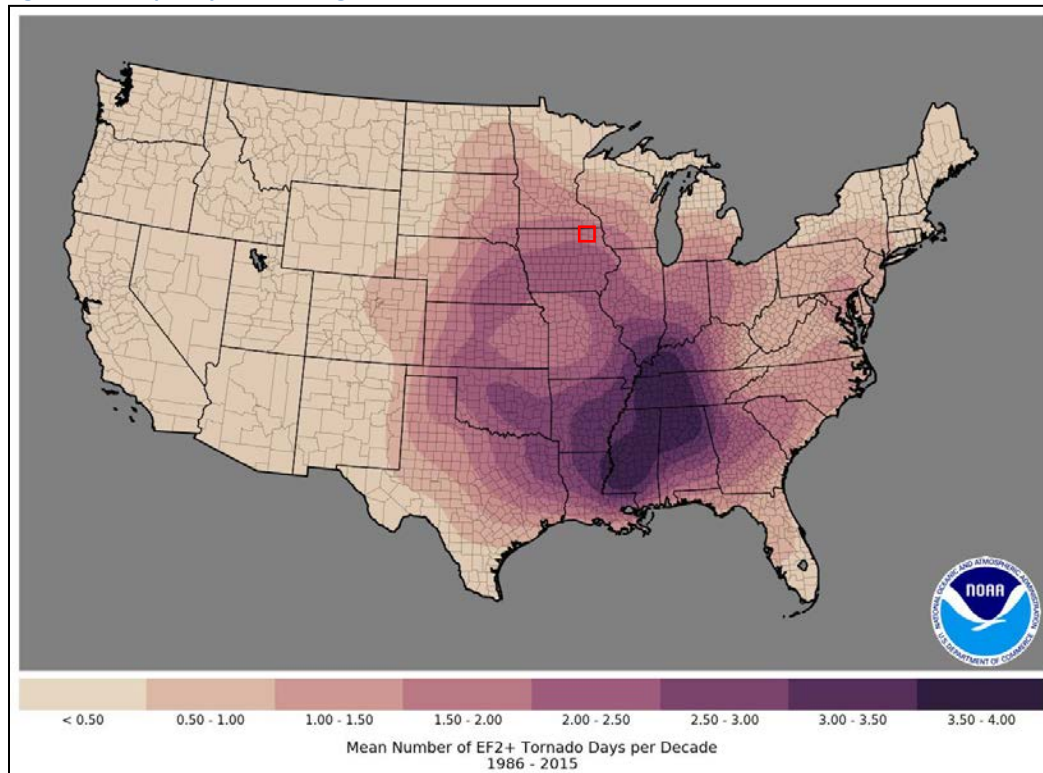
Figure 71: Daily Violent Tornado Probability, F4 or Larger, Winneshiek County, 1921-1995



Source: (National Severe Storms Laboratory, 2011)

Figure 72 reflects the United States' frequency of a tornado rated F2 or larger, based on number of days per decade, from 1986 - 2015.

Figure 72: Frequency of F2 or Larger Tornadoes in U.S., 1986 - 2015



Source: (National Weather Service, Storm Prediction Center, n.d.)

Summary of Vulnerability and Potential Losses

Tornado impacts can range from broken tree branches, shingle damage to roofs, and some broken windows, to complete destruction and disintegration of well-constructed structures, infrastructure and trees. 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. Injury or death related to tornadoes most often occur when buildings collapse, people are hit by flying objects, or are caught trying to escape the tornado in a vehicle.

The planning area is located in a region of the U.S. with high frequency of dangerous and destructive tornadoes. On at least two occasions since 1964, tornadoes have resulted in injuries to residents in Winneshiek County and there have been six occurrences of a single tornado event resulting in damages totaling \$250,000 or more. According to NCEI, total property damages from tornados in the county between 1964 and 2019 was \$6.2 million, and crop damages totaled \$42,550 (National Centers for Environmental Information (NCEI), 2019). The Iowa Homeland Security Hazard Mitigation Viewer website estimates average annual tornado damages in Winneshiek County (based on 22 tornado events) to be \$245,854 (Iowa Homeland Security and Emergency Mgt., n.d.).

Warning time for tornados is relatively short. Children, the elderly and disabled persons are particularly vulnerable to hazards with rapid onset (See Table 26). For this reason, some communities in the county are still considering their need and ability to construct storm shelters that can withstand the force of a major tornado in order to better protect vulnerable residents or locations. All infrastructure and structures are at risk for damage since currently the majority are not built to resist tornado wind speeds.

Transportation Incident

Risk Group 3: Low Risk

Description

This hazard includes incidents in air, roadway and rail transportation, any transportation accident involving any mode that directly threatens life and which results in property damage, death, injury and/or adversely impacts a community's capabilities to provide emergency services.

An air transportation incident may involve a military, commercial, or private aircraft. Air transportation is playing a more prominent role in transportation as a whole; airplanes, helicopters, and other modes of air transportation are used to transport passengers for business, health and recreation as well as freight. Mechanical failure, pilot error, weather conditions are among a variety of circumstances that can result in an air transportation incident.

A roadway transportation incident can be single or multi-vehicle requiring responses exceeding normal day-to-day capabilities. There are approximately 1,175 total miles of roadway in the county; local residents, travelers, business, and industry rely on this network on a daily basis. Weather conditions play a major factor in the ability of traffic to flow safely in and through the state as does the time of day and day of week. Numerous traffic accidents occur in the county and can result in property damage and injury; major accidents involving multiple vehicles and serious injury are not uncommon.

A rail 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.

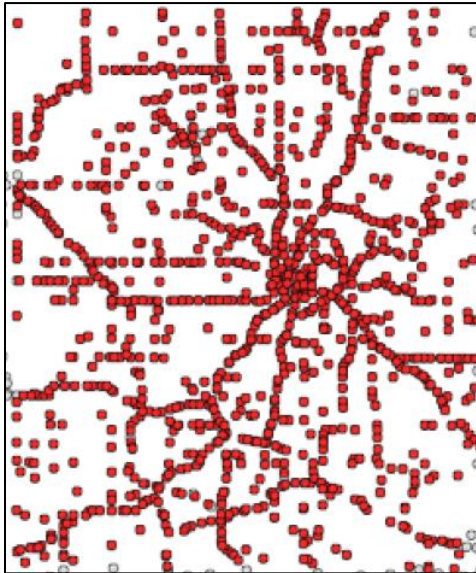
Previous Occurrences

There were two air transportation incidents in Winneshiek County between 1998 and 2018 . An accident in 2004 caused two fatalities and the other in 2012, involving a helicopter, caused minor injuries (Federal Aviation Administration, n.d.). According to the Iowa DOT Crash Analysis Tool, from 2008 – 2018 there were 4,192 vehicle crashes in Winneshiek County, resulting in 25 fatalities and 500 injuries (Iowa DOT, 2019). There were six rail accidents in the county between 1998 and 2018, one of which occurred since the last plan update. None of the accidents were fatal (Federal Railroad Administration, 2019).

Location, Probability and Extent

A vehicle incident can occur anywhere within the planning area and would generally be localized. Figure 73 shows the location of vehicle crashes that occurred between 2008 and 2018 (Iowa DOT, 2019).

Figure 73: Vehicle Crash Locations, 2008 - 2018



An air accident could also occur anywhere, although Winneshiek County has one airport (located just east of Decorah), as well as a heliport (at the Winneshiek Medical Center). Airspace usage at the Decorah airport is not limited to traffic from that facility. Rail incidents would be located near the railroad. The Canadian Pacific Railroad, owner of Dakota, Minnesota & Eastern Railroad Corp. (DME), operates the line through Winneshiek County. It runs through the communities of Jackson Junction, Fort Atkinson, Calmar, Ossian and Castalia. The main products handled by the rail include coal, farm products, food products, chemicals, waste products, primary metal products, nonmetallic metals and stone (Iowa Department of Transportation, 2019).

The probability of a transportation incident of some type occurring within the county in any given year is high, with a vehicle crash being the most likely (an average of 381 vehicle crashes occur in the county each year when considering aggregate crashes from 2008 -2018). Rail and air accidents have historically occurred less frequently in the region.

Summary of Vulnerability and Potential Losses

Transportation incidents can occur anywhere on the 1,175 miles of roads or 30 miles of railway in the county. The magnitude of a transportation incident is dependent upon the transportation mode.

Vehicle crashes have a demonstrated economic and human impact. Table 47 illustrates the cost of property damage from the vehicle crashes that occurred between 2008 – 2018 in the county (Iowa DOT, 2019). Property damage total is nearly \$24 million for the 11-year time period. And Table 48 illustrates fatalities and injuries resulting from the over 4,000 crashes that occurred in the same time period. Twenty-eight deaths and 183 major injuries resulted from the crashes.

Table 47: Property Damage from Vehicle Crashes, 2008 - 2018

Property/Vehicles/Occupants	
Property Damage Total (dollars):	23,996,100.00
Average (per crash dollars):	5,724.26
Total Vehicles:	5,700.00
Average (per crash):	1.36
Total Occupants:	24,029.00
Average (per crash):	5.73

(Iowa DOT, 2019)

Table 48: Injury Status from Vehicle Crashes, 2008 - 2018

Injury Status Summary	1,245
Fatal	28
Suspected serious/incapacitating	183
Suspected minor/non-incapacitating	501
Possible (complaint of pain/injury)	523
Uninjured	0
Fatal, not crash-related	0
Unknown	10
Not reported	0

(Iowa DOT, 2019)

The county may be more vulnerable to a certain type of vehicle crashes. Approximately 35% of all vehicle crashes over the past decade were caused by animal encounters, by far the greatest cause of accidents in the county (Iowa DOT, 2019). Concern was also raised over the increasing volume of rail cars carrying hazardous materials in the county, and the higher potential for economic, human or environmental impacts should an accident occur.

Windstorm

Risk Group 2: Medium Risk

Description

Windstorms are extreme straight-line winds associated with severe winter storms, severe thunderstorms, downbursts, and very strong pressure gradients. Straight-line winds are generally any thunderstorm wind that is not associated with rotation (i.e., not a tornado). These winds, which can exceed 100 mph, represent the most common type of severe weather and are the most common cause of thunderstorm damage. Since windstorms do not have a narrow track like a tornado, associated damage can be extensive and affect broad regions including multiple counties. Objects like trees, barns, outbuildings, high-profile vehicles, and power lines/poles can be toppled or destroyed, and roofs, windows, and homes can be damaged as wind speeds increase. One type of straight-line wind is the downburst, which can cause damage equivalent to a strong tornado and can be extremely dangerous to aviation. Windstorms in Iowa typically happen between late April and early September, but given the right conditions, can develop as early as March. They are usually produced by super cell thunderstorms or a line of thunderstorms that typically develop on hot and humid days.

Previous Occurrences

According to the NCEI database, there were 95 wind events in Winneshiek County from 1998 -2018 (National Centers for Environmental Information (NCEI), 2019), including those classified as high, strong or thunderstorm wind events. For a full accounting of occurrence and damages from thunderstorm wind events please refer to the thunderstorm and lightning analysis. In addition, notable details from high and strong wind events experienced during this time period follows:

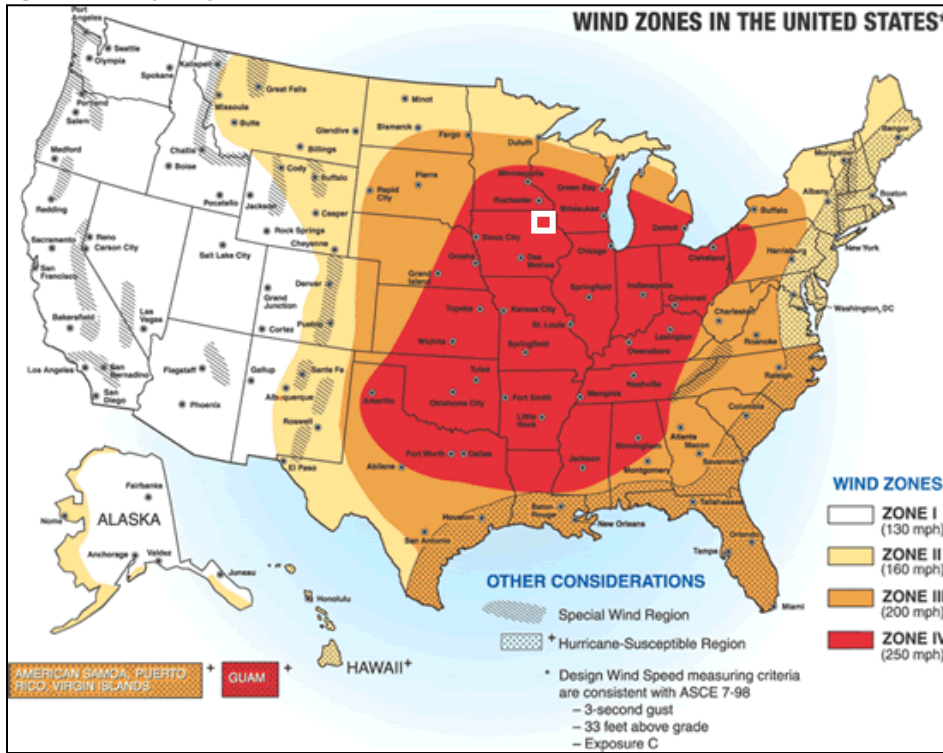
- **October 26, 2010.** A low pressure system deepened over northern Minnesota and was responsible for high winds across Northeast Iowa in the morning hours of October 26th into the daytime hours of the 27th.
- **April 18, 2004.** High winds, which were not associated with thunderstorms, gusted to 60 mph across portions of Northeast Iowa.
- **November 10, 1998.** One of the most powerful low pressure systems in 25 years caused hurricane force winds with gusts up to 90 mph. Widespread damage occurred to vehicles, signs, buildings and trees, while thousands were left without power for hours. A barn collapsed near Waukon, trapping a man inside, but only minor injuries were sustained.

Six Federal Disaster Declarations covering the county listed high winds/straight-line winds from 1990 – 2018.

Location, Probability and Extent

The county is susceptible to high wind events. Winneshiek County (and the State of Iowa) is located in Wind Zone IV, which is susceptible to winds up to 250 mph (the highest inland category). Figure 74 reflects the United States Wind Zones based on maximum wind speeds.

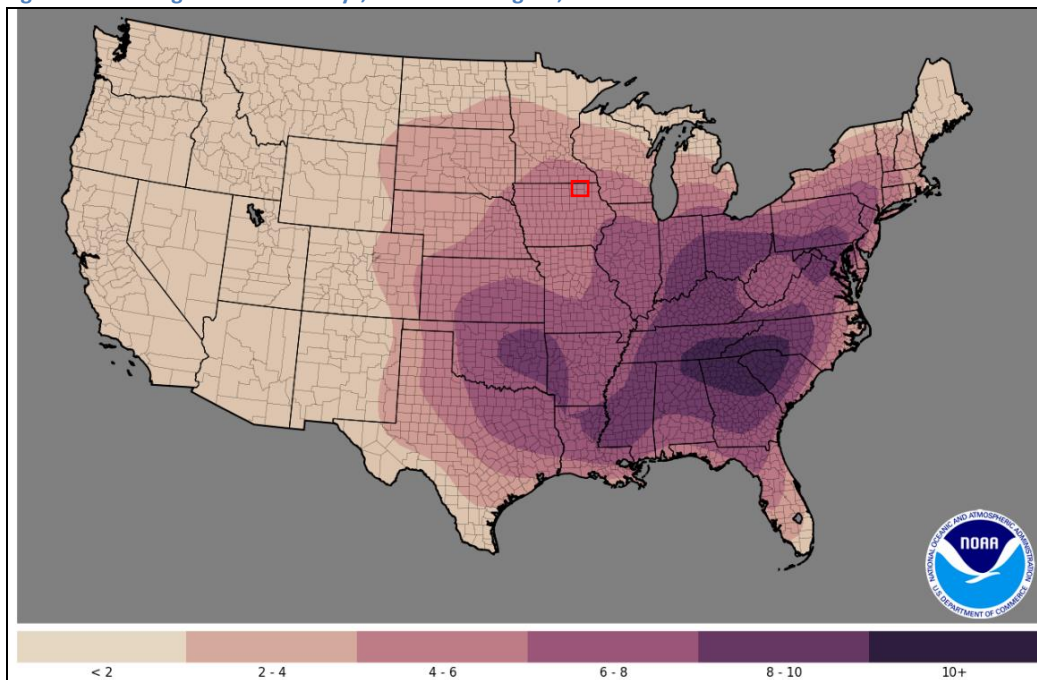
Figure 74: Frequency Wind Zones in the United States



Source: (FEMA, 2012)

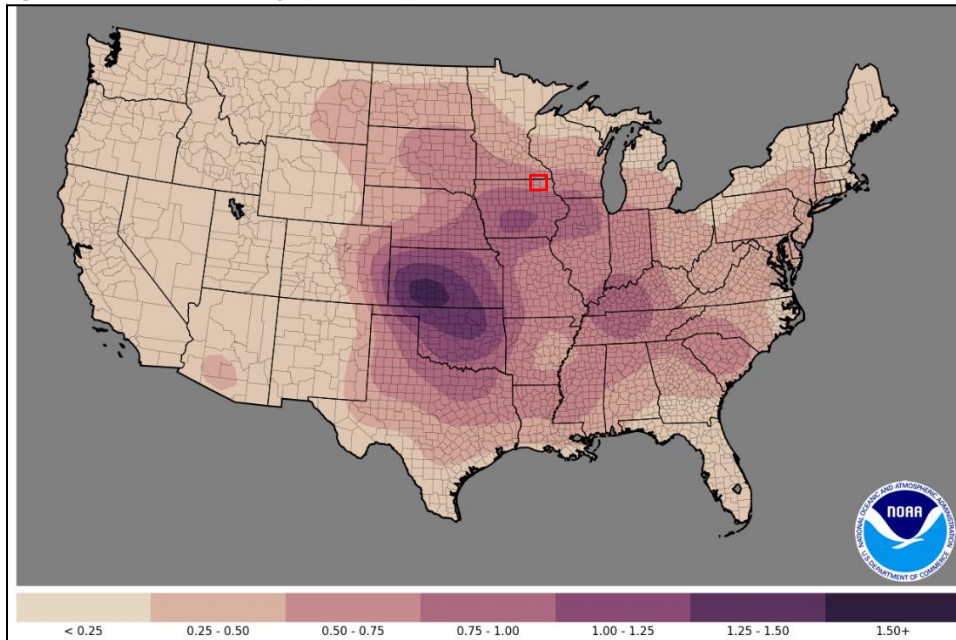
Figure 75 is a map of the average number of 50-knot wind days per year from 1986-2015. Winneshiek County has an average of 4 – 6 days of this type per year. Figure 76 reflects the average number of wind days of 65 knots or greater occurring per year, of which the county averages .5 - .75 days.

