Jurisdiction: **Palo Alto County + Jurisdictions**	**Title of Plan:** Palo Alto Multijurisdictional Hazard Mitigation Plan	**Date of Plan: 12-1-12**
Local Point of Contact: **Aaron Sedey** **Title:** Planner **Agency:** Northwest Iowa Planning Development	**Address:** **217 W 5th St** **Spencer, IA 51301**	
Phone Number: 712-262-7225	**E-Mail:** aaron.sedey@nwipdc.org	
Funding Source:		
State Reviewer:	**Title:**	**Date:**
FEMA Reviewer: Steve Greene	**Title:** HM Community Planner	**Date:** 4/15/2013, 05/21/2013
Date Received in FEMA Region VII	3/13/2013, 05/16/2013	
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved	05/21/2013	

Jurisdiction:	NFIP Status*	
	Y	**NP**
Palo Alto County	x	
Ayrshire		x
Curlew		x
Cylinder		x
Emmetsburg	x	
Graettinger		x
Mallard		x
Rodman		x
Ruthven		x
West Bend		x
Emmetsburg Catholic Schools		x
Emmetsburg Community Schools		x
Graettinger – Terril Schools		x
Ruthven – Ayrshire Schools		x
West Bend – Mallard Schools		x

*** Notes: Y = Participating NP = Not Participating in NFIP S- Sanctioned R-Rescinded**

SECTION 1: REGULATION CHECKLIST

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Section 1 pg 3	✓	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 1 pg 3, 4	✓	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 1 pg 3, 4	✓	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 1 pg 8 Section 9 pg 109	✓	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 8 pg 106 Section 9 pg 109	✓	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Section 8 pg 106 Section 9 pg 109	✓	
ELEMENT A: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Section 3, pg 27 Section 4, pg 30	✓	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Section 3, pg 27 Section 4, pg 30	✓	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Section 3, pg 27 Section 4, pg 30	✓	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Section 7, pg 99	✓	
ELEMENT B: REQUIRED REVISIONS			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Section 1.7, pg 8 Section 9, pg 109	✓	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Section 7, pg 97	✓	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 6, pg 84	✓	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Section 6, pg 85	✓	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Section 6, pg 90-96	✓	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Section 9, pg 109	✓	
ELEMENT C: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 9, pg 109	✓	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 9, pg 109	✓	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 9, pg 109	✓	
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Separate attachment to plan	✓	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Plan will be adopted when FEMA approves, resolutions will then be sent into FEMA.		
ELEMENT E: REQUIRED REVISIONS Written proof that all jurisdictions' governing bodies have formally adopted the plan (usually a resolution) must be submitted to FEMA. *See Local Multi-Hazard mitigation Planning Guidance (July 2008) pages 17-18.* **Note:** If the plan is not adopted by a participating jurisdiction, that jurisdiction would not be eligible for project grants under the following hazard mitigation assistance programs: HMGP, PDM, FMA, and SRL.			

SECTION 2: PLAN ASSESSMENT

Plan Strengths

- The plan provides excellent documentation of the Planning Committee re-evaluating the hazards identified in the previous plan vs. the hazards identified and analyzed for the current plan. The plan also does a great job in strengthening its risk and vulnerability assessment from the previous plan.
- The hazard profiles are well-researched, and form a solid basis for the analyses that follow, as well as the hazard mitigation strategy.
- Section 7 is an excellent and inclusive narrative on NFIP participation in the planning area. Particularly noteworthy is the community-specific information. Excellent job of researching.

Opportunities for Improvement

- National and state maps should be annotated to indicate the approximate location of Palo Alto County. Often a small open circle can be inserted "on top of" the image. (Pages 23 and 46 PDF)

Palo Alto County, Iowa Multijurisdictional Hazard Mitigation Plan

Included Jurisdictions:
- Palo Alto County (Rural)
- Ayrshire
- Curlew
- Cylinder
- Emmetsburg
- Graettinger
- Mallard
- Rodman
- Ruthven
- West Bend

Included School Districts:
- Emmetsburg Catholic Schools
- Emmetsburg Community Schools
- Graettinger – Terril Schools
- Ruthven – Ayrshire Schools
- West Bend – Mallard Schools

Prepared by
Northwest Iowa Planning and Development Commission

Spencer, IA 51301
www.nwipdc.org

Palo Alto County
Courthouse
1010 Broadway
Emmetsburg, IA 50536
Hours: M-F 8-4:30pm

Board of Supervisors

Keith Wirtz	District 1
Jerry Hofstad	District 2
Leo Goeders	District 3
Ronald D. Graettigner	District 4
Ed Nooan	District 5

County Departments

Lois Naig	Assessor
Lyssa Henderson	Attorney
Carmen Moser	Auditor
Mary Ellen Munn	Clerk of Court
Art Hampe	Conservation
John Carlstrom	County Attorney
Mark Hunefeld	Emergency Management
Joel D. Fantz	Engineer
Terry Janssen	Extension Service
Maureen Sandberg	General Relief
Dr. Patricia Banwart	Medical Examiner
Bonnie Whitney	Recorder
Dennis Goeders	Sheriff
Mary Hilfiker	Treasurer
Ron Hersom	Veterans Affairs

Table of Contents

Tables

Figures

GLOSSARY of terms to be defined in this Hazard Mitigation Plan

1. ***County***: Palo Alto County, Iowa
2. ***CMI***: Crop Moisture Index
3. ***EF or EF-Scale***: Enhanced Fujita Tornado Scale
4. ***EPA***: Environmental Protection Agency
5. ***FEMA***: Federal Emergency Management Agency
6. ***FIRM***: Flood Insurance Rate Map or ***DFIRM***: Digital Flood Insurance Rate Map
7. ***HAZMAT***: Hazardous materials response team from Sioux City, Iowa
8. ***HLSEM***: Iowa Homeland Security Emergency Management
9. ***HMGP***: Hazard Mitigation Grant Program
10. ***IDNR***: Iowa Department of Natural Resources
11. ***IDOT***: Iowa Department of Transportation
12. ***PACEM***: Palo Alto County Emergency Management
13. ***NCDC***: National Climatic Data Center
14. ***NOAA***: National Oceanic and Atmospheric Administration
15. ***NWIPDC***: Northwest Iowa Planning & Development Commission
16. ***NWS***: National Weather Service
17. ***PDSI***: Palmer Drought Severity Index
18. ***Planning Committee***: Hazard Mitigation Planning Committee
19. ***SPC***: Storm Prediction Center
20. ***STAPLEE***: Social, Technical, Administrative, Political, Legal, Economic, & Environmental, evaluation criteria in establishing priority for hazard mitigation alternatives
21. ***State***: State of Iowa
22. ***USGS***: United States Geological Survey

Introduction

Floods, tornados, windstorms, and severe winter storms – these are all examples of natural hazards that affect Iowans each year. These events threaten thousands, even millions of dollars of property damage annually and can sometimes be fatal to persons and animals that are in harm's way. To protect lives and property from natural or man-made hazards, it is vital for local leaders to identify potential losses and take measures to prevent such losses; this process is known as hazard mitigation planning.

Hazard mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event. Potential hazards can be natural, such as those described above or man-made such as an energy disruption/failure or transportation accidents involving hazardous materials. Mitigation encourages long-term reduction of vulnerability to natural and man-made hazards. The goal of mitigation is to save lives and reduce property damage. Mitigation actions should provide a cost-effective and environmentally sound method to reduce the enormous cost of disasters to property owners and all levels of government. Mitigation should also minimize disruption to communities by protecting critical resources and infrastructure such as water, food, shelter, energy, medical treatment, and transportation.

Background

The Federal Emergency Management Agency (FEMA) provides assistance to local governments for disaster response and recovery through the Stafford Disaster Relief and Emergency Assistance Act (Stafford Act). The Stafford Act aims at assisting communities that are affected by disasters. The Act was amended in 2000 to include The Disaster Mitigation Act of 2000. This amendment requires local governments to have adopted an approved Hazard Mitigation Plan in order to qualify for mitigation project funding. The purpose of this change is to encourage cities and counties to identify prevalent hazards and to determine appropriate mitigation strategies to protect property and save lives.

A Hazard Mitigation Plan is intended to accomplish several things. First, through the planning process, hazards that pose a risk to the community are identified. Next, an assessment of those hazards is made that takes into account the historical occurrences, probability, vulnerability, maximum threat, severity of impact and speed of onset of the hazard. Once the assessment is completed, a list of current and historic mitigation efforts is evaluated.

Once the hazards have been assessed and mitigation actions have been identified, the plan outlines implementation strategies. Some proposed projects are small in scope and thus relatively low cost. Other projects are broad in nature and would require more funding than the local community can reasonably provide. The plan highlights potential funding sources and identifies city/county departments responsible for implementation. Lastly, the plan outlines how to keep the public involved, and what steps should be taken by local government to ensure that the concept of hazard mitigation is always a priority.

When implemented appropriately, mitigation projects can save lives, reduce property damage, save public money, and protect the environment. Mitigation can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities, reduce exposure to liability, and minimize community disruption.

Basis for Planning Authority

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

Purpose

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

Section 1. Planning participation, Participating Jurisdictions and Adoption

This hazard mitigation plan is being developed to assess the ongoing mitigation goals in each participating community, to evaluate mitigation alternatives that should be undertaken, and to outline a strategy for implementation. Building a disaster resistant community is an initiative that challenges for Palo Alto County and participating jurisdictions, to undertake actions that protect families, businesses, and public facilities by reducing the effects of natural and man-made disasters. Reducing the effects of natural disasters makes economic sense, and it is good public policy because it protects our citizens and our future.

1.1 Regional Planning Participation

The county and cities have developed this Multijurisdictional Hazard Mitigation Plan with planning assistance from Northwest Iowa Planning & Development Commission. Northwest Iowa Planning & Development Commission is council of governments public planning agency established by Iowa Code 28E, 28H & 28I to provide planning assistance to a nine county area comprised of 79 cities and towns. Northwest Iowa Planning & Development Commission assisted in drafting the plan and provided input throughout the process.

1.2 Local Planning Participation

The Emergency Management Director Mark Hunefeld contacted each jurisdiction to inform them that they have to have at least two designated representatives from their jurisdiction to be the main contact points. The respective jurisdictions tried to designate hazard mitigation members which represented local government officials, utilities, police, fire, schools, businesses and the county sheriff's department. A listing of the "planning committee" is located in this section of this plan. The jurisdictions established the planning committee members based on their knowledge of the city/county's infrastructure, emergency response services, historical occurrences of natural disasters and willingness to participate. The committee members for the County and participating communities roles were to act on behalf of the communities.

Table 1.1	Planning Committee for the County	
Palo Alto County:	Joe Neary – Zoning/Sanitarian	Kathy Mehan - Hospital
	Mark Hunefeld – Emergency Manager	Todd Surh - Sheriff
Ayrshire	Kurt Moore – City Council	Chad Burttner – City Council
	Lonnie Kathman – City Council	Pauline Miller – City council
Curlew	Kay Frerk – City Clerk	John Barrett – City Council
	Robby Johnson – City Council	Donita Hellickson - Citizen
Cylinder	Dave Waldschmidt – City council	Harry Bromann - Council
	Art Mueller – Mayor	Kayra Weisbrod - Clerk
Emmetsburg	John Bird – City Administrator	Tony Kauten – City Council
	Steve Finer – City Council	Kim Kibbie – City Clerk
Graettinger	Jane Brown – Ambulance, Terril School	Paul Schweiger - Citizen
	Sandy Henderson – City Administrator	Julia Madsen – Daybreak Foods
Mallard	Jim Gehrt - Mayor	Becky Larson – City Clerk
	Karl Johnson – City Council	Glen Simonson – City Council
Rodman	Gary Fokken – City Council	Rose Fokken – City Council
	Sean Lenius – City Council	Mark Anthoy - Fire
Ruthven	Patrick Johnson – City Council	John Conlon – City Council
	David Kirk – City Council	Dave Smith – City Council
West Bend	Jane Hanselman City Council	Irene Freseriksen - Citizen
	Chris Theisen – Fire Dept	Richard Jergens – Police Chief
School	Tom Brotherton Iowa Lakes CC	Norene Bunt – Ruthven/Ayrshire
	Nancy Schmitz – West Bend Schools	John Joynt – Emmetsburg Comm.
	Jesse Ulrich – Graettinger - Terril	Jean Hyslop – E-burg Catholic

The public input was represented by the members of the planning committee. All of the committee members reside within the county limits. The hazard mitigation planning committee as a whole represents a good general cross section of those interested in and representing the critical facility interests of the jurisdictions. Through the planning process, public meeting notices were posted within the community to encourage public participation and input. Before adoption of the plan each participating jurisdiction held a public hearing and notice of the meeting was publicized in the Emmetsburg Democrat/Reporter which is considered a regional countywide newspaper with circulation across all of Palo Alto County. The publication in this regional circulation provided yet another opportunity for public comment and an opportunity for neighboring communities input prior to adoption. Throughout the planning process all meetings were held according to Open Meeting Law Chapter 21, Code of Iowa.

Sample Notice

PALO ALTO COUNTY MITIGATION PLANNING COMMITTEE
NOTICE OF PLANNING COMMITTEE MEETING

Palo Alto County, with assistance from NW IA Planning & Development Commission, is preparing a local Hazard Mitigation Plan for the community. The purpose of this planning process is to identify those natural hazards that pose a threat to the city and ways to mitigate against the loss of life and property from these hazards. Representatives from the school system in Palo Alto County are strongly encouraged to attend this public meeting and offer input on the hazard mitigation planning process. For more information, or to make arrangements for persons with disabilities or non-English speaking individuals, please contact the Mark Hunefeld or Darren Bumgarner.

The Palo Alto County Hazard Mitigation Planning Committee will be holding a public meeting at:

Time: *6:30 p.m.*
Date: *December 8, 2009*
Place: *Iowa Lakes Community College*

1.3 Opportunity for Neighboring Counties to Participate

All meetings were announced as public meetings and any representative from any neighboring cities or counties was welcomed and encouraged to attend. In an effort to reach out to neighboring counties, Clay and Emmet counties were contacted and offered an opportunity to assist in the process of drafting this plan. Neither county attended any of the meetings. Below is a sample letter that was sent to these neighboring cities/counties for their consideration.

Eric Tigges
300 4th St.
Spencer, IA 51301

SAMPLE LETTER

Dear Mr. Tigges,

Palo Alto County is in the process of completing a Countywide Multijurisdictional Pre-Disaster Hazard Mitigation Plan pursuant to 44 CFR 201.6. According to FEMA regulations Palo Alto County must provide an opportunity for neighboring counties and cities within and surrounding Palo Alto County to participate in the planning process and development of this plan and to provide opportunities for the public to comment on the plan during the drafting stage and prior to plan approval. There is no obligation for your county or city to participate in this process. The county is simply fulfilling its obligation to notify and provide the

opportunity for neighboring communities to participate in this process. The Palo Alto County Hazard Mitigation Committee will be holding its second meeting on December 6, 2009 at the Iowa Lakes Community College in Emmetsburg, at 6:30 p.m. The Hazard Mitigation Committee anticipates meeting on a monthly basis thereafter until the plan is completed. For more information or to answer questions, you may contact Mark Hunefeld, Palo Alto County EMA Coordinator at (712) 852-4997 or Darren Bumgarner, Northwest Iowa Planning and Development at (712) 262-7225 ext 1143.

Sincerely,
Mark Hunefeld
Palo Alto County EMA Director

1.4 Opportunity for School Districts Participation

In order to be eligible for mitigation project grants, a college, university, or school district must be an active participant in a FEMA-approved State/Tribal or local plan or have an approved plan of their own that meets the requirements of 44 CFR Part 201. If the entity is participating in a multi-jurisdictional plan, the plan must specifically identify those land areas that pertain to the entity. The plan must also list the entity's specific hazards and include an analysis of those hazards. Any aspects that are unique to the entity relative to the community in which the entity is located must be clearly set forth. After the entity's hazards and risks are identified, at least one specific mitigation action must be developed to reduce the impact of future hazards on the entity. Participation does not have to be direct, but can be indirect; however, the plan must provide a narrative description of this process. Some jurisdictions or entities may lack sufficient personnel to attend planning team meetings. Those jurisdictions can delegate authority to another planning team member. It is the responsibility of the party with delegated authority to ensure that the interests of the delegating jurisdiction or entity are served.

The Palo Alto County Planning Committee offered an opportunity for the following School Districts:

- Iowa Lakes Community College
- Graettinger - Terril Community School
- West Bend - Mallard Community School
- Emmetsburg Community Schools
- Emmetsburg Catholic School
- Ruthven Ayrshire Community Schools

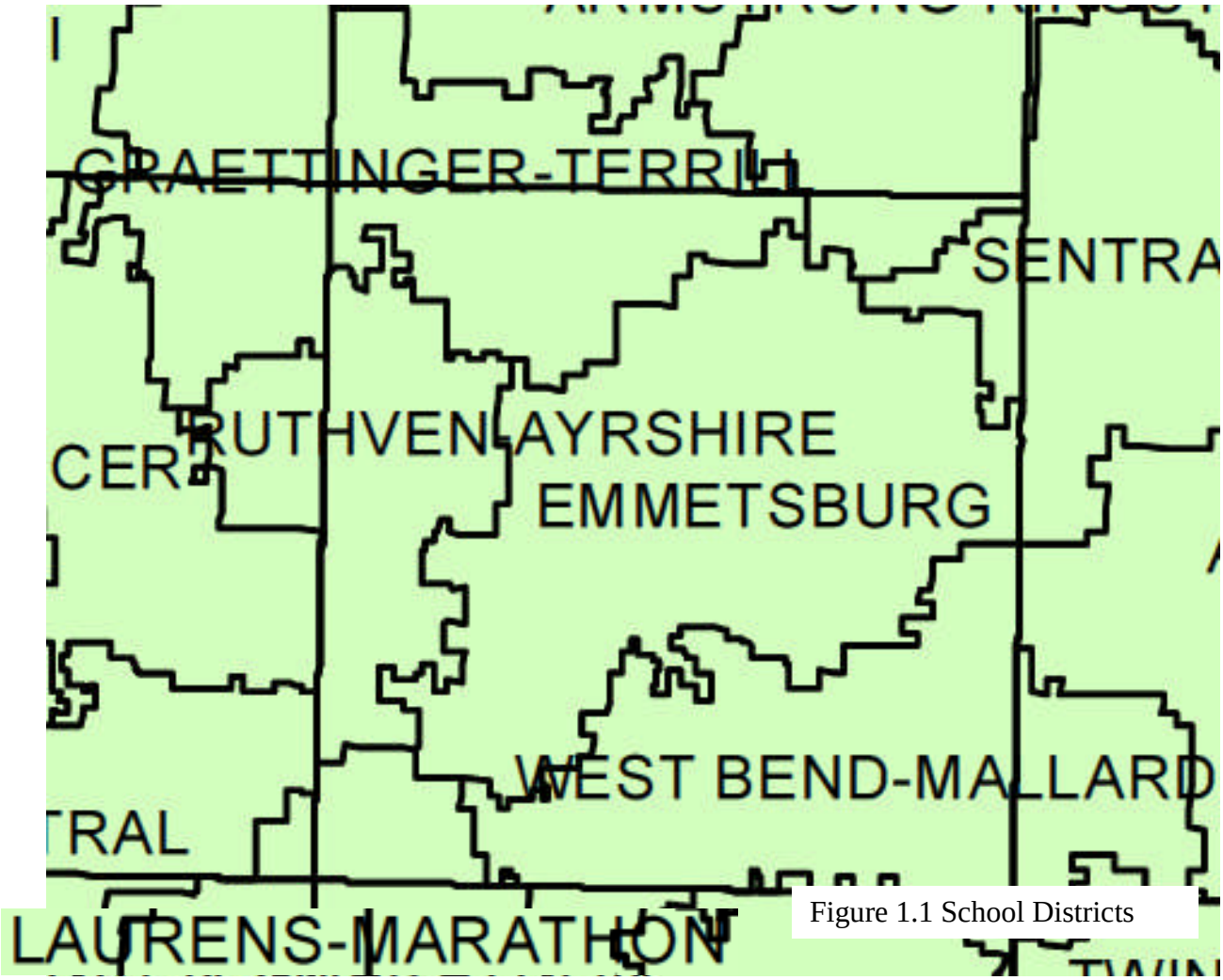


Figure 1.1 School Districts

These schools were reached out to participate in the planning process and mitigation actions of the Palo Alto County Multijurisdictional Hazard Mitigation Plan. Five schools participated in this plan (Ruthven Ayrshire, West Bend Mallard, Graettinger Terril, Emmetsburg Community and Emmetsburg Catholic), however the planning committees added the school facilities to their critical facilities so that they would be able to be to build a saferooms on the sites to help protect the most populated areas of the schools/athletic fields.

1.5 Palo Alto County Multijurisdictional Hazard Mitigation Meetings and Minutes (Public Participation Process)

Table 1.2	Date	Length	# of volt	Total Hours
Palo Alto Co. HM Committee Meeting #1	1/12/2010	1.75	15	26.25
Palo Alto Co. HM Committee Meeting #2	2/16/2010	1.5	10	15
Palo Alto Co. HM Committee Meeting #3	3/16/2011	2	11	22
Palo Alto Co. HM Committee Meeting #4	4/13/2011	1.25	9	11.25
Palo Alto Co. HM Committee Meeting #5	5/11/2010	1.75	4	7
Palo Alto Co. HM Committee Meeting #6	6/8/2011	1.75	12	21

Palo Alto Co. HM Committee Meeting #7	7/13/2011	1.5	9	13.5
Palo Alto Co. HM Committee Meeting #8	8/10/2011	2	8	16
Palo Alto Co. HM Committee Meeting #9	3/15/2011	0.5	15	7.5
Palo Alto County & City of Emmetsburg Meet #1	1/24/2011	1	8	8
Palo Alto County & City of Emmetsburg Meet#2	3/17/2011	1	3	3
Palo Alto County & City of Emmetsburg Meet #3	3/29/2011	1	5	5
Palo Alto County & City of Emmetsburg Meet#4	4/11/2011	1	4	4
Palo Alto County & City of Emmetsburg Meet#5	5/2/2011	1	2	2
Palo Alto County & City of Curlew Meeting #1	4/4/2011	1	10	10
Palo Alto County & City of Curlew Meeting #2	5/2/2011	1.5	7	10.5
Palo Alto County & City of Curlew Meeting #3	6/6/2011	1	6	6
Palo Alto County & City of Graettinger Meeting #1	12/13/2011	1	13	13
Palo Alto County & City of Graettinger Meeting #2	4/26/2011	1	6	6
Palo Alto County & City of Graettinger Meeting #3	6/1/2011	1	3	3
Palo Alto County & City of West Bend Meeting #1	1/24/2011	1	16	16
Palo Alto County & City of West Bend Meeting #2	2/28/2011	1	13	13
Palo Alto County & City of West Bend Meeting #3	3/28/2011	1	14	14
Palo Alto County & City of West Bend Meeting #4	5/9/2011	1	7	7
Palo Alto County & City of Cylinder Meeting #1	10/4/2011	0.75	4	3
Palo Alto County & City of Mallard Meeting #1	10/10/2011	1.25	7	8.75
Palo Alto County & City of Rodman Meeting #1	10/6/2011	1	8	8
Palo Alto County & City of Ruthven Meeting #1	9/20/2011	1.25	9	11.25
School Mtg Emmetsburg High school* (doesn't count)	12/9/2010	1.5	4	6
Palo Alto County & Ayrshire	4/9/2012	1	5	5
242 Needed				302

*This school meeting included Ruthven Ayrshire CSD, West Bend Mallard CSD, Graettinger Terril CSD, Emmetsburg Community School and Emmetsburg Catholic couldn't attend but was allowed to fill out sheets necessary for them to be part of the plan, some members attend the county wide meetings as did other school district members from each district.

The minutes and agendas for the previous meetings are in the Appendix. No public comment was received at any of the meetings. All meeting sign-ins are attached in the Appendix.

This document will be a planning effort for Palo Alto County and participating jurisdictions to address potential and real natural hazards, and the jurisdictions approach and efforts to mitigate against losses from these hazards. This document is intended to serve as a guide and resource document for those persons in Palo Alto County and participating jurisdiction that are responsible for the daily protection of the community's residents. Below is a table of all participating jurisdictions in the Palo Alto County Multijurisdictional Hazard Mitigation Plan.

Table 1.3: Multijurisdictional Involvement in the Palo Alto County Hazard Mitigation Plan

	Abbreviation in the plan	Last Hazard Plan	Update	Represented in Plan
Palo Alto County	PAC	3/7/05	Yes	Yes
Ayshire	AY	9/27/07	Yes	Yes
Curlew	CU	None	New	Yes
Cylinder	CY	6/1/09	Yes	Yes
Emmetsburg	EM	3/9/05	Yes	Yes
Graettinger	GR	1/12/05	Yes	Yes
Mallard	MA	6/1/09	Yes	Yes
Rodman	RO	7/20/09	Yes	Yes

Ruthven	RU	9/12/07	Yes	Yes
West Bend	WB	3/7/05	Yes	Yes
Graettinger - Terril Community School	GTS	None	New	Yes
West Bend - Mallard Community School	WBMS	None	New	Yes
Emmetsburg Community Schools	ECS	None	New	Yes
Emmetsburg Catholic School	ECAS	None	New	Yes
Ruthven Ayrshire Community Schools	RAS	None	New	Yes

1.6 Iowa's Open Meetings Law – Iowa Code

Iowa's open meetings law "seeks to assure, through a requirement of open meetings of governmental bodies, that the basis and rationale of governmental decisions, as well as those decisions themselves, are easily accessible to the people." All actions and discussions at meetings of governmental bodies, whether formal or informal, including work sessions, must be conducted in open session unless exceptions or exemptions are specifically provided by law. "Open session" means a meeting to which all members of the public have access.

The definition of "governmental bodies" includes school boards and any joint board established with other school districts, cities, counties or other units of government. Advisory committees created by statute are subject to the open meetings law whether or not they make recommendations on public policy issues. Advisory committees that are board-created are subject to the open meetings law if they develop and make recommendations on public policy issues. Since it is unlikely that a board would appoint or create an advisory committee that doesn't make recommendations on public policy issues, it is safe to say that all board-created or board-appointed advisory committees are subject to the open meetings law. Any ambiguity should be resolved in favor of openness. "Meeting" means a gathering in person or by electronic means, formal or informal, of a majority of the members of a governmental body where there is deliberation or action upon any matter within the scope of the governmental body's policy-making duties. Gatherings for purely social purposes or purely ministerial duties (mandatory acts requiring no discretion or judgment) when there is no discussion of policy, are exempt from the open meetings law (Iowa Code, Chapter 21.2).

This document will be a planning effort for Palo Alto County and participating jurisdictions to address potential and real natural hazards, and the jurisdictions approach and efforts to mitigate against losses from these hazards. This document is intended to serve as a guide and resource document for those persons in Palo Alto County and participating jurisdiction that are responsible for the daily protection of the community's residents.

The Palo Alto County Multijurisdictional Hazard Mitigation Plan, is a new plan, however there are some elements of the participating jurisdictions that this plan will be an update, as shown in the previous table. If the participating jurisdiction had a previous plan approved by FEMA, even if it is expired or current it will be considered an update this current planning document. So all jurisdictions in Palo Alto County were contacted and participated in developing with this plan with respects to their own community and those that had a previous plan, they updated and went of their previous information and bring it to the current.

Section 1.7 Record Review

During the development of the Palo Alto County Hazard Mitigation Plan, existing plans, studies, reports and technical information were reviewed. It is intended that Palo Alto County Multijurisdictional Hazard Mitigation Plan can be incorporated, where appropriate, into the existing plans in the county. The list below detail documents that were reviewed:

Palo Alto County:

- Palo Alto County Comprehensive Land Use Plan
- Palo Alto County Zoning
- Palo Alto County Emergency Operations Plan
- County Recovery Plan
- Subdivision Ordinance
- Nuisance Ordinance

Ayrshire

- Comprehensive Plan
- Ayrshire Hazard Mitigation Plan – Expired
- Zoning & Subdivision
- Tree Trimming Ordinance
- Nuisance Ordinance

Curlew

- Tree Trimming Ordinance
- Nuisance Ordinance

Cylinder

- Cylinder Hazard Mitigation Plan – Current Single
- Nuisance Ordinance

Emmetsburg

- Emmetsburg Hazard Mitigation Plan – Expired
- Comprehensive Plan
- Local Emergency Plan
- School Mitigation Plan
- Capital Improvements Plan
- Zoning Ordinance
- Subdivision Ordinance
- Tree Trimming Ordinance
- Nuisance Ordinance

Graettinger

- Graettinger Hazard Mitigation Plan – Expired
- Comprehensive Plan
- Land use Plan
- Tree Trimming Ordinance
- School Mitigation Plan
- Zoning Ordinance
- Subdivision Ordinance
- Nuisance Ordinance

Mallard

- Comprehensive Plan

- Land use Plan
- Mallard Hazard Mitigation Plan Current Single
- Tree Trimming Ordinance
- Nuisance Ordinance

Rodman

- Rodman Hazard Mitigation Plan – Current Single

Ruthven

- Ruthven Hazard Mitigation Plan - Expired
- Comprehensive Plan
- Land use Plan
- Tree Trimming Ordinance
- Zoning Ordinance
- Nuisance Ordinance

West Bend

- West Bend Hazard Mitigation Plan – Expired
- Comprehensive Plan
- Land use Plan
- Tree Trimming Ordinance
- Zoning Ordinance
- Subdivision Ordinance
- Nuisance Ordinance

Previous Disaster Declarations

July 29, 2010 – FEMA DR 1930 – 6/1/10-8/31/10

- Sever storms
- Flooding
- Tornadoes

March 3, 2010 – FEMA EM 1880 – 1/19/10-1/26/10

- Severe Winter Storms

February 25, 2010 – FEMA DR 1877 – 12/23/09-12/27/09

- Severe Winter Storm
- Snowstorm

August 27, 2008 – FEMA EM 1763 – 5/25/08-8/13/08

- Severe Storms
- Tornadoes
- flooding

September 14, 2007 – FEMA DR 1727 – 8/17/07-9/5/07

- Severe Storms
- Flooding

March 25, 2004 – FEMA DR 1518 – 5/19/04-6/24/04

- Severe Storms
- Flooding
- Tornadoes

May 2, 2001 – FEMA DR 1368 – 4/8/01-5/29/01

- Severe Storms

- Flooding

July 2, 1998 – FEMA DR 1230 – 6/3/98-7/15/98

- Severe Storms
- Flooding
- Tornadoes

July 9, 1993 – FEMA DR 996 – 4/13/93-10/1/93

- Flooding
- Severe storms

December 26, 1991 – FEMA DR 928 – 10/31/91-11/29/91

- Ice Storms

August 14, 1969 – FEMA DR 269 – 8/14/69-8/14/69

- Heavy Rains

April 25, 1969 – FEMA DR 1969 – 4/25/69-4/25/69

- Flooding

April 22, 1965 – FEMA DR 193 – 4/22/65-4/22/65

- Flooding

Section 1.8 Sources

The following resources were used to compile data and complete this plan include: State of Iowa Hazard Mitigation Plan (2010), National Climatic Data Center (NCDC), US Census data, Palo Alto County Assessor's Office, Hazard Mitigation Plans for the cities of Graettinger, Rural Palo Alto County, West Bend, Emmetsburg, Ruthven, Ayrshire, Cylinder, Mallard and Rodman, FEMA floodplain maps, Palo Alto County Zoning Ordinance and Comprehensive Plan, and critical facilities information in participating jurisdictions. These resources were used to compile information on community background information, vulnerability analysis, development of mitigation goals, critical facilities, hazard identification and profiles and historical weather events.

The information and data present in this hazard mitigation plan, was what was used for this plan. It reflects what was used at the time of creation and analysis for this plan. The state plans of 2007 and 2010 were used in creation of this plan for ideas and information.

Prior to 2012 only single jurisdiction were funded, but today with it being more economical the shift went to county hazard mitigation plans. The following table shows all of the participating jurisdictions in the Palo Alto County Multijurisdictional Hazard Mitigation Plan. That list shows that the six plans that were approved in 2005/2007 and now are expired were approved under different FEMA guidance than what is present today. Those plans concentrated mainly on technical hazards rather than the focus of today which is natural hazards. Each community that had a previous approved FEMA plan, reviewed it and determined that little information was correct as present and updated it and put into the new multijurisdictional plan. Those that had a 2005/2007 hazard mitigation plan, determined that the plans needed an overhaul to get current with current FEMA guidance and regulations. A lot of the information was left behind as the main focus of the new county plan is natural hazards. Since those plans there have been changes to population which is reflected in this plan and there is more concentration on natural hazards from FEMA especially after the flooding events from 2008 and 2011 in the northwest Iowa region. The new county plan included more information on natural hazards and a new layout was used. There was little change for Cylinder, Mallard and Rodman plans since their plans were pretty current having been approved in 2009. The plans for Cylinder, Mallard and Rodman plan information was rolled into the county plan and the information was displayed a little differently to fit in multijurisdictional plan format, but was mainly the same information.

Table 1.4: Multijurisdictional Involvement in the Palo Alto County Hazard Mitigation Plan				
	Current/Expired	Last Hazard Plan	Update	Represented in Plan
Palo Alto County	Expired	3/7/05	Yes	Yes
Ayshire	Expired	9/27/07	Yes	Yes
Curlew	n/a	None	New	Yes
Cylinder	Current	6/1/09	Yes	Yes
Emmetsburg	Expired	3/9/05	Yes	Yes
Graettinger	Expired	1/12/05	Yes	Yes
Mallard	Current	6/1/09	Yes	Yes
Rodman	Current	7/20/09	Yes	Yes
Ruthven	Expired	9/12/07	Yes	Yes
West Bend	Expired	3/7/05	Yes	Yes
Graettinger - Terril Community School	n/a	None	New	Yes
West Bend - Mallard Community School	n/a	None	New	Yes
Emmetsburg Community Schools	n/a	None	New	Yes
Emmetsburg Catholic School	n/a	None	New	Yes
Ruthven Ayrshire Community Schools	n/a	None	New	Yes

Section 2. Background

2.1 Brief County History

Iowa became a state in 1846 Palo Alto County was established in 1851. In 1855, near present day West Bend, along the east bank of the Des Moines River, the Carter and Evans families made the first settlement in Palo Alto County. The next year, a group of Irish immigrant families (Nolan, Neary, Mahan, Laughlin, Downey, Sylvester, Jackman, Hickey, and Crowley) settled close to the Des Moines River near the current site of Emmetsburg. The first census in the county, 1860, enumerates 133 inhabitants. The county began to fill up with citizens after the Civil War. Some were natives from the states east of the Mississippi, but many came as immigrants from Europe; Norwegians, Poles, Danes, and Germans came to farm the rich land. More Irish and Scotch-Irish joined those who had arrived in 1856.

The location of the current town of Emmetsburg was platted in 1874 and became the county seat in 1875. The community was named in honor of an Irish Patriot, Robert Emmet, who was executed in 1803 by the English government in Ireland's fight for independence. The county of Palo Alto was named in honor of the first battlefield victory in the Mexican-American War. The Palo Alto communities of Ayrshire, Curlew, Cylinder, Graettinger, Mallard, Osgood, Rodman, Ruthven, and West Bend sprung up quickly along the railroad lines connecting northwest Iowa with the Eastern United States. In 1880, the year the brick courthouse was built, there were 4053 souls living in Palo Alto County.

Through the years that followed, the complement of 16 townships was established, and the county continued to grow. The rich farmlands and prospering towns made Palo Alto County a flourishing community and held great promise for the future of its citizens.

Because of the large number of Irish immigrants, the culture and customs of the Emerald Isle were preserved in the area, even though there were large numbers of Germans and others. One such custom was the observance of St. Patrick's Day. The festivities have grown from a small group of men marching down Main Street with the Coat of Arms and green derbies to a gala three-day celebration that includes a variety of activities to please people of all ages.