Figure 75: Average Number of Days, 50 Knots or Higher, 1986 - 2015



Source: (National Weather Service, Storm Prediction Center, n.d.)

Figure 76: Annual Wind Days (65+ knots), United States, 1986 - 2015



Source: (National Weather Service, Storm Prediction Center, n.d.)

Previous occurrences and climatological patterns would indicate a high probability of a windstorm occurring in any given year in the county, with storms under 65 knots being more likely.

Summary of Vulnerability and Potential Losses

Injury or death related to windstorms is possible; and most often occur from building failure or people struck by airborne debris. Windstorms can effects electrical power with system components above ground.

Damaging windstorms are a common occurrence in the planning area. Damages frequently occur to structures and power lines. Debris flying from high wind events can shatter windows in structures and vehicles and can harm people that are not adequately sheltered.

According to the National Centers for Environmental Information (NCEI) Storm Events Database, the 95 wind events in Winneshiek County between 1998 – 2018 resulted in approximately \$946K in property damages and \$299K in crop damages. And according to the USDA Risk Management Agency, crop loss from excess wind from 2007 – 2018 totaled \$1,053,447 (USDA Risk Management Agency, 2007 - 2018). The high, strong and thunderstorm wind events between 1998 – 2018 reported by the NCEI recorded no deaths or injuries.

Summary of Key Hazard Issues

CRS Step 5(a)

(a) Summary of each hazard identified in the hazard assessment and their community impact

The following section summarizes key issues brought out by the risk assessment, arranged alphabetically by hazard.

Animal/Plant/Crop Disease

- As climate change occurs, animal, plant and crop diseases are likely to increase as changes such as earlier springs and warmer winters create conditions that increase the survival rate of pathogens and parasites.
- Increasingly industrialized animal operations (e.g. Confined Animal Feeding Operations), may increase animal, and resultantly human, exposure to certain diseases and health threats.

Dams

- All of the dams in the county have a low hazard potential. This classification accounts for 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.
- Dams in the county are aging. One of the oldest, the Lake Meyer Dam built in 1966, has the largest storage capacity and is upland of the community of Fort Atkinson, where it would flow should a dam failure occur. The dam is monitored by the county conservation board and IDNR.

Droughts

- The economic impact of droughts on agriculture are a particular concern in Iowa and the County (e.g. economic impact of crop loss, higher livestock feed costs, etc.). Winneshiek County crop loss from drought between 2007 – 2018 totaled \$32,725,487 (USDA Risk Management Agency, 2007 - 2018), an annual average crop loss of approximately \$2,727,124 over that time period.
- Could be associated with fires at certain times of year.

Earthquake

- Winneshiek County is located in Seismic Zone 0, the lowest risk zone in the United States.
- There is a 2% chance of a peak acceleration of 4.0 gravity (light perceived shaking, low potential damage) within the next 50 years for Winneshiek County.

Extreme Heat

- Extreme heat can impose stress on humans and animals (e.g. heatstroke, exhaustion, etc.). Segments of the county most at risk from extreme heat are the elderly, the very young, individuals living below the poverty line, people who are ill or on certain medications, and people with strenuous physical activity (e.g. farm workers). Overall, the County is determined to have low social vulnerability to extreme heat.
- Extreme heat can result in an economic impact to the agricultural sector as a result of livestock and crop loss.

Floods (Flash and Riverine)

- In Winneshiek County there have been 14 federal disaster declarations involved with flooding since 1990, 50% of which occurred in the last five years.
- 50% of flood loss in the county results from river flooding and 50% results from flash flooding.

- All areas of the county are at risk from flash floods. The communities of Decorah, Spillville and Fort Atkinson are at higher risk from riverine/creek floods.
- In the Upper Iowa River watershed, the City of Decorah HUC 12 subwatershed has the highest rate of flood prone structures, followed by the Community of Freeport and Ten Mile Creek subwatersheds. In the Turkey River Watershed, the Rogers Creek HUC 12 subwatershed has the highest rate of flood prone structures, followed by the Otter Creek-Turkey River sub-watershed.
- Combined average annual countywide structure and content loss estimates from flood events in the Upper Iowa River and Turkey River watersheds in the County total \$893,410, and full 100-year flood loss in both basins could exceed \$20 million.
- The average annual flood loss estimate for the City of Decorah is \$649,424 (highest in the County).
- There is little adequate warning for flash flooding. Better flood gauges and warning for riverine floods is also a significant need in the County.
- Driveways, roads, bridges, etc. can get washed out, leaving no access in case of an emergency.
- Floods can have severe impacts to areas with structures and infrastructure damaged routinely, especially in the unincorporated areas in the low-lying areas adjacent to the water source.
- There are initial public safety and long-term health concerns from floods.
- Downstream residents can be impacted as floodwaters carry hazardous material and debris into fields and backwaters, impacting downstream farms and natural areas, and overall ecological impacts can include water quality degradation, terrestrial and aquatic habitat loss, and soil and nutrient loss and loading.
- When flood waters saturate the ground, ground water or private wells can become contaminated.

Grass and Wildland Fire

- Wildfire hazard potential is low in the County, according to the USDA Forest Service.
- There are no recorded incidents of significant wildfire in Winneshiek County.

Hailstorm

- There were 135 hail events (over 49 days) in Winneshiek County from 1998-2018 (an average of 6.3 a year), resulting in approximately \$5 million in recorded property damages and \$9 million in crop damages. The communities of Decorah and Calmar have a higher rate of recorded hail events in that time period.
- Crops, structures, and vehicles are damaged by large hail events.
- The associated thunderstorms can generate damaging winds.

Hazardous Materials

- Entire planning area and beyond could be affected depending on the amount of HAZMAT released and its potency.
- A technician level response team out of Waterloo, IA responds to HAZMAT incidents in Winneshiek County to assist county fire departments at the operations level.
- Hazardous materials, in both liquid and gas form, are transported on the county's roadways, railways and through pipelines year round.
- Concern over the increase in rail traffic carrying potential hazardous materials was expressed by several communities in the county.

Human Disease

- Human disease can occur anywhere within the planning area. Typically people who become ill are the elderly, the very young and people with chronic medical conditions and high risk behaviors.
- Common reportable diseases in Winneshiek County are Cryptosporidiosis, Campylobacteriosis, Mumps, Lymes Disease, and Salmonellosis (though overall numbers are extremely low compared to the overall population).

Infrastructure Failure

- Communications, energy and structural failures, as well as fires, can occur in any area of the county for a variety of reasons.
- Nearly 42% of the dwellings in the county were built prior to 1940. Older homes are at increased risk of structural failure.
- Bridges are a concern as over 40% are ranked as deficient.

Landslide

- In northeast Iowa, along the Silurian Escarpment you can find blocks of dolomite slumped onto the underlying Maquoketa Shale, which creates situations vulnerable to landslides.
- Calmar, Castalia, Decorah, Fort Atkinson, Ossian, Ridgeway and Spillville are located in an area considered 'moderate susceptibility – low incidence' for landslides.

Levees

- The City of Decorah has the Dry Run Flood Control Project (Army Corps of Engineers Levee System), known as the Dry Run Project. Should the Dry Run Project levee fail unexpectedly residents and infrastructure are at risk. The levee did withstand historic river crests in 1993 and 2008, but information about the structural integrity of the levee is an ongoing priority.
- Fort Atkinson has a levee built in the 1940s.

Radiological

- No incidents related to a release of radioactive materials beyond plant walls have been noted in the nuclear plants nearest the County. The nearest plants exceed 50 miles away, which is beyond the "Ingestion Pathway Zone."
- There have been no occurrences of a radiological transportation incident in Iowa.

Severe Winter Storms

- 82 winter weather or winter storm events were reported in the County between 1998 – 2018
- From 2007 to 2018 Winneshiek County's crop losses as a result of winter conditions totaled \$2,164,854 (USDA Risk Management Agency, 2007 - 2018).
- Average annual winter storm crop damage in the county is \$450,000 - \$600,000, and average annual winter storm property damage is \$125,000 - \$300,000 (Iowa Homeland Security and Emergency Mgt., n.d.).
- Closure of schools and business impact economic productivity.
- Access to people and livestock could be limited.
- Unsafe driving conditions a concern.

Sinkholes

- According to IDNR data, there are 5,265 current and historic sinkhole and depression locations in Winneshiek County. Heavy concentrations of sinkholes can be found largely in the unincorporated areas running northwest to southeast through the center of the county, as well as in and around the communities of Decorah, Jackson Junction and Spillville.

Terrorism

- While nothing of severe consequence has occurred in the county to date in terms of agro-terrorism, bio-terrorism, domestic terrorism, workplace violence or public disorder, acts of terrorism could occur anywhere within the planning area.
- Active shooting incidents in schools are a specific concern in meeting with school districts.

Thunderstorms and lightning

- Associated winds and hail can cause damage to power infrastructure, structures, and vehicles
- Direct lightning strikes can cause major damage to the power infrastructure or structures, start a fire or cause death.
- There were 13 Presidential Disaster Declarations between 1990 - 2018 related to severe storms in Winneshiek County, almost half of which occurred since 2015.
- 87 thunderstorm wind events recorded for Winneshiek County between 1998 – 2018 resulted in approximately \$724.55K in property damages and \$299K in crop damages.

Tornadoes

- There were 19 tornadoes in Winneshiek County between 1964 – 2019; of those, two were rate F2 and one was rated F4.
- On at least two occasions since 1964, tornadoes have resulted in injuries to County residents.
- Total property damages from tornados in the county between 1964 - 2019 was \$6.2 million, and crop damages totaled \$42,550. There have been 6 occurrences of a single tornado event resulting in damages totaling \$250,000 or more.
- Average annual tornado damages in Winneshiek County (based on 22 tornado events) is \$245,854.
- Only one FEMA-compliant tornado safe room currently exists in schools or public buildings in the planning area.
- Damage endured from a tornado could range from minimal to complete devastation.
- Agricultural production and financial return can be severely impacted.

Transportation Incident

- Transportation Incidents can range in severity from minor injuries and damage to the vehicles to loss of life.
- Between 2008 – 2018 property damage totals from vehicle crashes was nearly \$24 million. Twenty-eight deaths and 183 major injuries resulted from the crashes.
- Over 35% of crashes in the past decade were caused by animal collisions or avoidance.
- Increasing volume of rail cars carrying hazardous materials in the county, and the higher potential for economic, human or environmental impacts should an accident occur.

Windstorms

- Six Federal Disaster Declarations covering the county listed high winds/straight-line winds from 1990 – 2018.

- There were 95 high, strong or thunderstorm wind events in the County from 1998 -2018, resulting in \$946K in property damages and \$299K in crop damages.
- Crop loss in the County from excess wind from 2007 – 2018 totaled \$1,053,447 (USDA Risk Management Agency, 2007 - 2018).
- Wind events can frequently cause damage to power lines.
- Unsecured mobile homes, campers, barns, and sheds and their occupants are specifically vulnerable.
- Human safety and wellbeing is a concern.
- Trees and tree limb debris can damage power lines, power infrastructure, structures, and automobiles.
- Storefront windows are vulnerable to damage from high-winds.
- Roofs are frequently damaged by high winds.

Mitigation Strategy

This section presents the mitigation strategy developed by the Hazard Mitigation Planning Committee (HMPC) and the participating jurisdictions based on the county-wide risk assessment as well as each city's strategies. The mitigation strategies were developed through a collaborative group process and consist of general goal statements to guide the Participating Jurisdictions in efforts to lessen disaster impacts as well as specific mitigation actions that can be put in place to directly reduce vulnerability to hazards and losses. The following definitions are based on those found in FEMA publication 386-3, *Developing a Mitigation Plan* (April, 2003):

- **Goals** – General guidelines that explain what you want to achieve. They are usually long-term, policy-type statements and represent broad visions
- **Objectives** – Strategies or implementation steps to attain the identified goals
- **Mitigation Actions** – Specific actions that help achieve goals and objectives

Goals

Requirement §201.6(c)(3)(i):

[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Goals were used to provide direction for reducing hazard-related losses in the Participating Jurisdictions. The HMPC reviewed the goals from the previously approved hazard mitigation plan (MJ-9) and updated them to the following:

Goal 1: Minimize vulnerability of people and private property in the Participating Jurisdictions to the impacts of hazards

Goal 2: Protect critical community assets, and public facilities and infrastructure from the impacts of hazards

Goal 3: Improve education and awareness regarding hazards and risk in the Participating Jurisdictions

Goal 4: Strategically implement flood reduction practices that also improve water quality

Identification and Analysis of Mitigation Actions

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.

CRS Step 6

Set goals

CRS Step 7 (Also found in Implementation of Mitigation Actions)

Review possible mitigation activities:

7(a) Preventative activities

7(b) Floodplain Management Regulatory/current & future conditions

7(c) Property protection activities

7(d) Natural resource protection activities

7(e) Emergency services activities

7(f) Structural projects

7(g) Public information activities

After review of hazards and defining the level of concern placed on each by the county and its communities, mitigation actions were developed by each jurisdiction to address those hazards deemed most critical. Actions fell into broad categories as defined below:

- **Local plans and regulations:** Actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.
- **Structure and infrastructure projects:** Actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- **Natural systems protection:** Actions that minimize damage and losses and also preserve or restore the functions of natural systems.
- **Education and awareness programs:** Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Education/awareness may help lead to more direct actions in the future.

Meetings open to the public were held in each community, by the planning committee, and in coordination meetings with other agencies to review past mitigation actions from the previous hazard mitigation plans (MJ-9), brainstorm new possible mitigation actions and discuss all for inclusion in this updated plan. Lists of a wide range of activities reviewed, as falls under the categories above, and as identified by the Community Rating System (CRS) as credited activity categories, can be found in Appendix D – Mitigation Action/Activities Considered Summary.

The HMPC approved the placement of the actions under the following goals and strategies. Some actions applied to more than one goal or strategy so may be listed twice:

Goal 1: Minimize vulnerability of people and private property in the Participating Jurisdictions to the impacts of hazards

Strategy: Develop safe and functioning havens as well as evacuation plans for the public in the event of a disaster

Mitigation Actions:

- Storm shelter – FEMA compliant safe room
- Generators/Transfer Switches
- Develop plans to address hazard issues

Strategy: Ensure that emergency responders are prepared and able to react in any hazard situation, and are able to communicate effectively with one another and the public before, during and after a hazard event

Mitigation Actions:

- Expand/improve communications/technology infrastructure and equipment
- Maintain/improve flood mitigation equipment

Strategy: Ensure that local jurisdictions are prepared and able to react in any hazard situation

Mitigation Actions:

- Maintain/improve flood mitigation equipment
- Sirens – additions/replacements/upgrades
- Develop plans to address hazard issues
- Improvements to transportation safety and response
- Implement city codes and policies to better address hazard issues
- Watershed & flood prevention planning & initiatives

Goal 2: Protect critical community assets, and public facilities and infrastructure from the impacts of hazards

Strategy: Ensure that emergency responders have the tools they need to prepare and/or respond to hazards

Mitigation Actions:

- Maintain/improve flood mitigation equipment
- Expand/improve communications/technology infrastructure and equipment

Strategy: Maintain the function of critical facilities and services to provide continued support in the event of a disaster

Mitigation Actions:

- Generators/Transfer Switches
- Improved/upgraded water/sewer facilities (wells, systems, hydrants, lagoons...)

Strategy: Ensure that communities have the ability to take necessary action to lessen the impact of a disaster

Mitigation Actions:

- Develop plans to address hazard issues
- Ensure the plan is updated prior to expiration
- Implement city codes and policies to better address hazard issues

Strategy: Provide ample warning to people and business to reduce loss of life or property

Mitigation Actions:

- Expand/improve communications/technology infrastructure and equipment
- Sirens – additions/replacements/upgrades

Goal 3: Improve education and awareness regarding hazards and risk in the Participating Jurisdictions

Strategy: Increase public knowledge and awareness of potential hazards and the individual and collaborative actions that can be taken to reduce or eliminate the risk and impact of an event

Mitigation Actions:

- Ensure the plan is updated prior to expiration
- Develop plans to address hazard issues
- NFIP participation/consideration
- Promote the Hazard Mitigation Plan to the public
- Improvements to transportation safety and response

Goal 4: Strategically implement flood reduction practices that also improve water quality

Strategy: Increase infiltration

Mitigation Actions:

- Increase infiltration/Green infrastructure
- Implement city codes and policies to better address hazard issues

Strategy: Store excess rainfall runoff

Mitigation Actions:

- Store excess runoff (e.g. farm/rural ponds & detention basins)
- Implement city codes and policies to better address hazard issues

Strategy: Restore and protect stream and river corridors and floodplains

Mitigation Actions:

- Floodplain restoration & streambank stabilization
- Implement city codes and policies to better address hazard issues

Strategy: Watershed and flood prevention planning and initiatives

Mitigation Actions:

- National Flood Insurance Program (NFIP) participation
- Watershed & flood prevention planning & initiatives

Implementation of Mitigation Actions

Requirement §201.6(c)(3)(iii):

[The mitigation strategy shall include] an action strategy describing how the actions identified in paragraph (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 benefits review of the proposed projects and their associated costs.

After the actions to include in the mitigation strategy for the each of the jurisdictions were determined, the planning committee determined the priority or rank of all the actions. The committee used a scoring methodology to assist in the ranking based on the State of Iowa Hazard Mitigation Plan (2018) Hazard Mitigation Strategy. Depending on the score, each action was ranked in priority compared to the other mitigation actions in its respective category, according to these ranking classifications:

- **High priority** (abbreviated as priority A in places)
- **Medium-high priority** (abbreviated as priority B in places)
- **Medium priority** (abbreviated as priority C in places)

Actions that ranked below medium (C) priority, were determined to be actions that will be delayed (and so marked D) for now, and implementation would not be pursued in the next five years unless a very good opportunity suddenly appeared that made implementation easy with little commitment of existing resources.

The criteria that the planning committee used to score the actions included criteria meant to evaluate how cost effective, environmentally sound, and technically feasible each action is. The actions were also considered relative to how much progress has been achieved by that action, or how much more progress the committee felt still needed to be made implementing the particular action. Finally, the actions were also considered relative to which hazard or hazards each one addressed, and the risks and vulnerabilities associated with such hazard(s).

To score the actions, the following mitigation action evaluation/scoring factors were applied to each action:

- 1) **Cost Effective Score:** Each action given a score based on its considered likelihood of getting more benefit than cost. Scores given based on:
 - 5 points = Benefit expected to be five times or more than cost, OR will prevent deaths/injuries
 - 4 points = Benefit expected to be four to five times cost
 - 3 points = Benefit expected to be three to four times cost
 - 2 points = Benefit expected to be two to three times cost
 - 1 point = Benefit expected to be one to two times cost
 - 0 points = Unsure if benefit will exceed cost
 - -1 point = Cost expected to exceed benefit, but not by much
- 2) **Environmentally Sound Score:** Each action given an “environmental” score according to how closely it matched the following:

- 5 points = Great benefit to the environment and most everyone knows it!
- 4 points = Most likely a benefit to the environment
- 3 points = Perhaps some benefit to the environment, certainly no harm
- 2 points = Generally accepted as causing no harm to environment, though not really considered a benefit either
- 1 point = More likely NOT to damage the environment than to damage the environment
- 0 points = Questionable if environmentally sound or not

3) **Technical Feasibility - Cost:** Each action considered in terms of ability for a jurisdiction to pay for it. Scores given on how closely each action matched the following:

- 5 points = Cost easily covered within jurisdiction's budgets or funding avenues (which may be from outside sources)
- 4 points = Cost within jurisdiction budgets or funding streams, but it would be tight and sometimes implementation would have to be delayed due to competing priorities
- 3 points = Could probably only do this action on a part-time basis, or provide sometimes
- 2 points = Could only do this action as a tangent or auxiliary to another purpose
- 1 point = Would need to find funding for this, as none currently available, but there is hope
- 0 points = Maybe we could do it/maybe not, chances are equal
- -1 point = Not likely to be able to find funding for this now due to various barriers

4) **Technical Feasibility - Capability:** Other than cost, how technically feasible is the action? How capable is a jurisdiction to handle it?

- 5 points = Already have an established program that does this very thing
- 4 points = Fairly easy – have capable staff, resources, political support, etc.
- 3 points = Would need to juggle staff and resources, but it is possible
- 2 points = Would need some technical assistance to do this, because currently not entirely capable
- 1 point = Very little capacity to do this, or political or other leaders do not seem to support
- 0 points = Political or other factors make this idea hinge in the balance
- -1 point = Political or other factors are against, but there is a chance tide could turn

5) **How much more to do:** According to 44 CFR 201.4d, the plan needs to be updated to reflect progress on past mitigation efforts, and priorities must reflect that. To reflect that, points will be given based on the following:

- 5 points = A lot more left to be done
- 2-4 points = Somewhere between above and below
- 1 point = So much past progress that little need left for this, but still some need
- 0 or -1 points = So much past progress little or no need for this action

- 6) In addition to points for the above, each mitigation action gets **3 points for each Group 1 high risk hazard** to which the action applies, **2 points for each Group 2 risk hazard** to which it applies, and **1 point for applicability to all other hazards**.

Requirement §201.6(c)(3)(iv):

For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan

CRS Step 8(a)

8(a) Draft an action plan - Actions must be prioritized

Table 49 lists the general mitigation actions the Participating Jurisdictions selected to include in the plan, the action category, the action priority (ranking and priority category), applicable goals and hazards addressed by the mitigation action. More details regarding the specific actions and action implementation by jurisdiction are included in the tables beginning on page 178.

Table 49: General Mitigation Actions by Jurisdiction and Priority

Mitigation Action:	Jurisdiction:	Action Category:	Priority Rating:	Priority Category:	Goal Addressed:	Priority Hazard Addressed:
Flood reduction practices: Floodplain restoration & streambank stabilization	Decorah, Fort Atkinson, Spillville	Natural Systems Protection, Structure & Infrastructure	23	High	4	All Floods
Flood reduction practices: Watershed & flood prevention planning & initiatives	Decorah, Fort Atkinson, Spillville	Local Plans & Regulations, Natural Systems Protection	22	High	1,4	All Floods
Implement codes & policies to better address hazard issues	Winneshiek Co. (all cities), Calmar/South Winneshiek CSD, Decorah	Local Plans & Regulations	22	High	1,2,4	All Floods, Transportation Incident
Flood reduction practices: Increase infiltration/Green infrastructure	Calmar, Decorah, Fort Atkinson	Natural Systems Protection, Structure & Infrastructure	21	Md - High	4	All Floods
Maintain/improve flood mitigation equipment	Winneshiek Co., Decorah, Fort Atkinson, Jackson Junction, Spillville	Structure & Infrastructure, Ed & Awareness	21	Md - High	1,2	All Floods
Promote the Hazard Mitigation Plan to the public	Winneshiek Co.	Ed & Awareness	21	Md - High	3	All Priority Hazards
Flood reduction practices: Store excess runoff	Winneshiek Co., Decorah	Natural Systems Protection, Structure & Infrastructure	20	Md - High	4	All Floods
Improve communications/technology infrastructure & equipment	Winneshiek Co., Decorah/Decorah CSD, Ossian	Structure & Infrastructure	20	Md - High	1,2	All Priority Hazards
Sirens – additions / replacements / upgrades	Decorah, Spillville	Structure & Infrastructure	20	Md - High	1,2	All Storms
Improvements to transportation safety and response	Castalia, Decorah, Ossian, Spillville	Ed & Awareness	20	Md - High	1,3	All Floods, Hazardous Materials, Transportation Incident
Generators/Transfer Switches	Winneshiek Co., Decorah/Decorah CSD, Ossian/South Winneshiek CSD, Ridgeway, Spillville	Structure & Infrastructure	19	Md - High	1,2	All Floods, All Storms

Mitigation Action:	Jurisdiction:	Action Category:	Priority Rating:	Priority Category:	Goal Addressed:	Priority Hazard Addressed:
NFIP participation/consideration	Decorah, Fort Atkinson, Spillville	Local Plans & Regulations, Natural Systems Protection, Ed & Awareness	19	Md - High	3,4	All Floods
Improved/upgraded water/sewer/storm sewer facilities (wells, systems, culverts, lagoons...)	Winneshiek Co., Decorah, Fort Atkinson, Jackson Junction/Turkey Valley CSD, Ridgeway, Spillville,	Structure & Infrastructure, Natural Systems Protection	19	Md - High	2	All Floods, All Storms
Ensure the plan is updated prior to expiration	Winneshiek Co.	Ed & Awareness	19	Md - High	2,3	All Priority Hazards
Develop plans to address hazard issues	Spillville	Local Plans & Regulations	17	Md - High	1,2,3	All Floods, All Priority Hazards, Plant Disease
Storm shelter – FEMA compliant safe room	Decorah/Decorah CSD, Ossian, Ridgeway, Spillville	Structure & Infrastructure	9	Medium	1	All Storms

Strategies for hazard mitigation in any jurisdiction reduce overall damage in the county. Implementation of the actions will be undertaken by the county and participating jurisdictions. Not all of the mitigation actions included in the plan are relevant to all jurisdictions. The following tables provide more detailed information for each general mitigation action listed in Table 49, including the jurisdiction and its specific action, the responsible agency for pursuing the action, potential funding sources and timeframes. Timeframes listed as “ongoing” indicate that the action is something that the jurisdiction has started and will continue to pursue and/or an action (like training) that re-occurs throughout the life of the planning document. Specific actions can also be found listed in each jurisdictional section of this plan.

High Priority Actions

1. Flood reduction practices: Floodplain restoration and streambank stabilization (23 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Decorah	Improvements and continued maintenance to levee system	Decorah City Council	City stormwater utility, RUT	1 – 5 years	>\$100,000
	Streambank stabilization along Upper Iowa River & levee	Decorah City Council	City stormwater utility, RUT	1 – 5 years	>\$100,000
	Cleanup/maintain the Dry Run diversion channel	Decorah City Council	City general funds	1 – 2 years	>\$100,000
	Identification and acquisition of all Dry Run Creek property	Decorah City Council	City stormwater utility	1 – 5 years	>\$100,000
	Acquisition of parcels at the end of Water St. prone to flooding, & other individual flood prone parcels	Decorah City Council	City stormwater utility	5 years	>\$100,000
	Pursue options for converting acquired Dry Run Creek land to city open space amenity, flood control, stormwater management and/or conservation uses	Decorah City Council	City stormwater utility	1 – 5 years	>\$10,000 & <\$100,000
Fort Atkinson	Take actions that contain the river and creek within designated boundaries (including working with railroad to clean up vegetation along the rail)	Fort Atkinson City Council	City general funds, FEMA, DNR, railroad	Ongoing	<\$10,000
Spillville	Address trees and junk causing dam up near Riverside Park	Spillville City Council	City general funds	Ongoing	<\$10,000
	Install rip-rap along the river (north park area, etc.)	Spillville City Council	City general funds, FEMA, DNR	Ongoing	<\$10,000

2. Flood reduction practices: Watershed and flood prevention planning & initiatives (22 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Decorah	Support/partner with the Upper Iowa River Watershed Management Authority (UIRWMA) on	Decorah City Council	City general funds, time	Ongoing	<\$5,000

	implementing objectives of the Upper Iowa River Watershed Plan, and stay involved in future meetings and planning of the UIRWMA				
Fort Atkinson	Continue participation in Turkey River Watershed Management Authority and related planning	Fort Atkinson City Council	City general funds, time	Ongoing	<\$5,000
Spillville	Continue participation in Turkey River Watershed Management Authority and related planning	Spillville City Council	City general funds, time	Ongoing	<\$5,000

3. Implement codes and policies to better address hazard issues (22 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Winneshiek County	Draft and adopt ordinance to prohibit building in the 100 yr. and 500 yr. floodplain	Winneshiek County Board/City Councils	City and county general funds, staff time	Ongoing	<\$1,000
Calmar/South Winneshiek CSD	Updates to disaster procedures & materials (add emergency kits in rooms, reunification binders w/children's pictures at each fire station, etc.)	South Winneshiek Schools District School Board	District funds	12 months	<\$10,000
Decorah	Approve a stormwater ordinance to manage stormwater runoff on sites over 2 ac. (& consider further stormwater mgt. ordinances)	Decorah Planning & Zoning, and Decorah City Council	City general funds, Staff time	12 months	<\$1,000
	Use stormwater utility funds to provide incentives for homeowners and businesses to implement onsite stormwater Best Management Practices (BMPs), and to create city demonstration BMPs; increase stormwater utility fee.	Decorah Planning & Zoning, and Decorah City Council	City general funds, Staff time	12 months	Varies by project, but upfront cost for city is minimal

Medium-High Priority Actions

1. Flood reduction practices: Increase infiltration/Green infrastructure (21 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Calmar	Incorporate stormwater management practices in the vicinity of Main St. to minimize flash flooding during large storm events. Potential practices include raingardens, bioswales, pervious pavers, native turf/grasses, etc.	Calmar City Council and city staff	City funds, FEMA, DNR (REAP)	Ongoing	<\$10,000 (smaller projects) to >\$80,000 (larger projects)
Decorah	Incorporate stormwater management in upcoming projects, as recommended by City's existing stormwater management plan	Decorah City Council and city staff	City funds, FEMA, DNR (REAP)	Ongoing	<\$10,000 (smaller projects) to >\$80,000 (larger projects)
Fort Atkinson	Consider opportunities for implementing community project ideas listed in Figure 6.G.1 of the TRWMA Flood Reduction Plan: 1) Rain barrel program, 2) Permeable pavers, 3) Native turf/native grasses, 4) Bio-swales, 5) Bank stabilization/stream meander	Fort Atkinson City Council and city staff	City funds, FEMA, DNR (REAP)	Ongoing	<\$10,000 (smaller projects) To >\$80,000 (larger projects)

2. Maintain/improve flood mitigation equipment (21 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Winneshiek County	Purchase additional stream gauges	Winneshiek County EMC	County emergency mgmt. funds, FEMA, DNR, Conservation district, NRCS	Ongoing	<\$10,000
	Upgrade Iowa Flood Information System (IFIS) gauge at Cardinal Marsh to a USGS gauge	Winneshiek County EMC	County general funds, county emergency mgmt. funds, FEMA grants	6 months after funding	<\$10,000

	Work with Howard Co. to place a new flood gauge at a bridge crossing the Turkey River (within Howard Co., west of the Winneshiek Co. border)	Winneshiek County EMC	County general funds, county emergency mgmt. funds, FEMA grants	6 months after funding	>\$10,000 & <\$30,000 (NOAA)
Decorah	Acquire additional USGS or Iowa Flood Center (or other) river gauges to monitor flooding along Trout Run and Dry Run creeks	Decorah City Council	City general funds, FEMA, DNR, NRCS	Ongoing	<\$10,000 per gauge
	Acquire permanent hydraulic pumps to be used along the Upper Iowa River during flooding	Decorah City Council	City general funds, HMGP, PDM, FMA	Ongoing	>\$10,000 & <\$100,000
Fort Atkinson	Purchase and manage flood mitigation equipment	Fort Atkinson City Council	City general funds, HMGP, PDM, FMA	Ongoing	>\$10,000 & <\$100,000
	Maintain a communication system along the Turkey River Corridor (continue payment for gauges)	Fort Atkinson City Council	City general funds, HMGP, PDM, FMA	Ongoing	<\$10,000
Jackson Junction	New flood mitigation equipment, including sawhorses with flashing lights to put on the road to warn of flooded areas, where roads are getting washed out during flooding	Jackson Junction City Council	City general funds, Winneshiek Community Foundation	6 months	<\$5,000
Spillville	Purchase portable flood barriers	Spillville City Council	City general funds, HMGP, PDM, FMA	Ongoing	>\$100,000 & <\$300,000
	Increase the number of gauges within the watershed	Spillville City Council	City general funds, FEMA, DNR, NRCS, Conservation district	Ongoing	<\$10,000
	Obtain responder boat and life jackets	Spillville City Council	City general funds	6 months after funding	<\$1,000

3. Promote the Hazard Mitigation Plan to the public (21 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Winneshiek County	Promote the Winneshiek County Hazard Mitigation Plan to the public	Winneshiek County EMC	Time only	Ongoing	<\$10,000

4. Flood reduction practices: Store excess runoff (20 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Winneshiek County	Flood protection for downstream communities by expanding & improving existing retention basins located south of Co. Rd. A46 (near the Turkey River), in the Otter Creek-Turkey River HUC 12 subwatershed	Winneshiek County Board & watershed authority representatives; county engineer & emergency manager; SWCD	FEMA, RCPP Grant, County Road Funding	1 – 5 years	>\$10,000 & <\$5,000,000
	Flood protection for downstream communities by implementing wetlands and riparian buffers near Ten Mile Creek in the Ten Mile Creek HUC 12 subwatershed	Winneshiek County Board & watershed authority representatives; county engineer & emergency manager; SWCD	FEMA, IDALS/Watershed Approach, County Road Funding	1 – 5 years	>\$10,000 & <\$5,000,000
	Work with private landowners to implement detention structures in cropland and pasture areas in the Nordness and Trout Creek HUC 12 subwatersheds to help mitigate flooding/protect homes in Freeport	Winneshiek County Board & watershed authority representatives; county engineer & emergency manager; SWCD	FEMA grants, County Road Funding	1 – 5 years	>\$10,000 & <\$5,000,000
	Implement on-road structures in the Nordness and Trout Creek HUC 12 subwatersheds to help mitigate flooding in Freeport	Winneshiek County Board & watershed authority representatives; county engineer & emergency manager; SWCD	FEMA grants, County Road Funding	1 – 5 years	>\$10,000 & <\$5,000,000
	Research potential impact of a detention pond uphill from the community of Freeport in the Freeport HUC 12 subwatershed, to protect residences downhill in Freeport. Consider implementing detention ponds uphill from Freeport community	Winneshiek County Board & watershed authority representatives; county engineer & emergency manager; SWCD	FEMA grants, County Road Funding	3 years	>\$10,000 & <\$5,000,000

Decorah	Construct upstream water retention structures on Dry Run to control quantity and velocity of water	Decorah City Council or Upper Iowa River Watershed Mgt. Authority	City general funds, FEMA, DNR	3 – 4 years	>\$10,000 & <\$300,000
	Partner with Winneshiek Co. Conservation to examine opportunities for the planned Dry Run Trail to serve for stormwater management, to help mitigate downstream flooding impacts to Decorah	Decorah City Council and Winneshiek Co. Conservation	City general funds, FEMA, DNR	2 – 5 years	>\$10,000 & <\$500,000