The link to Ireland was further reinforced in 1962. Negotiations between the Emmetsburg Mayor and the Lord Mayor of Dublin, Ireland, resulted in a joint proclamation officially declaring the two as "Sister Cities." Through this declaration, they agreed to join together in the rejoicing and celebration of St. Patrick's Day. (*Source: http://www.emmetsburg.com/About/History.htm*)

2.2 County Government Overview

The Palo Alto county government serves as the regional government and the provider of essential services to the residents of the county. The county performs many state administrative functions such as issuance of licenses and permits. It also provides public services on a local level such as zoning ordinances, provisions for health and indigent care and the maintenance of county jails.

In Palo Alto County, citizens elect a county auditor, recorder, attorney, sheriff, treasurer and a 5-member County Board of Supervisors. The County Board of Supervisors is the executive branch of county government. The County Board of Supervisors then appoints other individuals to serve as directors of the other offices in the courthouse. In the case of the County Conservation Board, the Board of Supervisors appoints a Director and through that appointee, oversees the Conservation Board. While the County Board of Supervisors is the chief policymaker for the county, the administration of county government is guided by a variety of elective and appointive offices and a number of semi-autonomous boards and commissions. The

Palo Alto County Emergency Management Agency and its coordinator is included in these county governmental offices.

The Palo Alto County Economic Development Corporation provides information about business opportunities and quality of life in the communities throughout Palo Alto County.

2.3 Transportation System

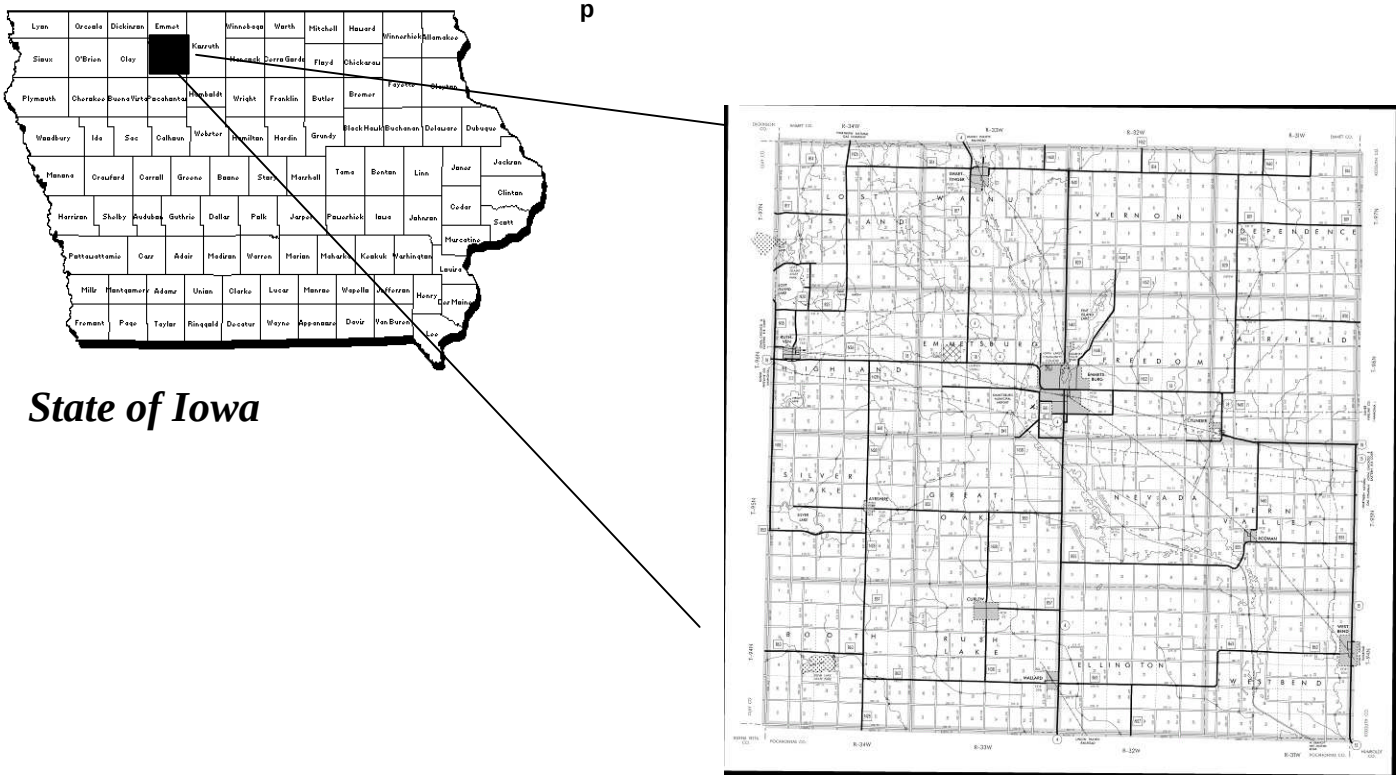
Highways: State highways 18 (running east-west) and 4 (running north-south) bisect the county and are the major routes of travel through and within the county.

Streets and Roads: The county has a total of 935 secondary road miles and 977 rural open roads. Surface types for these roads are primarily of gravel, asphalt and paved concrete.

Railroads: Dakota, Minnesota & Eastern Railroad (DM & E): The DM & E Railroad services Palo Alto County with a rail line running east and west. Union Pacific Railroad (UP): The Union Pacific Corporation services Palo Alto County, with one rail line running east and west in the northern part of the county, and another rail line running north and south.

Airports: The Emmetsburg Municipal Airport is the only airport in Palo Alto County. It is located 1 mile SW of the city of Emmetsburg. It has an attendant/manager and is open 365 days a year. It currently offers no commercial passenger service but serves small private aircraft.

2.4 Location – Figure 2.1 – Palo Alto County Location Map



Palo Alto County is located in northwest Iowa, four counties east of South Dakota and one away from Minnesota. Adjacent counties are Clay County to the west, Emmet County to the north, Pocahontas County to the south, and Kossuth County to the east. The county seat, Emmetsburg is at latitude 43.11 N and longitude 94.68 W. According to the U.S. Census Bureau, the county has a total area of 569 sq. miles. 563 sq. miles of it is land and 6 sq. miles of it is water. In land area it is the smallest county in Iowa. The population density for Palo Alto County is 17 people/sq. mile.

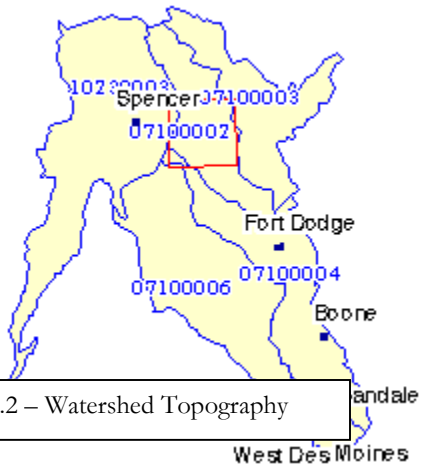


Figure 2.2 – Watershed Topography

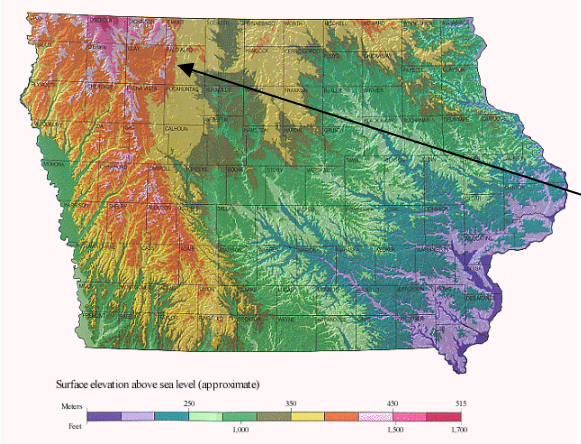
2.5 Major Rivers/Watersheds

Watersheds are areas in which all water, sediments and dissolved materials flow or drain into a common river, lake or other body of water. Watersheds may vary in size from the largest river basins to just a few acres, but within their boundaries, all living things are linked by their common watercourse. EPA provides a number of different financial and technical resources to support local watershed protection efforts undertaken by state and tribal governments, public interest groups, industry, academic institutions, private landowners and concerned citizens. Through the EPA's Office of Water, along with many local groups and other federal agencies can integrate solutions and measure success of these efforts through monitoring and other data gathering.

There are five watersheds in Palo Alto County, shown opposite (with the county border shown in red): Upper Des Moines, East Fork Des Moines, Middle Des Moines, North Racoon and Little Sioux. The major river watershed for the county is the Upper Des Moines. (Source: US EPA website: http://cfpub.epa.gov/surf/county)

Palo Alto County has 3 major lakes: Lost Island Lake, Five Island Lake and Silver Lake.

2.6 Elevation



The average elevation for Palo Alto County is between 1220 and 1540 feet above sea level.

Palo Alto County

Figure 2.3 – Elevation Map of Iowa, Geology Map of Iowa

2.7 Geology

The geology of Palo Alto County is almost entirely from the Cretaceous Era (74-102 million years ago). Iowa's geologic history lies buried beneath the ground. The deeper, older and least frequently seen portions

of this history consist mostly of sedimentary rocks such as sandstone, limestone, dolomite and shale, which are over 3,000 feet thick in places.

These rocks originated as layers of loose sediment accumulating in shallow seas and along coastal and floodplain environments that occupied Iowa between 74 million years ago (Cretaceous) and 530 million years. With time, this sediment hardened into rock containing fossil remains of past animal and plant life. Bedrock is occasionally exposed along the state's river valleys, at road cuts, and in quarries. Across much of the state, the bedrock surface is covered with younger glacial-age materials.

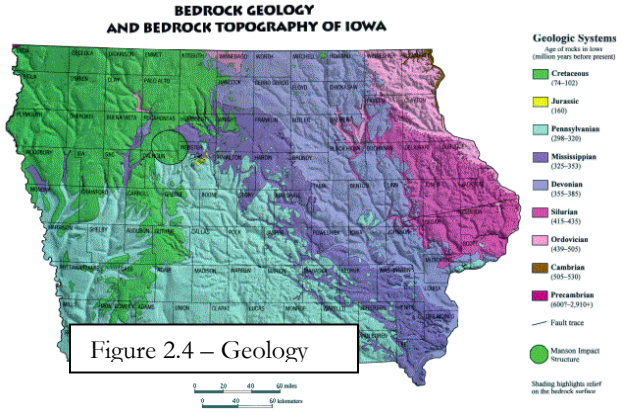


Figure 2.4 – Geology

As a result, much of our information about Iowa's bedrock geology comes from rock samples brought up to the land surface during the drilling of wells. The present land surface across Iowa is dominated by loose materials much younger than the bedrock beneath. These materials consist of sediment originating from ice sheets, meltwater streams, and strong winds during a series of glacial events between 2.5 million and 10,000 years ago (Quaternary). This familiar "dirt" consists of pebbly clay, sand, gravel, and abundant silt, which over time have weathered into Iowa's productive loamy soils. These easily eroded "Ice Age" deposits account for the gently rolling appearance of much of the Iowa (and Midwestern) landscape.

Differences observed in the landscapes across Iowa are the result of overlapping glacial advances coupled with the effects of erosion and wind. The last glacier to enter the state formed the Des Moines Lobe region (map, right) between 14,000 and 12,000 years ago. Knobby moraine ridges and numerous wetlands are the direct result of a stagnant, disintegrating ice sheet. The rest of Iowa's land surface is formed of much older glacial deposits, left between 2.5 million and 500,000 years ago.

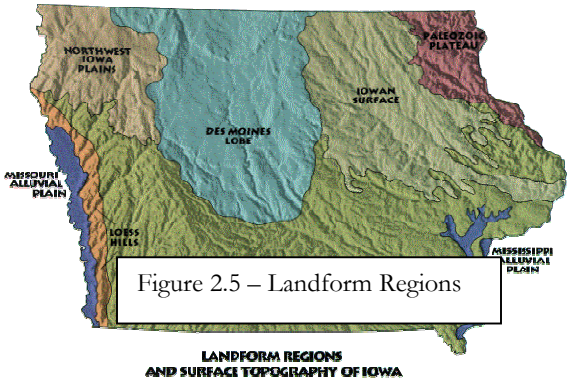


Figure 2.5 – Landform Regions

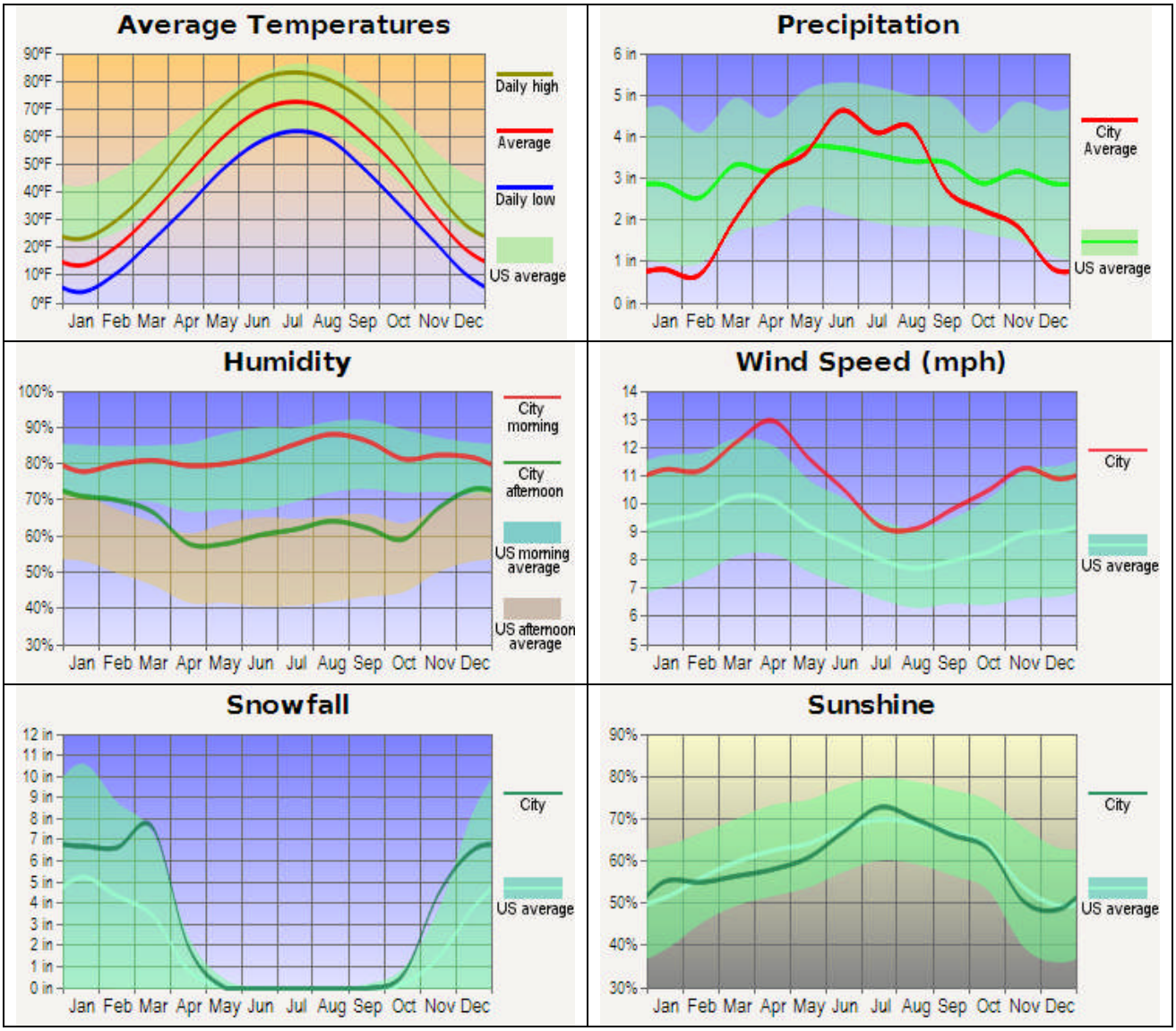
Across southern Iowa, erosion has carved these deposits into steeply rolling, well-drained terrain (Southern Iowa Drift Plain). Across the northern half of Iowa, however, these same deposits were leveled by intense erosion activity during a peak of glacial cold between 21,000 and 16,000 years ago. The result is more gently rolling terrain across the Iowan Surface and Northwest Iowa Plains, which lie on either side of (and beneath) the Des Moines Lobe. About the same time, strong winds swept glacially ground "rock flour" from river floodplains. This airborne silt was deposited as loess across much of the Iowa landscape, and unusually thick deposits along the Missouri Valley in western Iowa became the steep, picturesque ridges of the Loess Hills.

The flow of rivers is the primary geologic process affecting Iowa's landscape today (note valleys on Landform Regions map above). Many valleys, such as the Missouri and Mississippi alluvial plains, are much wider than the rivers within them, which indicates excavation by flood flows during glacial melting. Abundant gravel deposits along the valleys also reflect the power of meltwater to move coarse material. Even modern floods demonstrate how earth materials are eroded from one portion of a valley, sorted by flowing water, and redeposited downstream. Such episodes of sediment transport by rivers are an on-going part of the geologic evolution of Iowa.

Iowa's earth history continues to be shaped by slow, gradual processes as well as by brief, intense events. We live on the surface of a deep geologic inheritance, whose materials and processes -- past, present, and future -- affect the lives of us all. (Adapted from Iowa Geology 1997, Iowa Department of Natural Resources)

2.8 Climatology and Weather

Table 2.1 - Average Climate Data for Emmetsburg/Palo Alto County, Iowa



Source: http://www.city-data.com

2.9 Historical Places and Archeological Sites

Table 2.2 - Historic Places of Palo Alto County

Archeological Sites of Palo Alto County: http://www2.uiowa.edu/i-sites/public.htm

Table 2.2 - Historic Places of Palo Alto County

Emmetsburg Public Library ** (added 1983 - Building - #83000397)
10th St. on Courthouse Sq., Emmetsburg

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Simmons,A. T.
Architectural Style:	No Style Listed
Area of Significance:	Architecture
Period of Significance:	1900-1924
Owner:	Local Gov't
Historic Function:	Education
Historic Sub-function:	Library
Current Function:	Education
Current Sub-function:	Library
Assessed Value	$222,400

Grotto of the Redemption ** (added 2001 - Structure - #00001679)
300 N. Broadway, West Bend

Historic Significance:	Architecture/Engineering
Architect, builder, or engineer:	Dobberstein, Father Paul Matthias
Architectural Style:	No Style Listed
Area of Significance:	Architecture, Landscape Architecture
Period of Significance:	1900-1924, 1925-1949, 1950-1974
Owner:	Private
Historic Function:	Religion
Historic Sub-function:	Religious Structure
Current Function:	Religion
Current Sub-function:	Religious Structure
Assessed Value	$2,691,200

Ormsby-Kelly House ** (added 1977 - Building - #77000545)
2403 W. 7th St., Emmetsburg

Historic Significance:	Person
Historic Person:	Bliven,Bruce,et al.
Significant Year:	1899, 1940, 1876
Area of Significance:	Literature
Period of Significance:	1875-1899, 1925-1949
Owner:	Private
Historic Function:	Domestic
Historic Sub-function:	Single Dwelling
Current Function:	Domestic
Current Sub-function:	Single Dwelling
Assessed Value	$213,460

2.10 POPULATION AND DEMOGRAPHICS

Population analysis plays a critical role in the planning process. Analysis of past trends and current population structure is important in making future population projections. Those projections, along with information about population characteristics such as age, are fundamental in considering the need for current and future mitigation activities and infrastructure improvements. This section will examine past trends, current structure, and future projections, and discuss their impact on the future of Palo Alto County.

Population Trends (History and Future Projections)
Since the turn of the century, America's rural population has been declining, largely as a result of technological advances in the agricultural and industrial sectors, which have allowed fewer family farmers to efficiently farm more land. Iowa's rural areas have not been immune to this general population shift. Since 1920, reductions in agricultural employment, accompanied by migration of residents from rural to urban areas, and smaller family sizes have taken their toll on the state's rural population. Additionally, the agricultural recession of the 1980s had a tremendous impact on the economic vitality and therefore the population of Palo Alto County and the State of Iowa as a whole.

The trend in Iowa shows a decline in rural population and the population is gravitating towards larger cities and urban centers. This trend is very pronounced in Central and Eastern Iowa. In Western Iowa, the growth has not been as pronounced or magnitudinal, yet there are still areas of growth. The growth areas in Western Iowa are associated with communities that are considered industry, retail and recreation centers. Each of these cities has either a major employer(s) and/or a major retail center.

Another segment of rural population that will continue to impact the population will be the aging rural senior population. As rural farm families continue to age, many retiring couples or persons are looking to move into a city that offers adequate healthcare, services, entertainment and socialization for these senior residents.

The U.S. Census Bureau recorded Palo Alto County's population in 1900 as 14,354 persons. The population increased to a decennial high of 16,170 persons in 1940. Since then, the county's population has incrementally decreased low of 9,421 persons recorded in the 2010 Census.

The data presented in the Table illustrates the population of Palo Alto County of the current and projected decrease in population starting in 1940's. The County population has declined from that period and continues to decline, as does are smaller rural counties in the State of Iowa. Smaller cities are displaying a similar pattern of overall population declines over the past couple decades. There are numerous socioeconomic reasons of why population in smaller counties and cities is declining and population in larger communities and other regions of the U.S. is increasing – educational opportunities, employment, weather, more efficient farm production, recreation and amenities.

The time period from 1980 to 1990 was a period of decline in population for the State of Iowa and Palo Alto County having declines of -4.7% and -16.1% respectively. The State of Iowa population increased from 1990 to 2000 by 5.8% compared to -4.9% decline for the County and the State population increased by 4.1% and County's population decreased by -7.2% from 2000 to 2010.

The major variable responsible for the population decline(s) during the period of the 1980s was contributed to the depressed and slumping agricultural economy. The depressed rural economy of the 1980s and early 1990s caused agricultural and related rural businesses to down size and shut down and this ultimately funneled to the main streets of towns and cities. In turn, this caused many persons and households to move outside the state in search of better opportunities. The rural County and small town populations have

generally continued to decline since the 1980's as a result of, but not limited to, more efficient farming, larger farm operations, out-migration to larger communities and families having fewer children on average.
The following tables show the historical and projected population trends for Palo Alto County. The projections are indicated for the year 2020. The projection indicates negative growth for the County. Even without an increase of population, a real risk and exposure to potential natural hazards remains. Just as a City and County plans for streets and utilities, it must also plan for potential natural hazards.

Table 2.3 - Population Trends (History and Projected Future) – Palo Alto County

YEAR	1860	1870	1880	1890	1900	1910	1920	1930	1940
POPULATION	132	1,336	4,131	9,318	14,354	13,845	15,486	15,398	16,170
% Change	-	912.1%	209.2%	215.6%	54.0%	-3.5%	11.9%	-0.6%	5.0%
YEAR	1950	1960	1970	1980	1990	2000	2010	2020*	
POPULATION	15,891	14,736	13,289	12,721	10,669	10,147	9,421	9,019	
% Change	-1.7%	-7.3%	-9.8%	-4.3%	-16.1%	-4.9%	-7.2%	-4.3%	

** Year 2020 projections. The County projections come from 2012 Woods & Poole Economics, Inc projections and the City figures for this period come from extrapolating City historical population trends with projected County data. All previous decennial comes from the U.S. Census.*

The population in the County has been decreasing since 1940. The rural unincorporated population has substantially decreased (-52.0%) in recent decades from 4,527 in 1980 to 2,172 in 2010. All of the cities in the County have decreased in population from 1980 to 2010; some cities have shown more pronounced decreased than others.

Table 2.4 - Population Trends & Projections of Palo Alto County Communities 1980 to 2020

City	1980	1990	2000	2010	* 2020 Projected
Ayrshire	243	195	202	143	126
Curlew	85	56	62	58	46
Cylinder	119	112	110	88	85
Emmetsburg	4,621	3,940	3,958	3,904	3,888
Graettinger	923	813	900	844	869
Mallard	407	360	298	274	257
Rodman	86	56	56	45	39
Ruthven	769	707	711	737	758
West Bend	941	862	834	785	779
Unincorporated	4,527	3,568	3,016	2,543	2,172
Total	12,721	10,669	10,147	9,421	9,019

Source: US Census Bureau

** The County projections come from 2012 Woods & Poole Economics, Inc projections and the City figures for this period come from extrapolating City historical population trends with projected County data. All previous decennial comes from the U.S. Census.*

More recent population (years 2000 to 2010) statistics show all cities have lost population, except the City of Ruthven during this period. In general, larger communities in the County showed a smaller population ratio decrease than the smaller communities.

Table 2.5 - Population Change from 2000 to 2010

	2000 Population	2010 population	Change from 2000 to 2010	% Change from 2000 to 2010
Palo Alto County	**10,147**	**9,421**	**-726**	**-7.2%**
Ayrshire	202	**143**	-59	-29.2%
Curlew	62	**58**	-4	-6.5%
Cylinder	110	**88**	-22	-20.0%
Emmetsburg	3,958	**3,904**	-54	-1.4%
Graettinger	900	**844**	-56	-6.2%
Mallard	298	**274**	-24	-8.1%
Rodman	56	**45**	-11	-19.6%
Ruthven	711	**737**	26	3.7%
West Bend	834	**785**	-49	-5.9%
Rural	*3016*	***2,543***	*-473*	*-15.7%*

The larger population cities in the County are comprising a larger percentage of the County's population over time and the opposite is for smaller cities, which are comprising a smaller percentage of the County's overall population. This trend is likely to continue as the larger communities are able to provide more amenities and economic socioeconomic opportunities.

Table 2.6 - Individual Community Percentage % of County Population from 1980 to 2010

Community	% of County Population in 1980	% of County Population in 2010
Ayrshire	1.91%	1.52%
Curlew	0.66%	0.62%
Cylinder	0.94%	0.93%
Emmetsburg	36.33%	41.44%
Graettinger	7.26%	8.96%
Mallard	3.20%	2.91%
Rodman	0.67%	0.48%
Ruthven	6.05%	7.82%
West Bend	7.40%	8.33%
Rural	35.59%	26.99%
Palo Alto County Population	10,147	9,421

Population is closely tied to a community's housing needs. As population increases or decreases so does the need or lack of need for new or existing housing. Often if housing is not available, people will not move to a community. Businesses will also look at locating or expanding in communities that show growth potential and a capacity to house employees. Future population projections provide a guide for the community, lenders, builders and developers.

Table 2.7 - Population Trends of Palo Alto County Communities

City	1980	1990	2000	2010	* 2020 Projected
Ayrshire	243	195	202	143	126
Curlew	85	56	62	58	46
Cylinder	119	112	110	88	85
Emmetsburg	4,621	3,940	3,958	3,904	3,888
Graettinger	923	813	900	844	869

Mallard	407	360	298	274	257
Rodman	86	56	56	45	39
Ruthven	769	707	711	737	758
West Bend	941	862	834	785	779
Unincorporated	4,527	3,568	3,016	2,543	2,172
Total	12,721	10,669	10,147	9,421	9,019

Table 2.8 – Estimated Population & Persons per Household

YEAR	PALO ALTO COUNTY POPULATION	PERSONS PER HOUSEHOLD FOR PALO ALTO COUNTY
***1980**	12,720	2.69
***1990**	10,640	2.47
***2000**	10,140	2.36
***2010**	9,400	2.27
2020	9,110	2.20

** Source: Census Data 1980- 2010; 2020 is a projection extrapolated from Woods & Poole Inc. 2012*

The average household size in the U.S., State of Iowa, and most cities has decreased over time due to a number of socioeconomic factors. People on average are living longer and having fewer children and these combined with more single-parent families are the primary reasons to a smaller household size on average. With all other variables held constant, a smaller household size means a need for additional housing units. It appears the average household sizes for the County will hold steady over the next 25 years, if not increase slightly over time. The average household size in 1980 for Palo Alto County it was 2.69. By year 20100 the average household decreased to 2.27.

A note of caution - when considering these population projections, one must remember these projections do not factor potential socioeconomic variables. The projections are based on past population trends for the county. The projections do not take economic and sociological forces into consideration. These variables alone are quite difficult to project and forecast and then to apply them to population projections is even more difficult. A number of assumptions would have to be made and the margin or error at each level of application increases. The one assumption made is that with all other factors or variables held constant, the population for Palo Alto County is expected to increase. Factors that may affect population estimates include business expansions, the availability of affordable housing units, new subdivisions, or a rise or decrease in the cost of living. For example, if a new business employing 25 persons looks at locating in a community in Palo Alto County, this can significantly affect the population and demand for housing. In some cases a lack of services and housing opportunities will drive prospective homeowners to other areas where municipal services and housing opportunities are more readily available.

2.11 Current Population Statistics

As of the census of 2010, there are 9,421 people, 7,103 households, and 4,760 families residing in the county. The population density is 43.1/sq. mile. The racial makeup of the county is 98.5% White, 0.7% Black or African American, 0.6% Native American, 0.5% Asian, 0.1% Pacific Islander, 0.4% from other races, and 0.5% from two or more races, 1.6% of the population is Hispanic or Latino.

2.12 HOUSING CHARACTERISTICS AND OCCUPANCY

A lasting consequence of the farm crisis along with a restructuring of socioeconomic patterns for rural communities across the state resulted in an out-migration of people.

The 2000 U.S. Census for Palo Alto County shows 4,631 housing units and 4,119 households. Of the 4,119 occupied units, 3,052 (74.1%) were owner-occupied and 1,067 (25.9%) were renter-occupied units. Of the County's housing, 42% was constructed in 1939 or earlier and another 425 units (13.9%) were constructed from 1950 to 1959 and 460 units (15.1%) were constructed 1970 to 1979, making up the two next largest building eras. Only 166 housing units were constructed from 1990 to 2000.

According to the 2000 census, 56.4% of housing units were heated by utility gas, 27.4% of the housing units were heated by bottled, tanked or LP gas, 2.9% of homes were heated by kerosene or fuel oil and another 12.7% were heated by electricity.

The 2010 U.S. Census shows the County had 4,628 households in 2010 and 3,994 of these units or 86.3% were occupied and 13.7% were vacant. Owner-occupied housing units consisted of 2,956 (74%) and renter-occupied housing units was comprised of 1,038 (26%).

In summary, the total number of housing units has not changed in the decade from 2000 to 2010, which would stand to reason since the population for the County has decreased over this same period. The composition of renters and owner-occupied housing units has not change over the decade.

Table 2.9 - General Housing Characteristics

Source: U.S. Census Bureau/2010Census Data

Palo Alto County – Total	
Average Household Size	2.27
Average Family Size	2.84
Total Housing Units	4,628
Occupied Housing Units	3,994
Owner-occupied Housing Units	2,956
Renter-occupied Housing Units	1,038
Vacant Housing Units	634
Median Year Built	-
Median Household Income	$42,800

City of Ayrshire	
Average Household Size	2.27
Average Family Size	2.96
Total Housing Units	98
Occupied housing units	89
Owner-occupied housing units	70
Renter-occupied housing units	19
Vacant housing units	9
Median Age of Housing Units	
Median Year Built	
Median Household Income	$27,500
City of Curlew	
Average Household Size	2.07
Average Family Size	2.88
Total Housing Units	36
Occupied housing units	30
Owner-occupied housing units	28
Renter-occupied housing units	2
Vacant housing units	6

Median Age of Housing Units	
Median Year Built	
Median Household Income	$20,250
City of Cylinder	
Average Household Size	2.44
Average Family Size	2.97
Total Housing Units	49
Occupied housing units	45
Owner-occupied housing units	38
Renter-occupied housing units	7
Vacant housing units	4
Median Age of Housing Units	
Median Year Built	
Median Household Income	$24,750
City of Emmetsburg	
Average Household Size	2.24
Average Family Size	2.90
Total Housing Units	1,831
Occupied housing units	1,620
Owner-occupied housing units	1,110
Renter-occupied housing units	510
Vacant housing units	211
Median Age of Housing Units	
Median Year Built	
Median Household Income	$31,520
City of Graettinger	
Average Household Size	2.25
Average Family Size	2.90
Total Housing Units	430
Occupied housing units	396
Owner-occupied housing units	302
Renter-occupied housing units	94
Vacant housing units	34
Median Age of Housing Units	
Median Year Built	
Median Household Income	$28,988
City of Mallard	
Average Household Size	2.24
Average Family Size	2.83
Total Housing Units	143
Occupied housing units	133
Owner-occupied housing units	110
Renter-occupied housing units	23
Vacant housing units	10
Median Age of Housing Units	
Median Year Built	
Median Household Income	$28,056
City of Rodman	
Average Household Size	2.33
Average Family Size	2.94
Total Housing Units	28
Occupied housing units	24
Owner-occupied housing units	23
Renter-occupied housing units	1
Vacant housing units	4
Median Age of Housing Units	
Median Year Built	
Median Household Income	$29,063
City of Ruthven	

Average Household Size	2.19
Average Family Size	2.76
Total Housing Units	350
Occupied housing units	325
Owner-occupied housing units	253
Renter-occupied housing units	72
Vacant housing units	25
Median Age of Housing Units	
Median Year Built	
Median Household Income	$31,027
City of West Bend	
Average Household Size	2.21
Average Family Size	2.95
Total Housing Units	379
Occupied housing units	352
Owner-occupied housing units	306
Renter-occupied housing units	46
Vacant housing units	
Median Age of Housing Units	
Median Year Built	
Median Household Income	$31,711

City of Ayrshire	
Utility gas	2
Bottled, tank, or LP gas	59
Electricity	21
Fuel oil, kerosene, etc.	7
Coal or Coke	-
Wood	-
Solar Energy	-
Other Fuel	-
No Fuel Used	-
City of Curlew	
Utility gas	-
Bottled, tank, or LP gas	21
Electricity	5
Fuel oil, kerosene, etc.	2
Coal or coke	-
Wood	-
Solar energy	-
Other fuel	-
No fuel used	-
City of Cylinder	
Utility gas	35
Bottled, tank, or LP gas	4
Electricity	2
Fuel oil, kerosene, etc.	2
Coal or coke	-
Wood	-
Solar energy	-
Other fuel	-
No fuel used	-

City of Emmetsburg	
Utility gas	1,341
Bottled tank, or LP gas	72
Electricity	191

Fuel oil, kerosene, etc.	14
Coal or coke	-
Wood	6
Solar energy	-
Other fuel	5
No fuel used	-
City of Graettinger	
Utility gas	304
Bottled, tank, or LP gas	18
Electricity	70
Fuel oil, kerosene, etc.	2
Coal or coke	-
Wood	-
Solar energy	-
Other fuel	-
No fuel used	-
City of Mallard	
Utility gas	4
Bottled, tank, or LP gas	100
Electricity	21
Fuel oil, kerosene, etc.	11
Coal or coke	-
Wood	-
Solar energy	-
Other fuel	-
No fuel used	-

City of Rodman	
Utility gas	2
Bottled, tank, or LP gas	22
Electricity	-
Fuel oil, kerosene, etc.	-
Coal or coke	-
Wood	-
Solar energy	-
Other fuel	-
No fuel used	-
City of Ruthven	
Utility gas	265
Bottled, tank, or LP gas	8
Electricity	51
Fuel oil, kerosene, etc.	-
Coal or coke	-
Wood	-
Solar energy	-
Other fuel	-
No fuel used	-
City of West Bend	
Utility gas	315
Bottled, tank, or LP gas	9
Electricity	24
Fuel oil, kerosene, etc.	3
Coal or coke	-
Wood	-
Solar energy	-
Other fuel	3
No fuel used	-

2.13 Economic and Income Trends

The estimated median income for a household in Palo Alto County in 2008 was $42,062, compared to $49,007 for Iowa. Median income for the county was $33,824 in 2000, while the state median income was $40,443. In 1989, Palo Alto's median income was $23,313 compared to Iowa's median income of $26,169. . Males have a median income of $28,344 versus $19,655 for females. The per capita income for the county is $17,733. 10.60% of the population and 6.60% of families are below the poverty line. Out of the total population, 12.20% of those under the age of 18 and 9.10% of those 65 and older are living below the poverty line.

2.14 Agricultural Trends

The 2007 Census of Agriculture counted 2,204,792 farms in the United States, according to results released by the U.S. Department of Agriculture's National Agriculture Statistics Service. Since the last census in 2002, the number of reported U.S. farms increased 4 percent. In Iowa the number of farms increased by 2 percent to 92,856. In Palo Alto County the number of farms increased by 8% to 849 in 2007. The amount of land in farms in the county also increased by 8%, going from 326,884 acres in 2002 to 353,332 acres in 2007. The average farm size in Palo Alto County remained the same at 416 acres.