5. Expand/improve communications/technology infrastructure and equipment (20 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Winneshiek County	Improve data collection software and technology resources	Winneshiek County EMC	County emergency mgmt. funds, FEMA, DNR, Conservation district, NRCS	3 – 6 mos.	>\$10,000 & <\$100,000
	Evaluate and purchase automated reverse 911 system	Winneshiek County Dispatch Center	HMPG, 911 funds	6 – 12 mos. after funding	>\$10,000 & <\$100,000
	Purchase and implement countywide interagency portable mobile data	Winneshiek County Dispatch Center	HMPG, Iowa HSEMD, federal grants	1 – 2 years after funding	>\$10,000 & <\$100,000
	Upgrade to public safety software (e.g. CAD)	Winneshiek Co. 911 Board, Winneshiek Co. EMC	911 Funds, Federal grants	1 – 2 years	>\$100,000 & <\$400,000
Decorah and/or Decorah CSD	Upgrade digital two-way communication system to interface with fire, life, safety personnel	Decorah Community Schools District School Board	District funds, HMGP	12 mos.	<\$10,000
	Upgrade of mass notification system for the school district	Decorah Community Schools District School Board	District funds, HMGP	12 mos.	<\$10,000
	Continue to improve city interagency portable mobile data by implementing new technologies	Decorah Communication Center	Agency budget, HMGP, Iowa HSEMD, federal grants	Ongoing	>\$10,000 & <\$100,000

	Expand and maintain the Metronet fiber optic cable and related equipment – consolidate projects where feasible (i.e. lay conduit when city infrastructure projects occur)	Metronet Partners: City of Decorah, Decorah CSD, Winneshiek County, Winneshiek Medical Center, Luther College, UERPC	Partner grants or funds	1 – 2 years	>\$300,000
Ossian	Encourage and educate residents to utilize “all-hazards” radios	Ossian City Council	City funds, federal or state emergency management grants	Ongoing	<\$10,000

6. Sirens – additions/replacements/upgrades (20 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Decorah	Upgrade all warning sirens to battery backup	Decorah City Council	HMGP, City general funds	1 – 2 years	Unknown
Spillville	Purchase and install warning siren near lagoon, upgrade all warning sirens to battery backup	Spillville City Council	HMGP, City general funds	1 – 2 years	>\$10,000 & <100,000

7. Improvements to transportation safety and response (20 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Castalia	Create a rail accident evacuation plan, then inform community members	Castalia City Council	Time and minimal city funds	Ongoing	<\$10,000
Decorah	In coordination with County, re-route truck traffic so it doesn’t go through downtown (excepting necessary local service trucks, but not excepting animal trucks)	Decorah City Council, Winneshiek County Engineer	Time and minimal city funds	1 yr.	<\$1,000
Ossian	Pursue crossing arms or signals for rail crossings on Hall and West streets	Ossian City Council	Time, City funds, DOT	Ongoing	>\$10,000 & <\$100,000
Spillville	Purchase a portable speed monitor sign	Spillville City Council	City funds, DOT	1 – 2 years	<\$10,000

8. Generators/Transfer Switches (19 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Winneshiek County	Purchase a generator for the Frankville Community Center	Frankville Fire Department	Township taxes, Fire grants, HMGP	6 – 12 mos. after funding	<\$10,000
	Purchase mobile generators for deployment countywide as needed	Winneshiek County EMC	HMGP, DNR, Iowa HSEMD	6 – 12 mos. after funding	<\$10,000
	Provide stability to countywide technology resources through the addition of suitable back-up power at Decorah Middle School/Carrie Lee Campus (500 KVA generator)	Metronet Partners: City of Decorah, Decorah CSD, Winneshiek County, Winneshiek Medical Center, Luther College Provost, UERPC	Partner grants or funds	1 – 2 years	>\$200,000
Decorah and/or Decorah CSD	Purchase and install permanent generator for the water department at the main pumping station	Decorah City Council	City general/enterprise funds, LOST, HMGP	~ 1yr. after funding	Unknown
	Transfer switch purchase for city hall	Decorah City Council	City general/enterprise funds, LOST, HMGP	~ 1yr. after funding	<\$10,000
	Purchase & install 500 KVA generator for Decorah Middle School	Decorah CSD	CSD funds, HMGP	~ 1yr. after funding	Unknown
Ossian/South Winneshiek CSD	Continue to wire remaining lift stations for portable generator and then purchase generator(s)	Ossian City Council	City general/enterprise funds, LOST, HMGP, Iowa HSEMD	~ 1yr. after funding	<\$10,000
	Purchase generator for community center	Ossian City Council	City general funds, LOST, HMGP, Iowa HSEMD	~ 1yr. after funding	<\$10,000
	Purchase generator for South Winneshiek Elementary & Middle School to continue operations during disasters & support Ossian Senior Hospices if need be	South Winneshiek CSD School Board	District funds, HMGP	6 – 12 mos. after funding	<\$10,000
Ridgeway	Purchase and install a portable or fixed generator for the community center (city hall)	Ridgeway City Council	City general funds, LOST, HMGP, Iowa HSEMD	~ 1yr. after funding	<\$10,000

Spillville	Purchase and install generators as needed for replacements and new needs	Spillville City Council	City general/enterprise funds, LOST, HMGP, Iowa HSEMD	~ 1yr. after funding	<\$10,000
	Purchase and install power supply transfer switch for the Community Center	Spillville City Council	City general funds, LOST, HMGP, Iowa HSEMD	~ 3 mos. after funding	<\$10,000

Requirement §201.6(c)(3)(ii):

[The mitigation plan] must address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate

9. NFIP participation/consideration (19 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Winneshiek County	Consider membership in NFIP. Adopt floodplain regulations that meet or exceed minimum State of Iowa regulations. Establish work of floodplain administrator, to be identified in floodplain regulations.	Board of Supervisors	County general funds	Ongoing	>\$10,000 & <\$100,000
Decorah	Maintain membership in NFIP. Update floodplain regulations to continue to meet or exceed minimum State of Iowa regulations. Maintain work of floodplain administrator as identified in floodplain regulations.	Decorah City Council	City general funds	Ongoing	>\$10,000 & <\$100,000
Fort Atkinson	Maintain membership in NFIP. Update floodplain regulations to continue to meet or exceed minimum State of Iowa regulations. Maintain work of floodplain administrator as identified in floodplain regulations.	Fort Atkinson City Council	City general funds	Ongoing	>\$10,000 & <\$100,000
Spillville	Maintain membership in NFIP. Update floodplain regulations to continue to meet or exceed minimum State of Iowa regulations.	Spillville City Council	City general funds	Ongoing	>\$10,000 & <\$100,000

	Maintain work of floodplain administrator as identified in floodplain regulations.				
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10. Improved/upgraded water/sewer/storm sewer facilities (wells, systems, culverts, lagoons...) (19 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Winneshiek Co.	Sanitary sewer improvements to better accept increasing sewage from Freeport. Consider funding options for sliplining (Freeport Utility Board action).	Freeport Utility Board	SRF/ SRF Clean Water Sponsored Project Program, USDA Loans/Grants, CDBG	1-5 years	Unknown
Decorah	New well needed on west side of city – in remote and elevated area	Decorah City Council	City general/enterprise funds, CDBG, USDA, HMGP, PDM, FMA	3 -4 years	>\$100,000
	Continue to work on wastewater system to reduce inflow and infiltration and reline sewers	Decorah City Council	City general/enterprise funds	Ongoing	>\$100,000 & <\$300,000
Fort Atkinson	New lagoon project through 2021, which will also be designed to mitigate flooding issues (the city will build a waterway alongside the lagoon to bypass the water away from the town)	Fort Atkinson City Council	City general funds, CDBG, USDA, HMGP, PDM, FMA	2 – 3 years	Unknown
	New well and/or pump house	Fort Atkinson City Council	City general funds, CDBG, FEMA	1-5 years	>\$100,000
Jackson Junction/Turkey Valley CSD	Add new culverts, and update existing culverts, in central/SW side of city to deal with flash flooding	Jackson Junction City Council	City general funds, FEMA, CDBG	1-5 years	>\$10,000 & <\$300,000
	Upgrade and improve wastewater treatment/lagoon system (sanitary sewer improvements) (Turkey Valley CSD)	Turkey Valley Schools District School Board	District funds, FEMA, CDBG	1-5 years	Unknown

Ridgeway	Complete necessary lagoon expansion for wastewater treatment infrastructure	Ridgeway City Council	City general/enterprise funds, CDBG, USDA, FEMA	3 – 4 years	Unknown
Spillville	Monitor and maintain manhole covers to avoid floodwater in the sanitary sewer system, including raising covers as needed	Spillville City Council	City general/enterprise funds	Ongoing	<\$10,000
	Review water study and update the water supply based on recommendations (including water tower)	Spillville City Council	City general/enterprise funds, CDBG, USDA	Ongoing	>\$10,000 & <\$300,000

11. Ensure the plan is updated prior to expiration (19 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Winneshiek County	Ensure that the Winneshiek County MJ-9 Hazard Mitigation plan remains current and is updated and submitted for approval every 5 years	Winneshiek County EMC	County emergency mgmt. funds, HMPG	3 - 4 years	>\$10,000 & <\$30,000

12. Develop plans to address hazard issues (17 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Spillville	Continue to prepare for probable damage to city trees from the Emerald Ash Borer by setting aside funds for replacement and research Trees Forever Grant Programs	Spillville City Council	City funds, local fundraising, Alliant Energy, Black Hills Energy, Trees Forever	Ongoing	>\$5,000 & <\$25,000

Medium Priority Actions

1. Storm shelter – FEMA compliant safe room (9 Points)

Jurisdiction:	Specific Actions:	Responsible Agency:	Funding Source:	Timeframe:	Cost:
Decorah/Decorah CSD	Construction of a safe room on the new elementary campus	Decorah Community Schools District School Board	City general, District funds, LOST, HMGP, CDGB	1 – 2 yr. after funding	>\$50,000 <\$300,000

	Establish a safe room location for the Pulpit Rock Campground and soccer field areas; consider feasibility of using existing concrete block restroom facility	Decorah City Council/Decorah Park & Rec	City general, LOST, HMGP, CDGB	1 – 2 yr. after funding	>\$50,000 <\$300,000
Ossian	Construct shelter/safe room or retrofit Community Center safe room to meet FEMA standards	Ossian City Council	City general, LOST, HMGP, CDGB	1 – 2 yr. after funding	>\$50,000 <\$300,000
Ridgeway	Construct a shelter/safe room for the apartment complex and ball fields	Ridgeway City Council	City general funds, LOST, HMGP	1 – 2 yr. after funding	>\$50,000 <\$300,000
Spillville	Construct new or improve existing tornado shelter (in library basement) to be FEMA-compliant	Spillville City Council	City general funds, LOST, HMGP, CDGB	1 – 2 yr. after funding	>\$50,000 <\$300,000

Plan Maintenance Process

In order to ensure that this plan remains an active and relevant document, this section provides an overview of the overall strategy for plan maintenance and outlines the method and schedule for monitoring, updating and evaluating the plan. It also discusses how the plan can be incorporated into existing planning mechanisms and how to address continued public involvement.

Monitoring, Evaluating, and Updating the Plan

Requirement 201.6(c)(4)(i):

[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five year cycle.

CRS Step 10(a) and 10(b)

10(a) Procedures to monitor and recommend revisions

10(b) Same planning committee or successor committee does the evaluation

With adoption of this plan, the HMPC and the governing bodies with legal authority for each Participating Jurisdiction will be tasked with monitoring, evaluating, and maintaining the plan.

Hazard Mitigation Planning Committee (HMPC)

The Hazard Mitigation Planning Committee (HMPC) will meet as a committee once annually to monitor and evaluate the plan. The Winneshiek County Emergency Management Coordinator will organize the meeting time and place and notify other members. The core duty of the HMPC in relation to this plan is to see it successfully carried out and to report to the community governing boards and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, hearing stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information for the public to access.

More specifically, the HMPC, led by the Winneshiek County Emergency Management Coordinator, agree to:

- Meet annually to monitor and evaluate the implementation of the plan;
- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high priority, low- or no-cost recommended actions;
- Maintain vigilant monitoring of multi-objective, cost-share, and other funding opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;
- Annually report on plan progress and recommended changes to the governing body with legal authority of the Participating Jurisdictions, Winneshiek County Emergency Management

Coordinator and Upper Explorerland Regional Planning Commission (UERPC). The report must also be released to the media and available to the public; and

- Inform and solicit the public for input.
- For communities participating in the Community Rating System (CRS): An annual evaluation report on progress towards implementation must be prepared at least once each year and submitted with the community's annual CRS recertification. The report must be submitted to the governing body, released to the media, and made available to the public as well. In this case, the annual evaluation report must cover action items identified for the community in the multi-jurisdiction hazard mitigation plan. A community will not receive credit if it did not participate in the meeting at which the annual report was prepared.

Plan Maintenance Schedule

The HMPC agrees to meet annually to monitor progress and update the mitigation strategy. The Winneshiek County Emergency Management Coordinator is responsible for initiating these plan reviews. A five-year written update of the plan will be submitted to the Iowa Homeland Security and Emergency Management Division (HSEMD), FEMA Iowa and FEMA Region VII per Requirement §201.6(c)(4)(i) of the Disaster Mitigation Act (DMA) of 2000 and adopted by the governing body with legal authority of the Participating Jurisdictions within a five-year period from the final approval of this plan unless a disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

Plan Maintenance Process

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

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

Updates to this plan will:

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

To evaluate any changes in vulnerability as a result of plan implementation, the Participating Jurisdictions will undergo the following process:

- A representative from the responsible office identified in each mitigation action will be responsible for tracking and reporting to the jurisdictional lead annually on action status. The

representative will also provide input on whether the action, as implemented, meets the defined objectives and is likely to be successful in reducing vulnerabilities.

- If the action does not meet identified objectives, the jurisdictional lead will determine what additional measures may be implemented, and an assigned individual will be responsible for defining action scope, implementing the action, monitoring success of the action, and making any required modifications to the plan.

Changes will be made to the plan to accommodate actions that have failed or are not considered feasible after a review of their adherence to established criteria, time frames, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed during the monitoring and update of this plan to determine feasibility for future implementation. Updating of the plan will be enacted through written changes and submissions as the HMPC, particularly the Winneshiek County Emergency Management Coordinator, deems appropriate and necessary, and as approved by the governing bodies with legal authority for the Participating Jurisdictions.

Incorporation into Existing Planning Mechanisms

Requirement §201.6(c)(4)(ii):

[The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Where possible, the Participating Jurisdictions will use existing plans and/or programs to implement hazard mitigation actions. Based on the capability assessments of the Participating Jurisdictions, the communities will continue to plan and implement programs to reduce loss of life and property from hazards. This plan builds upon the momentum developed through previous related planning efforts and mitigation programs, and recommends implementing actions, where possible, through the following means:

- General or master plans of participating jurisdictions
- Winneshiek County Comprehensive Plan – plan updated in 2013 – includes all communities
- Ordinances of participating jurisdictions
- Capital improvement plans and budgets
- Winneshiek County Multi-Jurisdiction Mitigation Plan developed in future
- Other community plans either in existence or developed in the future
- Other county/regional plans either in existence or developed in the future

The governing body with legal authority for the participating jurisdictions adopting this plan will encourage other relevant planning mechanisms under their authority to consult this plan to ensure minimization of risk to natural hazards as well as maximum coordination of activities.

The local data collected will be included in the State of Iowa Hazard Mitigation Plan where appropriate.

HMPC members involved in updating these existing planning mechanisms will be responsible for integrating the findings and actions of the mitigation plan, as appropriate. The HMPC is also responsible

for monitoring this integration and incorporating the appropriate information into the five-year update of the multi-hazard mitigation plan.

Continued Public Involvement

Requirement §201.6(c)(4)(iii):

[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

The update process provides an opportunity to publicize success stories from the plan's implementation and seek additional public comment. Information will be posted in a county-wide publication following the annual review of the mitigation plan. Public meeting(s) to receive public comment on plan maintenance and updating will be held during the update period. When the HMPC reconvenes for the update, it will coordinate with all stakeholders participating in the planning process, including those who joined the HMPC after the initial effort, to update and revise the plan. In conclusion, public notices will continue to be posted and public participation will continue to be sought and encouraged through available local media outlets as this planning document is reviewed and revised.

Appendix A – References/Sources

- (USGCRP), U. G. (2018). *Ch. 21: Midwest*. Retrieved from Fourth National Climate Assessment (NCA4):
<https://nca2018.globalchange.gov/chapter/21/>
- A & J Petersburg Agency. (2007). *ISO Fire Suppression Rating Schedule*.
- Ahrens, M. (2012). *NFPA's "Lightning Fires and Lightning Strikes"*. National Fire Protection Association. Retrieved 2013, from <http://www.nfpa.org/research/statistical-reports/major-causes/lightning-fires-and-lightning-strikes>
- AirNav, LLC. (n.d.). *Search Airports*. Retrieved 2019, from AirNav.com:
<http://www.airnav.com/airports/get>
- Airport, D. M. (2014). *Airport Layout Plan Update*.
- Alexander, W. (1882). *History of Winneshiek and Allamakee Counties Iowa*. Sioux City: Western Publishing Company. Retrieved 2013, from
<http://archive.org/stream/historyofwinnesh00alex#page/n7/mode/2up>
- Becker, A. (2011). *Early History of Fort Atkinson*. Retrieved 2013, from Welcome to Fort Atkinson:
<http://www.fortatkinsoniowa.com/history.html>
- Bureau of Economic Analysis. (2012). *BEARFACTS*. Retrieved 2014, from U.S. Department of Commerce, BEA: <http://www.bea.gov/regional/bearfacts/>
- CDC. (2012). *Climate Change*. Retrieved 2013, from Centers for Disease Control and Prevention:
<http://ephtracking.cdc.gov/showClimateChangeExtremeHeat.action>
- Centers for Disease Control and Prevention. (2018). *National Notifiable Diseases Surveillance System (NNDSS)*. Retrieved 2019, from CDC:
https://wonder.cdc.gov/nndss/nndss_weekly_tables_menu.asp
- Cho, S. J., Jinxiu, D., McCarl, B. A., & Yu, C.-H. (2011). Economic Impacts of Climate Change on Agriculture: Adaptation and Vulnerability. In H. Kheradmand (Ed.), *Climate Change - Socioeconomic Effects* (pp. 307-324). InTech. Retrieved from
<http://cdn.intechweb.org/pdfs/19642.pdf>
- City of Calmar. (2012). *History, biking, fishing, business*. Retrieved 2013, from Calmar, Iowa:
<http://www.calmaria.com/history.html>
- City of Decorah. (n.d.). *Decorah Municipal Airport*. Retrieved 2013, from City of Decorah:
http://decorahia.org/decorah.asp?id=airport_home&level=35&pi=1&rec_id=35

- City of Spillville. (n.d.). *Spillville, Iowa*. Retrieved 2013, from Welcome to Spillville:
<http://spillville.org/Home.html>
- DNR, Iowa; Lynam, Anne, Environmental Specialist Sr. (2019). Winneshiek County Public Water Supplies.
- Federal Aviation Administration. (n.d.). *Aviation Accident Database*. Retrieved 2019, from FAA:
https://www.nts.gov/_layouts/nts.aviation/Results.aspx?queryId=07e6ec3d-3179-4a16-aae3-b763cee324de
- Federal Communications Commission. (n.d.). *Antenna Structure Registration*. Retrieved 2019, from FCC:
<https://wireless2.fcc.gov/UlsApp/AsrSearch/asrRegistrationSearch.jsp>
- Federal Emergency Management Agency (FEMA). (2019). Winneshiek County, Iowa Preliminary Flood Insurance Rate Maps (FIRMS). Retrieved 2013, from Beacon: <http://beacon.schneidercorp.com/>
- Federal Emergency Management Agency. (2019). *The National Flood Insurance Program Community Status Book*. Retrieved 2017, from FEMA: <http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book>
- Federal Emergency Management Agency*. (2019). Retrieved from FEMA Flood Map Service Center:
<https://msc.fema.gov/portal>
- Federal Highway Administration. (2012). *Planning Processes*. Retrieved 2012, from U.S. Department of Transportation Federal Highway Administration:
http://www.fhwa.dot.gov/planning/processes/statewide/related/functional_classification/fc01.cfm
- Federal Railroad Administration. (2019). *Office of Safety Analysis*. Retrieved 2019, from Federal Railroad Administration:
<https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/AccidentByStateRailroad.aspx>
- Federal Railroad Administration. (2019). *Office of Safety Analysis*. Retrieved 2019, from Federal Railroad Administration: <http://safetydata.fra.dot.gov/OfficeofSafety/Default.aspx>
- FEMA. (2001). *Understanding Your Risks: Identifying Hazards and Estimating Losses*. Federal Emergency Management Agency.
- FEMA. (2012). *Wind Zones in the United States*. Retrieved 2013, from Federal Emergency Management Agency: <http://www.fema.gov/safe-rooms/wind-zones-united-states>
- FEMA. (2013). *Policy & Claim Statistics for Flood Insurance*. Retrieved from FEMA:
<http://www.fema.gov/policy-claim-statistics-flood-insurance/policy-claim-statistics-flood-insurance/policy-claim-13>
- FEMA. (2019). *Disaster Declarations by Year*. Retrieved from Federal Emergency Management Agency (FEMA): https://www.fema.gov/disasters/year?field_dv2_declaration_type_value=All

- FEMA. (2019). *Policy & Claim Statistics for Flood Insurance*. Retrieved from FEMA:
<http://www.fema.gov/policy-claim-statistics-flood-insurance/policy-claim-statistics-flood-insurance/policy-claim-13>
- FEMA. (2019). *The National Flood Insurance Program Community Status Book*. Retrieved from FEMA:
<http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book>
- Fishel, R. (1996). *The Oneota Culture*. Retrieved 2013, from The Office of the State Archaeologist:
<http://www.uiowa.edu/~osa/learn/prehistoric/oneota.htm>
- Future Heat Events and Social Vulnerability*. (2014). Retrieved from
<https://maps.esri.com/jg/HeatVulnerability/index.html>
- Groux, D. (2013). Environmental Specialist, Winneshiek County Environmental Health.
- Gundersen Lutheran. (2013). *Clinics*. Retrieved 2013, from Gundersen Lutheran:
<http://www.gundluth.org/locations>
- High Plains Regional Climate Center. (2013). *Historical Climate Data Summaries*. Retrieved 2013, from High Plains Regional Climate Center:
http://www.hprcc.unl.edu/data/historical/index.php?state=ia&action=select_state&submit=Select+State
- High Plains Regional Climate Center. (2013). *Historical Climate Data Summaries*. Retrieved from High Plains Regional Climate Center:
http://www.hprcc.unl.edu/data/historical/index.php?state=ia&action=select_state&submit=Select+State
- Homeland Security and Emergency Management Division. (2010). *Iowa Hazard Mitigation Plan*. Johnston: Iowa Department of Public Defense.
- Houston, T. G., & Cnangnon, S. A. (2003). *Freezing Rain Events in the United States*. Retrieved from
<http://ams.confex.com/ams/pdfpapers/71872.pdf>
- IDNR, Bill Cappuccio, Flood Plain Management Engineer. (2019). Repetitive Loss Properties.
- Iowa Department of Education. (2018 - 2019). *Data & Reporting*. Retrieved 2020, from Iowa.gov:
http://www.educateiowa.gov/index.php?option=com_docman&task=cat_view&gid=926&Itemid=1563
- Iowa Department of Management. (2018). *Valuation Data*. Retrieved 2019, from Iowa Department of Management: <http://www.dom.state.ia.us/local/valuations/index.html>
- Iowa Department of Natural Resources. (2013). *Hazardous Material Release Database*. Retrieved from Iowa DNR: <https://programs.iowadnr.gov/hazardousspills/Reports/SpillSummary.aspx>

Iowa Department of Natural Resources. (n.d.). *Iowa Earthquakes*. Retrieved 2013, from Iowa Geological and Water Survey: <http://www.igsb.uiowa.edu/Browse/earthqua/earthqk2.htm>

Iowa Department of Transportation. (2019). *Office of Rail Transportation*. Retrieved 2019, from Iowa Department of Transportation: <https://iowadot.gov/iowarail/Iowa-Freight-Rail/Profiles>

Iowa Department of Transportation. (n.d.). *Office of Systems Planning*. Retrieved 2019, from Iowa.gov: <https://iowadot.gov/maps/Digital-maps/pdfview/winneshiek#25705673-city-and-county-maps>

Iowa Dept. of Public Health (IDPH). (2017). *The Center for Acute Disease Epidemiology (CADE), Iowa Surveillance of Notifiable and Other Diseases: Annual Report 2017*. Retrieved 2019, from IDPH: <https://idph.iowa.gov/Portals/1/userfiles/79/Reports/Misc/Annual%20Reports/2017%20Annual%20Report%20Final.pdf>

Iowa Dept. of Public Health (IDPH). (2019). *Center for Acute Disease Epidemiology (CADE)*. Retrieved from IDPH: <https://idph.iowa.gov/cade>

Iowa DHS. (n.d.). *Child Care*. Retrieved 2019, from Iowa Department of Human Services: https://secureapp.dhs.state.ia.us/dhs_titan_public/ChildCare/ComplianceReport

Iowa DIA, Health Facilities Division. (2019). *Entity Search*. Retrieved 2019, from Iowa Department of Inspections and Appeals, Health Facilities Division: https://dia-hfd.iowa.gov/DIA_HFD/CTLEntitySearch.do

Iowa DNR. (2019). *IDNR Facility Explorer*. Retrieved from <https://facilityexplorer.iowadnr.gov/facilityexplorer/default.aspx>

Iowa DNR. (2020). *Hazardous Materials Release Database*. Retrieved from <https://programs.iowadnr.gov/hazardousspills/Introductory.aspx#&&SearchResult=1>

Iowa DNR. (n.d.). *Iowa DNR Interactive Mapping*. Retrieved 2013, from Iowa Department of Natural Resources: http://programs.iowadnr.gov/ims/website/livestock_burial_zones/viewer.htm

Iowa DOT. (2018). *Motor Vehicle Division, Statistics and Research Studies*. Retrieved 2013, from Iowa Department of Transportation: <https://iowadot.gov/mvd/factsandstats>

Iowa DOT. (2019). *Iowa Crash Analysis Tool, Quick Report 2008 - 2018*. <https://iowadot.gov/mvd/factsandstats>.

Iowa DOT. (2019). *Motor Vehicle Division, Statistics and Research Studies*. Retrieved 2013, from Iowa Department of Transportation: <https://iowadot.gov/mvd/factsandstats>

Iowa DOT, CMAT. (2012). *Crash Mapping Analysis Tool*. Retrieved from DOT FTP Site: <ftp://165.206.203.34/TrafficSafety/TrafficSafetyPublic/>

Iowa Geological Survey, DNR. (2009, January 23). Current and Historic Sinkhole and Depression locations in Iowa. (July 21, 2014). Iowa Geological Survey, DNR. Retrieved 2019

- Iowa Homeland Security and Emergency Management. (2018). Iowa Hazard Mitigation Plan.
- Iowa Homeland Security and Emergency Mgt. (2019). Winneshiek County Flood Loss Estimates. (S. H. Jim Marwedel, & T. Brown, Compilers)
- Iowa Homeland Security and Emergency Mgt. (n.d.). *Hazard Mitigation Viewer*. Retrieved 2019, from IHSEMD:
<https://iowahsemd.maps.arcgis.com/apps/MapSeries/index.html?appid=581c59432cb24779af37161c492309fa>
- Iowa Natural Heritage Foundation. (2013). *The Karst Topography of Northeastern Iowa*. Retrieved 2013, from Off the Beaten Path: <http://inhfblog.org/2013/02/15/the-karst-topography-of-northeastern-iowa/>
- Iowa Secretary of State. (2012). *List of Incorporated Cities*. Retrieved 2013, from Iowa Secretary of State: <http://sos.iowa.gov/business/pdf/IncCities.pdf>
- Iowa State University Extension. (2013). *Iowa Land Values Survey Results*. Retrieved 2014, from Iowa State University Extension and Outreach: <http://www.extension.iastate.edu/topic/landvalue>
- Iowa Utilities Board. (2017). *Iowa Utilities Board - Electrical Service Area Boundaries*. Retrieved 2019, from iowadot.gov: <https://iowadot.gov/maps/digital-maps/electrical/electrical>
- Iowa Workforce Development. (2014). *Labor Force Data*. Retrieved from Iowa.gov: <http://www.iowaworkforce.org/lmi/laborforce/index.html>
- Kirk, B. (2011). *Blizzard Alley Meet Tornado Alley*. Retrieved 2013, from Weather Trends 360: <http://www.weathertrends360.com/Blog/Post/Blizzard-Alley-Meet-Tornado-Alley-777>
- Koehler, Thomas L. (1993 - 2018). 2019: Cloud-to-Ground Lightning Flash Density and Thunderstorm Day Distributions over the Contiguous United States Derived from NLDN Measurements. Retrieved 2019, from Oklahoma Climatological Survey: https://www.weather.gov/jetstream/tstorms_intro
- Luther College. (2018). *Enrollment, Persistence and Graduation*. Retrieved 2020, from Luther College: <http://www.luther.edu/ir/enrollment/>
- Margaret Carrel, P., Marin L. Schweizer, P., Mary Vaughan Sarrazin, P., & Tara. (2014, February). Residential Proximity to Large Numbers of Swine in Feeding Operations Is Associated with. *Infection Control and Hospital Epidemiology*, 35, 190 - 192. University of Chicago Press. Retrieved from <http://www.jstor.org/stable/10.1086/674860?origin=JSTOR-pdf>
- Meyer, C. (2013). Watershed Coordinator, Winneshiek County Soil and Water Conservation District (SWCD).
- National Centers for Environmental Information (NCEI). (2019). *Storm Events Database*. Retrieved 2019, from NOAA: <http://www.ncdc.noaa.gov/stormevents/>

- National Oceanic and Atmospheric Administration (NOAA). (n.d.). *National Centers for Environmental Information*. Retrieved 2013, from Climate Data Online: Data Tools: 1981 - 2010 Normals: <https://www.ncdc.noaa.gov/cdo-web/datatools/normals>
- National Severe Storms Laboratory. (2011). *Annual Cycles; Total Threat*. Retrieved 2010, from National Severe Storms Laboratory: <http://www.nssl.noaa.gov/projects/>
- National Transportation Safety Board. (2013). *Accident Database and Synopsis*. Retrieved 2013, from NTSB: <http://www.nts.gov/aviationquery/index.aspx>
- National Weather Service. (2005). *Heat Wave: A Major Summer Killer*. Retrieved 2013, from NOAA: http://www.nws.noaa.gov/om/brochures/heat_wave.shtml
- National Weather Service. (2009). *Office of Climate, Water and Weather Services*. Retrieved 2013, from NOAA: <http://www.nws.noaa.gov/om/windchill/>
- National Weather Service. (2012). *Storm Track 7*. Retrieved 2013, from KWWL.com: <http://addins.kwwl.com/blogs/weather/2012/08/september-snow>
- National Weather Service. (2013). *Lightning Safety*. Retrieved 2013, from National Weather Service: <http://www.lightningsafety.noaa.gov/statistics.htm>
- National Weather Service. (2013). *Storm Prediction Center*. Retrieved 2013, from NOAA: <http://www.spc.noaa.gov/faq/tornado/ef-scale.html>
- National Weather Service. (2013). *Summary of Natural Hazard Statistics for 2012 in the United States*. National Climatic Data Center.
- National Weather Service. (2019). *Heat Safety Tips and Resources*. Retrieved 2013, from Weather.gov: <https://www.weather.gov/safety/heat>
- National Weather Service. (n.d.). *The Enhanced Fujita Scale (EF Scale)*. Retrieved 2019, from NOAA: <https://www.weather.gov/oun/efscale>
- National Weather Service, Storm Prediction Center. (n.d.). *Tornadoes and Severe Storms*. Retrieved 2019, from Oklahoma Climatological Survey: https://climate.ok.gov/index.php/climate/category/tornadoes_severe_storms
- NOAA. (2010). *National Weather Service Forecast Office, La Crosse, WI*. Retrieved from National Oceanic and Atmospheric Administration: <http://www.nws.noaa.gov/climate/xmacis.php?wfo=arx>
- Northeast Iowa Community College. (2019). Teresa Kurash, Administrative Assistance to the Associate VP of Operations.
- Oklahoma Climatological Survey. (2010). *Tornadoes and Severe Storms*. Retrieved 2013, from Oklahoma Climatological Survey:

http://climate.ok.gov/index.php/climate/map/f2_tornado_days_1990_2009/tornadoes_severe_storms

Onboard Informatics. (2019). Retrieved 2012, from City-data.com: <http://www.city-data.com>

Otto, D., & Parkinson, S. (2009). *University Extension Publications*. Retrieved 2012, from Iowa State University Extension: <http://www.extension.iastate.edu/Publications/PM2023-96.pdf>

Otto, D., & Parkinson, S. (2009). *Winneshiek County Agriculture*. Ames: Iowa State University.

Peakbagger. (2012). *Winneshiek County High Point, Iowa*. Retrieved 2012, from Peakbagger.com: <http://www.peakbagger.com/>

Pipeline and Hazardous Materials Safety Administration. (2013). *Incident Reports Database Search*. Retrieved 2013, from DOT PHMSA: <https://hazmatonline.phmsa.dot.gov/IncidentReportsSearch/>

Pipeline and Hazardous Materials Safety Administration. (2019). *Iowa Incident and Mileage Overview*. Retrieved from U.S. Department of Transportation: Pipeline and Hazardous Materials Safety Administration: http://primis.phmsa.dot.gov/comm/reports/safety/IA_detail1.html?nocache=7616

Pipeline and Hazardous Materials Safety Administration. (2019). *National Pipeline Mapping System*. Retrieved 2019, from Iowa DOT PHMSA: <https://www.npms.phmsa.dot.gov/>

Reis, L. (2013). Naturalist and Natural Resource Manager, Winneshiek County Conservation Board.

Schroeder, B. (2013). Executive Director, Winneshiek County Conservation Board.

State Archaeologist, University of Iowa. (2012). *The Office of the State Archaeologist*. Retrieved 2013, from Learn About Iowa's Past: <http://www.uiowa.edu/~osa/archaeology.htm>

State Data Center of Iowa. (2013). *Iowans with Disabilities: 2013*. Des Moines: Iowa Library Services/State Library.

State Data Center of Iowa. (n.d.). *State Data Center of Iowa*. Retrieved 2012, from Iowa Data Center: <http://data.iowadatacenter.org/>

State Farm. (2013). *Top Five States for Deer-Related Collisions Named*. Retrieved from State Farm: http://www.statefarm.com/about/retirees/news_articles/top-states-for-deer-collisions.asp

TORRO. (2019). *Hail Scale*. Retrieved 2013, from TORRO: the TORnado and Storm Research Organisation: <http://www.torro.org.uk/site/hscale.php>

Tufts University. (2012). (C. D. Dabbagh, Producer) Retrieved from https://sites.tufts.edu/gis/files/2015/05/Deema_Dabbagh_2UEP.pdf

- Turkey River Watershed Management Authority. (2015). Turkey River Watershed Mgt. Authority Flood Reduction Plan.
- U.S. Army Corps of Engineers. (2019). *National Inventory of Dams*. Retrieved 2013, from CorpsMap National Inventory of Dams:
<https://nid.sec.usace.army.mil/ords/f?p=105:113:4594768220909::NO::>
- U.S. Army Corps of Engineers. (2019). *National Inventory of Dams*. Retrieved 2013, from CorpsMap National Inventory of Dams:
<https://nid.sec.usace.army.mil/ords/f?p=105:113:7909364803281::NO::>
- U.S. Census Bureau, 2010 Decennial. (n.d.). *American FactFinder*. Retrieved 2013, from U.S. Census Bureau: <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>
- U.S. Census Bureau, ACS 2013 - 2017. (2017). *American Fact Finder*. Retrieved 2019, from U.S. Census Bureau: https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml
- U.S. Department of Labor. (2014). *Labor Force Statistics from the Current Population Survey*. Retrieved 2014, from Bureau of Labor Statistics: <http://www.bls.gov/cps/>
- U.S. DOT . (2018). *Bridges and Structures*. Retrieved 2019, from Federal Highway Administration: <https://www.fhwa.dot.gov/bridge/nbi/no10/county18a.cfm#ia>
- U.S. Fish & Wildlife Service. (2008). *Dam Safety Program Description, Definitions, and Standards*. Retrieved 2013, from U.S. Fish & Wildlife: <http://www.fws.gov/policy/361fw2.html>
- U.S. Geological Survey. (n.d.). *NationalAtlas.gov*. Retrieved 2013, from NationalAtlas.gov: Where We Are: <http://www.nationalatlas.gov/mapmaker>
- U.S. NRC. (2013). *Operating Nuclear Power Reactors*. Retrieved 2013, from U.S. Nuclear Regulatory Commission: <http://www.nrc.gov/info-finder/reactor/>
- UERPC. (2019). Upper Explorerland Regional Planning Commission.
- United States Department of Agriculture. (2013). *National Agricultural Statistics Service*. Retrieved 2014, from USDA NASS:
http://www.nass.usda.gov/Statistics_by_State/Iowa/Publications/County_Estimates/index.asp
- Upper Explorerland Regional Planning Commission. (2012). *Winneshiek County Iowa Comprehensive Smart Plan*.
- Upper Iowa River Watershed Management Authority. (2019). *Upper Iowa River Watershed Resiliency Plan*. Retrieved from Upper Iowa River: <https://upperiowariver.org/plan/>
- USDA Forest Service. (2014). *Fire, Fuel, Smoke Science Program*. Retrieved from USDA Forest Service: <https://www.firelab.org/document/classified-2014-whp-gis-data-and-maps>

USDA Forest Service. (2019). *Forest Inventory and Analysis National Program*. Retrieved 2012, from USDA Forest Service: <https://www.fia.fs.fed.us/program-features/rpa/index.php>

USDA Risk Management Agency. (2007 - 2018). *Cause of Loss*. Retrieved 2019, from USDA: <https://www.rma.usda.gov/SummaryOfBusiness/CauseOfLoss>

USDA Risk Management Agency. (2012). *Information Browser*. Retrieved 2013, from United States Department of Agriculture: <http://www.rma.usda.gov/tools/>

USDA-NRCS. (2005). *Soil Survey of Winneshiek County, Iowa*. Washington, D.C.: United States Department of Agriculture.