Nationally, the latest census results show a continuing trend towards more small and very large farms and fewer mid-sized operations--a trend echoed in Iowa. Overall, the majority of U.S. farms are smaller operations with more than half characterized as residential/lifestyle or retirement farms.

In addition to looking at all aspects of farming, the Census of Agriculture provides a comprehensive look at operator demographics--with 2007 results indicating that farmers continue to become more diverse. The 2007 Census counted nearly 30 percent more female principal farm operators in the United States, while the count in Iowa increased by 36 percent from 2002. Nationwide, the count of Hispanic operators grew by 10 percent, and the counts of American Indian, Asian and Black farm operators increased as well.

Palo Alto County's primary agricultural commodities include corn, soybeans, hogs, and cattle. Market prices for all of these commodities have increased over the past ten years (as shown in Table 9). Yields for Palo Alto County from 2000-2009 averaged 169 bushels/acre for corn and 46 bushels/acre for soybeans.

Table 2.10 - Average Annual Market Prices

Commodity	2000 Average Price	2005 Average Price	2009 Average Price	Peak Price
Corn (per bushel)	$1.78	$1.90	$3.81	$5.40 (Jun'08)
Soybeans (per bushel)	$4.67	$5.88	$10.06	$13.10 (Jun'08)
Hogs (US #1-2 210-240 lb. barrows and gilts)	$42.76	$49.43	$49.55	$63.83 (Aug'08)
Cattle (Choice Steers)	$69.31	$86.99	$83.11	$98.66 (Aug'08)

Source: www.extension.iastate.edu/agdm

Section 3. Identifying Hazards

There are many different natural events such as floods, tornadoes, thunderstorms and extreme heat incidents that have adverse affects on the public safety and welfare of a community. The Hazard Analysis and Risk assessment focuses your attention on areas most in need by analyzing the populations and facilities that are most vulnerable to natural and man-made hazards and to what extent damages may occur. The risk assessment identifies how people properties and structures will be damaged due to a hazardous event. If the hazard can harm structures and people they are considered vulnerable. Finding weak points in the system include identifying building types that are vulnerable to damage and anticipating the loss in high risk areas. This will help the community to decide what mitigation efforts are required or should be undertaken and how to implement the selected activities. A community can best prepare for mitigation by understanding the following:

- What hazards is your community susceptible to;
- What these hazards can do to physical, social, and economic resources;
- Which areas are most vulnerable to damage from these hazards; and
- The resulting cost of damages or cost avoided through future mitigation projects.

The first step in the analysis is to identify all hazards that have occurred or that could potentially affect the community. The list of potential hazards that can occur in Iowa and examined in the Plan comes from the 2010 State of Iowa Hazard Mitigation Plan. The State of Iowa 2010 Plan identifies 16 natural hazards that may affect all or parts of the State of Iowa. (The Palo Alto County Hazard Mitigation Plan, specifically this section, addresses 12 of the 16 identified natural hazards identified in the State of Iowa) This identification process allows the local planning committee to examine the statewide listing of all hazards and make a local determination of which hazards have already affected Palo Alto County, which hazards may affect the county in the future and which hazards will likely not impact the county at all.

The planning committee's next step was to profile each hazard that was identified from the first step. Through the profiling process the planning committee discussed historical occurrences, the probability of the hazard occurring again in the future, the vulnerability of the population that will be affected by the hazard, the maximum geographic extent, the severity of the hazard in terms of injuries/fatalities, personal property, and infrastructure, and the speed of onset or warning time available before the hazard occurs. Table 3.1 shows which hazards were identified as either have occurred or potentially could occur in your Palo Alto County, and how each of the hazards was profiled.

The first step in the analysis is to identify all hazards that have occurred or that could potentially affect the community. The planning committee's next step was to profile each hazard that was identified from the first step. Through the profiling process the planning committee discussed historical occurrences, the probability of the hazard occurring again in the future, the vulnerability of the population that will be affected by the hazard, the maximum geographic extent, the severity of the hazard in terms of injuries/fatalities, personal property, and infrastructure, and the amount of warning time available before the hazard occurs. The tables listed below show which hazards were identified as either have occurred or potentially could occur in the respective communities, and which of the hazards are profiled.

The 2005/2007 plans looked at anywhere from 13 to 33 hazards and focused mainly on technical hazards,. Not all plans looked into flash flood which has been increasing important especially in northwest Iowa in recent flooding events in 2008 and 2011. The planning committee determined that it would like to concentrate on the natural hazards of the State 2010 plan and the risk assessment and vulnerability had to be created from scratch. With the more current plans of 2009, the committee determined to also focus just on the natural hazards and leave the manmade/technical hazards in the single jurisdiction plan, until that experienced, and to continue with what the state plan recognizes in the future for hazards. The technical

hazards were removed because are unlikely to impact the rural agriculturally based Palo Alto County with a widely dispersed population. Also the technical hazards are not required and resources are limited, the planning committee determined to concentrate on the natural hazards in accordance with FEMA regulations.

The planning committee reviewed data for those hazards selected, which is supplied in this section. After each hazard was scored, the overall planning committee ranked them based on the score for each. Then each community was then able to rank them to there liking, as an example some communities didn't have a river in their city and then removed that from their chart. Each community was then able to change the ranking if they thought their community was more susceptible to the hazard than the county. Each community's rankings are supplied in the city data section towards the back of this plan.

Table 3.0 - Identified hazards that have mitigation actions in old and this new hazard mitigation plans, showing what carries over into the new plan.

Hazards	Ayrshire old	Ayrshire New	Cylinder Old	Cylinder New	Emmetsburg Old	Emmetsburg New	Graettinger Old	Graettinger New	Mallard Old	Mallard New	Rodman Old	Rodman New	Ruthven Old	Ruthven New	West Bend Old	West Bend New	Palo Alto Old	Palo Alto New
Drought	x	x	x	x		x		x		x	x	x	x	x		x		x
Earthquake																		
Expansive Soils	x																	X
Extreme Heat	x	x	x	x		x		x	x	x	x	x	x	x		x		X
Flash Flood		x	x	x	x	x	x	x		x		x		x	x	x	x	X
Hailstorm	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x		X
Landslide																		
River Flood						x		x								x		X
Severe Winter Storm	x	x	x	x	x	x		x	X	x	x	x	x	x		x	x	X
Sinkhole																		
Thunderstorm and Lightning	x	x	x	x	x	x	x	x	X	x	x	x	x	x	x	x	x	X
Tornado	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	X
Windstorm	x	x	x	x	x	x	x	x	X	x	x	x	x	x	x	x	x	X
Dam Failure						x												X
Levee Failure (Includes Over Topping)									x									
Grass or Wildland Fire	x	x		x		x	x	x		x		x		x		x		x

*There are no old hazards for Curlew or the school districts. This table is to compare the old hazards with the new. The hazards for the schools and Curlew are represented further in the plan.

Table 3.1 Identified Hazards

Natural Hazards			
Has Occurred	Potentially Could Occur	Unlikely to Occur	Hazard
X			Drought
		X	Earthquake
	X		Expansive Soils
X			Extreme Heat
X			Flash Flood
X			Hailstorm
		X	Landslide
X			River Flood
X			Severe Winter Storm
		X	Sinkhole
X			Thunderstorm and Lightning
X			Tornado
X			Windstorm
	X		Dam Failure
		X	Levee Failure (Includes Over Topping)
X			Grass or Wildland Fire

The planning committee eliminated 4 hazards which were deemed "unlikely to occur" in the future will no longer be examined in this document. The planning team believe the probability, risk(s) or threats associated with these potential hazards occurring in the county is very small and pose little if any potential danger to the community. Earthquakes, landslide, sinkhole and levee failure will no longer be addressed, discussed or profiled throughout the remainder of this plan. Earthquakes landslide, sinkhole and levee failure are the hazards that were decided by the Palo Alto County Planning Team unlikely to occur in the cities and in Palo Alto County, along with why identified hazard will not occur.

- *Earthquake* – The information and data presented below are the supporting reasons why the all planning committees decided to eliminate this hazard for this plan. The planning committees recognizes certain portions of southern and central Iowa have the potential to be affected by earthquakes, however the planning committee also believes the potential for negative effects in Palo Alto County to be minuscule, if any. According to the Iowa Hazard Mitigation Plan, the state is located in low risk Seismic Zones 0 and 1. Although this does not mean an earthquake will not happen in Iowa, it does provide a relatively assured measure that the vulnerability of cities in Iowa, especially northwest Iowa is considerably low. Iowa has only experienced 13 total earthquakes in the past 175 years, most of which have occurred along the Mississippi corridor (eastern Iowa) and in southern Iowa. In the limited possibility that an earthquake hits northwest Iowa, property damage would be minimal. Again, according to data from the Iowa State Hazard Mitigation Plan, seismologists attempt to forecast earthquakes. Professionals estimate a 90% chance of a magnitude 6.0 earthquake occurring within the New Madrid Fault Zone by the year 2040. This magnitude of earthquake in Missouri would create an estimated 4.0 magnitude or less effect in Iowa, resulting in minimal damage and little or no fear.

- *Landslide* – The local planning committees determined that this hazard would be "unlikely to occur" in the Palo Alto County region and the affects would be negligible. The information and data presented the slopes and topography of Palo Alto isn't conclusive to promoting landslides that will affect the population in a negative way. The committee determined to focus their time on more plausible hazards.

- *Sinkhole* – The local planning committees determined that this hazard would be "unlikely to occur" or unlikely to affect inhabitants in a negative way in the Palo Alto County region and the affects would be negligible. There have been no recorded events in Palo Alto County, the committee does not wish to look into this hazard until it occurs or until there are proven methods to prove when and where sinkholes are going to occur. They will reassess this hazard in their next update.

- *Levee failure* – The local planning committees determined that this hazard would be "unlikely to occur" in the Palo Alto County region and the affects would be negligible. The only "levee" present are berms around lagoons or sewage treatment areas. The committee that most of these berms are inspected and repaired on a yearly basis and would not like to go further into this hazard in this current plan, but will reassess in the next plan update. There are no levees listed on the National Levee Database in Palo Alto County.

The Planning Committee determined that it would be best to leave all other potential hazards up for discussion and then, if through further research or discussion hazards that were not seen as a threat to Palo Alto County could be eliminated by the team.

The remaining relevant hazards were profiled in the following categories: historical occurrences, probability of future events, vulnerable populations, max threat, severity of impact and speed of onset. The numbers in each row were summarized, and then ranked, with the highest numbers being the most prevalent hazards.

The hazard scoring and rankings were completed by the planning committee for the county. Each individual city was provided with the county hazard rankings and relevant hazard information; and asked to draw upon their local experiences and knowledge to determine what hazards pose the highest risk to them. This information is detailed further in the jurisdiction section for each city.

Section 4. Profiling Hazards and Risk Assessment

The risk assessment identifies the risk to people properties and structures will be damaged due to a natural disaster event. If the event can harm structures and people they are considered vulnerable. This will help the community to decide what mitigation efforts are required or should be undertaken and how to implement the selected activities.

The hazard risk assessment process allowed the planning committee to explore six specific criteria to aid in the assessment of each hazard and lead to a score assigned to each hazard. Based upon the scoring of each hazard, this will aid in creating a ranking system which will identify the most significant to the least significant hazards affecting the community. The six criteria used in evaluating each hazard that could potentially impact Palo Alto County include reviewing:

1. **Historical Occurrences**
2. **Probability to Occur**
3. **Vulnerability to the Population**
4. **Maximum Geographic Extent**
5. **Severity of Impact**
6. **Speed of Onset**

The following tables were used to assess risk to people and property based on the hazards.

The tables that follow define each factor and the rating scale the planning committee used to assess the risk to the county. The planning committee scored each of the six factors on a scale of 1-4 using the definition of each factor. The scores are then added up to provide a total hazard score for each hazard. This score can be used to help the planning committee to prioritize future mitigation activities.

Table 4.1 – Category Criteria

Historical Occurrence: the number of times that a hazard has occurred in the past 25 years	
Score	**Description**
1	Less than 4 occurrences in the past 25 years
2	4 to 7 occurrences in the past 25 years
3	8-12 occurrences in the past 25 years
4	More than 12 occurrences in the past 25 years

Probability: reflects the likelihood of the hazard's occurring again in the future, sometimes without regard to the hazard's historical occurrence		
Score		**Description**
1	Unlikely	Less than 1% probability in the next 100 years
2	Possible	Between 1% and 10% probability in the next year, or at least one chance in the next 100 years
3	Likely	Between 11% and 100% probability in the next year, or at least one chance in the next 10 years
4	Highly Likely	Nearly 100% chance in the next year

Vulnerability: measure of the percentage of people that will be adversely affected by the occurrence of the hazard		
Score		**Description**
1	Negligible	• Less than 10% of the total population of the jurisdiction • No risk to response personnel, or no response needed
2	Limited	• 11% to 25% of the total population of the jurisdiction • Minimal risk to response personnel
3	Critical	• 26% to 50% of the total population of the jurisdiction • Moderate risk to response personnel
4	Catastrophic	• More than 50% of the total population of the jurisdiction • High risk to response personnel

Maximum Threat: the potential spatial extent of the impacted area		
Score		**Description**
1	Negligible	Less than 10% of the jurisdiction
2	Limited	11% to 25% of the jurisdiction
3	Critical	26% to 50% of the jurisdiction
4	Catastrophic	More than 50% of the jurisdiction

Severity of Impact: assessment of severity in terms of injuries and fatalities, personal property, and infrastructure.		
Score		**Description**
1	Negligible	• Few if any injuries • Minor quality of life lost with little or no property damage (<5% properties damaged) • Brief interruption of essential facilities and services for less than 4 hours • No environmental impact • No impact to reputation of the jurisdiction
2	Limited	• Minor injuries and illness • Minor or short-term property damage which does not threaten structural stability (5-9% properties damaged) • Shutdown of essential facilities and services for 4 to 24 hours • Minor short-term environmental impact • Very limited impact to reputation of the jurisdiction
3	Critical	• Serious injury and illness • Major or long-term property damage which threatens structural stability (10-25% properties damaged) • Shutdown of essential facilities and services for 24 to 72 hours • Minor long-term environmental impact • Moderate impact to reputation of the jurisdiction
4	Catastrophic	• Multiple deaths • Property destroyed or damaged beyond repair (>25% properties damaged) • Complete shutdown of essential facilities and services for 3 days or more • Major long-term environmental impact • Severe impacts to the reputation of the jurisdiction

Speed of Onset: rating of the potential amount of warning time that is available before the hazard occurs	
Score	**Description**
1	More than 24 hours warning time
2	12 to 24 hours warning time
3	6 to 12 hours warning time
4	Minimal or no warning

The scoring was based on the scoring criteria from the previous criteria tables. Scores for each jurisdiction that identified the hazard is shown on the first table of each hazard. The scoring is reflected by the scoring criteria and the determination of the planning committee. Data is from the NCDC that present in the plan is the data that was available when the committee was determining their scores.

Table 4.2 – Scoring for Palo Alto County

Hazard	Historical Occurrences	Probability of Future Events	Vulnerability Of Population	Maximum Threat	Severity of Impact	Speed of Onset	Total Score
Drought	1	3	3	4	2	1	14
Expansive Soils	1	1	1	1	1	1	6
Extreme Heat	4	4	2	4	2	1	17
Flash Flood	3	3	2	2	2	3	15
Hailstorm	4	4	1	2	3	3	17
River Flood	4	3	2	2	3	1	15
Severe Winter Storm	4	4	4	4	3	1	20
Thunderstorm & Lightning	4	4	2	2	2	2	16
Tornado	2	3	2	2	3	4	16
Windstorm	4	4	2	3	3	4	20
Dam Failure	1	1	1	1	1	4	9
Grass and Wild Fire	4	4	2	1	1	1	16

The following hazards were determined to pose the highest risk to Palo Alto County and will be further investigated. The basis of the hazards that were profiled was factors that were used to rank the hazards. Those factors were: historical occurrence, probability of future events, vulnerability, maximum threat, severity of impact and speed of onset. Ranked hazards were analyzed by the planning committee and decided which hazards to further profile. The chart below ranked the hazards based on the scoring which were determined to be the largest threat to Palo Alto County.

Table 4.3

Palo Alto County	
1	Severe Winter Storm
2	Windstorm
3	Hailstorm
4	Extreme Heat
5	Tornado
6	Thunderstorm and Lightning
7	Grass and Wildland Fire
8	Flash Flood
9	River Flood
10	Drought
11	Dam Failure
12	Expansive Soils
Source: Palo Alto County Planning Committee	

**This hazard scoring, which was completed by the Palo Alto County Hazard Mitigation Planning Team, was used for all jurisdictions in Palo Alto County. The hazard ranking comprised from the scoring was given to each jurisdiction and the jurisdictions identified which hazards could impact them and re-ranked the hazards according to their historical knowledge of their community.*

4.1 Drought

4.1.1 Definition and description:

Drought is defined as a period of prolonged lack of precipitation for weeks at a time producing severe dry conditions. There are four (4) types of drought conditions relevant to Iowa:

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

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

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

4.1.2. Hazards Identified by Jurisdiction:

The table below shows which jurisdictions identified drought as a hazard they are susceptible to.

	Unincorporated Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend	School Districts
Drought	X	X	X	X	X	X	X	X	X	X	

4.1.3. Historical Occurrences:

Palo Alto County local occurrences reported by the NCDC.

Table 4.4 Drought Events

3 DROUGHT event(s) were reported in Palo Alto County, Iowa between 01/01/1993 and 011/30/2010.

Mag: Magnitude
Dth: Deaths
Inj: Injuries
PrD: Property Damage
CrD: Crop Damage

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 All of Iowa	08/01/1995	0	Drought	N/A	0	0	0	.5B
2 Palo Alto County	08/01/2001	12:00 AM	Drought	N/A	0	0	0	578.9m
3 Palo Alto County	08/01/2003	12:00 AM	Drought	N/A	0	0	645.2 M	0
Source NCDC			TOTALS:		0	0	645.2 m	1.079B

Table 4.5 Iowa Drought Events. Source: Iowa State Hazard Mitigation Plan.

Drought Period	Geographic Impact
8/1/95 – 8/31/95	Statewide
7/20/99 – 7/30/99	24 percent of the state
11/1/99 – 11/30/99	11 percent of the state
12/1/99 – 12/31/99	11 percent of the state
2/1/00 – 2/29/00	11 percent of the state
3/1/00 – 3/31/00	11 percent of the state
4/1/00 – 4/30/00	11 percent of the state
8/14/00 – 8/31/00	32 percent of the state
9/1/00 – 9/6/00	32 percent of the state
9/1/01 – 9/23/01	51 percent of the state
9/1/03 – 9/31/03	51 percent of the state
7/1/05 – 7/31/05	20 percent of the state
8/1/05 – 8/31/05	20 percent of the state
9/1/05 – 9/30/05	20 percent of the state
10/1/05 – 10/31/05	20 percent of the state
11/1/05 – 11/30/05	18 percent of the state
12/1/05 – 12/31/05	18 percent of the state
1/1/06 – 1/31/06	18 percent of the state
2/1/06 – 2/28/06	17 percent of the state
3/1/06 – 3/31/06	16 percent of the state

During the period from 1980 to 2009, there was $2.010 billion in crop damages resulting from drought periods. The most common trend was the consistency of drought periods during the months of July through August; out of the twenty (20) periods, nine (9) of them were between July through August. While some may have been more severe than others, agricultural areas were impacted much more than the metropolitan areas where impacts were indirect.

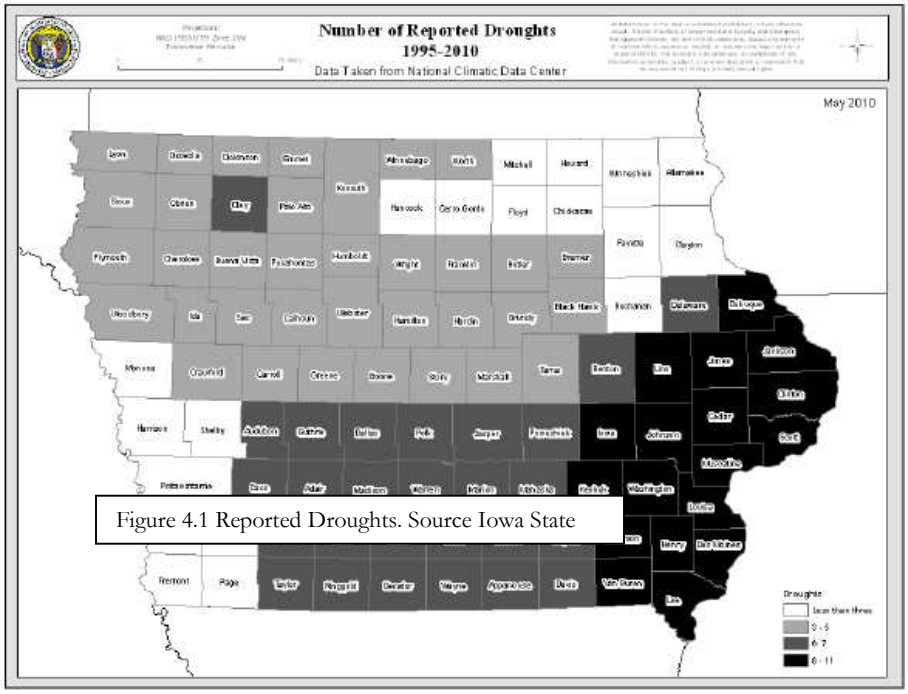


Figure 4.1 Reported Droughts. Source Iowa State

All jurisdictions determined there have been less than 4 occurrences that have affected them in a negative impact. The NCDC data shows 3 different events, in the same month of September all resulting in property or crop damage.

4.1.4. Probability of Future Events

The Palo Alto County planning committee determined there would be a "Likely" for a drought to occur within the next 10 years. The estimated average annual rainfall for Palo Alto County is 30.2 inches with the vast majority of this falling between April and September. The potential of drought conditions becomes more prevalent across the region during El Nino/LA Nina cycles.

In an effort to better understand the magnitude and severity of impact generated from drought events, the following Palmer Drought Index and Crop Moisture Index were found at the Climate Prediction Center website in association with the National Weather Service/NOAA. The Palmer Drought Severity Index (PDSI) is an indication of the relative dryness or wetness (in the case of the Crop Moisture Index) affective water sensitive or agricultural related economies. According the Storm Prediction Center of the National Weather Service, the difference between the PDSI and CMI is that the Palmer Index indicates the prolonged moisture deficiency or excess. The Crop Index provides the short term or current status of strictly agricultural drought or moisture surplus. According to NWS, this data is provided regularly for 350 climatic areas across the United States.

Table 4.6 – Palmer Drought Index and the Crop Moisture Index

Palmer Drought Severity Index	
-4.0 or less (Extreme Drought)	+2.0 or +2.9 (Unusual Moist Spell)
-3.0 or -3.9 (Severe Drought)	+3.0 or +3.9 (Very Moist Spell)
-2.0 or -2.9 (Moderate Drought)	+4.0 or above (Extremely Moist)
-1.9 to +1.9 (Near Normal)	
Crop Moisture Index	
-3.0 or less (Severely Dry)	+1.0 or +1.9 (Abnormally Moist)
-2.0 or -2.9 (Excessively Dry)	+2.0 or +2.9 (Wet)
-1.0 or -1.9 (Abnormally Dry)	+3.0 and above (Excessively Wet)
-0.9 or +0.9 (Slightly Dry/Favorably Moist)	

Source: Climate Prediction Center

4.1.5. Vulnerable Population

If a hydrological drought would occur, then it would adversely affect 26 - 50% of the population in the County. Groundwater supplies for potable water could be affected. Agriculture, agribusiness, and consumers (if a drought lasted long enough or impacted a large enough area) would be negatively impacted by drought conditions. The impact of a drought would be greater to the agricultural sector than the human population.

4.1.6. Maximum Geographic Extent

Drought events would not be localized to one specific area of the county. Rather the impact would likely affect the entire region. The committee determined that more than 50% of the county would be affected by a drought.

4.1.7. Severity of Impact

The planning committee determined that the severity of impact would be limited if a drought were to occur and human and structural assets would be fine.

The 2010 State of Iowa Hazard Mitigation Plan estimates Palo Alto County has an annual estimation loss of 2,033,031.15 due to drought. Property damage for three events was $645.2 million and $1.078 billion in crop damage, however this information is statewide and not totally reflective of just Palo Alto County.

4.1.8. Speed of Onset

The Palo Alto County planning committee determined that because droughts develop over a prolonged period of time, it can take weeks or months before the onset of this event. There fore, there is more than 24 hours warning time.

4.1.9. Hazard Ranking Total Score 14

4.2 Expansive Soils

4.2.1 Definition and description:

Expansive soils are oils and soft rock that tend to swell or shrink excessively due to changes in moisture content. The effects of expansive soils are most prevalent in regions of moderate to high precipitation, where prolonged periods of drought are followed by long periods of rainfall. The hazard occurs in many parts of the Southern, Central, and Western United States. Recent estimates put the annual damage from expansive soils as high as $7 billion. However, because the hazard develops gradually and seldom presents a threat to life, expansive soils have received limited attention, despite their costly effects.

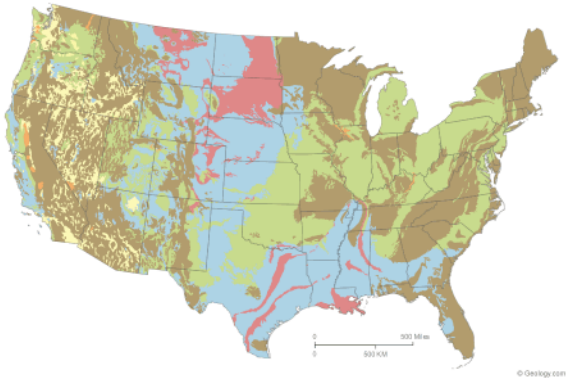


Figure 4.2 – Swelling Clays Map of the United States

Over 50 percent of these areas are underlain by soils with abundant clays of high swelling potential.

Less than 50 percent of these areas are underlain by soils with clays of high swelling potential.

Over 50 percent of these areas are underlain by soils with abundant clays of slight to moderate swelling potential.

Less than 50 percent of these areas are underlain by soils with abundant clays of slight to moderate swelling potential.

These areas are underlain by soils with little to no clays with swelling potential.

Data insufficient to indicate the clay content or the swelling potential of soils.

The map above is based upon "Swelling Clays Map of the Conterminous United States" by W. Olive, A. Chleborad, C. Frahme, J. Shlocker, R. Schneider and R. Schuster. It was published in 1989 as Map I-1940 in the USGS Miscellaneous Investigations

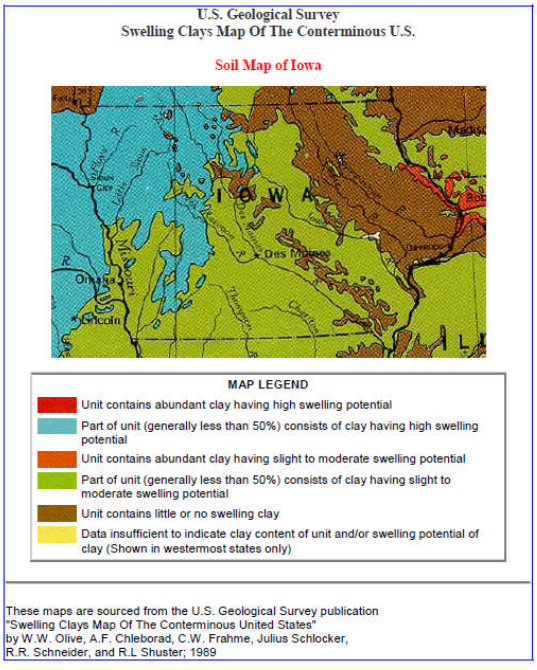


Figure 4.3 - Land areas were assigned to map soil categories based upon the type of bedrock that exists beneath them as shown on a geologic map. In most areas, where soils are produced "in situ", this method of assignment was reasonable. However, some areas are underlain by soils, which have been transported by wind, water or ice. The map soil categories would not apply for these locations.

4.2.2. Hazards Identified by Jurisdiction: The table below shows which jurisdictions identified expansive soils as a hazard they are susceptible to.

	Unincorporated Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend	School Districts
Expansive Soils	X										

4.2.3. Historical Occurrences:

Because this hazard occurs slowly over time, there is little documentation of historical occurrences, and little data available for the probability of it to occur, especially in rural areas, where its impact is the least. Impacts commonly involve clays beneath areas covered by buildings and slabs of concrete and asphalt, such as those used in the construction of highways, walkways and airport runways. The availability of data on expansive soils varies greatly. In or near metropolitan areas and at dam sites, abundant information on the amount of clay generally is available. However, for large areas of the U.S., little information is reported other than field observations of the physical characteristics of clay.

4.2.4. Probability of Future Events

Based on previous events, which there were none recorded, it is "unlikely" which is 1% in the next 100 years.

4.2.5. Vulnerable Population

The population that would be vulnerable would be "Negligible" and less than 10% of the population would be at risk.

4.2.6. Maximum Geographic Extent

The committee determined that this would be "negligible" in the maximum threat.

4.2.7. Severity of Impact

With no recorded events in Palo Alto County the committee determined that is unlikely to happen in the future and with no damages associated with it, that the impact would be 'Negligible' until an actual event were to occur.

4.2.8. Speed of Onset

The speed of onset for expansive soils is more than 24 hours, if county establishes a soil testing program its should have plenty of warning and there has been no recorded events.

4.2.9. Hazard Ranking Total Score 6

4.3 Extreme Heat

4.3.1 Definition and description:

Conditions for extreme heat are defined by summertime weather that is substantially hotter and/or more humid than average for a location at that time of year. This includes temperatures (including heat index) in excess of 100 degrees Fahrenheit or at least three (3) successive days of 90+ degrees Fahrenheit. A heat advisory is issued when temperatures reach 105 degrees and a warning is issued at 115 degrees. The heat index is a number in degrees Fahrenheit that tells how hot it really feels when relative humidity is added to the actual air temperature. Exposure to full sunshine can increase the heat index by at least 15 degrees. 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. Urban areas are particularly at risk because of air stagnation and large quantities of heat absorbing materials such as streets and buildings. Extreme heat can also result in distortion and failure of structures and surfaces such as roadways and railroad tracks.

4.3.2. Hazards Identified by Jurisdiction:

The table below shows which jurisdictions identified extreme heat as a hazard they are susceptible to.

	Unincorporated Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend	School Districts
Extreme Heat	X	X	X	X	X	X	X	X	X	X	X

4.2.3. Historical Occurrences:

Palo Alto County has several reports of extreme heat events since 1994, according to the National Data Climate Center. However, local residents of Palo Alto County present another picture in describing that successive days in excess of 90° F or one day in excess of 100° F occur on an almost annual basis across northwest Iowa and not are all recorded.

Table 4.7 Heat Index Chart

HEAT INDEX °F													
	RELATIVE HUMIDITY												
Temp.	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
110°	136												
108°	130	137											
106°	124	130	137										
104°	119	124	131	137									
102°	114	119	124	130	137								
100°	109	114	118	124	129	136							
98°	105	109	113	117	123	128	134						
96°	101	104	108	112	116	121	126	132					
94°	97	100	103	106	110	114	119	124	129	135			
92°	94	96	99	101	105	108	112	116	121	126	131		
90°	91	93	95	97	100	103	106	109	113	117	122	127	132
88°	88	89	91	93	95	98	100	103	106	110	113	117	121
86°	85	87	88	89	91	93	95	97	100	102	105	108	112

84°	83	84	85	86	88	89	90	92	94	96	98	100	103
82°	81	82	83	84	84	85	86	88	89	90	91	93	95
80°	80	80	81	81	82	82	83	84	84	85	86	86	87

Source: National Oceanic and Atmospheric Administration http://www.crh.noaa.gov/jkl/?n=heat_index_calculator

Table 4.8 – Negative Affects from Extreme Heat

Category	Heat Index	Possible heat disorders for people in high risk groups
Extreme Danger	130°F +	Heat stroke or sunstroke likely.
Danger	105 - 129°F	Sunstroke, muscle cramps, and/or heat exhaustion likely. Heatstroke possible with prolonged exposure and/or physical activity.
Extreme Caution	90 - 105°F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Caution	80 - 90°F	Fatigue possible with prolonged exposure and/or physical activity.

Source: National Oceanic and Atmospheric Administration http://www.crh.noaa.gov/jkl/?n=heat_index_calculator

During the period between 1995 and 2009 Iowa experienced nineteen (19) extreme heat events. The heat wave that occurred in July of 1995 had a major impact across the entire state, temperatures ranged from 98 degrees to 108 degrees with heat indices reaching a high of 131 degrees. This event lasted two (2) days causing 3.8 million dollars of property damage and resulted in three (3) fatalities. The following map depicts the number of extreme heat occurrences from 1994-2009.

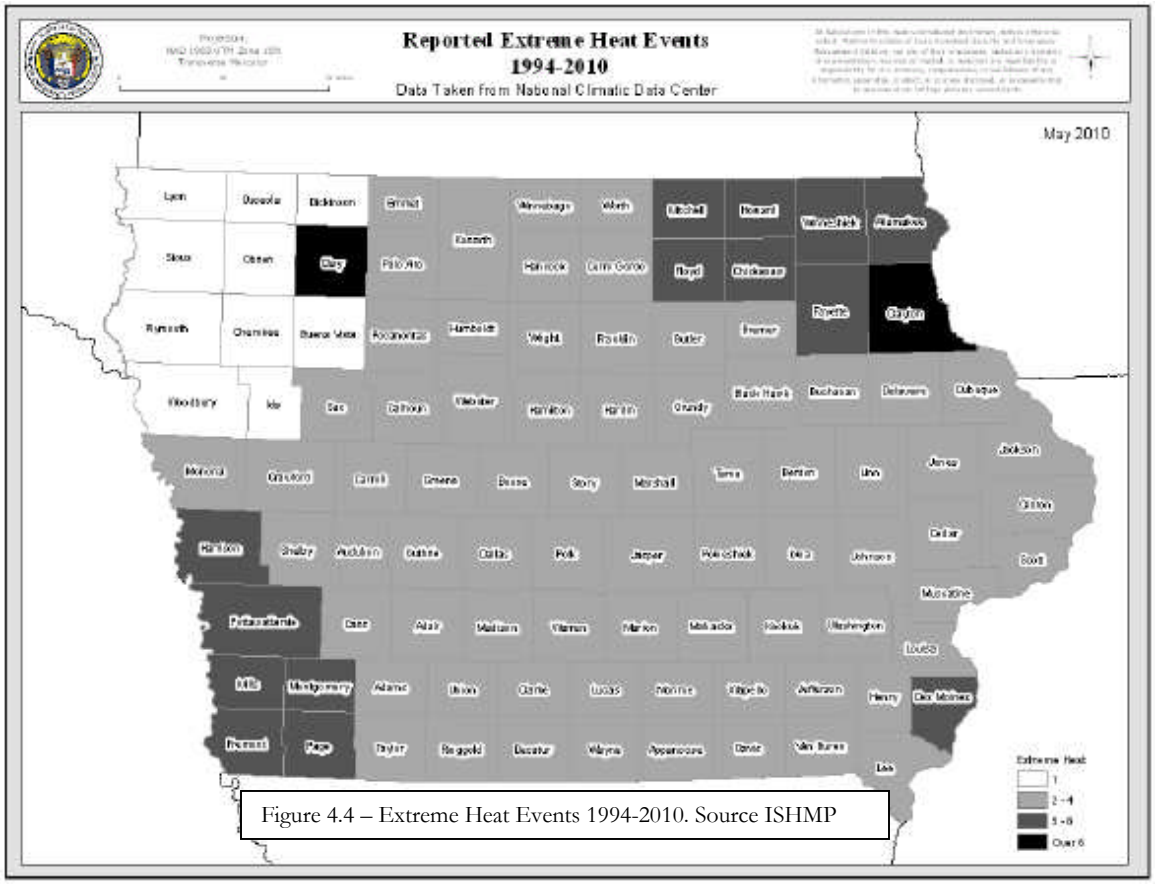


Figure 4.4 – Extreme Heat Events 1994-2010. Source ISHMP

4.3.4. Probability of Future Events

It is nearly 100% likely that plus 90+ degree temperatures will occur in the future based on the historical events and Midwest climate patterns. The planning committee believes this hazard will likely have a near 100 percent probability in the next year.