USDA-NRCS. (2012). *Winneshiek County, IA*. Retrieved 2013, from Field Office Technical Guide: <http://efotg.sc.egov.usda.gov/treemenuFS.aspx>

USGS. (2014). *Earthquake Hazards Program*. Retrieved 2013, from USGS: <https://www.usgs.gov/natural-hazards/earthquake-hazards/earthquakes>

USGS. (2019, November). *GAP/LANDFIRE National Terrestrial Ecosystems (2011)*. Retrieved 2012, from U.S. Geological Survey: <https://maps.usgs.gov/terrestrial-ecosystems-2011/>

Vaisala. (2008 - 2017). National Lightning Detection Network NLDN. Retrieved 2019, from <https://www.vaisala.com/en/products/data-subscriptions-and-reports/data-sets/nldn>

Winneshiek County. (2012). *Welcome to Winneshiek County*. Retrieved 2013, from County of Winneshiek, Iowa: <http://www.winneshiekcounty.org/>

Winneshiek County Assessor. (2012). *Tracking Value, 2012 Annual Report*. Decorah: Winneshiek County.

Winneshiek County Engineer's Office. (2019).

(n.d.). Winneshiek County, GIS Coordinator, 2013.

(n.d.). Winneshiek County, GIS Coordinator. (2019).

Appendix B – Jurisdictional Resolutions

CRS Step 9

Adopt the plan

Winneshiek County Board of Supervisors

City of Castalia

City of Jackson Junction

Decorah Community School District

South Winneshiek Community School District

Turkey Valley Community School District

Northeast Iowa Community College

Appendix C – Planning Process Documentation

Hazard Mitigation Planning Committee Meeting Agendas & Sign-Ins

Kick-off Meeting, January 3, 2019

Agenda/Flyer Notice



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Phone: 563-382-6171 Fax: 563-382-6311
www.uerpcc.org

Hazard Mitigation Planning Meeting Agenda City Kick-off Meeting Winneshiek County, Iowa

Meeting Date: January 3, 2018
Meeting Time: 6:00 p.m.
Meeting Location: Winneshiek County Courthouse (Annex)

1. Welcome and introduction
2. Purpose of mitigation planning
3. Guest Speakers:
 - **Iowa Homeland Security and Emergency Management Department**
Dan Schmitz, Deputy State Hazard Mitigation Officer
Jim Marwedel, State Hazard Mitigation Planner
 - **Winneshiek County**
Sean Snyder, Winneshiek County Emergency Management Coordinator
Dan Marx, Winneshiek County Sheriff
 - **City Representatives**
Chad Bird, Decorah City Administrator
Michael Klemish, Spillville Mayor
4. Overview of the planning project:
 - Key steps of the hazard mitigation planning process
 - Participation requirements
 - Hazard Mitigation Planning Committee 8
 - Questions & Answers
5. Next steps
 - Cities review Area Profiles and respond to planner
 - Hazard Mitigation Planning Committee (HMPC) meeting Jan. 31, 2019
6. Adjourn

Economic Development * Comprehensive Planning * Transportation * Workforce * Housing * Revolving Loan Fund

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Sign In Sheets

Meeting Sign-In Sheet

Sub-Grantee:

Winneshiek County

Date:

1/3/2018

Time/Place:

6:00 p.m./Winneshiek County Courthouse (Annex Building)

Printed Name:	Organization/City:	Phone:	Email Address:
Robert Glass	Fort Atkinson	563 279 8311	glassr311@gmail.com
Margaret Jones	Castalia	563 589-8465	mjones@acegroup.ca
Sean Snyder	Win. Co. EMA	563-49-2553	ema@winneshiek.ia.us
Dan Mark	Win. Co Sheriff	563 382 4268	dan@co.winneshiek.ia.us
Tori Nimrod	NEI PCRD	382-8452	tori@northwestiowaregion.org
Xavier Borowski	Decorah	382-8452	lbaute9@gmail.com
Chad Bird	City of Decorah	382-8451	citymanager@decorah.ia.us
Mark Kuhn	Winn. County	419-6441	abstare@cegroup.co
X Dan Schmitz	Iowa HSEMD	515-385-9369	dan.schmitz@iowagov
X Jim Merwadel	Iowa HSEMD		jim.merwadel@iowa.gov
LEE BERKE	WIND COUNTY	563-382-295	lberke@co.winneshiek,ia.us
Janelle Halverson	Hesper/Milk	563-339-6385	nelle@kulkradio.com
John Braud	Board of Supervisors	387-7993 563-382-4993	john.braud@co.winneshiek,ia.us

Meeting Sign-In Sheet

Sub-Grantee:

Winneshiak County

Date:

1/3/2018

Time/Place:

6:00 p.m./Winneshiak County Courthouse (Annex Building)

Printed Name:	Organization/City:	Phone:	Email Address:
Johanna Bergan	Decorah	380-9674	johannafordecorah@gmail.com
PAUL R. HEROLD	FORT ATKINSON, IOWA	563-380-2387	PRH@FRUVERIWA.COM
Renee Wagner	SPILLVILLE	563-419-8449	reneewagner1967@yahoo.com
Michael T. Kline	Spillville	563-380-4224	mike@scaphisinc.biz
John H. Lubke	Winneshiak Co IA	563-380-8235	jlubke@co.winneshiak.ia.us
Steve Lusa			
Barbara Schroeder	W. Co Conservation	563-419-3335	director@winneshiakwild.com

HMPC Meeting #1, January 30, 2019

Agenda/Flyer Notice



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Hazard Mitigation Planning Meeting Agenda Planning Kick-off Meeting Winneshiek County, Iowa

Meeting Date: January 30, 2019
Meeting Time: 6:00 p.m.
Meeting Location: Winneshiek County Courthouse Annex

1. Welcome and introductions
2. Overview of the hazard mitigation planning project
 - Key steps of the process
 - Brief review of existing plan
 - Planning Committee participation requirements
 - Project timeline
 - Questions & Answers
3. Provide Community Profile information for review
4. Activity to address community capability to respond to hazards
5. Activity to identify critical facilities in communities
6. Next steps:
 - Planning Committee members submit changes to community profile information
 - Planning Committee members respond to requests for data
 - Planner creates community profiles and capability assessment for review at next planning meeting
7. Review and set meeting schedule
8. Adjourn

Economic Development * Comprehensive Planning * Transportation * Workforce * Housing * Revolving Loan Fund

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BE INVOLVED IN A PLANNING COMMITTEE TO DISCUSS HAZARD RISKS IN WINNESHIEK COUNTY!!!

Hazard risks can be natural or man-made, and cover a variety of things, such as storms and flooding, hazardous materials, infrastructure failure, terrorism, and more. The public is invited to attend planning meetings to identify hazard risks and discuss ways communities can prevent, or mitigate, these risks.

The planning process will culminate in an update to the **Winneshiek County Hazard Mitigation Plan (2020)**. Meeting information is provided here.

Please contact Regional Planner Michelle Barness at Upper Explorerland Regional Planning Commission for more information: (563) 382-6171, mbarness@uerpc.org

Winneshiek County Hazard Mitigation Planning Committee Kick-Off Meeting

- Date: January 30, 2019
- Time: 6:00 p.m.
- Location: Winneshiek County Courthouse Annex
- Meeting agenda:
 - Overview of hazard mitigation planning project and planning committee involvement
 - Review information in Winneshiek County's existing hazard mitigation plan
 - Activity to address community capability to respond to hazards
 - Activity to identify critical facilities in communities
 - Next steps & future meetings



Sign-in Sheets

Sean Snyder - EMA
P. B. Glass - Ft Atkinson Council
Matt Frana - Winn. SWCD - Upper Iowa Watershed Project Coordinator
PAUL R. HEROLD - FT ATKINSON mayor
Scott Engelhardt - Ridgeway Council
Krista Vanden Brink - Winn. Co. Public Health / Health

HMPC Meeting #2, February 27, 2019

Agenda/Flyer Notice



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Hazard Mitigation Planning Meeting Agenda Meeting 2: Area Profiles & Hazard Identification Winneshiek County, Iowa

Meeting Date: February 27, 2019
Meeting Time: 6:00 p.m.
Meeting Location: Winneshiek County Courthouse Annex

1. Welcome and introductions
2. Explanation Hazard Analysis/Risk Assessment
3. Review introductory hazard information
4. Exercise to identify hazards for inclusion in the plan
5. Next steps:
 - Planning Committee members respond to requests for data regarding impacts of hazards
 - Planner creates hazard profiles for review at next planning meeting
6. Review and set meeting schedule
7. Adjourn

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BE INVOLVED IN A PLANNING COMMITTEE TO DISCUSS HAZARD RISKS IN WINNESHIK COUNTY!!!

Hazard risks can be natural or man-made, and cover a variety of things, such as storms and flooding, hazardous materials, infrastructure failure, terrorism, and more. The public is invited to attend planning meetings to identify hazard risks and discuss ways communities can prevent, or mitigate, these risks.

The planning process will culminate in an update to the **Winneshiek County Hazard Mitigation Plan (2020)**. Meeting information is provided here.

Please contact Regional Planner Michelle Barness at Upper Explorerland Regional Planning Commission for more information: (563) 382-6171, mbarness@uerpc.org

Winneshiek County Hazard Mitigation Planning Committee Meeting #2

- Date: February 27, 2019
- Time: 6:00 p.m.
- Location: Winneshiek County Courthouse Annex
- Meeting agenda:
 - Review background information on communities and their capabilities in responding to hazards
 - Review introductory information on hazards
 - Exercise to identify which hazards to address in the county plan
 - Next steps & future meetings



Meeting Sign-In Sheet

Date: Winnebago County - Hazard Mitigation Planning Meeting #2
 2/27/2019
 Time/Place: 6:00 p.m./Winnebago County Courthouse (Annex Building)

Printed Name:	Organization/City:	Phone:	Email Address:
✓ Robert S. Glass	Fort Atkinson	563 779 5311	glass8311@gmail.com
✓ Sean Snyder	Winnebago Co. EMA	563 419 2553	emma@co.winnebago.wisconsin.gov
✓ Brett Angelhart	Ridgelyway Ft. Atkinson	563 380 4723	angelhart4723@gmail.com
✓ PAUL R. HEROLD	Winnebago County	563-380-2387	PRH@HERSVERVEYAG.COM
✓ John Beard	Winnebago County	563-382-4993	beardrj@jgmail.com
✓ Matt Franca	Winn SWCS	563.419.8620	matt.franca@winnebago.net
✓ Dan Marx	Winn Co Sheriff	563.382.4268	dmarx@co.winnebago.wisconsin.gov
✓ Mary Boyd	WMC Marketing	563-387-3080	marxm@winmedical.org
✓ Steve Luse	Decorah OH, Iowa	563-379-2329	Steve.Luse@gmail.com
✓ Krista VandenBrink	Winn. Co. Public Health	563-379-7803	kvandenbrink@winnebagohealth.org
✓ Steve VandenBrink	Winn Med Center / Winn EMS	563-380-2581	vandenbrink@winmedical.org
✓ Renee Wynn	Spillville City Council	563-419 8477	reneewynn167@yahoo.com
✓ Jon Lubke	Winn Co IA	563-277-5300	jlubke@co.winnebago.wisconsin.gov

☺

HMPC Meeting #3, April 29, 2019

Agenda/Flyer Notice



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Hazard Mitigation Planning Meeting Agenda Meeting 3: Hazard Profile Review & Risk Grouping Winneshiek County, Iowa

Meeting Date: April 29, 2019
Meeting Time: 6:00 p.m.
Meeting Location: Winneshiek County Courthouse Annex

1. Welcome and introductions
2. Explanation Hazard Analysis/Risk Assessment
3. Review Summary Hazard Profile Information
4. Exercise to group hazards from least to highest risk
5. Next steps:
 - Planning Committee members respond to requests for data regarding community capabilities, future land use, community facilities & infrastructure and local hazard impacts
 - Planner works on vulnerability assessment to describe vulnerability in terms of the types and anticipated numbers of future buildings, infrastructure and critical facilities located in the identified hazards areas, and to estimate potential dollar losses to vulnerable structures.
6. Discuss city meetings, and date of next planning committee meeting
7. Adjourn

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BE INVOLVED IN A PLANNING COMMITTEE TO DISCUSS HAZARD RISKS IN WINNESHIEK COUNTY!!!

Hazard risks can be natural or man-made, and cover a variety of things, such as storms and flooding, hazardous materials, infrastructure failure, terrorism, and more. The public is invited to attend planning meetings to identify hazard risks and discuss ways communities can prevent, or mitigate, these risks.

The planning process will culminate in an update to the **Winneshiek County Hazard Mitigation Plan (2020)**. Meeting information is provided here.

Please contact Regional Planner Michelle Barness at Upper Explorerland Regional Planning Commission for more information: (563) 382-6171, mbarness@uerpc.org

Winneshiek County Hazard Mitigation Planning Committee Meeting #3

- Date: April 29, 2019
- Time: 6:00 p.m.
- Location: Winneshiek County Courthouse Annex
- Meeting agenda:
 - Review up to date information on hazards that affect Winneshiek County communities
 - Exercise to group hazards as high to low risk based on probability and hazard impact
 - Next steps & future meetings



Sign-in Sheets

Meeting Sign-In Sheet

Date: 4/29/2019
 Time/Place: 6:00 p.m./Winneshek County Courthouse (Annex Building)

Printed Name:	Organization/City:	Phone:	Email Address:
Sean Snyder	Win. Co. EMA	763-414-2553	ema@co.winneshek.in.us
HEARY STEVEN	Howards Co. supervisor	319-240-8578	
Jason White	Aase Haugen County Supervisor	563-388-3603	jason.white@asehaugen.com
Fau Braud	Sheriff	563-352-4993	
Dan Marx	WMC Marketing	387-3000	
Mary Marx	Aase Haugen	563-260-4677	Orson.Bauder@asehaugen.com
Orson Bauder	City of Edgewood	563-350-4723	
Scott Engellhardt	City of Sp, Milk	563 419 8647	
Dena Wm	WIND ESSEX CO.	352-2251	
LEE BSEKKE	Deerol. Mayor	382-379-9909	
Shuanie Barozzi	Fert #1 Kinson	563 379 8211	
Robert Glass	Decorah City	563-380-9663	
Chopper Albers			

HMPC Meeting #4, September 19, 2019

Agenda/Flyer Notice



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Hazard Mitigation Planning Meeting Agenda Meeting 4: Mitigation Strategy Part 1 Winneshiek County, Iowa

Meeting Date: September 19, 2019
Meeting Time: 6:00 p.m.
Meeting Location: Winneshiek County Courthouse Annex

1. Welcome
2. Review hazard risk and mitigation feedback from city hazard mitigation meetings
3. Identify mitigation goals and objectives
4. Discuss status of current countywide mitigation actions
5. Review vulnerability and future development information
6. Begin to develop mitigation actions
7. Next steps:
 - Planning Committee members help generate detailed information for city and county mitigation actions, including timeframe, cost, responsible party, and potential funding
8. Discuss date of next planning committee meeting
9. Adjourn

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HELP PLAN HOW TO MITIGATE HAZARDS IN WINNESHIEK COUNTY!!!

Hazard risks can be natural or man-made, and cover a variety of things, such as storms and flooding, hazardous materials, infrastructure failure, terrorism, and more. The public is invited to attend planning meetings to identify hazard risks and discuss ways communities can prevent, or mitigate, these risks.

The planning process will culminate in an update to the **Winneshiek County Hazard Mitigation Plan (2020)**. Meeting information is provided here.