4.3.5. Vulnerable Population

The planning committee stated the greatest concern of excessive heat is the danger to elderly, young children, those who work outdoors. As previously expressed, this natural occurrence impacts selected limited segments of the population (11-25%) in Palo Alto County, rarely the entire population.

4.3.6. Maximum Geographic Extent

Past and future events are not localized to one specific area of the city rather the impact of extreme heat conditions will likely affect the entire community.

4.3.7. Severity of Impact

The planning committee determined that severity of an event would be limited, if a long drawn out event were to occur, it would probably coincide with a drought and would be detrimental to the croplands.

The 2010 State of Iowa Hazard Mitigation Plan estimates Palo Alto County has an estimation loss of $3,000.00 due to extreme heat.

4.3.8. Speed of Onset

The planning committee determined that extreme heat weather events can usually be predicted at least 24 hours ahead of time.

4.3.9. Hazard Ranking Total Score 17

4.4 Flash Flood

4.4.1 Definition and description:

A flash flood is an event that occurs with little or no warning where water levels rise at an extremely fast rate. Flash flooding results from intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Most flash flooding is caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area. 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. Flash flooding often results in higher loss of life, both human and animal, than slower developing river and stream flooding.

4.4.2. Hazards Identified by Jurisdiction:

The table below shows which jurisdictions identified flash flood as a hazard they are susceptible to.

	Unincorporated Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend	School Districts
Flash Flood	X	X	X	X	X	X	X	X	X	X	X

4.4.3. Historical Occurrences:

The National Climatic Data Center lists 11 flash flooding events in Palo Alto County from 1993-2009.

Table 4.9 – Flash Flood Events. Source NCDC.

Mag:Magnitude
Dth:Deaths
Inj:Injuries
PrD:Property Damage
CrD:Crop Damage

9 FLASH FLOOD event(s) were reported in Palo Alto County, Iowa between 01/01/1993 and 07/31/2009.

1 Palo Alto	06/22/1994	2000	Flash Flooding	N/A	0	2	5.0M	500K
2 Graettinger	07/22/1997	01:00 AM	Flash Flood	N/A	0	0	100K	5K
3 Emmetsburg	07/26/1997	09:00 AM	Flash Flood	N/A	0	0	150K	20K
4 Emmetsburg	06/23/1998	08:00 PM	Flash Flood	N/A	0	0	60K	7K
5 Countywide	07/09/2000	10:30 PM	Flash Flood	N/A	0	0	50K	75K
6 Emmetsburg	09/15/2004	01:30 AM	Flash Flood	N/A	0	0	25K	5K
7 Countywide	09/15/2004	05:00 AM	Flash Flood	N/A	0	0	50K	10K
8 Emmetsburg Arpt	08/18/2007	07:00 AM	Flash Flood	N/A	0	0	75K	0K
9 Mallard	06/11/2008	20:00 PM	Flash Flood	N/A	0	0	25K	0K
10. Emmetsburg	06/23/2010	00:20 AM	Flash Flood	N/A	0	0	20K	0K
11. Ruthven	6/26/2010	21:15 PM	Flash Flood	N/A	0	0	5K	0K
TOTALS:					0	2	5.560M	622K

From 1993 to 2009, there have been two or injuries resulting from flash floods according to NCDC Data. The previous table lists 11 flash flood events between 1993 and 209. Property damages totaled an estimated $5.560 Million. Crop damages totaled an estimated $622,000, according to NCDC data.

No community had repetitive areas that saw flash floods. They seemed to be more random, based on the clogged sewer drains or very wet seasons. There for there is a data limitation on number of structures to be affect by flash flood. The communities and EMA have been directed to try to log information that is known to them in future events.

4.4.4. Probability of Future Events

The planning committee determined that there is "Likely" chance to occur in the next year. They based that on the historical occurrences of 11 listed events on the NCDC that happened in Palo Alto County from 1993-2009.

4.4.5. Vulnerable Population

The planning committee determined that 11-25% of the population would be affected by an event. They determined that most of the population in Palo Alto County resides in close proximity of low lying lands.

4.4.6. Maximum Geographic Extent

The planning committee determined that a flash flood could affect more than 5-9% of the jurisdiction. However the properties would be affected would most likely be unoccupied by humans and more cropland would damaged.

4.4.7. Severity of Impact

The planning committee determined that the level of severity would be limited and cropland would be the most affected by being lost and financial losses would occur.

The 2010 State of Iowa Hazard Mitigation Plan estimates Palo Alto County has an annual estimation loss of $10,607,352.94 due to flood. The State Plan does not separate annual estimation loss for flash flood and river flood.

4.4.8. Speed of Onset

The planning committee determined that there would be 6-12 hours warning in an event. You should be able to tell when the rain is coming, however knowing the extent is difficult. Extensive rainfall or ground saturation could produce sudden flash floods. It is still mostly unpredictable as to how fast a flash flood will occur.

4.4.9. Hazard Ranking Total Score 15

4.5 Hailstorm

4.5.1 Definition and description:

Hailstorms are an outgrowth of a severe thunderstorm in which pellets or irregularly shaped lumps of ice greater than 1 inch in diameter fall with rain. Hail is produced in many strong thunderstorms by strong rising currents of air carrying water droplets to a height where freezing occurs, the ice particles grow in size until they are too heavy to be supported by the updraft and fall back to earth. Hail can be smaller than a pea or as large as a softball and can be very destructive to plants and crops; pets and livestock are particularly vulnerable to hail. The following map depicts a geographic breakdown of the number of hailstorms in Iowa since 1956.

4.5.2. Hazards Identified by Jurisdiction:

The table below shows which jurisdictions identified hailstorm as a hazard they are susceptible to.

	Unincorporated Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend	School Districts
Hail	X	X	X	X	X	X	X	X	X	X	X

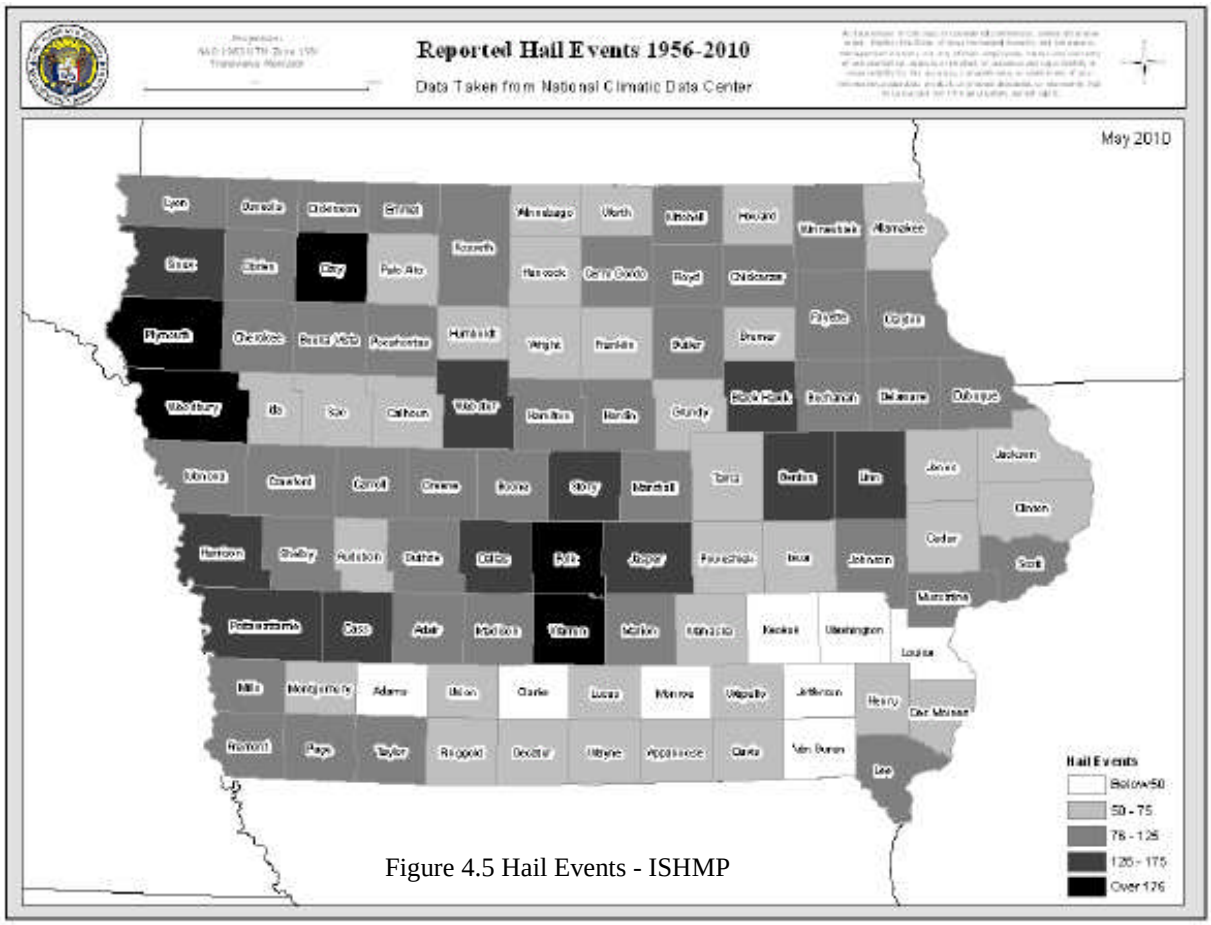


Figure 4.5 Hail Events - ISHMP

4.5.3. Historical Occurrences:

Table 4.10

77 HAIL event(s) were reported in Palo Alto County, Iowa between 01/01/1950 and 07/31/2009.

Mag: Magnitude
Dth: Deaths
Inj: Injuries
PrD: Property Damage
CrD: Crop Damage

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 PALO ALTO	05/19/1959	0400	Hail	2.00 in.	0	0	0	0
2 PALO ALTO	05/20/1959	1740	Hail	1.00 in.	0	0	0	0
3 PALO ALTO	10/12/1961	1530	Hail	1.00 in.	0	0	0	0
4 PALO ALTO	07/18/1963	1750	Hail	1.75 in.	0	0	0	0
5 PALO ALTO	06/18/1974	1830	Hail	1.75 in.	0	0	0	0
6 PALO ALTO	07/13/1979	1627	Hail	1.00 in.	0	0	0	0
7 PALO ALTO	06/13/1980	1732	Hail	1.75 in.	0	0	0	0
8 PALO ALTO	06/13/1983	1545	Hail	1.75 in.	0	0	0	0
9 PALO ALTO	05/24/1984	1057	Hail	1.00 in.	0	0	0	0
10 PALO ALTO	04/20/1985	2000	Hail	1.00 in.	0	0	0	0
11 PALO ALTO	07/08/1986	1600	Hail	1.75 in.	0	0	0	0
12 PALO ALTO	07/08/1986	1700	Hail	1.75 in.	0	0	0	0
13 PALO ALTO	04/02/1989	2200	Hail	1.00 in.	0	0	0	0
14 PALO ALTO	09/14/1992	0400	Hail	1.50 in.	0	0	0	0
15 Ayrshire	08/04/1995	1253	Hail	1.75 in.	0	0	15K	40K
16 Ayrshire	08/04/1995	1302	Hail	2.75 in.	0	0	25K	40K
17 Webb	08/04/1995	1303	Hail	2.75 in.	0	0	25K	50K
18 Ayrshire	08/04/1995	1313	Hail	1.75 in.	0	0	5K	30K
19 Emmetsburg	07/19/1997	08:10 PM	Hail	0.75 in.	0	0	0	5K
20 West Bend	08/24/1998	08:45 AM	Hail	2.75 in.	0	0	50K	100K
21 Ruthven	09/01/1998	03:01 PM	Hail	0.88 in.	0	0	0K	30K
22 Ruthven	09/01/1998	03:05 PM	Hail	0.75 in.	0	0	0	10K
23 Emmetsburg	09/01/1998	03:15 PM	Hail	0.75 in.	0	0	0	30K
24 Emmetsburg	06/05/1999	06:10 PM	Hail	0.88 in.	0	0	0	5K
25 Cylinder	06/05/1999	06:20 PM	Hail	0.75 in.	0	0	0	5K
26 Graettinger	07/02/2000	05:07 AM	Hail	0.88 in.	0	0	1K	5K
27 Ayrshire	07/26/2000	02:05 AM	Hail	1.00 in.	0	0	2K	5K
28 Mallard	07/26/2000	02:35 AM	Hail	1.75 in.	0	0	5K	10K
29 Ruthven	08/07/2000	10:26 PM	Hail	0.88 in.	0	0	1K	5K
30 Ayrshire	08/07/2000	10:41 PM	Hail	1.75 in.	0	0	10K	10K
31 Ayrshire	09/13/2000	07:27 PM	Hail	1.75 in.	0	0	10K	20K
32 Emmetsburg	04/20/2001	10:01 PM	Hail	1.00 in.	0	0	5K	0
33 Emmetsburg	04/20/2001	10:04 PM	Hail	1.00 in.	0	0	5K	0
34 Emmetsburg	05/01/2001	03:35 PM	Hail	1.00 in.	0	0	5K	0
35 Curlew	05/09/2001	06:54 PM	Hail	1.00 in.	0	0	3K	0
36 Mallard	06/11/2001	09:38 PM	Hail	0.88 in.	0	0	1K	3K
37 Ayrshire	06/11/2001	10:02 PM	Hail	1.00 in.	0	0	1K	5K
38 Mallard	06/11/2001	10:55 PM	Hail	0.88 in.	0	0	1K	3K
39 Emmetsburg	04/17/2002	11:27 PM	Hail	1.00 in.	0	0	5K	0
40 Graettinger	07/28/2002	05:20 PM	Hail	0.75 in.	0	0	0	5K
41 Graettinger	07/28/2002	06:17 PM	Hail	1.00 in.	0	0	5K	10K
42 Ayrshire	08/16/2002	03:35 PM	Hail	0.88 in.	0	0	3K	5K
43 Ayrshire	08/16/2002	11:10 PM	Hail	1.00 in.	0	0	5K	10K
44 Emmetsburg	08/16/2002	11:27 PM	Hail	1.75 in.	0	0	20K	15K
45 Emmetsburg	10/01/2002	03:20 PM	Hail	0.88 in.	0	0	50K	4.4M
46 Mallard	07/31/2003	09:30 PM	Hail	0.75 in.	0	0	0	5K
47 Emmetsburg	08/18/2003	07:37 PM	Hail	1.75 in.	0	0	10K	10K
48 West Bend	04/17/2004	09:00 PM	Hail	0.88 in.	0	0	0	0
49 West Bend	04/17/2004	09:00 PM	Hail	2.00 in.	0	0	15K	0

50 Mallard	04/17/2004	09:06 PM	Hail	1.00 in.	0	0	2K	0
51 West Bend	04/17/2004	09:10 PM	Hail	2.00 in.	0	0	10K	0
52 Mallard	04/17/2004	09:15 PM	Hail	2.75 in.	0	0	25K	0
53 West Bend	04/17/2004	09:15 PM	Hail	1.75 in.	0	0	10K	0
54 Graettinger	05/08/2004	01:12 AM	Hail	0.75 in.	0	0	0	3K
55 Mallard	05/21/2004	09:59 PM	Hail	0.75 in.	0	0	0	5K
56 Ruthven	05/21/2004	10:30 AM	Hail	1.75 in.	0	0	5K	5K
57 Ruthven	05/21/2004	10:31 AM	Hail	1.00 in.	0	0	3K	5K
58 Ayrshire	06/08/2004	05:30 PM	Hail	0.75 in.	0	0	0	5K
59 Emmetsburg	06/11/2004	03:43 PM	Hail	1.75 in.	0	0	10K	5K
60 Mallard	05/08/2005	03:33 PM	Hail	1.00 in.	0	0	5K	0
61 Emmetsburg	05/08/2005	03:53 PM	Hail	1.00 in.	0	0	2K	0
62 Graettinger	08/09/2005	03:51 PM	Hail	1.00 in.	0	0	3K	5K
63 Cylinder	10/04/2005	02:35 PM	Hail	0.88 in.	0	0	2K	5K
64 Cylinder	10/04/2005	02:39 PM	Hail	1.75 in.	0	0	5K	30K
65 Emmetsburg	06/21/2007	13:31 PM	Hail	0.88 in.	0	0	2K	5K
66 Ruthven	05/06/2008	16:01 PM	Hail	1.00 in.	0	0	3K	0K
67 Ruthven	06/14/2008	23:48 PM	Hail	0.88 in.	0	0	1K	5K
68 Ruthven	08/13/2008	18:10 PM	Hail	0.88 in.	0	0	0K	10K
69 Emmetsburg Arpt	04/12/2010	14:07 PM	Hail	1.00 in.	0	0	3K	0K
70 Emmetsburg	04/12/2010	14:09 PM	Hail	1.25 in.	0	0	5K	0K
71 Emmetsburg	04/12/2010	14:10 PM	Hail	1.00 in.	0	0	3K	0K
72 Emmetsburg Arpt	04/12/2010	14:13 PM	Hail	1.25 in.	0	0	5K	0K
73 Emmetsburg	04/12/2010	14:15 PM	Hail	1.75 in.	0	0	25K	0K
74 Curlew	06/17/2010	18:09 PM	Hail	0.88 in.	0	0	1K	5K
75 Cylinder	06/17/2010	18:40 PM	Hail	0.88 in.	0	0	1K	5K
76 Graettinger	07/17/2010	22:25 PM	Hail	1.75 in.	0	0	5K	15K
77 Graettinger	07/17/2010	22:25 PM	Hail	1.25 in.	0	0	5K	200K
TOTALS:					0	0	424K	5.184 M

There were no deaths and no injuries or from these storms, property damages totaled an estimated $424,000 and crop damage totaled an estimated $5,184,000, according to NCDC data. According to Table 4.10, palo Alto County has had 77 hail events reported from 1950 to 2009.

4.5.4. Probability of Future Events

The planning committee determined that there is nearly 100% chance to happen in the next year. They based this on the 77 NCDC recorded events that happened from 1950 to 2009.

4.5.5. Vulnerable Population

Since the residents of Palo Alto County are active in outdoor recreational activities, the planning committee determined that at less than 10% of the county population would be adversely affected by a hail event.

4.5.6. Maximum Geographic Extent

The planning committee determined that 11-25% of their jurisdictions would be affected. This due to the number of events that occur a year, which can affect large areas of the county when added together.

4.5.7. Severity of Impact

Palo Alto County determined that severity would be critical with a great concern on crop damage that can be a result of hail.

The 2010 State of Iowa Hazard Mitigation Plan estimates Palo Alto County, has an annual estimation loss of $333,125.00 due to hail.

Table 4.11 - TORRO Hailstorm Intensity Scale			
	Intensity Category	Typical Hail Diameter(mm)	Typical Damage Impacts
H0	Hard Hail	5	No damage
H1	Potentially Damaging	5-15	Slight general damage to plants, crops
H2	Significant	10-20	Significant damage to fruit, crops, vegetation
H3	Severe	20-30	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-40	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-50	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-60	Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	50-75	Severe roof damage, risk of serious injuries
H8	Destructive	60-90	(Severest recorded in the British Isles) Severe damage to aircraft bodywork
H9	Super Hailstorms	75-100	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Source: TORRO, the Tornado and Storm Research Organization			

Approximate range (typical maximum size in bold), since other factors (e.g. number and density of hailstones, hail fall speed and surface wind speeds) affect severity.

Table 4.12 – Hail size and diameter in relation to TORRO Hailstorm Intensity Scale.

Size code	Maximum Diameter (mm)	Description
0	5-9	Pea
1	10-15	Mothball
2	16-20	Marble, grape
3	21-30	Walnut
4	31-40	Pigeon's egg > squash ball
5	41-50	Golf ball > Pullet's egg
6	51-60	Hen's egg
7	61-75	Tennis ball > cricket ball
8	76-90	Large orange > Soft ball
9	91-100	Grapefruit
10	>100	Melon

4.5.8. Speed of Onset

The planning committee determined there is 6-12 hours warning time on storm development that might produce hail. Some storms can be predicted, however the predictions don't always accurately depict the size of the hail.

4.5.9. Hazard Ranking Total Score 17

4.6 River Flood

4.6.1 Definition and description:

River flooding is a rising or overflowing of a tributary or body of water that covers adjacent land, not usually covered by water, when the volume of water in a stream exceeds the channel's capacity. Floods are the most common and widespread of all natural disasters, except fire.

Most communities may experience some kind of flooding after spring rains, heavy thunderstorms, winter snow thaws, waterway obstructions, or levee or dam failures. Winter snow thaws, waterway obstructions, or levee or dam failures snow thaws, waterway obstructions, or levee or dam failures.

4.6.2. Hazards Identified by Jurisdiction:

The table below shows which jurisdictions identified river flood as a hazard they are susceptible to.

	Unincorporated Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend	School Districts
River Flood	X				X	X				X	

All jurisdictions that listed river flood as a hazard they are vulnerable to is because of the jurisdictions proximity to a river and may have had previous occurrences of flooding.

4.6.3. Historical Occurrences:

Table 4.13 – Flood Events in Palo Alto County. Source NCDC

39FLOOD event(s) were reported in **Palo Alto County, Iowa** between **01/01/1993** and **11/30/2010**.					**Mag**: Magnitude **Dth**: Deaths **Inj**: Injuries **PrD**: Property Damage **CrD**: Crop Damage			
Location or County	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
1 Palo Alto County +	03/22/1993	0600	Major Flood	N/A	0	0	50.0M	0
2 Palo Alto County +	04/01/1993	0000	Major Flood	N/A	0	0	50.0M	0
3 Palo Alto County +	04/20/1993	0600	Major Flood	N/A	0	0	5.0M	0
4 Palo Alto County +	05/07/1993	1800	Flood	N/A	0	0	5.0M	5.0M
5 Palo Alto County +	08/16/1993	0600	Flood	N/A	0	0	5.0M	5.0M
6 Palo Alto County +	08/29/1993	0300	Flood	N/A	0	0	5.0M	5.0M
7 All Of Iowa	09/01/1993	0000	Flood	N/A	0	0	500K	500K
8 Central And	10/01/1993	0000	Flooding	N/A	0	0	50K	50K
9 Much Of Iowa	02/19/1994	0600	Flooding	N/A	0	0	500K	0
10 Much Of Iowa	03/03/1994	1200	Flooding	N/A	0	0	500K	0
11 Northwest Iowa	04/28/1994	1200	Flooding	N/A	0	0	5K	0
12 Palo Alto County	06/12/1994	2115	Urban Flooding	N/A	0	0	50K	5K
13 Palo Alto County +	06/13/1994	0400	Flooding	N/A	0	0	500K	500K
14 Palo Alto County	06/17/1994	1815	Urban Flooding	N/A	0	0	50K	5K
15 Palo Alto County +	06/22/1994	2330	Flooding	N/A	0	0	500K	500K
16 Northern Iowa	07/15/1994	0300	Flooding	N/A	0	0	50K	500K
17 Palo Alto County +	08/11/1994	0600	Flooding	N/A	0	0	5K	50K
18 Palo Alto County +	04/10/1995	0900	Flooding	N/A	0	0	10K	0
19 Palo Alto County +	04/26/1995	1500	Flooding	N/A	0	0	25K	0
20 Palo Alto County +	06/06/1995	2300	Flood	N/A	0	0	50K	100K
21 Palo Alto County	08/05/1995	1915	Urban Flood	N/A	0	0	20K	5K
22 Palo Alto County +	03/24/1997	06:00 AM	Flood	N/A	0	0	50K	0
23 Palo Alto County +	04/01/1997	12:00 AM	Flood	N/A	0	0	150K	0
24 Palo Alto County +	04/22/1999	06:00 AM	Flood	N/A	0	0	370K	0
25 Palo Alto County +	03/23/2001	06:00 PM	Flood	N/A	0	0	383K	0
26 Palo Alto County +	04/01/2001	12:00 AM	Flood	N/A	0	0	65K	0

27 Palo Alto County +	04/07/2001	09:00 PM	Flood	N/A	0	0	4.7M	0
28 Palo Alto County +	05/01/2001	12:00 AM	Flood	N/A	0	0	2.0M	0
29 Palo Alto County +	05/21/2001	06:00 PM	Flood	N/A	0	0	420K	0
30 Palo Alto County +	06/12/2001	03:00 PM	Flood	N/A	0	0	825K	1.7M
31 Palo Alto County +	05/04/2003	12:00 PM	Flood	N/A	0	0	200K	0
32 Palo Alto County +	05/09/2003	06:00 AM	Flood	N/A	0	0	155K	0
33 Palo Alto County +	06/27/2003	06:00 AM	Flood	N/A	0	0	75K	150K
34 Palo Alto County +	05/22/2004	06:00 PM	Flood	N/A	0	0	5.1M	15.2M
35 Palo Alto County +	09/15/2004	05:00 AM	Flood	N/A	0	0	600K	1.2M
36 Palo Alto County +	05/07/2005	06:45 AM	Flood	N/A	0	0	30K	0
37 Palo Alto County +	05/13/2005	02:00 AM	Flood	N/A	0	0	960K	0
38 Palo Alto County	04/01/2006	12:00 AM	Flood	N/A	0	0	5K	0
39 Emmetsburg	03/14/2007	19:30 PM	Flood	N/A	0	0	50K	0K
40 Graettinger	03/16/2010	15:28 PM	Flood	N/A	0	0	50K	0K
41 Graettinger	04/01/2010	00:00 AM	Flood	N/A	0	0	50K	0K
42 Graettinger	06/27/2010	11:30 AM	Flood	N/A	0	0	10K	0K
43 Graettinger	09/26/2010	14:25 PM	Flood	N/A	0	0	15K	5K
44 Graettinger	10/01/2010	00:00 AM	Flood	N/A	0	0	10K	0K
TOTALS:					0	2	138.988M	35.420M
Source: National Climate Data Center								

There were two injuries and no deaths from these storms, property damages totaled an estimated $138.988 Million and crop damage totaled an estimated $35.420 Million, according to NCDC data. According to Table 4.13, Palo Alto County has had 44 flood events reported from 1993 to 2010.

4.6.4. Probability of Future Events

The planning committee determined that based on the NCDC data that there is 11-100% chance that a river in the county is going to flood every year.

The City of Emmetsburg has a SFHA which is overlaid on their critical facilities map. Below shows the committee's estimation of those structures in that zone. This is just an estimate, knowing that it may not totally be accurate, one reason being that this SFHA from the 1970-80's and the topography has changed. The DNR is believed to be updating these maps and will be a valuable asset in this plan update in five years. Otherwise there is a data limitation on structures in those zones.

Table 4.14 – Structures vulnerable

City	# of residential	Average Cost	# of Commercial, Industrial, others.	Average Cost	Total Lost Estimate
Emmetsburg	12	$93,839.00	23	$1,421,628.00	$33,823,512.00

4.6.5. Vulnerable Population

Those in a flood plain are the most vulnerable, but since recent practices have been put into place since the 1993 floods so no homes are built in the vicinity of the floodplains. Some places or towns cannot be moved after being developed, and therefore 11-25% of the population is at risk.

4.6.6. Maximum Geographic Extent

Those areas that have identified floodplains are most likely to be affected first. The committee determined that 11-25% of the jurisdiction would be affected by an event, mostly rural agricultural lands.

4.6.7. Severity of Impact

The committee determined a river flood would be critical and that farms and croplands will be the ones that lose the most, since most farms and pastures are placed near fresh running water.

The 2010 State of Iowa Hazard Mitigation Plan estimates Palo Alto County has an annual estimation loss of $10,607,352.94 due to flood. The State Plan does not separate annual estimation loss for flash flood and river flood.

4.6.8. Speed of Onset

The speed of a river flood was determined to be more than 24 hours notice. The committee determined that that there is usually enough warning time with heavy rains to know that river will be rising.

4.6.9. Hazard Ranking Total Score 15

4.7 Severe Winter Storm

4.7.1 Definition and description:

Severe winter weather conditions that affect day-to-day activities can include blizzard conditions, heavy snow, blowing snow, freezing rain, heavy sleet, and extreme cold. Winter storms are common during the months of October through April.

The various types of severe winter weather can cause considerable damage. Heavy snows can immobilize transportation systems, down trees and power lines, collapse buildings, and the loss of livestock and wildlife. Blizzard conditions are winter storms lasting at least three (3) hours with sustained winds of 35 mph or more, reduced visibility of 1/4 mile or less, and white out conditions. Heavy snows of more than six (6) inches in a 12 hour period or freezing rain greater than 1/4 inch accumulation causing hazardous conditions in the community can slow or stop the flow of vital supplies as well as disrupting emergency and medical services.

Loose snow begins to drift when wind speed reaches a critical speed of 9 to 10 mph under freezing conditions. The potential for drifting is substantially higher in open country than in urban areas where buildings, trees, and other features obstruct the wind.

Ice storms have resulted in fallen trees, broken tree limbs, downed power lines and utility poles, fallen communications towers, and impassable transportation routes. Severe ice storms have caused total electric power outages over large areas of Iowa and rendered assistance unavailable to those in need due to impassable roads.

4.7.2. Hazards Identified by Jurisdiction:

The table below shows which jurisdictions identified severe winter storm as a hazard they are susceptible to.

	Unincorporated Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend	School Districts
Severe Winter Storm	X	X	X	X	X	X	X	X	X	X	X

4.7.3. Historical Occurrences:

Table 4.15 – Snow and Ice Events in Palo Alto County

53 SNOW & ICE event(s) were reported in **Palo Alto County, Iowa** between **01/01/1993** and **11/30/2010**.

Mag: Magnitude
Dth: Deaths
Inj: Injuries
PrD: Property Damage
CrD: Crop Damage

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 Palo Alto County + others	01/11/1993	0900	Snow And Heavy Snow	N/A	0	0	50K	0
2 Palo Alto County + others	01/20/1993	0430	Ice Storm	N/A	0	0	50K	0
3 Palo Alto County + others	02/08/1993	2230	Freezing Rain	N/A	0	0	1K	0
4 Palo Alto County + others	02/10/1993	2100	Freezing Rain	N/A	1	0	50K	0
5 Palo Alto County + others	02/20/1993	1400	Heavy Snow	N/A	0	0	50K	0
6 Palo Alto County + others	11/24/1993	1600	Heavy Snow	N/A	0	0	50K	0
7 Palo Alto County + others	12/01/1993	0500	Freezing Rain	N/A	0	0	5K	0
8 Palo Alto County + others	01/02/1994	0600	Snow/heavy Snow	N/A	0	0	500K	0
9 Palo Alto County + others	01/26/1994	1600	Snow And Heavy Snow	N/A	0	0	50K	0
10 Palo Alto County + others	02/22/1994	1000	Snow	N/A	0	0	5K	0
11 Palo Alto County + others	11/27/1994	0600	Heavy Snow	N/A	0	0	40K	0

12 Palo Alto County + others	12/06/1994	0000	Ice Storm	N/A	0	0	15.0M	0
13 Palo Alto County + others	12/07/1994	0600	Heavy Snow	N/A	0	0	500K	0
14 Palo Alto County + others	01/26/1995	2300	Freezing Rain	N/A	0	0	100K	0
15 Much Of The North-	03/06/1995	0900	Heavy Snow	N/A	0	0	25K	0
16 Palo Alto County + others	04/10/1995	0600	Freezing Rain	N/A	0	0	50K	0
17 Much Of Iowa	11/27/1995	0500	Snow	N/A	0	0	50K	0
18 Palo Alto County + others	12/08/1995	0200	Snow	N/A	0	0	20K	0
19 Palo Alto County + others	01/17/1996	12:00 PM	Ice Storm	N/A	0	0	25K	0
20 Palo Alto County + others	11/14/1996	04:00 PM	Ice Storm	N/A	0	0	150K	0
21 Palo Alto County + others	02/03/1997	02:00 PM	Heavy Snow	N/A	0	0	500K	0
22 Palo Alto County + others	11/14/1997	10:00 AM	Heavy Snow	N/A	0	0	50K	0
23 Palo Alto County + others	01/04/1998	06:30 AM	Ice Storm	N/A	0	0	1.0M	0
24 Palo Alto County + others	03/17/1998	02:00 AM	Ice Storm	N/A	0	0	300K	0
25 Palo Alto County + others	01/01/1999	03:00 PM	Winter Storm	N/A	2	0	440K	0
26 Palo Alto County + others	02/11/1999	09:00 AM	Ice Storm	N/A	0	0	230K	0
27 Palo Alto County + others	03/08/1999	12:00 AM	Winter Storm	N/A	0	0	450K	0
28 Palo Alto County + others	01/19/2000	07:00 AM	Winter Storm	N/A	0	0	22K	0
29 Palo Alto County + others	04/07/2000	05:00 AM	Heavy Snow	N/A	0	0	60K	0
30 Palo Alto County + others	12/10/2000	09:00 PM	Winter Storm	N/A	0	0	1.3M	0
31 Palo Alto County + others	01/29/2001	05:00 AM	Ice Storm	N/A	0	0	225K	0
32 Palo Alto County + others	01/31/2002	09:00 AM	Heavy Snow	N/A	0	0	180K	0
33 Palo Alto County + others	03/08/2002	04:00 PM	Ice Storm	N/A	0	0	375K	0
34 Palo Alto County + others	03/14/2002	09:00 AM	Ice Storm	N/A	0	0	140K	0
35 Palo Alto County + others	01/28/2003	05:00 AM	Freezing Rain	N/A	0	0	0	0
36 Palo Alto County + others	04/04/2003	08:00 AM	Ice Storm	N/A	0	0	100K	0
37 Palo Alto County + others	04/06/2003	03:00 PM	Winter Storm	N/A	0	0	95K	0
38 Palo Alto County + others	12/02/2003	08:00 PM	Heavy Snow	N/A	0	0	0	0
39 Palo Alto County + others	01/26/2004	07:00 AM	Heavy Snow	N/A	0	0	0	0
40 Palo Alto County + others	01/04/2005	05:00 PM	Heavy Snow	N/A	0	0	510K	0
41 Palo Alto County + others	03/18/2005	10:30 AM	Heavy Snow	N/A	0	0	35K	0
42 Palo Alto County + others	11/10/2006	04:00 AM	Heavy Snow	N/A	0	0	70K	0K
43 Palo Alto County + others	12/31/2006	07:00 AM	Heavy Snow	N/A	0	0	0K	0K
44 Palo Alto County + others	01/14/2007	12:00 PM	Heavy Snow	N/A	0	0	0K	0K
45 Palo Alto County + others	02/24/2007	03:00	Winter Storm	N/A	0	0	250K	0K

		AM						
46 Palo Alto County + others	12/01/2007	08:00 AM	Ice Storm	N/A	0	0	10K	0K
47 Palo Alto County + others	12/01/2007	08:00 AM	Winter Storm	N/A	0	0	10K	0K
48 Palo Alto County + others	12/08/2008	14:00 PM	Winter Storm	N/A	0	0	10K	0K
49 Palo Alto County + others	12/18/2008	21:30 PM	Winter Storm	N/A	0	0	5K	0K
50 Palo Alto County + others	12/24/2009	14:00 PM	Winter Storm	N/A	0	0	50K	0K
51 Palo Alto County + others	01/06/2010	13:00 PM	Winter Storm	N/A	0	0	25K	0K
52 Palo Alto County + others	01/20/2010	07:00 AM	Ice Storm	N/A	0	0	50K	0K
53 Palo Alto County	11/13/2010	00:00 AM	Heavy Snow	N/A	0	0	150K	0K
TOTALS:					3	0	23.402 M	0
Source: National Climate Data Center								

4.7.4. Probability of Future Events

The planning committee determined that based on the NCDC data that there is 100% chance that a severe winter storm will occur every year.

4.7.5. Vulnerable Population

More than 50% of the population will be affected by a severe winter storm. They will be vulnerable while commuting to work or home. The committee determined that most businesses want to remain open and therefore employees have to put themselves in danger getting there.

4.7.6. Maximum Geographic Extent

More than 50% of the county will be affected by an event, most winter storms encompass large areas dropping different amounts of precipitation that can affect daily life.