Please contact Regional Planner Michelle Barness at Upper Explorerland Regional Planning Commission for more information: (563) 382-6171, mbarness@uerpc.org

Winneshiek County Hazard Mitigation Planning Committee Meeting #4

- Date: Thursday September 19th
- Time: 6:00 p.m.
- Location: Winneshiek County Courthouse Annex
- Meeting agenda:
 - Discuss feedback from cities on hazard risks and mitigation priorities
 - Identify mitigation goals and objectives
 - Review existing and potential mitigation activities



Meeting Sign-In Sheet

Date: Winnebago County - Hazard Mitigation Planning Meeting - HMPC #4
 9/19/2019
 Time/Place: 6:00 p.m./County Annex Bldg

Printed Name:	Organization/City:	Phone:	Email Address:
✓ Sean Snyder	Winnebago Co. EMT	703-418-2553	ems@co.winnebago.wi.us
✓ Robert S. Glass	Fort Atkinson	563-379-8311	rglass8311@gmail.com
✓ Renee Wagner	Spillville	563-419-8647	rwagner167@yahoo.com
✓ Mandy Gresh	Decorah	563-382-3467 378-9609	mgresh@decorahia.org
✓ Lorraine Borowski	Decorah	563-382-5	lborowski@gmail.com
✓ Michelle Barnoss	UEPPS	563-380-4725	563-380-4725@gmail.com
✓ Jeff Engelbrecht	Ridgeway	563-399-2327	jeff@ridgewayia.org
✓ Steve Luse	Decorah		sluse@decorahia.org
✓ Chad Bow	City of Decorah	563-382-2551	citymanager@decorahia.org
✓ Lori R. Egan	NEICAC	563-382-8436	legan@neicac.org

HMPC Meeting #5, December 10, 2019

Agenda/Flyer Notice



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Hazard Mitigation Planning Meeting Agenda Meeting 5: Mitigation Strategy Part 2 Winneshiek County, Iowa

Meeting Date: December 10, 2019
Meeting Time: 6:00 p.m.
Meeting Location: Decorah City Council Chambers (400 Claiborne Dr.)

1. Welcome
2. Review new mitigation goals and objectives
3. Review list of new hazard mitigation actions and implementation information for county, cities, and school districts. Incorporate any revisions or additions.
4. Review scoring methodology for prioritizing mitigation actions
5. Group exercise for mitigation action evaluation and scoring
6. Next steps:
 - Planner will finalize mitigation strategy and implementation plan, and will create draft of plan for review at next hazard mitigation meeting
 - Committee members, communities and schools may be contacted with requests for specific information, or information review, as draft is being finalized
 - Draft of plan will be forwarded to committee, cities, schools, and emergency management commission at least one week prior to last countywide planning meeting
7. Discuss date of next planning committee meeting
8. Adjourn

Economic Development * Comprehensive Planning * Transportation * Workforce * Housing * Revolving Loan Fund

Established in 1972

HELP PLAN HOW TO MITIGATE HAZARDS IN WINNESHIEK COUNTY!!!

Hazard risks can be natural or man-made, and cover a variety of things, such as storms and flooding, hazardous materials, infrastructure failure, terrorism, and more. The public is invited to attend planning meetings to identify hazard risks and discuss ways communities can prevent, or mitigate, these risks.

The planning process will culminate in an update to the **Winneshiek County Hazard Mitigation Plan (2020)**. Meeting information is provided here.

Please contact Regional Planner Michelle Barness at Upper Explorerland Regional Planning Commission for more information: (563) 382-6171, mbarness@uerpc.org

Winneshiek County Hazard Mitigation Planning Committee Meeting #5

- Date: Tuesday December 10th
- Time: 6:00 p.m.
- Location: Decorah City Council Chambers (400 Claiborne Dr.)
- Meeting agenda:
 - Review proposed city, county & school hazard mitigation actions
 - Review mitigation action implementation
 - Exercise to prioritize mitigation actions



Sign-in Sheets

Meeting Sign-In Sheet

Date: 12/10/2019
 Time/Place: 6:00 p.m./Decorah City Council Chambers

Printed Name:	Organization/City:	Phone:	Email Address:
Amud Bond	City of Decorah	387-3251	citymanager@decorahia.org
Jeremy Bril	City of Decorah	382-2157	cityengineer@decorahia.org
Jim Beard	County Supervisor	382-4993	john.beard@co.winneshiekia.us
Jim Speman	Luther College	563-387-6881	hermto1@luther.edu
Jerry Jones	Luther College student senate	515-782-0020	JerryJalen@gmail.com
Kurt MS Malone	Decorah Community School District	563-387-5700	kurt.deverne@decorah.k12.ia.us
Mary Mary	WMC	563-387-3000	markm@winnmedical.org
Mark Ks	Winn. Co.	563-419-6441	abstca@acegroup.ce
Math Frans	Winn	563-419-8220	math.frans@ia.nadnet.net
Tick Hanson	Citizen	387-2058	hanson.janison@gmail.com
Sean Snyder	Emud	563-419-2373	sean@co.winneshiek-ia.us

HMPC Meeting #6, January 30, 2020

Agenda/Flyer Notice



Serving Allamakee, Clayton, Fayette, Howard and Winneshiek Counties
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Hazard Mitigation Planning Meeting Agenda Meeting 6: Draft Plan Review Winneshiek County, Iowa

Meeting Date: January 30, 2020
Meeting Time: 6:00 p.m.
Meeting Location: Fort Atkinson Community Center (303 3rd St. NW, Fort Atkinson)

1. Welcome
2. Review sections of the draft county hazard mitigation plan; discussion and feedback by section
3. Discuss plan adoption process, and involvement by the Hazard Mitigation Planning Committee
4. Review implementation plan, and involvement by the Hazard Mitigation Planning Committee
5. Next steps:
 - Planner incorporates feedback from HMPC in draft plan, completes plan review tool, and submits initial draft of plan to Iowa Homeland Security and Emergency Mgt. Dept. (IHSEMD)
 - Planner and HMPC coordinate setting up local plan adoption meetings; attend and facilitate local plan adoption meetings; and complete local plan adoptions
 - Emergency Mgt. Commission to review and provide feedback on draft plan; EMC plan adoption
 - Board of Supervisors to review and provide feedback on draft plan; county plan adoption
 - 30-day public comment period on draft plan (from late Jan. – late Feb.)
6. Adjourn

Economic Development * Comprehensive Planning * Transportation * Workforce * Housing * Revolving Loan Fund

Established in 1972

PROVIDE FEEDBACK ON THE WINNESHIEK COUNTY HAZARD MITIGATION PLAN!!!

Hazard risks can be natural or man-made, and cover a variety of things, such as storms and flooding, hazardous materials, infrastructure failure, terrorism, and more.

The public is invited to review a draft of the Winneshiek County Multi-Jurisdiction Multi-Hazard Mitigation plan then attend a meeting to share feedback on the plan on Thursday January 30th, 2020.

A version of the draft plan will be available for review on this Upper Explorerland Regional Planning Commission website beginning January 23rd, 2020:

<http://uerpc.org/comprehensive-planning-comments.html>

Please contact Regional Planner Michelle Barness at Upper Explorerland Regional Planning Commission for more information: (563) 382-6171, mbarness@uerpc.org

Winneshiek County Hazard Mitigation Planning Meeting #6: Plan Review

- Date: Thursday Jan. 30th, 2020
- Time: 6:00 p.m.
- Location: Fort Atkinson Community Center (303 3rd St. NW)
- Meeting agenda:
 - Review and discuss sections of the draft 2020 county hazard mitigation plan
 - Discuss plan adoption process
 - Discuss plan implementation



Sign-in Sheets

City Meetings

Common Agenda & City Meeting Flyer (Example from Calmar)

Meeting Agenda:

1. Introductions/sign-in sheets
2. Review plan purpose / process
3. Review of community profile information for Calmar
4. Discussion of hazards most relevant to community
5. Mitigation Actions for inclusion in new plan



CALMAR HAZARD MITIGATION MEETING



Calmar Residents are Invited to Attend a July 10th Meeting on Mitigating Local Hazards!

At the meeting, residents will discuss:

- Hazards/disasters most likely to impact the community
- Community information, including infrastructure susceptible to hazards and the city's current capabilities for responding to hazards
- Potential hazard mitigation actions for the community to reduce risk to people and property
- All are welcome!

Wednesday July 10th 5:00 p.m.

At the Calmar City Hall (101 S. Washington Street)



Meeting Sign-In Sheet

Winnebago County - Hazard Mitigation Planning Meeting - Castalia

8/5/2019

6:00 p.m./Castalia City Hall

Printed Name:	Organization/City:	Phone:	Email Address:
Jamie Smith Lorelei Corbett	Castalia Council Castalia Council	319-238-9452 563-567-8244	Jamie@bryanhwyequipment.com NA
Margie Corlett Kathie Ellis	Castalia Council Castalia	563-380-3264 563-380-4572	NA Nellie@accgroup.cc
Dennis Wilkins	Castalia Council	563-379-0417	
Chris Bodensteiner	City Clerk	563-419-1984	beans@accgroup.cc
Margaret Jones	Mayor	563-567-8465	Mjones@accgroup.cc

✓ Kir J...
✓ [Signature]
✓ Louaine Bouschi
✓ Randy Ehring
✓ [Signature]
✓ Andy Carlson
✓ Dan Bell
✓ Steve Luse
Jeremy Brill

johnsonk@luther.edu
Russ. NADLEY @ Gmail.com
lkcarter9@gmail.com
randyschissel@yahoo.com
johanna-for-decorah@gmail.com
decorah3@gmail.com
weird2decorah@gmail.com
stevele.luse@gmail.com
cityengineer@decorahia.org

Decorah City Meeting
Sign-In Sheet

Meeting Sign-In Sheet

Winnebago County - Hazard Mitigation Planning Meeting - Fort Atkinson
 8/7/2019
 7:00 p.m./Fort Atkinson City Hall

Printed Name:	Organization/City:	Phone:	Email Address:
RAY SCHMITT	City Council	419-3567	rkschmt@cegrp.org
Paul Schmitt	City Council	563-380-3334	paul.bette@cegrp.org
Robert S. Glass	City Council	563-379-8311	rglass@b311@gmail.com
PAUL R. HEROLD	MAYOR - FORT ATKINSON IOWA	563-380-2387	PRH@HRSURVEYING.COM
David Schneider	City Council	563-419-7963	dschneider@hotmail.com
Aimee Johnson	City Clerk	563-422-7052	c.fortatkinson@mchsi.com

Ossian City Meeting
Sign-In

Meeting Agenda:

1. Introductions/sign-in sheets
2. Review plan purpose / process
3. Review of community profile information for Ossian
4. Discussion of hazards most relevant to community
5. Mitigation Actions for inclusion in new plan

Bryan Beckman
Don DiLaura
Brian Zweibohmer
Joyce Bakewell

2

Meeting Sign-In Sheet

Winnebago County - Hazard Mitigation Planning Meeting - Ridgeway
 9/18/2019
 5:15 p.m./Ridgeway Town Hall

Date:

Time/Place:

Printed Name:	Organization/City:	Phone:	Email Address:
✓ Rosemary Kopava	Council	563-737-2287	
✓ Eha Novakny	City Council	563 207 0134	novakny.aha@gmail.com
✓ Alynn Spindelbaum	City Council	563 419 7912	ALSpindelbaum@mabelltel.com
✓ Shara Beems	Clark	563-379-0964	cityridgeway@gmail.com
✓ Scott E.			

City of Spillville Hazard Mitigation Meeting Attendance, June 4, 2019
(As reported in City Council meeting minutes)

Mayor Klimesh
Joane Kulish
Renee Wagner
Darrell Schmitt
Tom Straube
Andrew Hackman
Ben VanHorn

School District Meeting

Sign In Sheet

[Handwritten signature]

Meeting Sign-In Sheet

Date: Winnebago County - Hazard Mitigation Planning Meeting - School Mtg
 11/13/2019
 Time/Place: 10 a.m./Decorah Schools Central Bldg

Printed Name:	Organization/City:	Phone:	Email Address:
Kris Einek	South Win	563-380-9727	keinek@swinn.k12.ia.us
Lisa Smith	South Win	563-379-8849	ksmith@swinn.k12.ia.us
Carol Knoll	Turkey Valley	563-776-6011	cknoll@turkey-v.k12.ia.us
Brandi Hemesath	South Win	563-532-9365	bhemesath@swinn.k12.ia.us
JASON HARVESEN	SOUTH WIN	563-532-9365	Jharverson@swinn.k12.ia.us
Kurt WJ Dohore	Decorah USD	563-387-5700	kurt.dohore@decorah.k12.ia.us
Michelle Barnes	UTRPC		
Sean Snyder	EMA	563-449-2553	ema@co-winnebago.ia.us

Watershed Authority Meetings

Attendee List

Upper Iowa River Watershed Authority/Hazard Mitigation Planning Meeting, October 16, 2019

Meeting attendees:

Matthew Frana, Winneshiek Co. Soil & Water Conservation District (SWCD)

Lee Bjerke, Winneshiek County Engineer

Sean Snyder, Winneshiek County Emergency Management Coordinator

Ross Evelsizer, Watershed Planner & GIS Specialist, Northeast Iowa Resource Conservation & Development

Jim Marwedel, State Hazard Mitigation Planner, Iowa Homeland Security & Emergency Mgt.

John Beard, Winneshiek County Supervisor

Turkey River Watershed Authority/Hazard Mitigation Planning Meeting, November 18, 2019

Meeting attendees:

Rod Marlatt, Director, Fayette County Conservation

Mark Kuhn, Winneshiek County Supervisor

Michael Klemish, Spillville Mayor

Sean Snyder, Winneshiek County Emergency Management Coordinator

Final Public Input Presentations

Presentation

Sign-in Sheets

Notices, Articles and Press Releases

CALMAR RESIDENTS INVITED TO CITY MEETING TO DISCUSS MITIGATING LOCAL HAZARDS

Winneshiek County is completing an update to their Hazard Mitigation Plan, which assesses hazard risks and prioritizes mitigation actions in order to reduce disaster impacts on people and property. The plan is being developed by county and city representatives, with planning assistance from Upper Explorerland Regional Planning Commission. Flooding, severe storms, and man-made risks such as hazardous materials, infrastructure failure, and terrorism are examples of the types of hazards that are considered.

Residents of Calmar are invited to attend a public hazard mitigation meeting to be held on Wednesday July 10th at 5:00 pm at the Calmar City Hall. At the meeting planners will engage city representatives and community members in a discussion of hazard risks and hazard mitigation actions specific to Calmar. Public input on this topic is greatly valued and all interested citizens are encouraged to attend and be involved.

For those who would like to learn more about the current Winneshiek County Hazard Mitigation Plan, visit the following Upper Explorerland Regional Planning Commission website to view the existing plan document: <http://uerpc.org/winneshiek-haz-mit.html>.

If you have questions, please contact Upper Explorerland Regional Planning Commission Regional Planner Michelle Barness at 563-382-6171 or by email at mbarness@uerpc.org.

CASTALIA RESIDENTS INVITED TO CITY MEETING TO DISCUSS MITIGATING LOCAL HAZARDS

Winneshiek County is completing an update to their Hazard Mitigation Plan, which assesses hazard risks and prioritizes mitigation actions in order to reduce disaster impacts on people and property. The plan is being developed by county and city representatives, with planning assistance from Upper Explorerland Regional Planning Commission. Flooding, severe storms, and man-made risks such as hazardous materials, infrastructure failure, and terrorism are examples of the types of hazards that are considered.

Residents of Castalia are invited to attend a public hazard mitigation meeting to be held on Monday August 5th at 6:00 pm at the Castalia City Hall (during the regularly scheduled city council meeting). At the meeting planners will engage city representatives and community members in a discussion of hazard risks and hazard mitigation actions specific to Castalia. Public input on this topic is greatly valued and all interested citizens are encouraged to attend and be involved.

For those who would like to learn more about the current Winneshiek County Hazard Mitigation Plan, visit the following Upper Explorerland Regional Planning Commission website to view the existing plan document: <http://uerpc.org/winneshiek-haz-mit.html>.

If you have questions, please contact Upper Explorerland Regional Planning Commission Regional Planner Michelle Barness at 563-382-6171 or by email at mbarness@uerpc.org.

DECORAH RESIDENTS INVITED TO CITY MEETING TO DISCUSS MITIGATING LOCAL HAZARDS

Winneshiek County is completing an update to their Hazard Mitigation Plan, which assesses hazard risks and prioritizes mitigation actions in order to reduce disaster impacts on people and property. The plan is being developed by county and city representatives, with planning assistance from Upper Explorerland Regional Planning Commission. Flooding, severe storms, and man-made risks such as hazardous materials and infrastructure failure are examples of the types of hazards that are considered.

Residents of Decorah are invited to attend a public hazard mitigation meeting to be held on Monday July 15th at 5:45 pm at the Decorah City Hall, during the regularly scheduled Decorah City Council Meeting. At the meeting planners will engage city representatives and community members in a discussion of hazard risks and hazard mitigation actions specific to Decorah. Public input on this topic is greatly valued and all interested citizens are encouraged to attend and be involved.

For those who would like to learn more about the current Winneshiek County Hazard Mitigation Plan, visit the following Upper Explorerland Regional Planning Commission website to view the existing plan document: <http://uerpc.org/winneshiek-haz-mit.html>.

If you have questions, please contact Upper Explorerland Regional Planning Commission Regional Planner Michelle Barness at 563-382-6171 or by email at mbarness@uerpc.org.

FORT ATKINSON RESIDENTS INVITED TO CITY MEETING TO DISCUSS MITIGATING LOCAL HAZARDS

Winneshiek County is completing an update to their Hazard Mitigation Plan, which assesses hazard risks and prioritizes mitigation actions in order to reduce disaster impacts on people and property. The plan is being developed by county and city representatives, with planning assistance from Upper Explorerland Regional Planning Commission. Flooding, severe storms, and man-made risks such as hazardous materials, infrastructure failure, and terrorism are examples of the types of hazards that are considered.

Residents of Fort Atkinson are invited to attend a public hazard mitigation meeting to be held on Wednesday August 7th at 7:00 pm at the Fort Atkinson Community Center (during the regularly scheduled city council meeting). At the meeting planners will engage city representatives and community members in a discussion of hazard risks and hazard mitigation actions specific to Fort Atkinson. Public input on this topic is greatly valued and all interested citizens are encouraged to attend and be involved.

For those who would like to learn more about the current Winneshiek County Hazard Mitigation Plan, visit the following Upper Explorerland Regional Planning Commission website to view the existing plan document: <http://uerpc.org/winneshiek-haz-mit.html>.