4.7.7. Severity of Impact

The committee determined that a large even could be catastrophic there could be a shutdown of essential facilities and services for 72 hours and many accidents causing property damage and injuries will occur from a severe winter storm.

The 2010 State of Iowa Hazard Mitigation Plan estimates Palo Alto County has an annual estimation loss of $43,499.71 due to snow and ice.

4.7.8. Speed of Onset

Severe winter storms often occur with over 24 hours of warning time. Weather forecasters predict severe winter storms up to a full week before they will occur, but often wait until closer to the event to be able to predict how severe the storm will be.

4.7.9. Hazard Ranking Total Score 20

4.8 Thunderstorm and Lightning

4.8.1 Definition and description:

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

Between 1955 and March of 2010, at least 10,090 severe thunderstorm events have impacted Iowa. Because thunderstorms may occur singly, in clusters, or in lines, it is possible that several thunderstorms may affect the same area in the course of a few hours. It is likely that more than 10,090 individual severe storms systems occurred in the state.

4.8.2. Hazards Identified by Jurisdiction:

The table below shows which jurisdictions identified Thunderstorm and Lightning as a hazard they are susceptible to.

	Unincorporated Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend	School Districts
Thunderstorm and Lightning	X	X	X	X	X	X	X	X	X	X	X

All jurisdictions have identified thunderstorms and lightning as a hazard that they are vulnerable to. All jurisdictions determined that thunderstorms and lightning can occur annually.

4.8.3. Historical Occurrences:

Table 4.16 – Thunderstorm Events in Palo Alto County

70 THUNDERSTORM & HIGH WIND event(s) were reported in **Palo Alto County, Iowa** between **5/18/1962** and **11/30/2010**.

Mag: Magnitude
Dth: Deaths
Inj: Injuries
PrD: Property Damage
CrD: Crop Damage

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 PALO ALTO	05/18/1962	1500	Tstm Wind	0 kts.	0	0	0	0
2 PALO ALTO	06/14/1967	2300	Tstm Wind	0 kts.	0	0	0	0
3 PALO ALTO	06/13/1968	1930	Tstm Wind	0 kts.	0	0	0	0
4 PALO ALTO	06/13/1968	1930	Tstm Wind	0 kts.	0	0	0	0
5 PALO ALTO	10/15/1968	1720	Tstm Wind	0 kts.	0	0	0	0
6 PALO ALTO	06/16/1970	0030	Tstm Wind	0 kts.	0	0	0	0
7 PALO ALTO	05/26/1973	0900	Tstm Wind	0 kts.	0	0	0	0
8 PALO ALTO	06/21/1975	1200	Tstm Wind	68 kts.	0	0	0	0
9 PALO ALTO	05/08/1979	0530	Tstm Wind	0 kts.	0	0	0	0
10 PALO ALTO	06/28/1979	1800	Tstm Wind	0 kts.	0	0	0	0
11 PALO ALTO	06/21/1981	1820	Tstm Wind	61 kts.	0	0	0	0
12 PALO ALTO	04/02/1982	1712	Tstm Wind	0 kts.	0	0	0	0
13 PALO ALTO	08/29/1983	2145	Tstm Wind	56 kts.	0	0	0	0
14 PALO ALTO	08/29/1983	2200	Tstm Wind	52 kts.	0	0	0	0
15 PALO ALTO	07/16/1984	1800	Tstm Wind	0 kts.	0	0	0	0
16 PALO ALTO	05/30/1985	1905	Tstm Wind	0 kts.	0	0	0	0
17 PALO ALTO	05/08/1986	1655	Tstm Wind	52 kts.	0	0	0	0
18 PALO ALTO	06/10/1986	1904	Tstm Wind	52 kts.	0	0	0	0

19 PALO ALTO	04/22/1989	0900	Tstm Wind	61 kts.	0	0	0	0
20 PALO ALTO	06/16/1990	2110	Tstm Wind	50 kts.	0	0	0	0
21 PALO ALTO	06/16/1990	2120	Tstm Wind	50 kts.	0	0	0	0
22 PALO ALTO	07/07/1991	0930	Tstm Wind	65 kts.	0	0	0	0
23 PALO ALTO	07/07/1991	0945	Tstm Wind	65 kts.	0	0	0	0
24 PALO ALTO	07/07/1991	0950	Tstm Wind	61 kts.	0	0	0	0
25 PALO ALTO	07/22/1991	0148	Tstm Wind	61 kts.	0	0	0	0
26 Mallard	06/12/1994	1910	Thunderstorm Winds	65 kts.	0	0	500K	1K
27 Mallard	06/12/1994	1915	Thunderstorm Winds	50 kts.	0	0	50K	0K
28 Mallard	06/12/1994	1920	Thunderstorm Winds	65 kts.	0	0	50K	1K
29 Emmetsburg	06/21/1995	2218	Thunderstorm Winds	61 kts.	0	0	35K	0
30 Ruthven	08/13/1995	2000	Thunderstorm Winds	56 kts.	0	0	15K	1K
31 Emmetsburg	08/13/1995	2017	Thunderstorm Winds	50 kts.	0	0	5K	0
32 Emmetsburg	08/13/1995	2020	Thunderstorm Winds	50 kts.	0	0	5K	0
33 Emmetsburg	08/13/1995	2026	Thunderstorm Winds	56 kts.	0	0	45K	5K
34 Graettinger	08/13/1995	2100	Thunderstorm Winds	70 kts.	0	0	60K	10K
35 Emmetsburg	08/04/1996	02:00 PM	Tstm Wind	50 kts.	0	0	10K	0
36 Graettinger	07/14/1998	11:56 PM	Tstm Wind	59 kts.	0	0	10K	1K
37 Graettinger	07/15/1998	12:29 AM	Tstm Wind	56 kts.	0	0	15K	0
38 Ruthven	07/15/1998	12:35 AM	Tstm Wind	54 kts.	0	0	20K	10K
39 Ayrshire	07/21/1998	06:45 AM	Tstm Wind	61 kts.	0	0	5K	1K
40 Ayrshire	08/24/1998	07:20 AM	Tstm Wind	52 kts.	0	0	5K	5K
41 Graettinger	08/24/1998	07:20 AM	Tstm Wind	52 kts.	0	0	5K	5K
42 Cylinder	05/08/2000	12:30 AM	Tstm Wind	61 kts.	0	0	30K	0
43 Ayrshire	06/13/2000	03:35 PM	Tstm Wind	52 kts.	0	0	5K	0
44 Emmetsburg	06/13/2000	03:50 PM	Tstm Wind	56 kts.	0	0	5K	0
45 Depew	06/13/2000	03:55 PM	Tstm Wind	65 kts.	0	0	50K	5K
46 Ruthven	07/09/2000	10:10 PM	Tstm Wind	65 kts.	0	0	50K	10K
47 Ruthven	08/07/2000	10:26 PM	Tstm Wind	52 kts.	0	0	2K	0
48 Ruthven	08/07/2000	10:29 PM	Tstm Wind	52 kts.	0	0	5K	2K
49 Mallard	10/13/2000	06:10 PM	Tstm Wind	61 kts.	0	0	40K	5K
50 Mallard	04/16/2002	07:25 PM	Tstm Wind	56 kts.	0	0	10K	0
51 Emmetsburg	04/16/2002	09:55 PM	Tstm Wind	50 kts.	0	0	2K	0
52 Mallard	06/07/2002	11:13 PM	Tstm Wind	56 kts.	0	0	5K	0
53 Cylinder	07/28/2002	09:00 PM	Tstm Wind	52 kts.	0	0	5K	0
54 Ruthven	08/16/2002	03:30 PM	Tstm Wind	57 kts.	0	0	15K	5K
55 Ruthven	07/03/2003	11:37 PM	Tstm Wind	56 kts.	0	0	5K	0
56 Mallard	06/12/2004	03:09 PM	Tstm Wind	52 kts.	0	0	2K	0
57 West Bend	03/06/2005	07:16 PM	Tstm Wind	50 kts.	0	0	0	0
58 Mallard	05/08/2005	03:51 PM	Tstm Wind	63 kts.	0	0	5K	0
59 Mallard	06/20/2005	04:58 PM	Tstm Wind	57 kts.	0	0	5K	0
60 Mallard	08/09/2005	04:38 PM	Tstm Wind	52 kts.	0	0	3K	0
61 Ruthven	10/04/2005	07:05 PM	Tstm Wind	52 kts.	0	0	15K	0
62 Ayrshire	08/01/2006	08:19 PM	Tstm Wind	52 kts.	0	0	5K	0
63 Emmetsburg	09/30/2007	18:46 PM	Thunderstorm	52 kts.	0	0	2K	0K

Arpt			Wind					
64 Mallard	06/11/2008	19:00 PM	Thunderstorm Wind	52 kts.	0	0	3K	0K
65 Mallard	06/11/2008	19:45 PM	Thunderstorm Wind	52 kts.	0	0	3K	0K
66 Graettinger	06/25/2010	21:15 PM	Thunderstorm Wind	54 kts.	0	0	15K	0K
67 Emmetsburg	06/25/2010	21:25 PM	Thunderstorm Wind	57 kts.	0	0	15K	0K
68 Emmetsburg	06/26/2010	20:45 PM	Thunderstorm Wind	57 kts.	0	0	15K	0K
69 Emmetsburg	07/17/2010	22:40 PM	Thunderstorm Wind	61 kts.	0	0	10K	10K
70 Graettinger	08/08/2010	19:58 PM	Thunderstorm Wind	57 kts.	0	0	25K	0K
TOTALS:					0	0	1.187 M	76K
Source: National Climate Data Center								

Table 4.17

4 LIGHTNING event(s) were reported in **Palo Alto County, Iowa** between **01/01/1997** and **11/30/2010**.						**Mag**: Magnitude **Dth**: Deaths **Inj**: Injuries **PrD**: Property Damage **CrD**: Crop Damage		
Location or County	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
1 Graettinger	07/11/1997	08:05 PM	Lightning	N/A	0	0	250K	0
2 Emmetsburg	07/26/1997	09:25 AM	Lightning	N/A	0	0	20K	5K
3 Curlew	06/11/2008	08:30 AM	Lightning	N/A	1	0	0K	0K
4 Graettinger	04/24/2009	23:15 PM	Lightning	N/A	0	0	45K	0K
TOTALS:					1	0	315K	5K
Source: National Climate Data Center								

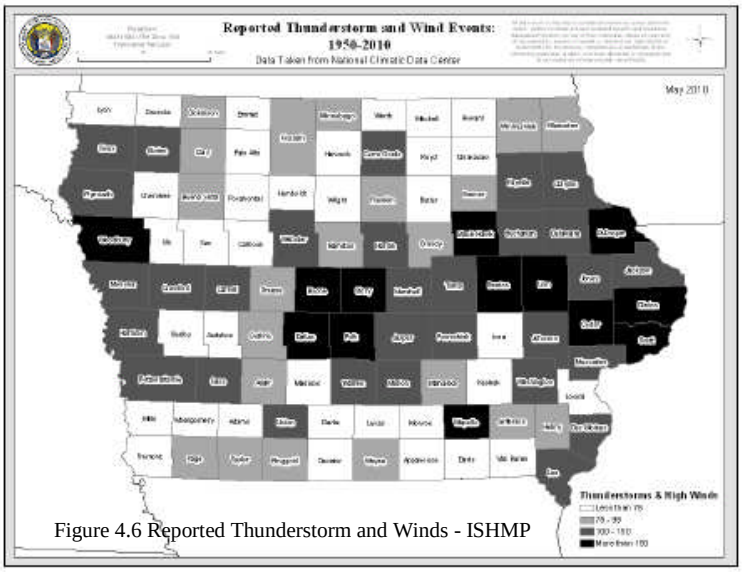


Figure 4.6 Reported Thunderstorm and Winds - ISHMP

4.8.4. Probability of Future Events

The committee determined that thunderstorm and lightning will be highly likely to occur, which is nearly 100% chance to occur in the next year (chance of 1 in 1 to occur). Pervious NCDC was used to determine this with the 70 thunderstorms and 4 lightning strikes.

4.8.5. Vulnerable Population

Committee determined that more than 11-25% of the population would be vulnerable to thunderstorms and lighting. As stated before the residents and tourists of Palo Alto County are heavy recreational users especially in the summer months on the lakes, when thunderstorms and lightning are most often to occur.

4.8.6. Maximum Geographic Extent

The committee determined that with thunderstorm and lightning that be limited to 11-25% of the County would be affected. Whether it be from heavy rain, damaging winds, lightning strikes or other elements of a storm. They will likely affect a lot of the County since thunderstorms often are over a mile wide in their storm cell.

4.8.7. Severity of Impact

The committee determined that the severity would be limited as a thunderstorm or lightning strike can possibly damage essential facilities that could hinder essential emergency services.

The 2010 State of Iowa Hazard Mitigation Plan estimates Palo Alto County has an annual estimation loss of $69,000.00 due to thunderstorm, $18,823.53 due to lightning.

4.8.8. Speed of Onset

The speed of onset of thunderstorm or lightning the committee determined to be 12-24 warning time with new weather radars that have been developed recently.

4.8.9. Hazard Ranking Total Score 16

4.9 Tornado

4.9.1 Definition and description:

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

The new EF-scale was unveiled by the National Weather Service to the public in 2006. In February 2007, the Enhanced Fujita scale replaced the original Fujita scale in all tornado damage surveys in the United States. Below is a table comparing the estimated winds in the original F-scale and the operational EF-scale that is currently in use by the NWS.

Table 4.18 – Original vs. Enhanced Fujita Scales

ORIGINAL FUJITA F-SCALE		**NEW ENHANCED FUJITA EF-SCALE**	
F Number	3 Second Gust (mph)	**EF Number**	**3 Second Gust (mph)**
0	45-78	**0**	**65-85**
1	79-117	**1**	**86-110**
2	118-161	**2**	**111-135**
3	162-209	**3**	**136-165**
4	210-261	**4**	**166-200**
5	262-317	**5**	**Over 200**

Table 4.18 - EF Scale Classifications and Types of Damage Done

EF-Scale			
EF-Scale	**Wind Speed**	**Classification**	**Type of Damage Done**
EF-0	65-85 mph (105-137 km/h)	Light damage	Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF-1	86-110 mph (138-178 km/h)	Potential damage	Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF-2	111-135 mph (179-218 km/h)	Considerable damage	Roofs torn off houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF-3	136-165 mph (219-266 km/h)	Severe damage	Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF-4	166-200 mph (267-322 km/h)	Devastating damage	Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF-5	200 mph + (322 km +)	Total destruction	Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yd); steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation; incredible phenomena will occur.
Source: Tornado EF Scale.com http://www.tornadoefscale.com/pages/t/tornadoefscale.com-index-nav-1.html			

Since the Enhanced Fujita Scale was introduced on February 1, 2007, there have only been two EF5 tornadoes recorded in the United States. The most recent one occurred in Parkersburg, Iowa on May 25, 2008 and leveled half the city.

4.90.2. Hazards Identified by Jurisdiction: The table below shows which jurisdictions identified Tornado as a hazard they are susceptible to.

	Unincorporated Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend	School Districts
Tornado	X	X	X	X	X	X	X	X	X	X	X

4.9.3 Historical Occurrences:

The following map depicts a geographic breakdown of reported tornadoes in Iowa since 1950.

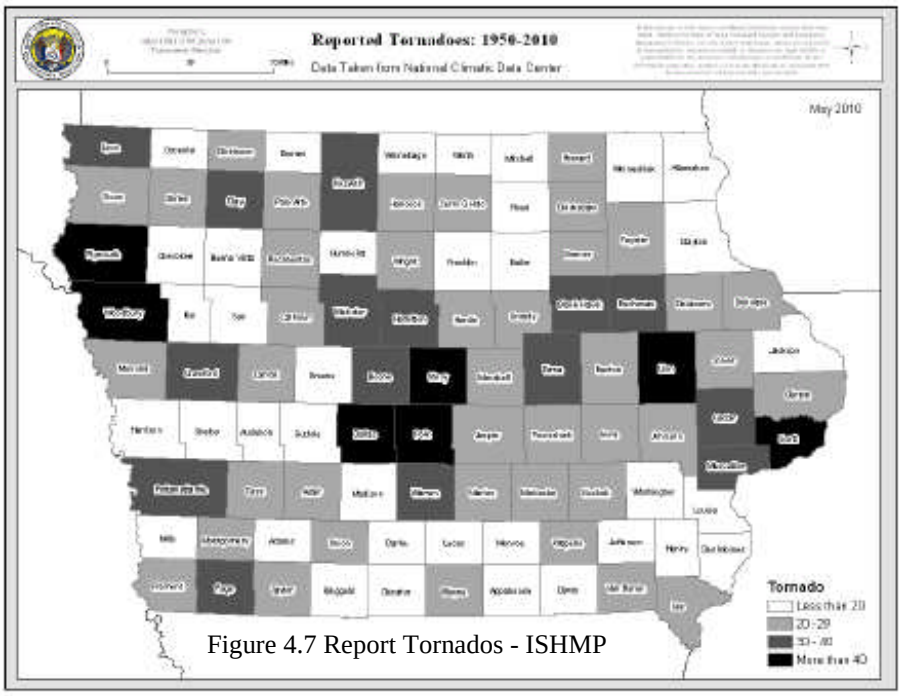


Figure 4.7 Report Tornados - ISHMP

The following table shows that there have been twenty tornado events reported in Palo Alto County since 1950. These tornadoes resulted in 1 reported injury and zero deaths. Total property damages were $6.463 million and crop damage totaled $71,000. The highest magnitude tornado to strike the county were several; F2's.

Table 4.20 – Tornados in Palo Alto County. Source NCDC.

20 TORNADO(s) were reported in **Palo Alto County, Iowa** between **01/01/1950** and **11/30/2010**.					**Mag**: Magnitude **Dth**: Deaths **Inj**: Injuries **PrD**: Property Damage **CrD**: Crop Damage			
Location or County	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
1 PALO ALTO	06/07/1953	2100	Tornado	F2	0	0	0K	0
2 PALO ALTO	04/05/1958	1400	Tornado	F	0	0	0K	0

3 PALO ALTO	05/28/1959	0630	Tornado	F2	0	0	25K	0
4 PALO ALTO	08/03/1961	1405	Tornado	F0	0	0	25K	0
5 PALO ALTO	04/30/1967	1610	Tornado	F2	0	0	250K	0
6 PALO ALTO	06/14/1967	2200	Tornado	F0	0	0	250K	0
7 PALO ALTO	06/21/1975	1225	Tornado	F0	0	0	0K	0
8 PALO ALTO	06/14/1976	1800	Tornado	F2	0	0	3K	0
9 PALO ALTO	06/10/1977	1800	Tornado	F	0	0	25K	0
10 PALO ALTO	07/14/1978	1700	Tornado	F1	0	0	25K	0
11 PALO ALTO	07/14/1978	1700	Tornado	F1	0	0	25K	0
12 PALO ALTO	06/28/1979	1800	Tornado	F0	0	0	25K	0
13 PALO ALTO	07/19/1980	1735	Tornado	F2	0	0	2.5M	0
14 PALO ALTO	06/07/1984	1635	Tornado	F2	0	1	2.5M	0
15 PALO ALTO	06/12/1994	1941	Tornado	F2	0	0	500K	50K
16 Cylinder	07/19/1994	1739	Tornado	F1	0	0	50K	5K
17 Emmetsburg Arpt	07/26/1997	0930	Tornado	F1	0	0	220K	3K
18 Ayrshire	09/13/2000	1930	Tornado	F0	0	0	0	3K
19 West Bend	10/13/2000	1756	Tornado	F1	0	0	30K	5K
20 Ruthven	06/11/2004	0200	Tornado	F1	0	0	10K	5K
TOTALS:					0	1	6.463 M	71K

Source: National Climate Data Center

Even though the scoring criteria should put tornado into 3 for historical occurrence the committee decided that they didn't even know some of these occurred and didn't see to much damage or effects to daily life. They therefore scored it with the lower value of 2.

4.9.4. Probability of Future Events

Based on the NCDC recorded history of ten events in Palo Alto County in the last 25 years, the committee determined that the probability is 'likely' to happen again. They determined that with those 10 events anyone can happen and be more destructive or deadly. That amounts to an 11-100% probability in the next year or at least one chance in the next 10 years.

5.9.5. Vulnerable Population

The vulnerable population due to a tornado event was determined to be a limited number of people. Which would amount to 11-25% of the county population, it could fluctuate with what area it would hit. Palo Alto County has an ever increasing population of recreational users that can contribute to the population that is vulnerable.

4.9.6. Maximum Geographic Extent

The committee determined that if a tornado where to hit Palo Alto County that at least 11-25% of the county would be affected. The committee was informed that a typical tornado can be 10-50 yards wide and be on the ground for 1-2 miles on average. They also recalled a more recent event in Parkersburg, IA where the whole community was almost leveled. They stated that is not the mostly likely situation but did not want to rule it out and made a conservative determination on the extent.

4.9.7. Severity of Impact

The committee determined that if a tornado is going to affect the county, it would be by hitting a populated area, which could result in critical outcomes. There would be damage to essential services for several hours and property would be destroyed.

The 2010 State of Iowa Hazard Mitigation Plan estimates Palo Alto County has an annual estimation loss of $108,900.00 due to tornado.

4.9.8. Speed of Onset

Tornados often occur with minimal or no warning (up to 6 hours warning). Weather forecasters predict storm system up several days before they will occur, but can not predict where a tornado will hit or if it will hit.

4.9.9. Hazard Ranking Total Score 16

4.10 Windstorm

4.10.1 Definition and description:

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

Although Iowa does not experience direct impacts from hurricanes, the state is no stranger to strong, damaging winds. Unlike tornadoes, windstorms may have a destructive path that is tens of miles wide and the duration of the event could range from hours to days. These events can produce straight lines winds in excess of 64 knots causing some power outages, property damage, impaired visibility, and crop damage. Windstorms occur in every county in Iowa. Historically, windstorm events are associated with severe thunderstorms and blizzards. It is often difficult to separate windstorms and tornado damage when winds get above 64 knots.

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

4.10.2. Hazards Identified by Jurisdiction:

The table below shows which jurisdictions identified windstorm as a hazard they are susceptible to.

	Unincorporated Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend	School Districts
Windstorm	X	X	X	X	X	X	X	X	X	X	X

4.10.3. Historical Occurrences:

Table 4.21 – High Wind Events

20 HIGH WIND event(s) were reported in **Palo Alto County, Iowa** between **4/30/1998** and **7/31/09**.					**Mag**: Magnitude **Dth**: Deaths **Inj**: Injuries **PrD**: Property Damage **CrD**: Crop Damage			
Location or County	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
1 Palo Alto County	11/10/1998	02:00 AM	High Wind	61 kts.	1	0	17.3M	260K
2 Palo Alto County	03/17/1999	12:00 PM	High Wind	50 kts.	0	0	890K	0
3 Palo Alto County	04/05/2000	12:30 PM	High Wind	55 kts.	0	0	700K	0
4 Palo Alto County	04/07/2001	04:00 AM	High Wind	72 kts.	0	4	3.2M	0
5 Palo Alto County	03/09/2002	06:00 AM	High Wind	54 kts.	0	0	2.6M	0
6 Palo Alto County	05/11/2002	10:30 AM	High Wind	51 kts.	0	0	1.4M	0
7 Palo Alto County	08/16/2002	10:15 PM	High Wind	61 kts.	0	0	250K	115K
8 Palo Alto County	02/11/2003	01:15 PM	High Wind	65 kts.	0	0	257K	0
9 Palo Alto County	05/04/2003	11:07 AM	High Wind	52 kts.	0	0	5K	0
10 Palo Alto County	05/30/2003	02:00 PM	High Wind	50 kts.	1	0	700K	0
11 Palo Alto County	11/12/2003	09:00 AM	High Wind	55 kts.	0	2	2.6M	0
12 Palo Alto County	04/18/2004	03:10 PM	High Wind	57 kts.	0	0	3.6M	0

13 Palo Alto County	04/27/2004	12:30 PM	High Wind	56 kts.	0	0	3.5M	0
14 Palo Alto County	10/30/2004	03:00 AM	High Wind	60 kts.	0	0	190K	0
15 Palo Alto County	12/12/2004	10:00 AM	High Wind	56 kts.	0	0	1.4M	0
16 Palo Alto County	01/22/2005	12:15 AM	High Wind	56 kts.	0	0	440K	0
17 Palo Alto County	11/12/2005	06:00 PM	High Wind	57 kts.	0	0	2.0M	0
18 Palo Alto County	01/24/2006	09:30 AM	High Wind	60 kts.	0	2	550K	0
19 Palo Alto County	05/06/2007	04:30 AM	High Wind	56 kts.	0	0	25K	0K
20 Palo Alto County	10/26/08	09:30 AM	High Wind	52 kts.	0	0	25K	25K
TOTALS:	2	8	41.632M	400K				
Source: National Climate Data Center								

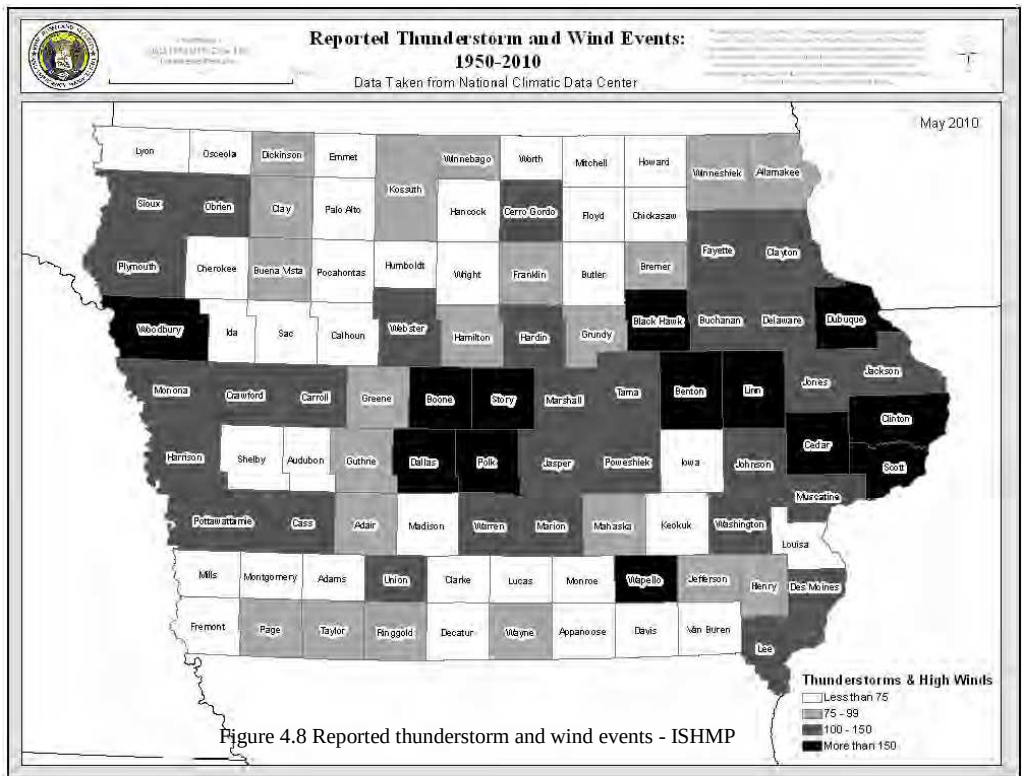


Figure 4.8 Reported thunderstorm and wind events - ISHMP

Table 4.22 – Beaufort Wind Scale (Developed in 1805 by Sir Francis Beaufort of England)

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth & mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires

7	28-33	Near Gale	Sea heaps up, waves 13-20 ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 ft) waves of greater length, crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 ft) with overhanging crests, densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (30-45 ft) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	
Source: Storm Prediction Center & NOAA				

Table 4.23 –

SPEED CONVERSIONS - KNOTS, MPH, KPH		
Knots	**Miles per Hour**	**Kilometers per Hour**
1	1.152	1.85
2	2.303	3.70
3	3.445	5.55
4	4.606	7.41
5	5.758	9.26
6	6.909	11.13
7	8.061	12.98
8	9.212	14.83
9	10.364	16.68
10	11.515	18.55
Source: Storm Prediction Center & NOAA		

4.10.4. Probability of Future Events

The committee determined that due the past 20 NCDC recorded events that it is highly likely or nearly a 100% chance to occur in the next year (1 in 1 chance of occurring).

4.10.5. Vulnerable Population

The committee determined that more than 11-25% of the county would be affected by a windstorm event (a 1 in 4 chance).

4.10.6. Maximum Geographic Extent

The committee determined that more than 26-50% of the county would be affected by a windstorm event.

4.10.7. Severity of Impact

The committee determined that the impact would be critical. A shutdown of essential services for 24-72 hours could occur if power lines are hit, also mentioned would that falling trees and branches would damage buildings when blown around.

The 2010 State of Iowa Hazard Mitigation Plan estimates Palo Alto County has an annual estimation loss of $76,437.63 due to windstorm.

4.10.8. Speed of Onset

Windstorms are typically associated with thunderstorms and will have minimal or no warning time before the storm occurs. Weather forecasters predict storm system up several days before they will occur, but will not know if a thunderstorm will cause a windstorm until much closer to the event occurring.

4.10.9. Hazard Ranking Total Score 20

4.11 Dam Failure

4.11.1 Definition and description:

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

Dams are classified into three (3) categories based on the potential risk to people and property should a failure occur. The classification may change over time because of development downstream from the dam since its construction. Older dams may not have been built to the standards of its new classification. Below are the hazard classifications defined by Iowa Department of Natural Resources (DNR):

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

Dam hazard potential classifications have nothing to do with the material condition of a dam, only the potential for death and/or destruction due to the size of the dam, the size of the impoundment, and the characteristics of the area downstream of the dam. The Iowa Department of Natural Resources (DNR) tracks all dams in Iowa with a height of at least 25 feet or a total storage of at least 50 acre feet of water. The inventory excludes all dams less than six (6) feet high regardless of storage capacity and dams less than fifteen (15) acre feet of storage regardless of height.

Table 4.24

Dam Name State ID#	Owners	Hazard Level	Location	Nearest City or Feature and Distance	Dam Ht. (feet)	Max. Storage (acre-ft)
ELSENBAST WETLAND DAM	BERNARD F. & JEAN M. ELSENBAST	Low	SW,SE,S12,T097NR,34W	EMMETSBURG, 10mi	6	363
GRAETTINGER DAM	RALPH GRAETTINGER	Low	,NE,S14,T097N,R33W	EMMETSBURG, 9 mi	30	42
SIMONSON DAM	LLOYD SIMONSON	Low	,SE,S35,T097N,R34W	EMMETSBURG, 9 mi	24	61

4.11.2. Hazards Identified by Jurisdiction:

The table below shows which jurisdictions identified Dam Failure as a hazard they are susceptible to.

	Unincorporated Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend	School Districts
Dam Failure	X				X						

Only Unincorporated Palo Alto County and Emmetsburg have identified dam failure as a hazard they are vulnerable to. There are no dams in Palo Alto County that are located within city limits and portions of the county that are most vulnerable if a dam fails, are in the unincorporated county.

4.11.3. Historical Occurrences:

There have been no dam failures in Palo Alto County in last 50 years.

4.11.4. Probability of Future Events

Palo Alto County planning committee determined there is less than 1% chance of happening in the next 100 years. They determined this based on the current requirements and checks that need to happen ever year to make sure they are structurally sound, but also there yearly preventative maintenance that keeps them in good working order.

4.11.5. Vulnerable Population

Palo Alto County planning committee determined that less than 10% of the population would be affected by a dam failure. Those that could be affecting are those that live near the dams or down stream from the dams. Those that live in a floodplain near the river/creek are at risk.

4.11.6. Maximum Geographic Extent

Palo Alto County planning committee, determined that those that own property in floodplains would be at risk, they came to the conclusion that mostly pasture lands, crops and very few structures of value would be present in those areas.

4.11.7. Severity of Impact

Palo Alto County planning committee determined that the severity of impact would be negligible, since the dams only hold back a low amount of water behind it, that any breach or break in the dam would affect the downstream properties (mostly cropland) only for a short period of time and would be resilient to come back as long as there was no other flooding events present.

4.11.8. Speed of Onset

The planning committee determined that there is no warning time for a dam failure.

4.11.9. Hazard Ranking Total Score 9

*No studies have been conducted to determine which structures would be damage due to a dam failure. It is unknown what number of structures would possibly be affected by an event. This will be reviewed in updates of this plan, to see if there is any information or studies available.

4.12 Grass or Wildland Fire

4.12.1 Definition and description:

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

4.12.2. Hazards Identified by Jurisdiction:

The table below shows which jurisdictions identified Grass or Wildland Fire as a hazard they are susceptible to.

	Unincorporated Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend	School Districts
Grass or Wildland Fire	X	X	X	X	X	X	X	X	X	X	

4.12.3. Historical Occurrences

The planning determined from those members that are on the volunteer fire departments that grass or wildland fires have happened every year in the past. They determined that there have been more the 12 occurrences in the last 25 years.

4.12.4. Probability of Future Events

All fire departments for Palo Alto County have responded to at least one grass or wildland fire yearly. Therefore there is 100% chance that it will occur on a yearly basis in Palo Alto County.

Each committee was asked to designate on their critical facilities map which areas were most prone to wildland fires. Most communities determined that those buildings closest to farm fields would be the most likely to be damaged by a wildland fire. The communities marked on their maps the areas most prone then estimated the type of structures and cost based on the average. The estimated buildings and value are presented below. It is to be known that wildland fires are a natural hazard that usually occurs at unknown time and location, therefore these are just estimates in good faith to get the communities thinking of the possible outcomes for damages from wildland fires. The maps are to be found in Section 9. It is to be noted that Palo Alto County did not determine damage estimates the same way as the communities determined, because of time and resources it was to large of task to determine that number, because again it is difficult to determine when and where and how much will be affected.

Table 4.25 – Vulnerable structures

City	# of residential	Average Cost	# of Commercial, Industrial, others.	Average Cost	Total Lost Estimate
Ayrshire	7	$24,262.00	5	$13,370.00	$236,684.00
Curlew	All Properties 51 structures totaling $857,978				
Cylinder	4	$34,060.00	1	$35,719.00	$171,959.00
Emmetsburg	20	$93,839.00	10	$1,421,628.00	$16,093,060.00
Graettinger	19	$60,121.00	1	$88,295.00	$1,230,594.00
Mallard	2	$37,480.00	2	$124,360.00	$323,680.00
Rodman	2	$23,900.00	1	$21,153.00	$68,953.00
Ruthven	19	$59,517.00	1	$61,628.00	$1,192,451.00

West Bend	17	$81,677.00	5	$72,262.00	$1,749,819.00

4.12.5. Vulnerable Population

The committee determined that a limited or 11-25% percent of population would be adversely affected. Those populations most at risk would those that live in rural and farm settings that border grass, timber or croplands. Also response personal or fire fighters responding would be at risk.

4.12.6. Maximum Geographic Extent

The committee determined that in an event of a grass or wildland fire less than 10% of Palo Alto County would be affected.

4.12.7. Severity of Impact

The severity of impact would be "Negligible" which could affect the local economy of the farmers produce, which they rely on to make a living off of. The planning committees fire department participants most crops or grass fields are destroyed and rarely if ever they result in a lost of a structure due a grass or wildland fire.

4.12.8. Speed of Onset

The planning committee determined that that there would be plenty of time and to respond.

4.12.9. Hazard Ranking Total Score 16

Section 5. Vulnerability

The methodology used to define vulnerability was to identify vulnerable structures in Palo Alto County and all jurisdictions participating in the Palo Alto County Hazard Mitigation Plan. All vulnerable structures were determined to be critical facilities and infrastructure by the planning team. Each jurisdiction planning team has identified critical facilities and infrastructure that could be in potential hazard areas. If any of these facilities were affected by a hazard, it would have a large affect on cities and the county to maintain current operations. The potential dollar losses for facilities are the most recent assessed value and are valuations for total structure loss. Vulnerability is also assessed by types and number of structures. Types of structural vulnerability expressed are: residential, commercial, industrial, agricultural and exempt (religious, utilities, education, government). These categories are used to show potential dollar losses to structural uses. The potential losses were used to show the vulnerability to critical facilities/infrastructure and structural uses in all hazard events investigated in this plan. Data limits were that no data was available for contents and functional loss of facilities. Sources used to identify valuations was the Palo Alto County Assessor for valuations of critical facilities. Vulnerability is also described in terns of a percentage or dollar amount of structural damage. The vulnerability percentages are based on the scoring criteria for severity in the Criteria Category Table at the beginning of Section 4. The severity breakdown helped the planning team to decide the vulnerability percentages in relation to the hazards that were identified.

The following wording is from the Criteria Category Table found in the beginning of Section Four scoring section on severity: Negligible- Less than 5% of property severely damaged, shutdown of facilities and services for less than 4 hours, and/or injuries/illnesses treatable with first aid, Limited-5% to 9% of property severely damaged, shutdown of facilities and services for 4 to 24 hours, and/or minor injuries/illnesses, Critical-10% to 25% of property severely damaged, shutdown of facilities and services for 24 to 72 hours, and/or serious injuries/illnesses, Catastrophic- More than 25% of property severely damaged, shutdown of facilities and services for more than 3 days, and/or multiple deaths. Those severity percentages were estimated at 5%, 10%, and 25%. The following hazards had a score of 1 or 2 for severity and were considered to have an estimated 5% of critical facilities and infrastructure vulnerable: expansive soils, drought, extreme heat, flash flood, thunderstorm and lightning, dam failure and grass and wildland fire. These two were combined to reflect 5% damage to properties on the decision of the committee. The next hazards had a score of 3 for severity and were considered to have an estimated 10% of critical facilities and infrastructure vulnerable: hailstorm, river flood, severe winter storm, tornado and windstorm. The next hazard had a score of 4 for severity and was considered to have an estimated 25% of critical facilities and infrastructure vulnerable. None were put into this category but were left on there show the amount if an event were to affect that much. Description of vulnerability specific to each hazard and jurisdictions affected is included in Section 4: Hazard Analysis/Risk Assessment in each hazard profile and continued on further following the table in Section 5: Assessing Vulnerability.

Section 5.1 Totals for Cities and County

Palo Alto Rural County Totals									
	Number of Structures			Value of Structures			Number of People		
Type of Structure	# in County	# in Hazard Area	% in Hazard Area	$ in County	$ in Hazard Area	% in Hazard Area	# in County	# in Hazard Area	% in Hazard Area
Residential	815	815	100%	$45,386,468	$45,386,468	100%	*	*	100%
Commercial	69	69	100%	$8,676,530	$8,676,530	100%	*	*	100%
Industrial	30	30	100%	$39,511,560	$39,511,560	100%	*	*	100%
Agricultural	4075	4075	100%	$80,954,973	$80,954,973	100%	*	*	100%
Exempt : Religious, Utilities Education, Govt	52	52	100%	$151,569,510	$151,569,510	100%	*	*	100%
Trailer/Mobile Home	37	37		$205,162	$205,162		*	*	
Total	5,078	5,078	100%	$326,304,203	$326,304,203	100%	2,543	2,543	100%

Palo Alto County Totals									
	Number of Structures			Value of Structures			Number of People		
Type of Structure	# in County	# in Hazard Area	% in Hazard Area	$ in County	$ in Hazard Area	% in Hazard Area	# in County	# in Hazard Area	% in Hazard Area
Residential	3,587	3,587	100%	449,148,900	449,148,900	100%	*	*	100%
Commercial	678	678	100%	27,913,500	27,913,500	100%	*	*	100%
Industrial	62	62	100%	17,670,400	17,670,400	100%	*	*	100%
Agricultural	4,112	4,112	100%	61,220,300	61,220,300	100%	*	*	100%
Exempt : Religious, Utilities Education, Govt	140	140	100%	382,470,800	382,470,800	100%	*	*	100%
Trailer/Mobile home	64	64	100%				*	*	100%
Total	8,643	8,643	100%	1,070,025,493	1,070,025,493	100%	9,421	9,421	100%

Ayrshire Totals									
	Number of Structures			Value of Structures			Number of People		
Type of Structure	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	89	89	100%	$2,159,284	$2,159,284	100%	*	*	100%
Commercial	41	41	100%	$583,266	$583,266	100%	*	*	100%
Industrial	0	0	100%	$0	$0	100%	*	*	100%
Agricultural	9	9	100%	$16,350	$16,350	100%	*	*	100%
Exempt : Religious, Utilities Education, Govt	7	7	100%	$162,526	$162,526	100%	*	*	100%
Trailer/Mobile home	0	0	100%	$0	$0		*	*	100%
Total	146	146	100%	$2,921,426	$2,921,426	100%	143	143	100%

Curlew Totals									
	Number of Structures			Value of Structures			Number of People		
Type of Structure	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	31	31	100%	$627,127	$627,127	100%	*	*	100%
Commercial	4	4	100%	$35,630	$35,630	100%	*	*	100%
Industrial	0	0	100%	$0	$0	100%	*	*	100%
Agricultural	12	12	100%	$150,070	$150,070	100%	*	*	100%
Exempt : Religious, Utilities Education, Govt	2	2	100%	$37,151	$37,151	100%	*	*	100%
Trailer/Mobile Home	2	2	100%	$8,000	$8,000		*	*	100%
Total	51	51	100%	$857,978	$857,978	100%	58	58	100%

Cylinder Totals									
	Number of Structures			Value of Structures			Number of People		
Type of Structure	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	52	52	100%	$1,771,130	$1,771,130	100%	*	*	100%
Commercial	29	29	100%	$1,151,650	$1,151,650	100%	*	*	100%
Industrial	0	0	100%	$0	$0	100%	*	*	100%
Agricultural	0	0	100%	$0	$0	100%	*	*	100%
Exempt : Religious, Utilities Education, Govt	6	6	100%	$98,548	$98,548	100%	*	*	100%
Trailer/Mobile home	0	0	100%	$0	$0		*	*	100%
Total	87	87	100%	$3,021,328	$3,021,328	100%	88	88	100%

Emmetsburg Totals									
	Number of Structures			Value of Structures			Number of People		
Type of Structure	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	1420	1420	100%	$133,251,790	$133,251,790	100%	*	*	100%
Commercial	280	280	100%	$478,157,730	$47,815,730	100%	*	*	100%
Industrial	13	13	100%	$2,199,460	$2,199,460	100%	*	*	100%
Agricultural	7	7	100%	$238,120	$238,120	100%	*	*	100%
Exempt : Religious, Utilities Education, Govt	29	29	100%	$22,645,212	$22,645,212	100%	*	*	100%
Trailer/Mobile home	25	25	100%	$15,856	$15,856		*	*	100%
Total	1,774	1,774	100%	$636,508,168	$636,508,168	100%	3,904	3,904	100%

Graettinger Totals									
	Number of Structures			Value of Structures			Number of People		
Type of Structure	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	374	374	100%	$22,485,567	$22,485,567	100%	*	*	100%
Commercial	72	72	100%	$5,623,160	$5,623,160	100%	*	*	100%
Industrial	14	14	100%	$2,212,930	$2,212,930	100%	*	*	100%
Agricultural	0	0	100%	$0	$0	100%	*	*	100%
Exempt : Religious, Utilities Education, Govt	10	10	100%	$640,306	$640,306	100%	*	*	100%
Trailer/Mobile home	0	0	100%	$0	$0		*	*	100%
Total	470	470	100%	$30,961,963	$30,961,963	100%	844	844	100%

Mallard Totals									
	Number of Structures			Value of Structures			Number of People		
Type of Structure	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	132	132	100%	$4,947,320	$4,947,320	100%	*	*	100%
Commercial	36	36	100%	$5,946,880	$5,946,880	100%	*	*	100%
Industrial	4	4	100%	$35,600	$35,600	100%	*	*	100%
Agricultural	3	3	100%	$49,020	$49,020	100%	*	*	100%
Exempt : Religious, Utilities Education, Govt	7	7	100%	$186,522	$186,522	100%	*	*	100%
Trailer/Mobile home	0	0	100%	$0	$0		*	*	100%
Total	182	182	100%	$11,165,342	$11,165,342	100%	274	274	100%

Rodman Totals									
	Number of Structures			Value of Structures			Number of People		
Type of Structure	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	24	24	100%	$573,610	$573,610	100%	*	*	100%
Commercial	6	6	100%	$252,470	$252,470	100%	*	*	100%
Industrial	0	0	100%	$0	$0	100%	*	*	100%
Agricultural	5	5	100%	$22,510	$22,510	100%	*	*	100%
Exempt : Religious, Utilities Education, Govt	2	2	100%	$12.114	$12.114	100%	*	*	100%
Trailer/Mobile home	0	0	100%	$0	$0		*	*	100%
Total	37	37	100%	$848,602	$848,602	100%	45	45	100%

Ruthven Totals									
	Number of Structures			Value of Structures			Number of People		
Type of Structure	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	311	311	100%	$18,509,790	$18,509,790	100%	*	*	100%
Commercial	72	72	100%	$4,739,310	$4,739,310	100%	*	*	100%
Industrial	0	0	100%	$0	$0	100%	*	*	100%
Agricultural	0	0	100%	$0	$0	100%	*	*	100%
Exempt : Religious, Utilities Education, Govt	11	11	100%	$375,858	$375,858	100%	*	*	100%
Trailer/Mobile home	0	0	100%	$0	$0	100%	*	*	100%
Total	394	394	100%	$2,3624,958	$2,3624,958	100%	737	737	

West Bend Totals									
	Number of Structures			Value of Structures			Number of People		
Type of Structure	# in City	# in Hazard Area	% in Hazard Area	$ in City	$ in Hazard Area	% in Hazard Area	# in City	# in Hazard Area	% in Hazard Area
Residential	339	339	100%	$27,668,600	$27,668,600	100%	*	*	100%
Commercial	69	69	100%	$4,988,130	$4,988,130	100%	*	*	100%
Industrial	1	1	100%	$24,920	$24,920	100%	*	*	100%
Agricultural	1	1	100%	$5310	$5310	100%	*	*	100%
Exempt : Religious, Utilities Education, Govt	14	14	100%	$1,124,565	$1,124,565	100%	*	*	100%
Trailer/Mobile home	0	0	100%	$0	$0	100%	*	*	100%
Total	424	424	100%	$33,811,525	$33,811,525	100%	785	785	100%

Source: Palo Alto County Assessor's Office and US Census 2010

5.2 Vulnerability Assessment and Critical Facilities

Palo Alto County Identified Critical Facilities

Facility Name	People at Facility at Peak Hours	Valuation (2010/2011)	Severity 25% of Total Structure Value for the following hazard:	Severity 10% of Total Structure Value for the following hazards: hailstorm, river flood, severe winter storm, tornado and windstorm.	Severity 5% of Total Structure Value for the following hazards: drought, expansive soils, extreme heat, flash flood, thunderstorm & lightning, dam failure and grass and wildland fire fires
Communication Tower	2	$150,000.00	$37,500.00	$3,750.00	$187.50
West Bend Wastewater Treatment	5	$1,500,000.00	$375,000.00	$37,500.00	$1,875.00
Mallard WT	5	$2,000,000.00	$500,000.00	$50,000.00	$2,500.00
Ayrshire WT	5	$1,200,000.00	$300,000.00	$30,000.00	$1,500.00
Ruthven WT	5	$2,000,000.00	$500,000.00	$50,000.00	$2,500.00
Graettinger WT	5	$2,000,000.00	$500,000.00	$50,000.00	$2,500.00
Emmetsburg WT	5	$5,500,000.00	$1,375,000.00	$137,500.00	$6,875.00
Electrical substations 6 + 3 Relay	2	$9,000,000.00	$2,250,000.00	$225,000.00	$11,250.00
County Parks totaled 4	250	$390,000.00	$97,500.00	$9,750.00	$487.50
Lutheran Church Depew	150	$498,440.00	$124,610.00	$12,461.00	$623.05
Poet	150	$16,100,000.00	$4,025,000.00	$402,500.00	$20,125.00
AGP	150	$7,600,000.00	$1,900,000.00	$190,000.00	$9,500.00
St. Paul's Lutheran Church South Walnut Township	100	$49,000.00	$12,250.00	$1,225.00	$61.25
Iowa lakes Regional Water Well Osgood	5	$25,000.00	$6,250.00	$625.00	$31.25
Daybreak Farms	50	$4,400,000.00	$1,100,000.00	$110,000.00	$5,500.00
St. Luke's Lutheran Fairview Township	100	$113,170.00	$28,292.50	$2,829.25	$141.46
County Emergency Siren	1	$20,000.00	$5,000.00	$500.00	$25.00
Lost Island Lutheran Church	100	$75,000.00	$18,750.00	$1,875.00	$93.75
Communication Tower	2	$150,000.00	$37,500.00	$3,750.00	$187.50
West Bend Wastewater Treatment	5	$1,500,000.00	$375,000.00	$37,500.00	$1,875.00
Mallard WT	5	$2,000,000.00	$500,000.00	$50,000.00	$2,500.00
Ayrshire WT	5	$1,200,000.00	$300,000.00	$30,000.00	$1,500.00

Ayrshire Identified Critical Facilities.

Facility Name	People at Facility at Peak Hours	Valuation (2010/2011)	Severity 25% of Total Structure Value for the following hazard:	Severity 10% of Total Structure Value for the following hazards: hailstorm, severe winter storm, tornado and windstorm.	Severity 5% of Total Structure Value for the following hazards: drought, extreme heat, flash flood, thunderstorm & lightning, and grass and wildland fire fires
City Hall/Water Plant/Water Tower/Warning siren	50	$780,000.00	$195,000.00	$78,000.00	$39,000.00
Fire Station	50	$255,000.00	$63,750.00	$25,500.00	$12,750.00
Quick Stop Gas Station	15	$235,500.00	$58,875.00	$23,550.00	$11,775.00
Post Office/ Telephone	10	$450.19	$112.55	$45.02	$22.51
Lutheran Church	100	$82,240.00	$20,560.00	$8,224.00	$4,112.00
Methodist Church	100	$188,180.00	$47,045.00	$18,818.00	$9,409.00
Catholic Church	100	$408,590.00	$102,147.50	$40,859.00	$20,429.50
Elevator	10	$244,360.00	$61,090.00	$24,436.00	$12,218.00
Legion Hall		Same as City Hall Same Bldg			

Curlew Identified Critical Facilities

Facility Name	People at Facility at Peak Hours	Valuation (2010/2011)	Severity 25% of Total Structure Value for the following hazard:	Severity 10% of Total Structure Value for the following hazards: hailstorm, severe winter storm, tornado and windstorm.	Severity 5% of Total Structure Value for the following hazards: drought, extreme heat, flash flood, thunderstorm & lightning, and grass and wildland fire fires
City Hall/Social Center	75	$150,000.00	$37,500.00	$15,000.00	$7,500.00
City Post Office	5	$100,000.00	$25,000.00	$10,000.00	$5,000.00
City Park	75	$25,000.00	$6,250.00	$2,500.00	$1,250.00

Cylinder Identified Critical Facilities

Facility Name	People at Facility at Peak Hours	Valuation (2010/2011)	Severity 25% of Total Structure Value for the following hazard:	Severity 10% of Total Structure Value for the following hazards: hailstorm, severe winter storm, tornado and windstorm.	Severity 5% of Total Structure Value for the following hazards: drought, extreme heat, flash flood, thunderstorm & lightning, and grass and wildland fire fires
US HWY 18	N/a	n/a			
Tornado Siren	2	18,500	4625	1850	925
Sewer Lift Station	5	35,380	8845	3538	1769
Post Office	n/a	closed			
Fire Station	14	235,480	58870	23548	11774
City Hall	50	89,750	22437.5	8975	4487.5
Sewage Lagoon	2	750,000	187500	75000	37500
Natural Gas Line Station	3	500,000	125000	50000	25000
390th St	n/a	n/a			
Water Well	5	35,000	8750	3500	1750
Elevator Chemical Storage	10	550,500	137625	55050	27525

Emmetsburg Identified Critical Facilities

Facility Name	People at Facility at Peak Hours	Valuation (2010/2011)	Severity 25% of Total Structure Value for the following hazard: tornado	Severity 10% of Total Structure Value for the following hazards: flash flood, hailstorm, river floodsevere winter storm, thunderstorms and lightning and windstorms	Severity 5% of Total Structure Value for the following hazards: extreme heat, landslide, dam failure and grass or wildland fires
City Offices (1)	50	$465,000	$116,250.00	$46,500.0	$23,250.00
Palo Alto County Courthouse (2)	100	$1,829,640	$457,410.00	$182,964.0	$91,482.00
Police/Fire Dept (3)	200	$895,000	$223,750.00	$89,500.0	$44,750.00
Palo Alto County Hospital (4)		$17,510,780	$4,377,695.00	$1,751,078.0	$875,539.00
Public Works Building (5)	20	$335,000	$83,750.00	$33,500.0	$16,750.00
U.S. Post Office (6)	10	$261,720	$65,430.00	$26,172.0	$13,086.00
Designated Emergency Shelter:			$0.00	$0.0	$0.00

Bethany Evangelical Lutheran Church 703 Broadway (7a)	100	$886,720	$221,680.00	$88,672.0	$44,336.00
Designated Emergency Shelter: First Methodist Episcopal Church 801 Broadway (7b)	100	$831,340	$207,835.00	$83,134.0	$41,567.00
Designated Emergency Shelter: Our Savior's Lutheran Church Highway 18 E (7c)	100	$180,260	$45,065.00	$18,026.0	$9,013.00
Designated Emergency Shelter: Holy Family Roman Catholic Church 2001 Broadway (7d)	200	$1,401,830	$350,457.50	$140,183.0	$70,091.50
Designated Emergency Shelter: Grace Baptist Church of Emmetsburg 209 N State St (7e)	100	$895,770	$223,942.50	$89,577.0	$44,788.50
Designated Emergency Shelter: Saint Pauls Evangelical Lutheran Church 805 Harrison St (7f)	75	$951,020	$237,755.00	$95,102.0	$47,551.00
Designated Emergency Shelter: Veterans of Foreign Affairs Highway 4 W (7g)	100	$380,440	$95,110.00	$38,044.0	$19,022.00
Designated Emergency Shelter: Iowa Lakes Community College (7h)	1000	Value included with Community College (23)			
Wastewater Treatment (8)	10	$10,890,000	$2,722,500.00	$1,089,000.0	$544,500.00
Water Plant (9)	5	$3,117,000	$779,250.00	$311,700.0	$155,850.00
City Wells (10)	2	$291,000	$72,750.00	$29,100.0	$14,550.00
Electrical Substation (11)	2	$90,400	$22,600.00	$9,040.0	$4,520.00
Water Tower (12)	2	$1,466,300	$366,575.00	$146,630.0	$73,315.00
Outdoor Warning Siren (13)	0	$32,900	$8,225.00	$3,290.0	$1,645.00
Natural Gas Border Station (14)	5	$120,000	$30,000.00	$12,000.0	$6,000.00
Retirement Home/Assisted Living: Willow Ridge Senior Independent (15a)	57	Value included with Palo Alto County Hospital (4)			
Retirement Home/Assisted Living: Care Center 2601 17th Street (15b)	63	$625,580	$156,395.00	$62,558.0	$31,279.00
Retirement Home/Assistant Living: Emmetsburg Care center 2405 21st street (15c)	50	$1,262,520	$315,630.00	$126,252.0	$63,126.00
Retirement Home/Assistant Living:	50	$579,800	$144,950.00	$57,980.0	$28,990.00

Kathleen's Residential Care, 1505 5th Street (15d)					
Retirement Home/Assistant Living: Lakeside Lutheran Home 301 N Lawler Street (15e)	100	$1,955,140	$488,785.00	$195,514.0	$97,757.00
Little Learners Daycare (16)	35	Value included with Palo Alto County Hospital (4)			
Senior Center (17)	25	$226,090	$56,522.50	$22,609.0	$11,304.50
MaxYield- Ag Chemicals (18)	15	$593,300	$148,325.00	$59,330.0	$29,665.00
Head Start (19)	35	Value included with Community College (23)			
New Hope Daycare (20)	35	$50,600	$12,650.00	$5,060.0	$2,530.00
High/Middle School (21)	450	$8,599,180	$2,149,795.00	$859,918.0	$429,959.00
Elementary School (22)	300	$1,805,440	$451,360.00	$180,544.0	$90,272.00
Iowa Lakes Community College & Library & Wellness Center (23)	300	$20,017,130	$5,004,282.50	$2,001,713.0	$1,000,856.50

Graettinger Identified Critical Facilities

Facility Name	People at Facility at Peak Hours	Valuation (2010/2011)	Severity 25% of Total Structure Value for the following hazard:	Severity 10% of Total Structure Value for the following hazards: hailstorm, severe winter storm, river flood tornado and windstorm.	Severity 5% of Total Structure Value for the following hazards: drought, extreme heat, flash flood, thunderstorm & lightning, and grass and wildland fire fires
City Offices/ Ambulance/ Public Works	30	$480,978	$120,244.50	$48,097.80	$24,048.90
Fire Department	150	$185,000	$46,250.00	$18,500.00	$9,250.00
Palo Alto Co. Family Medical Clinic	20	$147,580	$36,895.00	$14,758.00	$7,379.00
Public Works Building	5	$269,462	$67,365.50	$26,946.20	$13,473.10
U.S. Post Office	10	$20,000	$5,000.00	$2,000.00	$1,000.00
EMS/Ambulance Shed	10	$100,000	$25,000.00	$10,000.00	$5,000.00
Lift Station	2	$20,000	$5,000.00	$2,000.00	$1,000.00
Wastewater Lagoons	2	$3,000,000	$750,000.00	$300,000.00	$150,000.00

Pool	150	$190,000	$47,500.00	$19,000.00	$9,500.00
City Wells	2	$104,204	$26,051.00	$10,420.40	$5,210.20
Electrical Substation	2	$234,330	$58,582.50	$23,433.00	$11,716.50
Water Tower	2	$339,534	$84,883.50	$33,953.40	$16,976.70
Outdoor Warning Sirens	n/a	$20,000	$5,000.00	$2,000.00	$1,000.00
Natural Gas Boarder Station	2	$36,647	$9,161.75	$3,664.70	$1,832.35
Library	25	$504,867	$126,216.75	$50,486.70	$25,243.35
Churches			$0.00	$0.00	$0.00
16a. United Methodist Church- 102 S. Cameron AVE	150	$675,770	$168,942.50	$67,577.00	$33,788.50
16b. Immaculate Conception Catholic Church- 503 W Olive Street	200	$2,058,020	$514,505.00	$205,802.00	$102,901.00
16c. Bethel Lutheran Church- 401 W Patterson Street	200	$1,396,110	$349,027.50	$139,611.00	$69,805.50
Graettinger-Terril School	300	$2,297,340	$574,335.00	$229,734.00	$114,867.00
Legion	150	$107,500	$26,875.00	$10,750.00	$5,375.00
Hydrus Detergent	10	$50,000	$12,500.00	$5,000.00	$2,500.00
Shavers	25	$545,130	$136,282.50	$54,513.00	$27,256.50
EPS	100	$2,076,140	$519,035.00	$207,614.00	$103,807.00
Street Department	5	$269,462	$67,365.50	$26,946.20	$13,473.10
Elevator	25	$3,509,682	$877,420.50	$350,968.20	$175,484.10
Park Shelters	150	$156,175	$39,043.75	$15,617.50	$7,808.75

Mallard Identified Critical Facilities

Facility Name	People at Facility at Peak Hours	Valuation (2010/2011)	Severity 25% of Total Structure Value for the following hazard:	Severity 10% of Total Structure Value for the following hazards: hailstorm, severe winter storm, tornado and windstorm.	Severity 5% of Total Structure Value for the following hazards: drought, extreme heat, flash flood, thunderstorm & lightning, and grass and wildland fire fires
Anhydrous Tanks/LP/Fertilizer	n/a	n/a			
$500,000.00	$125,000.00	$50,000.00	$25,000.00	$500,000.00	$125,000.00
$845,470.00	$211,367.50	$84,547.00	$42,273.50	$845,470.00	$211,367.50
$586,800.00	$146,700.00	$58,680.00	$29,340.00	$586,800.00	$146,700.00
$682,120.00	$170,530.00	$68,212.00	$34,106.00	$682,120.00	$170,530.00
$350,000.00	$87,500.00	$35,000.00	$17,500.00	$350,000.00	$87,500.00

$500,000.00	$125,000.00	$50,000.00	$25,000.00	$500,000.00	$125,000.00
$500,000.00	$125,000.00	$50,000.00	$25,000.00	$500,000.00	$125,000.00
$600,000.00	$150,000.00	$60,000.00	$30,000.00	$600,000.00	$150,000.00
$2,500,000.00	$625,000.00	$250,000.00	$125,000.00	$2,500,000.00	$625,000.00
$100,000.00	$25,000.00	$10,000.00	$5,000.00	$100,000.00	$25,000.00
$300,000.00	$75,000.00	$30,000.00	$15,000.00	$300,000.00	$75,000.00
$270,000.00	$67,500.00	$27,000.00	$13,500.00	$270,000.00	$67,500.00
$150,000.00	$37,500.00	$15,000.00	$7,500.00	$150,000.00	$37,500.00
$150,000.00	$37,500.00	$15,000.00	$7,500.00	$150,000.00	$37,500.00
n/a				n/a	
n/a				n/a	
$100,000.00	$25,000.00	$10,000.00	$5,000.00	$100,000.00	$25,000.00

Rodman Identified Critical Facilities

Facility Name	People at Facility at Peak Hours	Valuation (2010/2011)	Severity 25% of Total Structure Value for the following hazard:	Severity 10% of Total Structure Value for the following hazards: hailstorm, severe winter storm, tornado and windstorm.	Severity 5% of Total Structure Value for the following hazards: drought, extreme heat, flash flood, thunderstorm & lightning, and grass and wildland fire fires
Union Pacific RR	n/a	n/a	#VALUE!		
City Water Well	n/a	$200,000.00	$50,000.00	$20,000.00	$10,000.00
City Hall	25	$150,000.00	$37,500.00	$15,000.00	$7,500.00
Fire Station	75	$180,000.00	$45,000.00	$18,000.00	$9,000.00
Electrical Sub Station	2	$100,000.00	$25,000.00	$10,000.00	$5,000.00
Elevator (Max Yield)	5	$250,000.00	$62,500.00	$25,000.00	$12,500.00
Warning Siren	n/a	$20,000.00	$5,000.00	$2,000.00	$1,000.00

Ruthven Identified Critical Facilities

Facility Name	People at Facility at Peak Hours	Valuation (2010/2011)	Severity 25% of Total Structure Value for the following hazard:	Severity 10% of Total Structure Value for the following hazards: hailstorm, severe winter storm, tornado and windstorm.	Severity 5% of Total Structure Value for the following hazards: drought, extreme heat, flash flood, thunderstorm & lightning, and grass and wildland fire fires
School	150	$2,500,000.00	$625,000.00	$250,000.00	$125,000.00
Nursing Home	100	$1,600,000.00	$400,000.00	$160,000.00	$80,000.00
Daycare	35	$75,000.00	$18,750.00	$7,500.00	$3,750.00
Elevator	15	$450,000.00	$112,500.00	$45,000.00	$22,500.00
Water Tower	2	$250,000.00	$62,500.00	$25,000.00	$12,500.00
Outdoor Sirens	0	$75,000.00	$18,750.00	$7,500.00	$3,750.00
Fire Dept	100	$300,000.00	$75,000.00	$30,000.00	$15,000.00
Ambulance Shed	10	$100,000.00	$25,000.00	$10,000.00	$5,000.00
Social Center	50	$100,000.00	$25,000.00	$10,000.00	$5,000.00
Telephone	10	$500,000.00	$125,000.00	$50,000.00	$25,000.00
Catholic Church	100	$1,021,140.00	$255,285.00	$102,114.00	$51,057.00
Zion Lutheran Church	75	$999,580.00	$249,895.00	$99,958.00	$49,979.00
Methodist Church	100	$556,430.00	$139,107.50	$55,643.00	$27,821.50
Lakeland EZ	20	$250,000.00	$62,500.00	$25,000.00	$12,500.00
Oil company Coop	10	$250,000.00	$62,500.00	$25,000.00	$12,500.00
City Shed	50	$200,000.00	$50,000.00	$20,000.00	$10,000.00
Water Plant	2	$250,000.00	$62,500.00	$25,000.00	$12,500.00
Natural Gas Border Station	2	$200,000.00	$50,000.00	$20,000.00	$10,000.00
Pool/park	70	$350,000.00	$87,500.00	$35,000.00	$17,500.00
Wastewater Treatment	3	$500,000.00	$125,000.00	$50,000.00	$25,000.00
Wells	3	$500,000.00	$125,000.00	$50,000.00	$25,000.00
Electrical Substation	1	$100,000.00	$25,000.00	$10,000.00	$5,000.00

West Bend Identified Critical Facilities

Facility Name	People at Facility at Peak Hours	Valuation (2010/2011)	Severity 25% of Total Structure Value for the following hazard:	Severity 10% of Total Structure Value for the following hazards: hailstorm, severe winter storm, tornado and windstorm.	Severity 5% of Total Structure Value for the following hazards: drought, extreme heat, flash flood, thunderstorm & lightning, and grass and wildland fire fires
City Offices	12	$106,940.00	$26,735.00	$10,694.00	$5,347.00
Police/Fire Dept.	25	Included with City Offices			
Medical Clinic	10	$238,610.00	$59,652.50	$23,861.00	$11,930.50
Public Works/City Maintenance	6	$23,310.00	$5,827.50	$2,331.00	$1,165.50
		$98,100.00	$24,525.00	$9,810.00	$4,905.00
U.S. Post Office	10	$60,180.00	$15,045.00	$6,018.00	$3,009.00
EMS/Ambulance	10	Included with Medical Clinic			
Designated Emergency Shelter (West Bend School)	250	$3,953,620.00	$988,405.00	$395,362.00	$197,681.00
Water Plant/Wells	6	$545,000.00	$136,250.00	$54,500.00	$27,250.00
Water Tower	N/A	$379,400.00	$94,850.00	$37,940.00	$18,970.00
Apostolic Church	500	$689,169.00	$172,292.25	$68,916.90	$34,458.45
Peace Lutheran Church	75	$457,700.00	$114,425.00	$45,770.00	$22,885.00
SS Peter & Paul Catholic Church	400	$1,183,060.00	$295,765.00	$118,306.00	$59,153.00
United Methodist Church	50	$498,150.00	$124,537.50	$49,815.00	$24,907.50
West Bend Mallard School	250	$3,953,620.00	$988,405.00	$395,362.00	$197,681.00
Retirement Home/Assisted Living	80	$1,069,260.00	$267,315.00	$106,926.00	$53,463.00
		$940,120.00	$235,030.00	$94,012.00	$47,006.00
Daycare Center-Wolverine Den	25	$798,100.00	$199,525.00	$79,810.00	$39,905.00
Library	50	$120,750.00	$30,187.50	$12,075.00	$6,037.50
Highway 15	N/A	N/A			
Community Center	100	$237,010.00	$59,252.50	$23,701.00	$11,850.50
Max Yield Coop-Grain Storage	50	$793,880.00	$198,470.00	$79,388.00	$39,694.00
Grotto of the Redemption	500	$3,342,990.00	$835,747.50	$334,299.00	$167,149.50
Electric Plant	6	$8,750,000.00	$2,187,500.00	$875,000.00	$437,500.00

School District Identified Critical Facilities

Emmetsburg Catholic	Critical Facilities	Address	Peak # of people vulnerable	Estimated Replacement Value	0.25	0.1	0.05
	School	1903 S Broadway	135	$1,892,000.00	$473,000.00	$189,200.00	$94,600.00
	Corrigan Hall	1903 S Broadway	135	$2,308,000.00	$577,000.00	$230,800.00	$115,400.00
Emmetsburg Community	Critical Facilities	Address	Peak # of people vulnerable	Estimated Replacement Value	0.25	0.1	0.05
	W. Elementary	602 Call St	500	$3,500,000.00	$875,000.00	$350,000.00	$175,000.00
	High/Middle School	205 King St	400	$18,500,000.00	$4,625,000.00	$1,850,000.00	$925,000.00
	Bus Barn	205 King St	25	$380,000.00	$95,000.00	$38,000.00	$19,000.00
	Sports Complex	205 King St	2000	$460,000.00	$115,000.00	$46,000.00	$23,000.00
Graettinger Terril	Critical Facilities	Address	Peak # of people vulnerable	Estimated Replacement Value	0.25	0.1	0.05
	School	400 W lost Island Graet	195	$9,353,525.00	$2,338,381.25	$935,352.50	$467,676.25
	Shop building	400 W lost Island Graet	195	$399,387.00	$99,846.75	$39,938.70	$19,969.35
	Garage	301 N Lincoln Graet	20	$6,243.00	$1,560.75	$624.30	$312.15
	Bus Barn	Graet	35	$24,974.00	$6,243.50	$2,497.40	$1,248.70
	School k-12	101 S Schooley Terril	200	$4,413,694.00	$1,103,423.50	$441,369.40	$220,684.70
	Shop	Terril	15	$250,000.00	$62,500.00	$25,000.00	$12,500.00
Ruthven Ayrshire	Critical Facilities	Address	Peak # of people vulnerable	Estimated Replacement Value	0.25	0.1	0.05
	PK-12	1505 N Washington Ruthven	300	$569,639.00	$142,409.75	$56,963.90	$7,120.49
	CSD Industrial Tech	1505 N Washington Ruthven	28	$343,610.00	$85,902.50	$34,361.00	$4,295.13
	CSD Bus Barn	1401 N Washington Ruthven	4	$127,345.00	$31,836.25	$12,734.50	$1,591.81
	Athletic Complex	1103 Bruce St Ruthven	500	$9,271.00	$2,317.75	$927.10	$115.89
West Bend Mallard	Critical Facilities	Address	Peak # of people vulnerable	Estimated Replacement Value	0.25	0.1	0.05
	High/Middle School	303 3rd Av SW West Bend	260	$8,805,658.00	$2,201,414.50	$880,565.80	$440,282.90
	Elementary School	414 Micawber St Mallard	155	$7,032,181.00	$1,758,045.25	$703,218.10	$351,609.05

Section 6. Hazard Mitigation Goals

The participating jurisdiction planning committees identified the mitigation plan goals. The committee developed broad-based goals that would address a large number of hazards and cover a variety of mitigation activities. The hazard mitigation plan goals identified are as follows:

Goals to reduce or avoid long-term vulnerabilities to the identified hazards.
1. Injuries, sickness, deaths, property loss, utility services disruption and economic loss due to natural hazards will be reduced and mitigated against.
2. Protect against critical infrastructure and city/county assets from natural hazards.
3. Educating the public on the hazards that are associated and are most prone to cause a disturbance or result in damage in Palo Alto County.

The purpose of establishing goal statements is to set a general guideline for eliminating or reducing the long-term effects to property and life, reducing costs of response and recovery and minimizing disruption to all of Palo Alto County following a natural hazard event. Goal statements do not spell out specific strategies that can be measured but are written in general terms. Mitigation actions or measures are designed to be measured. The subsections of the hazards worksheets sections, i.e., historical occurrence, probability, vulnerability, maximum extent, severity, and speed of onset (which form the methodology of the assessment) were consulted as necessary.

The planning committee reviewed all previous goals from approved plans and all previous goals were thrown out. Although some were similar to these new goals, it was concluded by the planning committee that these goals were better in representing the needs of County and participating jurisdictions. Also one reoccurring goal in the older plans was dealing with manmade or technical hazards which are not represented in this plan and therefore not needed. The individual jurisdictions then accepted the new goals for each of their respective communities.

The mitigation actions from the 2005/2007 plans were reviewed for relevance. Most off the actions were for technical hazards that are no longer in the multijurisdictional plan and were not included in this plan update. Typically in the development of multijurisdictional hazard mitigation plans, often include ideas from the 2005/2007 plan, but the changes between the 2005/2007 and 2013 warranted developing even more useful actions for the natural hazards selected. Those mitigation actions from those plans are attached in the Appendix and described if they were completed, ongoing or deleted at this point in time. Most of the actions from those plans were never completed because of the lack of resources and time. A good portion of them have been included in this multijurisdictional plan and the committees hope to have more resources and time to be able to complete more mitigation actions in the near future. The mitigation actions for natural hazards that are in the FEMA approved Cylinder, Mallard and Rodman plan have been carried over into this plan since, they have not completed any to date. There haven't been sufficient funds or time to complete any of their actions. The mitigation actions have a better time of getting funded in the future if there is FEMA funds available since they won't be competing with man made or technical hazards. Funding will hopefully be for natural hazards only, helping make it more successful for those that apply for funding.