If you have questions, please contact Upper Explorerland Regional Planning Commission Regional Planner Michelle Barness at 563-382-6171 or by email at mbarness@uerpc.org.

JACKSON JUNCTION RESIDENTS INVITED TO CITY MEETING TO DISCUSS MITIGATING LOCAL HAZARDS

Winneshiek County is completing an update to their Hazard Mitigation Plan, which assesses hazard risks and prioritizes mitigation actions in order to reduce disaster impacts on people and property. The plan is being developed by county and city representatives, with planning assistance from Upper Explorerland Regional Planning Commission. Flooding, severe storms, and man-made risks such as hazardous materials, infrastructure failure, and terrorism are examples of the types of hazards that are considered.

Residents of Jackson Junction are invited to attend a public hazard mitigation meeting to be held on Tuesday October 8th at 7:00 pm at the Jackson Junction Town Hall (1202 Co. Rd. B68), during the regularly scheduled city council meeting. At the meeting planners will engage city representatives and community members in a discussion of hazard risks and hazard mitigation actions specific to Jackson Junction. Public input on this topic is greatly valued and all interested citizens are encouraged to attend and be involved.

For those who would like to learn more about the current Winneshiek County Hazard Mitigation Plan, visit the following Upper Explorerland Regional Planning Commission website to view the existing plan document: <http://uerpc.org/winneshiek-haz-mit.html>.

If you have questions, please contact Upper Explorerland Regional Planning Commission Regional Planner Michelle Barness at 563-382-6171 or by email at mbarness@uerpc.org.

RIDGEWAY RESIDENTS INVITED TO CITY MEETING TO DISCUSS MITIGATING LOCAL HAZARDS

Winneshiek County is completing an update to their Hazard Mitigation Plan, which assesses hazard risks and prioritizes mitigation actions in order to reduce disaster impacts on people and property. The plan is being developed by county and city representatives, with planning assistance from Upper Explorerland Regional Planning Commission. Flooding, severe storms, and man-made risks such as hazardous materials, infrastructure failure, and terrorism are examples of the types of hazards that are considered.

Residents of Ridgeway are invited to attend a public hazard mitigation meeting to be held on Wednesday September 18th at 5:15 pm at the Ridgeway Town Hall (690 County St.). At the meeting planners will engage city representatives and community members in a discussion of hazard risks and hazard mitigation actions specific to Ridgeway. Public input on this topic is greatly valued and all interested citizens are encouraged to attend and be involved.

For those who would like to learn more about the current Winneshiek County Hazard Mitigation Plan, visit the following Upper Explorerland Regional Planning Commission website to view the existing plan document: <http://uerpc.org/winneshiek-haz-mit.html>.

If you have questions, please contact Upper Explorerland Regional Planning Commission Regional Planner Michelle Barness at 563-382-6171 or by email at mbarness@uerpc.org.

SPILLVILLE RESIDENTS INVITED TO CITY MEETING TO DISCUSS MITIGATING LOCAL HAZARDS

Winneshiek County is completing an update to their Hazard Mitigation Plan, which assesses hazard risks and prioritizes mitigation actions in order to reduce disaster impacts on people and property. The plan is being developed in coordination with incorporated cities in the county and Upper Explorerland Regional Planning Commission. Flooding, severe storms, and man-made risks such as hazardous materials or infrastructure failure are examples of the types of hazards that are looked at.

Residents of Spillville are invited to attend a public hazard mitigation meeting to be held on Tuesday June 4th at 5:30 pm during the regularly scheduled Spillville City Council meeting. The meeting will be held at the Spillville City Hall. At the meeting planners will engage city representatives and community members in a discussion of hazard risks and hazard mitigation actions specific to Spillville. Public input on this topic is greatly valued and all interested citizens are encouraged to attend and be involved.

For those who would like to learn more about the current Winneshiek County Hazard Mitigation Plan, visit the following Upper Explorerland Regional Planning Commission website to view the existing plan document: <http://uerpc.org/winneshiek-haz-mit.html>.

If you have questions, please contact Upper Explorerland Regional Planning Commission Regional Planner Michelle Barness at 563-382-6171 or by email at mbarness@uerpc.org.

FOR IMMEDIATE RELEASE: HAZARD MITIGATION PLAN AVAILABLE FOR PUBLIC REVIEW AND COMMENT

Winneshiek County and its jurisdictions have worked diligently over the last year to complete an update to a comprehensive Hazard Mitigation Plan. The planning process was lead by the Winneshiek County Emergency Management Agency with assistance from Upper Explorerland Regional Planning Commission and a countywide Hazard Mitigation Planning Committee.

The Committee started working together in the winter of 2019. Their process began by identifying the characteristics and potential consequences of hazards, and assessing vulnerabilities of communities and the county. After gaining an understanding of hazard risks the Committee determined what the priorities should be and then looked at possible ways to avoid or minimize the undesired effects, culminating in a list of potential countywide hazard mitigation actions.

Planners visited each city in the county in the summer and fall of 2019 for a public meeting to review and discuss local hazards. Information on each community's hazard risks and response capabilities has been incorporated in the updated plan. City's also had the opportunity to contribute information regarding what hazard mitigation actions could be pursued locally.

Beginning on January 23rd, 2020 a draft of the Winneshiek County Multi-Hazard Multi-Jurisdiction Hazard Mitigation Plan (MJ-9) is available for review and comment on the Upper Explorerland Regional Planning Commission website, <http://uerpc.org/comprehensive-planning-comments.html>. Comments on the plan can be submitted on the website through February 22nd, 2020. Feedback will be incorporated in the plan, after which point the plan will be adopted by local jurisdictions and reviewed and approved by the Federal Emergency Management Agency (FEMA).

Also, the public is invited to attend an upcoming meeting to provide plan feedback in person, which will be held on Thursday January 30th, 2020 at the Fort Atkinson Community Center (303 3rd St. NW, Fort Atkinson) from 6 – 8 pm.

For additional information on the plan or upcoming meeting contact Michelle Barness, Regional Planner at Upper Explorerland Regional Planning Commission, at 563-382-6171 or mbarness@uerpc.org.

Appendix D – Mitigation Action/Activities Considered Summary

Iowa Homeland Security and Emergency Management Dept (HSEMD) Project Priorities for FEMA Grant Funding

CATEGORY A PROJECTS:

- Property acquisition and conversion to green space
- Projects that elevate at least one foot above base flood elevation
- Restoration of floodplain, including oxbows, that reduce peak flow
- Streambank stabilization projects that reduce peak flow
- Channel improvements that reduce peak flow
- Channels, culverts and structures connected together as a system for flood protection
- Farm/Rural Pond for flood protection
- Detention basins to prevent flooding
- Urban infiltration projects that prevent flooding, including bioswales or infiltration trenches
- Riparian forest buffers done in cities for flood prevention
- Wet detention systems in cities
- Urban wetlands for flood prevention
- Vegetated swales for flood prevention in cities
- Permeable pavement resulting in flood prevention
- Other green infrastructure in accordance with Iowa Storm Water Management Manual design criteria
- Sanitary sewer improvements
- Hardening/retrofitting line and constructing design failure structures
- System, series or collection of practices and small projects that together provide flood protection for roads and bridges downstream
- Bridge retrofit or reconstruction
- Road reconstruction and installation of unconnected culvert(s) that cross under a road (typically rural)
- Signage or educational materials to improve awareness of hazard risks and ways to prevent/reduce impacts (typically limited to 5% of HMA funding)
- Watershed plans and studies of hydrology, study of groundwater issues and study of areas of risk to erosion
- Projects recommended in watershed plans, hydrology studies, and similar documents
- Warning sirens (no more than 5% of HMA funds)
- River/flood gauges and other alert devices installed to provide advance warnings and alerts (limited to 5% of HMA funding)

CATEGORY B PROJECTS:

- Elevate or protect wastewater lift stations
- Projects that promote the use of NOAA all-hazards weather radio
- Wetlands outside of cities
- Prairie strips and other vegetated cover outside of cities for flood prevention
- Purchase/install backup power generators

CATEGORY C PROJECTS:

- Public safe rooms

- Obtain and distribute copies of ICC/NSSA Standard for the Design and Construction of Storm Shelters and FEMA P-320 - Taking Shelter from the Storm: Building a Safe Room for Your Home or Small Business to cities, architects, and builders
- Small flood-control measures
- Projects that provide model standards and guides, including the Iowa Stormwater Management Manual, to local jurisdictions about construction, design and landscaping measures that direct water away from structures

2018 Iowa Hazard Mitigation Plan Mitigation Actions – Priority Ranked

#	Mitigation Action	Total Evaluation Score	Reduces Vulnerability of State Facilities (+)	Priority: A=High, B=Medium High, C=Medium
Category: Local Plans and Regulations				
1.1	Increase number of jurisdictions adopting ordinances, regulations, and building codes that provide higher standards to regulate construction in order to decrease risk in areas susceptible to hazards.	45		A
1.2	Of the communities that have repetitive loss properties, increase the percentage of such communities that include mitigation actions to address severe repetitive loss and repetitive loss in their all-hazard mitigation plans and comprehensive plans. Do this by verifying and updating the list of repetitive loss properties, and by educating communities on these properties in their jurisdictions and measures which may be used to reduce future damage.	33		B
New 1.3	Increase the number of jurisdictions participating in NFIP as well as Community Rating System.	25		C
New 1.4	Promulgate (and develop if necessary) a handbook explaining options and methods for communities to deal with property acquired from flood buyouts.	30		B
1.5	Identify communities in areas vulnerable to earthquake and make them aware of, and encourage them to adopt, current building codes for seismic retrofitting to make structures earthquake resistant.	8		This lower-priority action delayed (will do if opportunity suddenly appears, or locals may do with their own resources)
New 1.6	As new watershed plans are developed, ensure most integrate local hazard mitigation plan elements. Then, ensure that most jurisdictions in those watersheds include in their local hazard mitigation plan the references to relevant watershed plan elements.	30	+	B+
New 1.7	Develop a strategy for flood buyouts.	33		B
New 1.8	Increase number of dams with completed Emergency Action Plans.	25	+	C+
1.9	Identify and map existing sinkholes and evaluate the potential for new sinkholes in hazard plans.	8		This lower-priority action delayed (will do if opportunity suddenly appears, or locals may do with their own resources)
1.10	Increase number of jurisdictions that have hazard mitigation plan action to do nonstructural retrofit of public structures.	27		C

Category: Structure and Infrastructure Projects				
2.1	Install dry hydrants in areas without water mains and domestic fire hydrants.	13	This lower-priority action delayed (will do if opportunity suddenly appears, or locals may do with their own resources)	
2.2	Connect to redundant water sources.	19		
2.3	Increase number of wastewater lift stations that are elevated/protected.	28	+	B+
2.4	Acquire more flood-prone properties (with priority for repetitive loss and SRL properties) and convert to open space/green space, or elevate to at least 1 foot above base flood elevation.	33	+	A+
2.5	Implement floodplain and streambank restoration/channel improvement projects that reduce peak flow during flood events.	32		A
2.6	Construct, retrofit, or maintain storm and sewage drainage systems (including retention and detention basins, pipes, culverts, and channels) to function adequately and properly.	37	+	A+
2.7	Install and maintain protective measures for the physical safety and security of critical facilities.	18	+	Delayed - low priority
2.8	Construct public safe rooms.	24	+	C+
2.9	Remove asbestos from public facilities.	18	+	Delayed - low priority
2.10	Construct, retrofit or maintain levees, dams, floodwalls, culverts, and floodgates to ensure adequate flood protection for property and critical facilities.	23	+	C+
2.11	Mitigate hazards associated with underground fuel storage tanks.	16	This lower-priority action delayed (will do if opportunity suddenly appears, or locals may do with their own resources)	
2.12	Encourage and implement green infrastructure practices to manage storm water management and create healthier urban environments. Practices can include mechanisms that prevent soil erosion, provide habitat, or provide flood protection and cleaner air and water.	34	+	A+
2.13	Electrical utility retrofit/hardening (see REC Mitigation Plan in Annex)	31		A
2.14	Use a comprehensive approach to address problems with water washing over or threatening public roads, and with public bridges and culverts that do not meet flow requirements. A comprehensive approach could mean a simple elevation, replacement, or retrofit, OR it could be systemwide with a collection of projects/changes that might include green infrastructure, basins, and increased capacity of soil to retain water.	30	+	A+

Category: Education and Awareness Programs				
3.1	Develop signage and educational materials for the general public, decision makers, and private volunteer organizations to improve awareness of hazard risks and ways to prevent or reduce impacts of hazard events. Also, develop or maintain sustainment mechanisms to dispense such signage and educational materials.	56	+	A+
3.2	Promote NOAA all-hazards weather radio, including citizen purchase of receivers.	45	+	B+
3.3	Educate architects and developers about need for shelters/safe rooms as well as guidance for their design as found in <u>ICC/NSSA Standard for the Design and Construction of Storm Shelters</u> and <u>FEMA P-320 - Taking Shelter from the Storm: Building a Safe Room for Your Home or Small Business</u> .	20	+	C+

3.4	Provide model standards and guides, including the Iowa Stormwater Management Manual, to local jurisdictions about construction, design and landscaping measures that direct water away from structures.	22		C
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Category: Natural Systems Protection				
4.1	Develop watershed plans, hydrology studies, and studies of groundwater issues and areas of risk to erosion, and implement recommendations of such plans and studies.	34	+	A+
4.2	Coordinate with FEMA on earthquake program.	8	This lower-priority action delayed (will do if opportunity suddenly appears, or locals may do with their own resources)	
4.3	Minimize damage and also preserve/restore the functions of natural systems by utilizing actions, such as establishing natural vegetation buffers and strategically-placed wetlands that capture runoff and drainage waters before they can negatively impact the surrounding environment.	28	+	B+

Category: Continuity of Emergency Services				
5.1	Develop/update/publicize continuity of operations plans for emergency and other essential functions (as defined by FEMA for continuity of operations).	47	+	B+
5.2	Purchase/install backup power generators.	42	+	B+
5.3	Establish systems necessary to issue warnings, alert officials and emergency personnel, and inform the public (e.g. sirens).	56	+	A+

Upper Iowa Watershed Resiliency Plan Objectives (Re: City or County Partners)

Objective 1: Develop and Empower an Upper Iowa River Watershed Resiliency Network

Strategy 1: Encourage Multi-Agency/Organization Information Sharing (Decorah & Winn Co.)

Strategy 2: Foster implementation of this plan through expanded technical assistance through local, state and federal partner agencies and organizations. (Decorah & Winn. Co.)

Objective 2: Strategically Implement Flood Reduction Practices that also Improve Water Quality

Strategy 1: Increase Infiltration (Decorah & Winn. Co.)

Strategy 2: Implement Water Quality Improvement Practices (Decorah & Winn. Co.)

Strategy 3: Store Excess Rainfall Runoff (Decorah & Winn. Co.)

Strategy 4: Restore and Protect Stream and River Corridors and Floodplains (Decorah & Winn. Co.)

Objective 3: Maximize the Benefits of Scientific Watershed Analysis

Strategy 1: Support Projects that Target Priority Landscape Positions (Decorah & Winn. Co.)

Strategy 2: Provide Research, Content and Recommendations that Encourage Location and Practice Prioritization in Local Plans, Projects and Programs (Decorah & Winn. Co.)

Strategy 3: Assure the plan is a working document that meets the criteria outlined by the Iowa DNR, has local buy-in, provides expert guidance for the partners and provide regular updates and reports to that others may learn from our efforts. (Decorah & Winn. Co.)

Objective 4: Support Education and Outreach

Strategy 1: Increase Public Awareness of Watersheds and the Power of Working Through the Watershed Approach

Strategy 2: Encourage Producers and Landowners to Implement Agricultural Practices that Conserve Soil and Improve Water Infiltration

Strategy 3: Promote Greater Understanding of BMPs for Urban Stormwater Management and Develop Champions for Watershed Protection

Strategy 4: Engage Students and Youth in Watershed Education and Improvement Projects

Objective 5: Build the UIR WMA's Long-term Capacity to Operate and Implement Projects

Strategy 3: Periodically develop, implement and analyze UIR WMA Watershed Resident Surveys to better understand public perception and attitudes, assess the UIR WMA's impact on the watershed and to inform future WMA and partner work. (Decorah & Winn. Co.)

Strategy 5: Educate legislators about the need for WMA funding, and advocate for legislation that provides for a watershed approach to address significant flood and water quality protection. (Communities/Cities)

Strategy 6: Identify and pursue grants, partnerships, and other means for sustaining funding for flood reduction projects in the UIR Watershed. (Decorah & Winn. Co.)

Turkey River Flood Reduction Plan (Re: City Actions)

COMMUNITY PROJECT IDEAS

	Pond, Wetland, or Small Lake	Rain Garden/Empty Lot Project	Rain Barrel Program	Permeable Pavers Strips of P.P.	Rain-scaped Park Revitalization	School Storm Water Runoff Program	Green Roof Project	Native Turf Project/ Native Grasses	Bio-swale Project	Lawn Nutrient Reduction/Grass Mgmt	Downspout Rain-scape	Policy/Ordinance	Business Rain-scape Incentive/ Bldg Proj.	Bank Stabilization/ Stream Meander	Tree Planting (edible/other)
Arlington		X	X	X				X	X	X					X
Calmar	X	X	X	X	X			X	X	X		X	X		X
Clermont	X	X	X	X	X	X	X	X	X	X					
Cresco			X		X			X				X			
Elgin															
Elkader	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Farmersburg															
Fayette	X	X	X	X	X		X	X	X	X	X	X	X		X
Fort Atkinson			X	X				X	X					X	
Garnavillo		X						X							
Hawkeye			X	X				X							
Lawler		X	X						X						
Maynard	X		X												
Monona		X	X	X	X	X		X	X	X	X				X
Postville			X	X	X	X		X		X					
Strawberry Point		X	X						X						
St Lucas	X														
Volga	X	X	X		X			X	X						X
Wadena		X	X					X	X	X					
Waucoma			X		X			X				X	X		X
West Union	X	X	X	X		X	X	X	X	X		X	X		X

Appendix E – FEMA Approval Letter