The following two tables are showing the abbreviations used for the local jurisdictions and a number system for the natural hazards.

Table 6.1. - Jurisdiction Abbreviation In This Plan					
Palo Alto County	=	PAC	Graettinger	=	GR

Ayrshire	=	AY	Mallard	=	MA
Curlew	=	CU	Rodman	=	RO
Cylinder	=	CY	Ruthven	=	RU
Emmetsburg	=	EM	West Bend	=	WB
Schools					
Emmetsburg Catholic	=	ECA	Ruthven – Ayrshire	=	RAS
Emmetsburg Community	=	ECO	West Bend - Mallard	=	WBM
Graettinger - Terril	=	GTS			

Table 6.2 – Natural Hazards by Number					
1	=	Drought	7	=	Severe Winter Storm
2	=	Expansive Soils	8	=	Thunderstorm and Lightning
3	=	Extreme Heat	9	=	Tornado
4	=	Flash Flood	10	=	Windstorm
5	=	Hailstorm	11	=	Dam Failure
6	=	River Flood	12	=	Grass of Wildland Fire

SECTION 6.1 MITIGATION ACTIONS

To be able to complete or help meet the goals of the Palo Alto County Multi-Hazard Mitigation Plan, different mitigation measures were developed. The following table shows those mitigation actions and what actions are to be followed by what entity.

Table 6.3

Mitigation Action	Communities Choosing this Mitigation	Hazards Addressed	Category	Corresponding Goal
Conduct sump pump study to ensure building sump pumps are not connected to sanitary sewer system.	WB	4, 6, 8	Prevention	1, 2
Raising manholes to help prevent sewer backup into home and businesses.	WB	4, 6, 8	Structural Project	1, 2
Make improvements to the City's sanitary sewer collection system	EM, GR, WB	4, 6, 8	Structural Project	1, 2
Perform video televising of the collection system	WB	4, 6, 8	Prevention	1, 2
Educate the public about the hazard risks of natural hazards (public awareness)	ALL	ALL	Public Education and Awareness	1, 3
Continue storm spotter training/education for firefighters, police and other City officials.	ALL	5, 8, 9	Prevention	1, 3
Promote the use of NOAA radios and/or buy	PAC, AY, CU, GR, WB,ECA, ECO, GTS, RAS, WBM	3, 4, 5, 7, 8, 9, 41	Public Education and Awareness	1, 3
Enforce snow ordinances	CY, GR, WB	7	Prevention	1, 2, 3
Enforce tree trimming	PAC, CU, CY, EM, GR, MA, WB	5, 7, 8, 9, 10	Prevention	1, 2
Upgrade or install new warning sirens	PAC, CU, CY, EM, GR, RO, RU,WB	5, 8, 9, 10	Prevention	1
Hold fundraisers and apply for Palo Alto Gaming grants for updates to warning sirens.	WB	5, 8, 9, 10	Prevention	1, 3
Purchase generator(s)	ALL	3, 4, 5, 6, 7, 8, 9, 10	Prevention	1, 2

Backup city records	CU, EM, RO, RU	4, 5, 6, 7, 8, 9, 10	Prevention	1, 2
Implement good neighbor program/list of persons needing special attention	PAC, AY, CU, CY, EM, GR, RO, RU	1, 3, 4, 6, 7, 8, 9,10, 12	Public Education and Awareness	1, 2, 3
Have a debris management program/plan/sites/equipment	PAC, AY, CY, MA, RO, RU	4, 5, 6, 7, 8, 9, 10	Emergency Services	2
Construct FEMA safe room(s)	PAC, CU, CY, EM, GR, RO, RU	8, 9, 10	Property Protection	1
Purchase fire equipment/apparatus	AY, EM, GR, RO, RU, WB	9, 12	Emergency Services	1
Fire/EMT training	PAC, AY, EM, GR, RO RU, WB	9, 12	Emergency Services	1
Encourage energy/communications companies for improvements	PAC, MA, RO	3, 5, 7, 8, 9, 10, 12	Prevention	1, 2
Bury Utility lines	GR, MA	3, 5, 7, 8, 9, 10, 12	Structural Project	1, 2
Upgrade snow removal equipment(purchase)	PAC, CU, GR, MA	7	Emergency Services	1, 2
Designate gathering points(storm shelter) after events	PAC, AY, CU, MA	5, 8, 9, 10	Public Education and Awareness	1
Exercise disaster response training	GR	4, 6, 8, 9, 10, 12	Emergency Services	1, 3
Establish a cell phone program for alerts.	PAC, CU, EM	ALL	Public Education and Awareness	1, 3
Establish SOP's for road closures	EM	4, 6, 7	Prevention	1, 3
Purchase barricades and other traffic equipment	EM	4, 6, 7	Emergency Services	1
Update County and City flood maps	PAC	4, 6	Property Protection	1, 2
Limit development in the floodplain	PAC	4, 6	Property Protection	2
Look into getting map for flood plain maps	AY, CU, CY, GR, MA, RO, RU, WB	4, 6	Property Protection	2, 3
Install riprap to protect against soil erosion due to flooding	PAC	4, 6	Natural Resource Protection	1
Replace bridges and culverts that contribute to flooding	PAC	4, 6	Natural Resource Protection	1, 2
Raise grades to eliminate backup flooding	PAC	4, 6	Natural Resource Protection	1, 2
Develop study for river channels	PAC	4, 6	Natural Resource Protection	2
Enforce floodplain regulations	PAC, EM	4, 6	Prevention	1, 3
Close flooded roads and add signage	EM	4, 6	Emergency Services	1, 3
Purchase sandbagging equipment and appropriate accessory equipment	EM	4, 6	Prevention	1, 2
Inspection plan of all public buildings	EM	5, 7, 8, 9, 10	Public Education and Awareness	1, 2
Keep Palo Alto operations Plan up to date	EM	ALL	Prevention	1, 3
Utilize burn ban when needed	AY, EM	1, 12	Natural Resource Protection	1, 2

Develop Plans to address utility outages and emergencies	AY	3, 7, 8, 9, 10	Prevention	1, 2
Maintain/update plan to contact utility companies	AY	3, 7, 8, 9, 10	Prevention	2
Remove dead vegetation	AY	12	Property Protection	2
Install hydrants	RO	12	Property Protection	2
Coordinate mutual aid in county	RO	12	Emergency Services	1, 2
Purchase portable pumps	CY	4, 5	Emergency Services	1, 2
Install GPS in emergency vehicles	PAC	7, 8, 9	Emergency Services	2
create cable television weather advisories	PAC	1, 3, 4, 5, 6, 7, 8, 9, 10, 12	Public Education and Awareness	1, 2
Indoor warning sirens/equipment for schools	RAS, ECO, WBM	3, 5, 7, 8, 9, 10	Prevention	1, 2, 3
Training & exercises for student and teachers. Informational handouts.	ECA, ECO, GTS, RAS, WBM	3, 4, 5, 7, 8, 9, 10	Prevention	1, 3

Mitigation Measures

The identified mitigation measures can be grouped into six categories. The Palo Alto County Mitigation Actions Table identifies which group a specific measure falls within.

Prevention

Government administrative or regulatory measures or processes that influence the way land and buildings are developed and built. These measures also include public activities to reduce hazard losses. Examples include:

- Planning and zoning
- Hazard mapping
- Building codes
- Subdivision regulations
- Studies/data collection and analysis to support prevention measures
- Floodplain regulations
- Storm water management regulations
- Multi-jurisdictional agreements that reduce hazard risks
- Other regulatory measures or processes that reduce hazard risks

Property Protection

Measures that involve modifying existing buildings or structures to protect them from a hazard, or removing buildings or structures from the hazard area or providing insurance to cover potential losses. Examples include:

- Acquisition, elevation, or relocation of hazard-prone property
- Safe room/storm shelter retrofits
- Security retrofits
- Critical facility protection
- Risk reduction retrofits (modifications) to hazard prone properties
- Studies/data collection and analysis to develop property protection measures

- National Flood Insurance Program (NFIP) participation

Public Education and Awareness

Measures to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Examples include:

- Programs to improve awareness of hazard risk
- Programs to improve awareness of hazard risk prevention and reduction
- Education programs directed toward specialized audience, i.e. buildings, developers, and hazard prone neighborhoods

Natural Resource Protection

Measures that, in addition to minimizing hazard losses; preserve or restore the functions of natural systems. Examples include:

- Sediment and erosion control
- Stream corridor restoration, watershed management
- Forest and vegetation management
- Wetland restoration and preservation

Emergency Services and Clean up Effort

Measures taken before, during and after a hazard event to protect people, and property; although these measures are not typically considered "mitigation, they significantly minimize the events impact and preserve the community's health and safety. Examples include:

- Emergency/response facilities and personnel
- Hazard warning systems and equipment
- Health/safety/environmental risk prevention/reduction
- Emergency/response infrastructure
- Emergency/response planning
- Emergency/response training
- Emergency/response vehicles, equipment and protective gear
- Emergency/response services studies and data collection
- Emergency/response communication systems
- Equipment to clean up

Structural Projects

Measures that involve the construction and maintenance of structures and infrastructure that will reduce the impact of a hazard or redirect the impact away from people and property. Examples include:

- Channel modification/maintenance
- Dam and reservoir construction/maintenance
- Levee and floodwall construction and maintenance
- Safe room construction
- Infrastructure construction and maintenance — roads and bridges
- Infrastructure construction and maintenance — utility systems
- Infrastructure construction and maintenance — urban and rural drainage systems
- Studies and data collection to develop structural projects

SECTION 6.2 STAPLEE

STAPLEE is an evaluation tool explained in the FEMA How to Guide, 386-3 to re-evaluate and prioritize mitigation measures. This tool is also used by local communities to evaluate and prioritize mitigation measures selected for inclusion in local mitigation plans. This is how the Mahaska County Planning Team wished to evaluate the mitigation actions and strategies that were discussed in mitigation meetings. This acronym indicates the various factors that should be considered in planning decisions standing for Social, Technical, Administrative, Political, Legal, Economic, and Environmental elements.

Explanation of STAPLEE

S - Social

Is the proposed mitigation action acceptable to the community?
Will the measure treat all individuals and groups equitably?
Will the measure result in an inadvertent negative treatment of one or more segments of the population?

T - Technical

Will the measure reduce losses in the long-term?
Is the measure a whole or partial solution to the problem?
Does the measure solve the problem instead of the symptoms?

A - Administrative

Do the agencies responsible for implementing the measure have the skill, experience, knowledge, ability, staffing, funding, and maintenance capability to do so?

P - Political

Does the measure have the support of elected officials, public or private agencies, and the general public?

L - Legal

Does the jurisdiction responsible for implementing the measure have the legal authority to do so?

Is there a legal basis (local code/ordinance, state law, or federal law] for the measure?

E - Economic

Do the measure's benefits exceed the costs?
Does the measure contribute to the overall economic goals of the community?
Are there current sources of funds to implement the measure?
Will the measure impose an increased burden on the tax base or the local economy?

E - Environmental

How does the measure impact the natural environment?
Does the measure comply with local, state, and federal environmental laws?
Is the measure consistent with current environmental goals?

Table 6.4 - STAPLEE		S	T	A	P	L	E	E	
Hazard Addressed	Mitigation Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total Score
4, 6, 8	Conduct sump pump study to ensure building sump pumps are not connected to sanitary sewer system.	+	0	0	+	+	-	+	+2
4, 6, 8	Raising manholes to help prevent sewer backup into home and businesses.	+	-	0	+	+	-	+	+1
4, 6, 8	Make improvements to the City's sanitary sewer collection system	+	+	0	+	+	-	+	+4
4, 6, 8	Perform video televising of the collection system	+	0	0	0	+	0	+	+3
ALL	Educate the public about the hazard risks of natural hazards (public awareness)	+	+	+	+	+	+	+	+7
5, 8, 9	Continue storm spotter training/education for firefighters, police and other City officials.	+	0	+	+	+	+	0	+5
3, 4, 5, 7, 8, 9, 41	Promote the use of NOAA radios and/or buy	+	0	+	+	+	+	0	+5
7	Enforce snow ordinances	+	0	+	+	0	+	0	+4
5, 7, 8, 9, 10	Enforce tree trimming	+	0	+	+	+	+	+	+6
5, 8, 9, 10	Upgrade or install new warning sirens	+	+	+	+	+	+	0	+6
5, 8, 9, 10	Hold fundraisers and apply for Palo Alto Gaming grants for updates to warning sirens.	+	0	+	+	0	+	0	+4
3, 4, 5, 6, 7, 8, 9, 10	Purchase generator(s)	+	+	0	+	0	+	+	+5
4, 5, 6, 7, 8, 9, 10	Backup city records	+	+	+	+	0	+	0	+5
1, 3, 4, 6, 7, 8, 9,10, 12	Implement good neighbor program/list of persons needing special attention	+	0	+	+	0	+	0	+4
4, 5, 6, 7, 8, 9, 10	Have a debris management program/plan/sites/equipment	+	0	+	+	0	+	+	+5
8, 9, 10	Construct FEMA safe room(s)	+	+	0	+	0	-	0	+2
9, 12	Purchase fire equipment/apparatus	+	+	+	+	+	-	0	+4
9, 12	Fire/EMT training	+	0	+	+	+	+	+	+6
3, 5, 7, 8, 9, 10, 12	Encourage energy/communications companies for improvements	+	+	+	+	0	0	+	+5
3, 5, 7, 8, 9, 10, 12	Bury Utility lines	+	+	0	0	0	-	+	+2
7	Upgrade snow removal equipment(purchase)	+	0	0	+	+	-	0	+2
5, 8, 9, 10	Designate gathering points(storm shelter) after events	+	0	+	+	0	+	0	+4
4, 6, 8, 9, 10, 12	Exercise disaster response training	+	0	0	+	0	+	0	+3
ALL	Establish a cell phone program for alerts.	+	0	+	+	0	+	0	+4
4, 6, 7	Establish SOP's for road closures	+	0	+	+	0	0	0	+3
4, 6, 7	Purchase barricades and other traffic equipment	+	0	0	+	0	0	0	+2

4, 6	Update County and City flood maps	+	0	0	+	0	0	+	+3
4, 6	Limit development in the floodplain	+	0	0	+	+	0	+	+4
4, 6	Look into getting map for flood plain maps	+	0	0	+	0	0	+	+3
4, 6	Install riprap to protect against soil erosion due to flooding	+	+	0	+	0	0	+	+4
4, 6	Replace bridges and culverts that contribute to flooding	+	+	+	+	0	-	+	+4
4, 6	Raise grades to eliminate backup flooding	+	+	0	+	0	-	+	+3
4, 6	Develop study for river channels	+	0	0	+	0	-	+	+2
4, 6	Enforce floodplain regulations	+	0	+	+	0	+	+	+5
4, 6	Close flooded roads and add signage	+	0	+	+	+	+	0	+5
4, 6	Purchase sandbagging equipment and appropriate accessory equipment	+	0	0	+	0	0	0	+2
5, 7, 8, 9, 10	Inspection plan of all public buildings	+	0	+	+	0	+	0	+4
ALL	Keep Palo Alto operations Plan up to date	+	0	+	+	0	+	0	+4
1, 12	Utilize burn ban when needed	+	+	+	+	+	+	+	+7
3, 7, 8, 9, 10	Develop Plans to address utility outages and emergencies	+	0	+	+	0	+	0	+4
3, 7, 8, 9, 10	Maintain/update plan to contact utility companies	+	0	+	+	0	0	0	+3
12	Remove dead vegetation	+	0	+	+	0	0	+	+4
12	Install hydrants	+	0	0	+	0	0	0	+2
12	Coordinate mutual aid in county	+	0	+	+	0	0	0	+3
4, 5	Purchase portable pumps	+	0	+	+	0	0	0	+3
7, 8, 9	Install GPS in emergency vehicles	+	0	+	+	0	0	0	+3
1, 3, 4, 5, 6, 7, 8, 9, 10, 12	create cable television weather advisories	+	0	+	+	+	+	0	+5
3, 5, 7, 8, 9, 10	Indoor warning sirens/equipment for schools	+	+	+	+	+	+	+	+7
3, 4, 5, 7, 8, 9, 10	Training & exercises for student and teachers. Informational handouts.	+	+	+	+	+	+	+	+7

Responsible Entity & Funding Source:

Responsible Entity, Cost Estimates and Funding Sources for Mitigation Actions		
Funding Source	**Cost Estimates**	**Responsible Party***
G- Grant B- Local Budget T- Local Time OS- Outside Source - other	Estimates were given by the Palo Alto County Hazard Mitigation Planning Team Unknown N/A-Little or No Known Additional Costs	LJ - Local Jurisdiction (Clerk, Mayor, Council, Public Works) FD- Volunteer Fire Department ST- State of Iowa HUD- U.S. Dept. of Housing and Urban Development HLSEM- Iowa Homeland Security Emergency Management FEMA- Federal Emergency Management Agency Hazmat- Hazardous Materials Response Team from Mason City IDOT- Iowa Department of Transportation NWS- National Weather Service EM- Palo Alto County Emergency Management UC- Utility Company PD- Police Department/Sheriff

***** For those responsible for implementing and administering the mitigation actions when it states Local Jurisdiction (LJ) it means that the communities are small and don't have the full personnel to designate the action to a single person and will have to be a group effort for the local jurisdiction. Therefore the broad category of LJ was used.

6.3 Funding Sources and Average Cost of Mitigation Actions

Table 6.5 – Cost, Funding Source, Responsibility

	Estimated Cost	Funding Source	Responsible Party
Conduct sump pump study to ensure building sump pumps are not connected to sanitary sewer system.	$15,000.00	B, OS	LJ, DNR
Raising manholes to help prevent sewer backup into home and businesses.	$200,000.00	G, B	LJ, ST, DNR, UC
Make improvements to the City's sanitary sewer collection system	$1,000,000.00	G, B	LJ, ST, DNR, UC
Perform video televising of the collection system	$50,000.00	B, OS	LJ, DNR
Educate the public about the hazard risks of natural hazards (public awareness)	Varies	B, T	LJ, HLSEM, FEMA, EM
Continue storm spotter training/education for firefighters, police and other City officials.	$5,000.00	B, G	LJ, FD, PD, HLSEM, EM
Promote the use of NOAA radios and/or buy	$1,000.00	B, T, G	LJ, FD, PD, EM
Enforce snow ordinances	n/a	B	LJ, PD
Enforce tree trimming	n/a	B	LJ, PD
Upgrade or install new warning sirens	Varies	B, G	LJ, HLSEM, FEMA, EM
Hold fundraisers and apply for Palo Alto Gaming grants for updates to warning sirens.	n/a	B	LJ
Purchase generator(s)	$20,000+	B, G, OS	LJ, HLSEM, FEMA, EM
Backup city records	n/a	B	LJ
Implement good neighbor program/list of persons needing special attention	n/a	B, T	LJ, FD, PD, EM
Have a debris management program/plan/sites/equipment	$1,000.00	B, G, T	LJ
Construct FEMA safe room(s)	$500,000+	B, G, OS	LJ, HLSEM, FEMA, EM
Purchase fire equipment /apparatus	$20k-$500k	B, G, OS	LJ, FD, HLSEM
Fire/EMT training	$5,000.00	B, OS	LJ, FD, HLSEM
Encourage energy/communications companies for improvements	n/a	B	LJ, UC, HLSEM

Bury Utility lines	Millions	G, OS	LJ, UC, HLSEM
Upgrade snow removal equipment(purchase)	$150,000+	B, G, OS	LJ, HLSEM, EM
Designate gathering points(storm shelter) after events	n/a	B	LJ, EM
Exercise disaster response training	$2,000.00	B, G, OS	LJ, FD, PD, EM
Establish a cell phone program for alerts.	$2,000.00	B	LJ, FD, PD, EM
Establish SOP's for road closures	n/a	B	LJ, FD, PD, EM
Purchase barricades and other traffic equipment	$25,000.00	B, G, OS	LJ, HLSEM, EM
Update County and City flood maps	$50,000+	G, OS	LJ, DNR, EM
Limit development in the floodplain	n/a	B	LJ, DNR
Look into getting map for flood plain maps	n/a	B	LJ, DNR, EM
Install riprap to protect against soil erosion due to flooding	$100,000.00	B, G, OS	LJ, DNR, EM, HLSEM
Replace birdges and culverts that contribute to flooding	Millions	B, G, OS	LJ, DNR, EM, HLSEM
Raise grades to elminate backup flooding	Millions	B, G, OS	LJ, DNR, EM, HLSEM
Develop study for river channels	$100,000.00	G, OS	LJ, DNR, EM, HLSEM
Enforce floodplain regulations	n/a	B	LJ, EM
Close flooded roads and add signage	$10,000.00	B	LJ, PD, EM
Purchase sandbagging equipment and appropriate accessory equipment	$25,000.00	B, G, OS	LJ HMSEM
Inspection plan of all public buildings	n/a	B	LJ, EM, FD
Keep Palo Alto operations Plan up to date	n/a	B	LJ, EM
Utilize burn ban when needed	n/a	B	LJ, EM
Develop Plans to address utility outages and emergencies	n/a	B	LJ, EM
Maintain/update plan to contact utility companies	n/a	B	LJ
Remove dead vegetation	$20,000.00	B, G, OS	LJ, DNR
Install hydrants	$50,000.00	B, G, OS	LJ, FD, HLSEM
Coordinate mutual aid in county	n/a	B	FD, EM
Purchase portable pumps	$15k each	B, G, OS	FD, EM, LJ, HLSEM
Install GPS in emergency vehicles	$45,000.00	B, G, OS	LJ, FD, PD, EM HLSEM
Create cable television weather advisories	$2,000.00	B	LJ, EM
Indoor warning sirens/equipment for schools	$10,000+	B, G	LJ, EM
Training & exercises for student and teachers. Informational handouts.	$5,000+	B, G	LJ, EM

6.4 Priority of Mitigation Actions

Priority was established by each jurisdiction and displayed in the following table. The committees determined the level of priority into three groups of high, medium and low. They based this on the completed STAPLEE for each mitigation action, knowledge of future jurisdiction funds,

Priority Ranking

High (H) – Jurisdictions valued this as something that had the highest effect on helping the community and people survive severe weather events. Also the cost could be easily obtained or funding has already been set aside.

Medium (M) – These were valued at the jurisdictions as projects that where ranked in between the other two priority groups.

Low (L) – These mitigation actions have the least effect on protecting human life from severe weather events and therefore have been given the lowest priority. Or the cost is too high at this point in time and makes it unlikely to be acted upon in present future.

Implementation Schedule for the mitigation activities, whether ongoing or considered, will be subject to the availability of Federal, State, and local funding.

Continuing (ON) = Ongoing (responsible entity regularly participates in or supports)
Short Term (ST) = 1-5 years to initiate or accomplish
Long Term (LT) = 5 or more years to initiate or accomplish

Table 6.6 - Action Priority and Implementation Schedule

Mitigation Action / City	Unincorporated Palo Alto Co	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend
Conduct sump pump study to ensure building sump pumps are not connected to sanitary sewer system.										M LT
Raising manholes to help prevent sewer backup into home and businesses.										
Make improvements to the City's sanitary sewer collection system					M LT	L LT				L LT
Perform video televising of the collection system										x
Educate the public about the hazard risks of natural hazards (public awareness)	H ON	H ON	H ON	H ON	H ON	H ON	H ON	H ON	H ON	H ON
Continue storm spotter training/education for firefighters, police and other City officials.	H ON	H ON	H ON	H ON	H ON	H ON	H ON	H ON	H ON	H ON
Promote the use of NOAA radios and/or buy	M ON	M ST	M ST			M ST				M ON
Enforce snow ordinances				M ON		M ON				H ON
Enforce tree trimming	L ON		L ST	L ST	M ON	L ST	L ST			L ST
Upgrade or install new warning sirens	M ON		M ST	M ST	M ST	M ST		M ST	M ST	M ST
Hold fundraisers and apply for Palo Alto Gaming grants for updates to warning sirens.										M ON
Purchase generator(s)	M ON	M ST	M ST	M LT	M ST	M ST	M ST	M LT	M LT	M ST
Backup city records			M ST		M ON			L ST	M ON	
Implement good neighbor program/list of persons needing special attention	M ST	M ST	H ST	M ST	M ON	M ON		L ST	M ST	
Have a debris management program/plan/sites/equipment	M ST	M LT		M ST			M ST	L LT	M ST	
Construct FEMA safe room(s)	L LT		L LT	L LT	M LT	M LT		L LT	M LT	
Purchase fire equipment /apparatus		M LT			M LT	M LT		M LT	M LT	M LT
Fire/EMT training	M ON	M ON			M ON	M ON		M ON	M ON	M ON
Encourage energy/communications companies for improvements	M ST						M ON	M ST		
Bury Utility lines						M LT	L LT			

Upgrade snow removal equipment(purchase)	H ST		M ST			M ST	M ST			
Designate gathering points(storm shelter) after events	M ST	M ON	M ON				M ST			
Exercise disaster response training						M ST				
Establish a cell phone program for alerts.	M ST		M ST		M ST					
Establish SOP's for road closures					M ST					
Purchase barricades and other traffic equipment					M ST					
Update County and City flood maps	M LT									
Limit development in the floodplain	M ON									
Look into getting map for flood plain maps		L LT	L LT	L LT		L LT	L LT	L LT	L LT	L LT
Install riprap to protect against soil erosion due to flooding	L LT									
Replace bridges and culverts that contribute to flooding	L LT									
Raise grades to eliminate backup flooding	L LT									
Develop study for river channels	L LT									
Enforce floodplain regulations	M ON				M ON					
Close flooded roads and add signage					L ST					
Purchase sandbagging equipment and appropriate accessory equipment					M ST					
Inspection plan of all public buildings					M ON					
Keep Palo Alto operations Plan up to date					M ON					
Mitigation Action	PAC	AY	CU	CY	EM	GR	MA	RO	RU	WB
Utilize burn ban when needed		M ON			M ON					
Develop Plans to address utility outages and emergencies		M ON								
Maintain/update plan to contact utility companies		M ON								
Remove dead vegetation		L LT								
Install hydrants								M LT		
Coordinate mutual aid in county								M ON		
Purchase portable pumps				M ST						
Install GPS in emergency vehicles	M ST									
Create cable television weather advisories	M									

	ON									

Mitigation Action Schools	ECA	ECO	GTS	RAS	WBM
Indoor warning sirens/equipment for schools		M ST		M ST	M ST
Training & exercises for student and teachers. Informational handouts.	M ON	M ON	M ON	M ON	M ON
Promote NOAA radios or purchase	M ST	M ST	M ST		M ST

Section 7. National Flood Insurance Program (NFIP)

In 1968, Congress created the National Flood Insurance Program (NFIP) to help provide a means for property owners to financially protect themselves. The NFIP offers flood insurance to homeowners, renters, and business owners if their community participates in the NFIP. Participating communities agree to adopt and enforce ordinances that meet or exceed FEMA requirements to reduce the risk of flooding.

The National Flood Insurance Program (NFIP) is administered by the Federal Emergency Management Agency (FEMA), which works closely with nearly 90 private insurance companies to offer flood insurance to property owners and renters. In order to qualify for flood insurance, a community must join the NFIP and agree to enforce sound floodplain management standards.

NFIP is a federal program that offers flood insurance which can be purchased through property and casualty insurance agents. Rates are set and do not differ from company to company or agent to agent. These rates depend on many factors, which include the date and type of construction of your home, along with your buildings level of risk.

The NFIP does more than make flood insurance available; it also supports local communities in their efforts to reduce the risk and consequences of serious flooding. In order to participate in the NFIP, a community must agree to adopt and enforce sound floodplain management regulations and ordinances. In exchange for these practices, FEMA makes flood insurance available to homeowners, business owners and renters in these communities.

Congress mandated federally regulated or insured lenders to require flood insurance on properties that are located in areas at high risk of flooding. A lender can require flood insurance, even if it is not federally required. Insurance requirements for different flood risk areas include: residents of high-risk areas and residents of moderate-to-low risk areas.

Residents of High-Risk Areas: Homes and buildings in high-risk flood areas with mortgages from federally regulated or insured lenders are required to have flood insurance. These areas have a 1% or greater chance of flooding in any given year, which is equivalent to a 26% chance of flooding during a 30-year mortgage.

Residents of Moderate-to-Low Risk Areas: Homes and businesses located in moderate-to-low risk areas that have mortgages from federally regulated or insured lenders are typically not required to have flood insurance. However, flood insurance is highly recommended because anyone can be financially vulnerable to floods. People outside of high-risk areas file over 20% of NFIP claims and receive one-third of disaster assistance for flooding. When it's available, disaster assistance is typically a loan you must repay with interest.

Building versus Contents Coverage

Flood insurance protects two types of insurable property: building and contents. The first covers your building, the latter covers your possessions; neither covers the land they occupy.

Building coverage includes:

- The insured building and its foundation
- The electrical and plumbing system
- Central air conditioning equipment, furnaces, and water heaters
- Refrigerators, cooking stoves, and built-in appliances such as dishwashers
- Permanently installed carpeting over unfinished flooring

Contents coverage includes:

- Clothing, furniture, and electronic equipment
- Curtains
- Portable and window air conditioners
- Portable microwaves and dishwashers
- Carpeting that is not already included in property coverage
- Clothing washers and dryers

The two most common reimbursement methods for flood claims are: Replacement Cost Value (RCV) and Actual Cash Value (ACV). The RCV is the cost to replace damaged property. It is reimbursable to owners of single-family, primary residences insured to within 80% of the buildings replacement cost. All other buildings and personal property (i.e. contents) are valued at ACV. The ACV is the RCV at the time of loss minus physical depreciation. Personal property is always valued using the ACV.

What a community must do to join NFIP

- Complete the application for participation in the National Flood Insurance Program(FEMA 81-64)
  - This application includes information such as the community name, chief executive officer, person responsible for administering the community's floodplain management program, community repository for public inspection of flood maps and estimates of land area, population and number of structures in and out of the floodplain.
- Resolution of Intent
  - There must be a resolution of intent adopted, which indicates an explicit desire to participate in the NFIP and commitment to recognize flood hazards and carry out the objectives of the program.
- Floodplain Management Regulations
  - The community must adopt and submit floodplain management regulations that meet or exceed the minimum flood plain management requirements of the NFIP.

Below is a chart of the communities in Palo Alto County that are participating in the NFIP.

Table 7.1 -NFIP Community Information

Community	Palo Alto County	Ayrshire	Curlew	Cylinder	Emmetsburg	Graettinger	Mallard	Rodman	Ruthven	West Bend
CID	190898	190699	n/a	n/a	190221	190929	190774	n/a	190650	190475
Status	Participating	Not Participating	Not Participating	Not Participating	Participating	Not Participating	Not Participating	n/a	Not Participating	Not Participating
Status Effective	11/18/02	08/13/76	9/1/87	7/16/76	7/16/87	3/25/99	3/25/99	n/a	8/13/76	8/6/76
Initial Firm	9/1/96	Never	9/1/87	None	7/16/87	None	n/a	n/a	None	n/a
Initial FHBM	5/17/77	8/13/76	7/30/76	7/16/76	6/28/74	n/a	n/a	n/a	8/13/76	8/6/76
Study Underway	Yes	No	No	No	Yes	No	No	No	No	No
Policies In Force	0	0	0	0	5	0	0	0	0	0
Insurance In Force	$0	$0	$0	$0	$1,201,000	$0	$0	$0	$0	$0
# of Paid Losses	0	0	0	0	0	0	0	0	0	0
Total Losses Paid	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

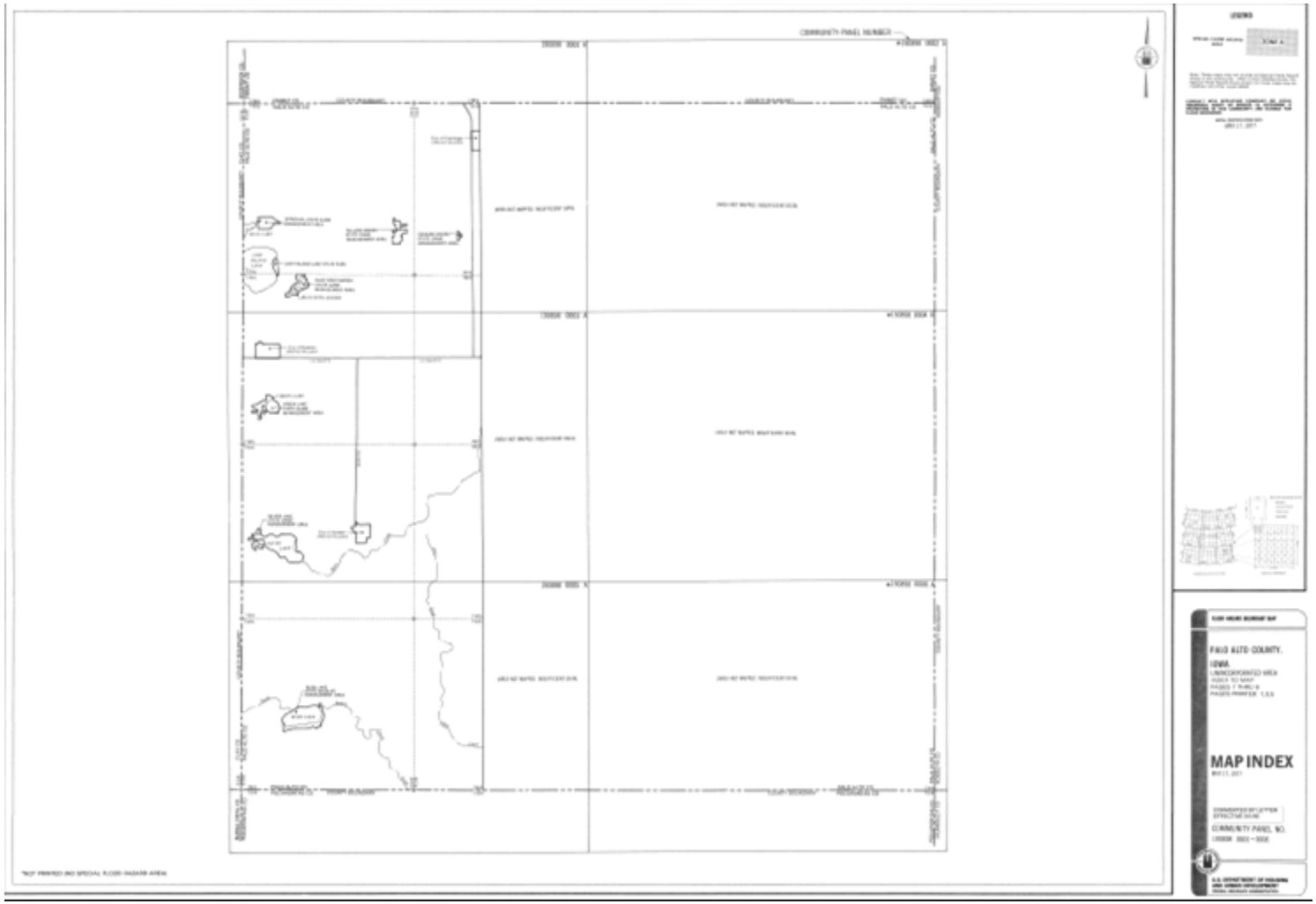
In support of the NFIP, FEMA identifies flood hazard areas through the US and its territories by producing Flood Hazard Boundary Maps (FHNMs), Flood Insurance Maps (FIRMs) and Flood Boundary and Floodway Maps (FBFMs). Several areas of flood hazards are commonly identified on these maps. One of these areas is the Special Flood Hazard Area (SFHA) or high risk area defined as any land that would be inundated by a flood having a 1% chance of occurring any given year (also referred to as a the base flood level).

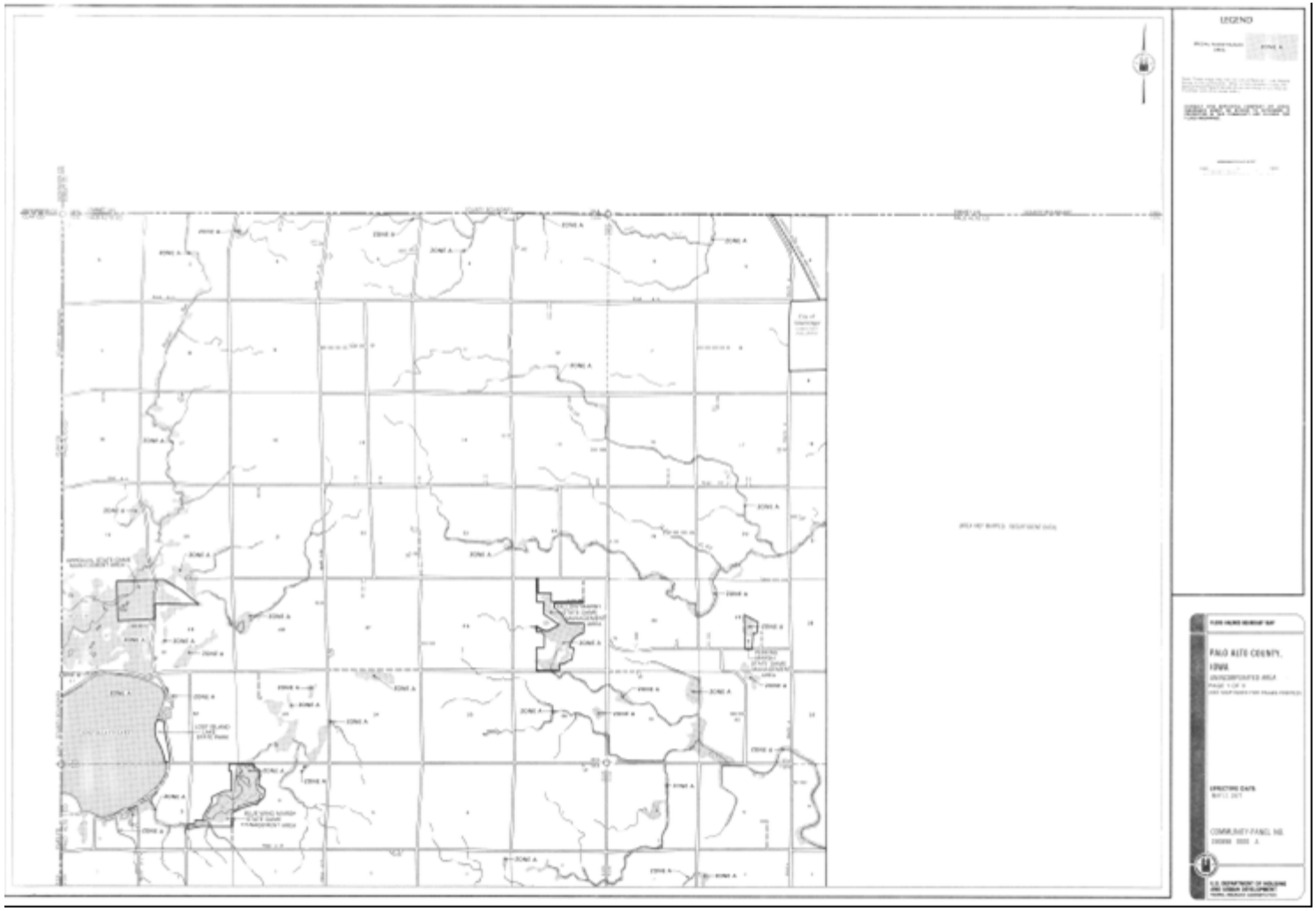
Participation in the NFIP is completely voluntary (although some states require NFIP participation as part of their flood plain management program) by cities and participation is on a community rather than an individual basis. Participating in the program allows those who want to purchase flood insurance for their insurable property, whether it is a home or other property. Almost every type of walled and roofed building that is principally above ground and not entirely over water may be insured if it is in a participating community.

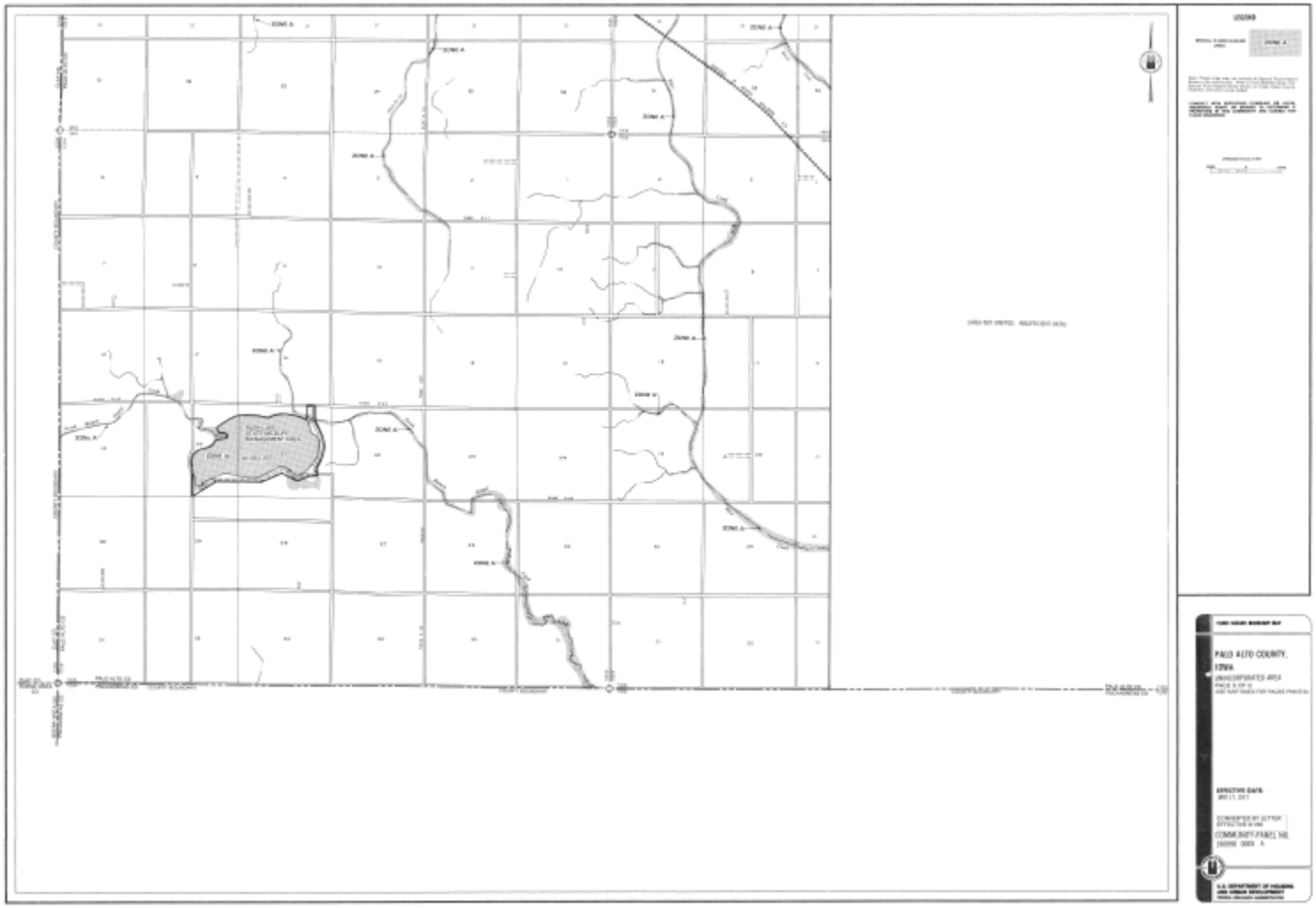
There are no repetitive loss properties present in Palo Alto County at the time of development of this plan.

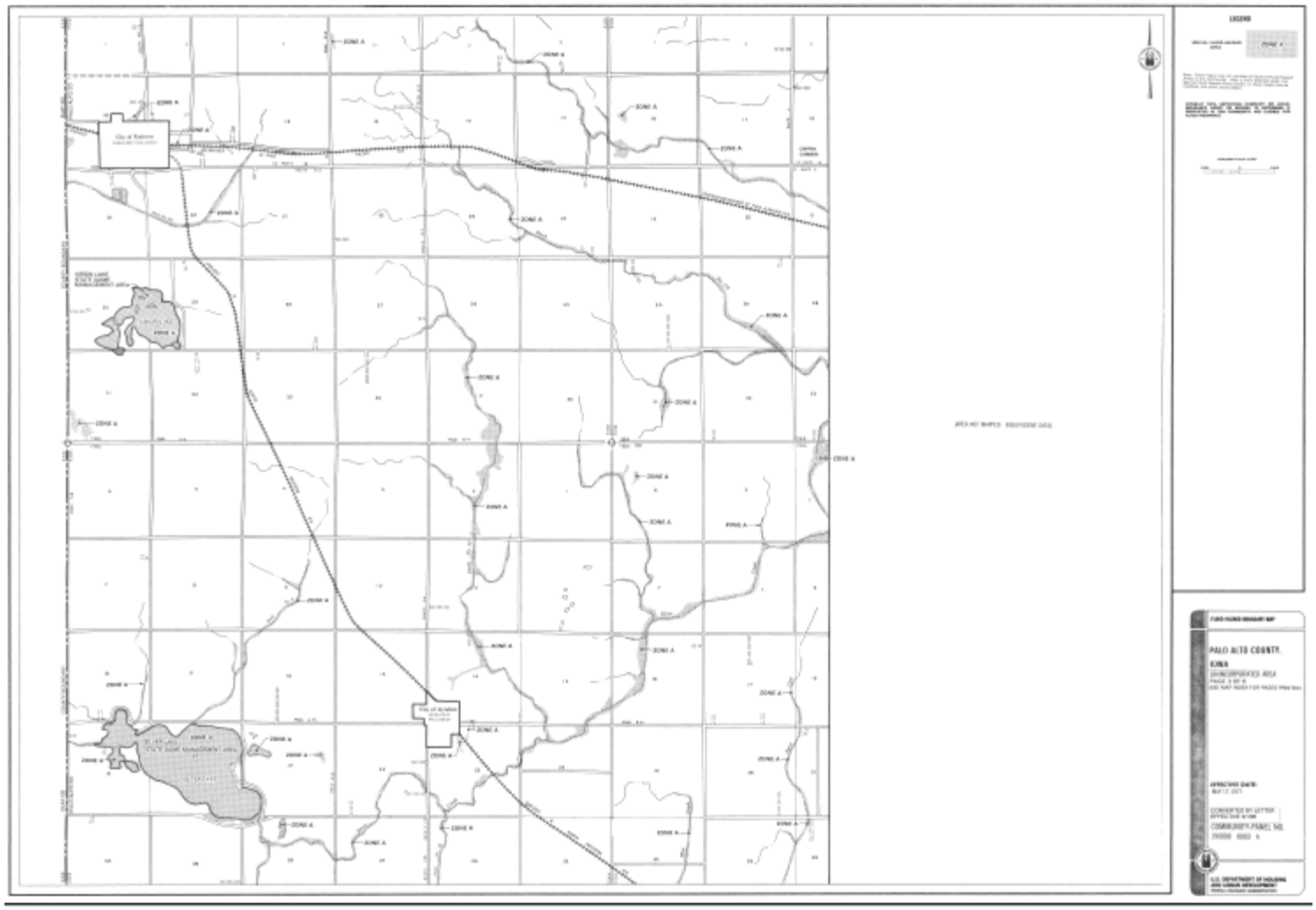
Flood Map Follows:

Palo Alto County

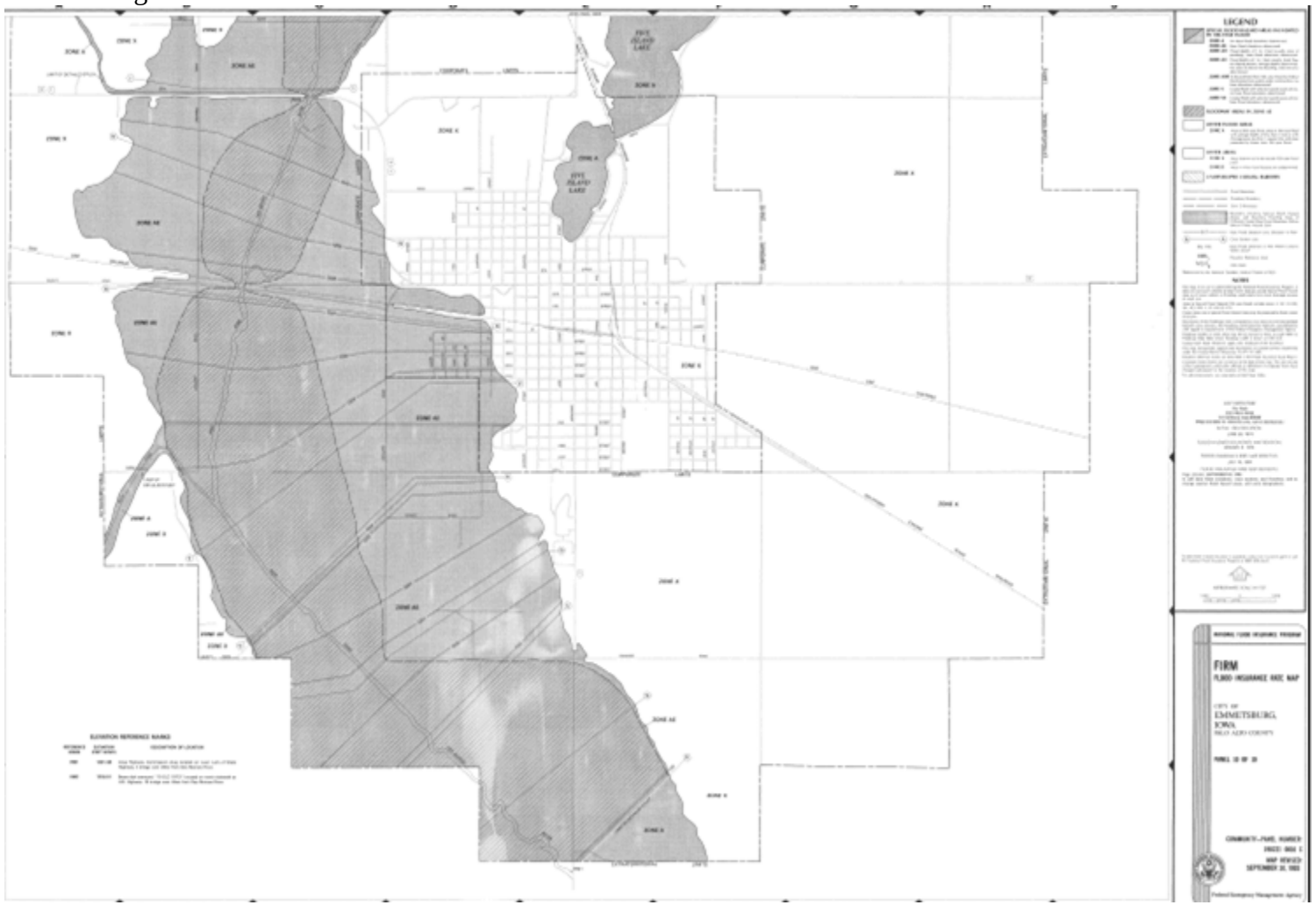



LEGEND
PALO ALTO COUNTY,
IOWA
UNINCORPORATED AREA
EFFECTIVE DATE
COMMUNITY-PANEL NO.


ZONE A
PALO ALTO COUNTY,
IOWA
UNINCORPORATED AREA
COMMUNITY-PANEL NO.


LEGEND
ZONE A
PALO ALTO COUNTY,
IOWA
UNINCORPORATED AREA
EFFECTIVE DATE:
COMMUNITY PANEL NO.
U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Emmetsburg




LEGEND
NOTES
FIRM
FLOOD INSURANCE RATE MAP
CITY OF
EMMETSBURG,
IOWA
PALO ALTO COUNTY
PANEL 1 OF 10
ZONE X
ZONE A
ZONE AE
ZONE X
FIVE
ISLAND
LAKE

Section 8. Plan Maintenance and Continued Involvement

The Palo Alto County Multijurisdictional Hazard Mitigation Plan shall be evaluated and updated at a minimum once every five (5) years for potential changes and compliance with FEMA rules and regulations. At a minimum, the five year update of the Palo Alto County Multijurisdictional Hazard Mitigation Plan will be completed to reflect community changes and compliance with FEMA or Iowa Homeland Security regulations. Each participating planning committee, to be comprised of representatives from city staff, members of the public, local businesses, school district representatives, elected officials and the Palo Alto County Emergency Management Director will be the responsible party for ensuring the review and evaluation of the city's mitigation plan. This local hazard mitigation planning committee will utilize the following criteria in monitoring and evaluating the effectiveness of the plan.

- Request and generate reports specific to city departments or other organizations or businesses within the community that are either responsible for or can contribute valuable information necessary to the successful implementation of this plan. The participating planning committees will meet and evaluate on an annual basis (1 year increments) and make the determination of whether additional reports are needed and by which agency or local organization.
- The each community hazard mitigation planning committees, will at its discretion, conduct site visits to places, businesses or locations within the community to evaluate and monitor progress on mitigation actions or projects.
- Each participating jurisdictions hazard mitigation planning committee, upon request of the City Council, shall provide the council, no more than once per year, a summary report of evaluation and implementation of mitigation actions.
- On an ongoing basis, the each of jurisdictions lead point of contact shall be deemed the overseeing and responsible position for ensuring the local hazard mitigation planning committee is reconvened and each jurisdiction in the plan is monitored on at least an annual basis. At the jurisdictions discretion, the community may also rely upon and request the assistance of the Palo Alto County Emergency Management Coordinator and other outside planning consultants who may be able to provide professional and technical assistance in monitoring and evaluating the successful implementation of the Palo Alto County Multijurisdictional Hazard Mitigation Plan.

8.1 PALO ALTO COUNTY ANNUAL HAZARD MITIGATION PROGRESS MEETING

The Emergency Management Director, or other designee thereof, will invite the county and local hazard mitigation planning committee and additional members of the community to participate in future meetings regarding the update or amendment of the plan. Additionally, a public notice will be posted at Court House and City Halls inviting the general public to participate to review the plan and provide comments. Copies of the plan and the committee's review will be available at the Court House and City Halls. Following the planning committee's completion of the review process, the findings of the review and recommended changes, if applicable, will be presented during the City Council meeting. A public meeting will be held at that time. It is further recommended that the Palo Alto hazard mitigation planning committee make every effort to review the goals and alternatives of this plan on an annual basis to determine their relevance (whether pertinent or current) to changing situations in the city as well as changes in state or federal policy. The progress of each alternative will be reported to the planning committee by the specific city department, business, organization or individuals responsible for implementation of the various mitigation actions. The progress report will include any difficulties or successes in meeting the alternative, how coordination efforts are proceeding, and which alternatives should be revised. Also, regular review of the plan will also allow the city to include new goals and objectives that may be identified after the initial adoption.

8.2 EVALUATION CRITERIA TO MEASURE EFFECTIVENESS OF THE PLAN

1. Do goals and objectives address current and expected conditions?
2. Have the nature, magnitude, and/or type of risks changed?
3. Are there implementation problems?
4. Are current resources available appropriate to implement the plan or parts of the plan?
5. Were the outcomes as expected?
6. Did the plan partners participate as originally planned?
7. Has the plan been reviewed and incorporated (entire document or essential parts) into other planning documents for the city.

Procedures and Techniques for Future Reviews and Updates

Step #1. Evaluate the effectiveness of the Planning Process.

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

Step #2. Evaluate the effectiveness of your actions.

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

Step #3. Determine why actions worked or did not work. Possible reasons are, but not limited to:

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

8.3 METHOD AND SCHEDULE FOR UPDATING THE PLAN

Each of the hazard mitigation planning committees will be reconvened at the will of their City Council or Board of supervisors, no more than once per year (annually) to review and update the plan. Additionally, the council or board will reconvene the hazard mitigation planning committee along with the assistance of the Palo Alto County Emergency Management Director and outside planning consultants on a five (5) year basis to complete a comprehensive update to the Palo Alto Hazard Mitigation Plan and the proposed mitigation actions. If a city chooses to update plan they must inform the emergency management director to update the master copy.

8.4. INCORPORATION OF THE PALO ALTO COUNTY MULTIJURISDICTIONAL HAZARD MITIGATION PLAN INTO OTHER JURISDICTIONAL PLANNING DOCUMENTS

The Palo Alto County Hazard Mitigation Plan, its data and proposed mitigation actions, will be reviewed, evaluated and consulted in the future for inclusion in the city's other planning mechanisms. This includes reviewing the hazard mitigation plan and its specific mitigation actions for possible inclusion into or at a minimum the potential effect upon other future and present municipal documents such as the city/county's code of ordinances, land use and zoning plans, and future comprehensive land use plan updates, subdivision regulations ordinance, future changes or amendments to the city's zoning ordinance, capital improvements plan(s) and other related studies that may be procured by the city/county. If the local hazard mitigation plan would be benefitted or specific mitigation actions could be benefitted by incorporation into other plans, then the city/county should consider and incorporate any specific hazard data or mitigation actions into other city/county plans. A list of the city and county documents can be found in the next section, these listed documents have been seen as the most useful during the hazard mitigation planning efforts.

From the 2005 plans there was no language of incorporation of this hazard mitigation plan into future or previous planning documents. Therefore there has been no progress made on that on those plans adopted that year. However, Emmetsburg reference their 2005 plan in their 2009 comprehensive plan, but did not add any language from it and just included it in the reference pages. Those older plans did not offer a lot of useful information, but with the new multijurisdictional plan will offer a lot more content and when a community updates their comprehensive plan, they will be able to pull up information to help make a more complete comprehensive plan for future planning. With this new multijurisdictional plan, the participating communities are to include this plan in future planning documents whenever possible. The FEMA approved Cylinder, Mallard and Rodman have not updated any planning documents to be able to include the hazard mitigation information but will continue to this plan in mind if they ever do.

Section 9. County/City Information

Section 9.1 Palo Alto County

Planning Committee Members:

Mark Hunefeld	County EMA
Joe Neary	Palo Alto County
Art Hampe	County Conservation
Todd Suhr	Sheriff

County Contact:

Mark Hunefeld, County Emergency Management 712-852-4997

Planning Process

Meetings were held throughout the planning process to collect information and share that information with the general public and the planning team. Notices for meetings were posted at city hall or the school where the meeting was being held. Agendas and minutes for meetings are included in the Appendix.

Utilities

The utilities that supply the county are represented in each of the city profiles that follow.

Future Plans and Mechanisms

The Palo Alto County planning committee stated they would try to incorporate the mitigation strategies developed in the plan in their community actions and other community planned documents if they occur. The committee also stated they would draw from other community mechanisms when applicable to add into the mitigation strategies and mitigation requirements of their hazard mitigation plan.

In preparation of this plan, existing plans and other technical information was considered. The purpose of this review was to give consideration to existing information before setting future mitigation goals.

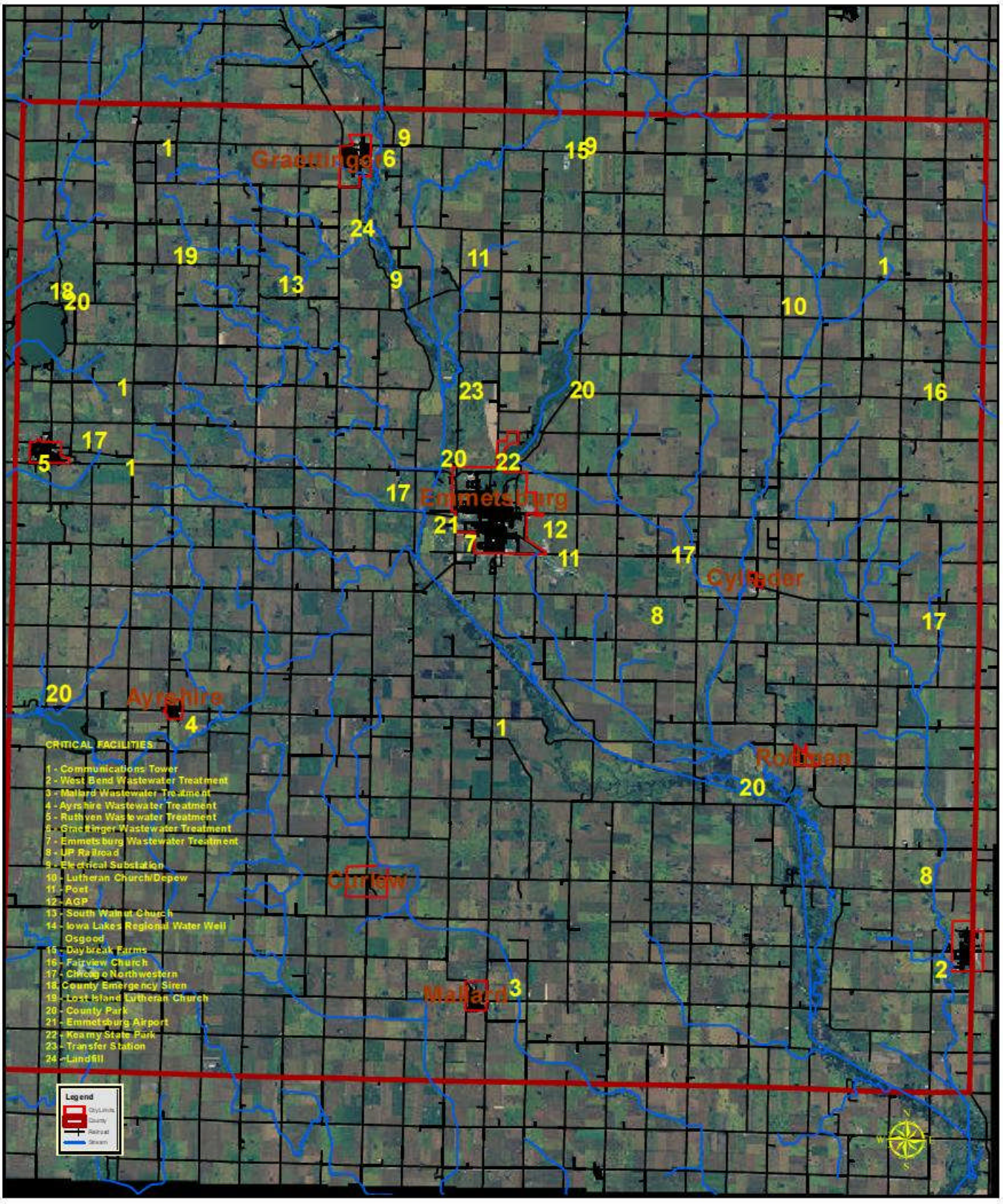
Plan/Document	If yes last year updated	Plan/Document	If yes last year updated
Comprehensive/Landuse plan	Yes	Capital Improvement Plan	No
Economic Development Plan	No	County Recovery Plan	Yes
School Mitigation Plan	Yes	County Mitigation Plan	No 2005
Building Code	Yes	Flood Ordinance or Plan	Ongoing
Tree Trimming Ordinance	Yes	Zoning Ordinance	Yes
Storm Water Ordinance	No	Subdivision	Yes
		Nuisance Ordinance	Yes

Land use and development There have been no drastic changes to land uses and development in the County/Cities and no drastic changes are to occur in the near future.

Emergency Services

Are represented in the following city profiles, but below are the fire districts of Palo Alto County

UNINCORPORATED PALO ALTO COUNTY CRITICAL FACILITIES MAP



Critical Facilities and Assessed Values

	Critical Facilities	Estimated Replacement Value
1	Communication Tower	$150,000.00
2	West Bend Wastewater Treatment	$1,500,000.00
3	Mallard WT	$2,000,000.00
4	Ayrshire WT	$1,200,000.00
5	Ruthven WT	$2,000,000.00
6	Graettinger WT	$2,000,000.00
7	Emmetsburg WT	$5,500,000.00
8	UP Railroad	n/a
9	Electrical substations 6 + 3 Relay	$9,000,000.00
20	County Parks totaled 4	$390,000.00
10	Lutheran Church Depew	$498,440.00
11	Poet	$16,100,000.00
12	AGP	$7,600,000.00
13	St. Paul's Lutheran Church South Walnut Township	$49,000.00
14	Iowa lakes Regional Water Well Osgood	$25,000.00
15	Daybreak Farms	$4,400,000.00
16	St. Luke's Lutheran Fairview Township	$113,170.00
17	Chicago Northwestern Railroad	n/a
18	County Emergency Siren	$20,000.00
19	Lost Island Lutheran Church	$75,000.00
21	Emmetsburg Airport	$150,000.00
22	Kearny State Park	$50,000.00
23	Transfer Station	$150,000.00
24	Landfill	$50,000.00

Hazard Risk Assessment

The Palo Alto County Hazard Mitigation Planning Committee determined the countywide hazard rankings. They eliminated the hazards that were in the countywide ranking, such as: earthquake and expansive soils. The planning team decided that those hazards did not apply to the county.

It is recognized that county may be susceptible to other hazards, such as the other hazards in the State of Iowa Hazard Mitigation Plan, but those hazards are not considered to be a high risk and are not examined at this time. However, if it is later determined that a hazard affecting the county does pose a higher risk than originally determined, it will be examined at that time or when the plan is updated.

Palo Alto County	
1	Severe Winter Storm
2	Windstorm
3	Hailstorm
4	Extreme Heat
5	Tornado
6	Thunderstorm and Lightning
7	Grass and Wildland Fire
8	Flash Flood

**This hazard scoring, which was completed by the Palo Alto County Hazard Mitigation Planning Team, was used for all jurisdictions in Palo Alto County. The hazard ranking comprised from the scoring was given to each jurisdiction and the jurisdictions identified which hazards could impact them and re-ranked the hazards according to their historical knowledge of their community.*

9	River Flood
10	Drought
11	Dam Failure
12	Expansive Soils
Source: Palo Alto County Planning Committee	

Identified Mitigation Actions

The following are the actions that were identified by the local planning team:

- Educate the public about the hazard risks of natural hazards (public awareness)
- Continue storm spotter training/education for firefighters, police and other City officials.
- Promote the use of NOAA radios and/or buy
- Enforce snow ordinances
- Enforce tree trimming
- Upgrade or install new warning sirens
- Purchase generator(s)
- Implement good neighbor program/list of persons needing special attention
- Have a debris management program/plan/sites/equipment
- Construct FEMA safe room(s)
- Fire/EMT training
- Encourage energy/communications companies for improvements
- Upgrade snow removal equipment(purchase)
- Designate gathering points(storm shelter) after events
- Establish a cell phone program for alerts.
- Update County and City flood maps
- Limit development in the floodplain
- Install riprap to protect against soil erosion due to flooding
- Replace bridges and culverts that contribute to flooding
- Raise grades to eliminate backup flooding
- Develop study for river channels
- Enforce floodplain regulations
- Install GPS in emergency vehicles
- Create cable television weather advisories
- Monitor and evaluate dams
- Develop soil testing procedures for expansive soils

The Palo Alto County Planning Team and Palo Alto County are responsible for overseeing the implementation of this plan. Palo Alto County Emergency Management and other county and local agencies will assist with implementing and administering this plan. The mitigations actions were discussed with a high, medium and low priority ranking in mind. **High (H) –** Jurisdictions valued this as something that had the highest effect on helping the community and people survive severe weather events. Also the cost could be easily obtained or funding has already been set aside. **Medium (M) –** These were valued at the jurisdictions as projects that where ranked in between the other two priority groups. **Low (L) –** These mitigation actions have the least effect on protecting human life from severe weather events and therefore have been given the lowest priority. Or the cost is too high at this point in time and makes it unlikely to be acted upon in present future. Priorities for each mitigation action are discussed in the Mitigation Actions, Section 6. Another factor in the implementation of the mitigation actions was their benefit versus how much the project would cost. Economics of implementing mitigation actions were considered when the planning team discussed the priority of projects. Cost estimates were given by the Palo Alto County Planning Committee to help display which actions were of a higher importance and fit in the economic goals of the county/cities/schools. Those estimates can be reference in Section 6. The Implementation Schedule for the mitigation activities, whether

ongoing or considered, will be subject to the availability of Federal, State, and local funding. Continuing (ON) = Ongoing (responsible entity regularly participates in or supports); Short Term (ST) = 1-5 years to initiate or accomplish; and Long Term (LT) = 5 or more years to initiate or accomplish.

Once the plan is completed, approved, and adopted, local governments will be eligible for funding assistance from FEMA for mitigation strategies put forth in the plan. Potential funding resources include the FEMA Pre-Disaster Mitigation Program (PDM) and FEMA Hazard Mitigation Grant Program (HMGP). No timeframe was identified in implementing these mitigation actions will be acted upon as funding become available. It was discussed that additional mitigation actions would be examined during the update process. The mitigation actions that were discussed were what the Palo Alto Planning Committee wanted to have included in the hazard mitigation plan.

Plan Maintenance

Plan maintenance involves taking action to ensure that the plan stays current with information, priorities are still in order, and goals and objectives are maintained and updated. To accomplish this, the plan will be reviewed by the planning team annually and be incorporated into other city plans. Additionally, a comprehensive update is required at least once every 5 years and submitted to FEMA for certification. The revised plan will be adopted by the city council. To assist with the update, information is to be collected by the county annually to document efforts, hazard events, and other pertinent activities to mitigate hazards. Part of plan maintenance is maintaining the planning team. The planning team is composed of local elected officials, city employees and other interested parties. This is an important part of plan maintenance in order to reconvene the planning team when necessary.

Monitoring

The Palo Alto County Planning Team and Palo Alto County Emergency Management are responsible for monitoring this portion of the plan. The plan will be monitored based on the mitigation strategies identified in the plan and the reported progress to accomplish the work. Projects that are complete will be monitored for effectiveness. Any strategies that are removed from the plan will be examined and documented. An annual reporting sheet is included in this plan for the city to keep track of the mitigation process.

Incorporation into Existing Plans

The county is responsible for reviewing its local plans, codes, and ordinances and amending documents as they see appropriate. As appropriate, information and actions from this plan will be incorporated into comprehensive or community builder plans during review and update processes. A worksheet is provided to record what information from this plan is incorporated to other plans.

Continued Public Participation

The public will be involved in the implementation of the plan at city council meetings and general public meetings. Mitigation actions and implementation strategies will be discussed at city council meetings and an opportunity for public input will be encouraged. This process will ensure opportunity for public awareness of hazards and threats faced by the community and actions planned to eliminate or reduce impacts. To promote continued public participation, meetings where the plan will be discussed will have public notice posted.

Incorporation into Other Plans

Date	Plan or Document	Information Incorporated into Plan or Document

Plan Updates Concerning Palo Alto County

When updating the plan please contact the Palo Alto County Emergency Management for assistance.

Date	Page	Change

Previous Plan – 3/7/05 - Expired

Section (Below are Examples-Use headings from plan)	Updates	Comments:
Purpose and Planning Process	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Community Background, Profile, Services/Facilities	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard Analysis/Risk Assessment	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard and Activities Prioritization	Yes	Was a previous expired plan, all data needed to be updated and reassessed.

Hazard Vulnerability Assessment	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Mitigation Actions	Yes	Was a previous expired plan, all data needed to be updated and reassessed.

Section 9.2 Ayrshire

Planning Committee Members:

Janice Stowell	City Clerk
Kurt Moore	Council Member
Cheri Bowman	Fire/EMT
Michael Garrets	City Council

City Contact:

Janice Stowell, City Administrator 712-426-3510

Planning Process

Meetings were held throughout the planning process to collect information and share that information with the general public and the planning team. Notices for meetings were posted at city hall or the school where the meeting was being held. Agendas and minutes for meetings are included in the Appendix.

Utilities

City of Ayrshire	
Water	City of Ayrshire
Contact	712-426-3510
Wastewater Treatment	City of Ayrshire /IA Lakes Regional Water
Contact	712-262-8847
Storm **Sewer**	None
Electric	**MidAmerican** Energy
Contact	800-358-6265
Natural Gas	Private LP
	MidAmerican Energy
Contact	800-358-6265
Telecom	Ayrshire Farmers Mutual Telephone Co.
Contact	_ 712-426-2800

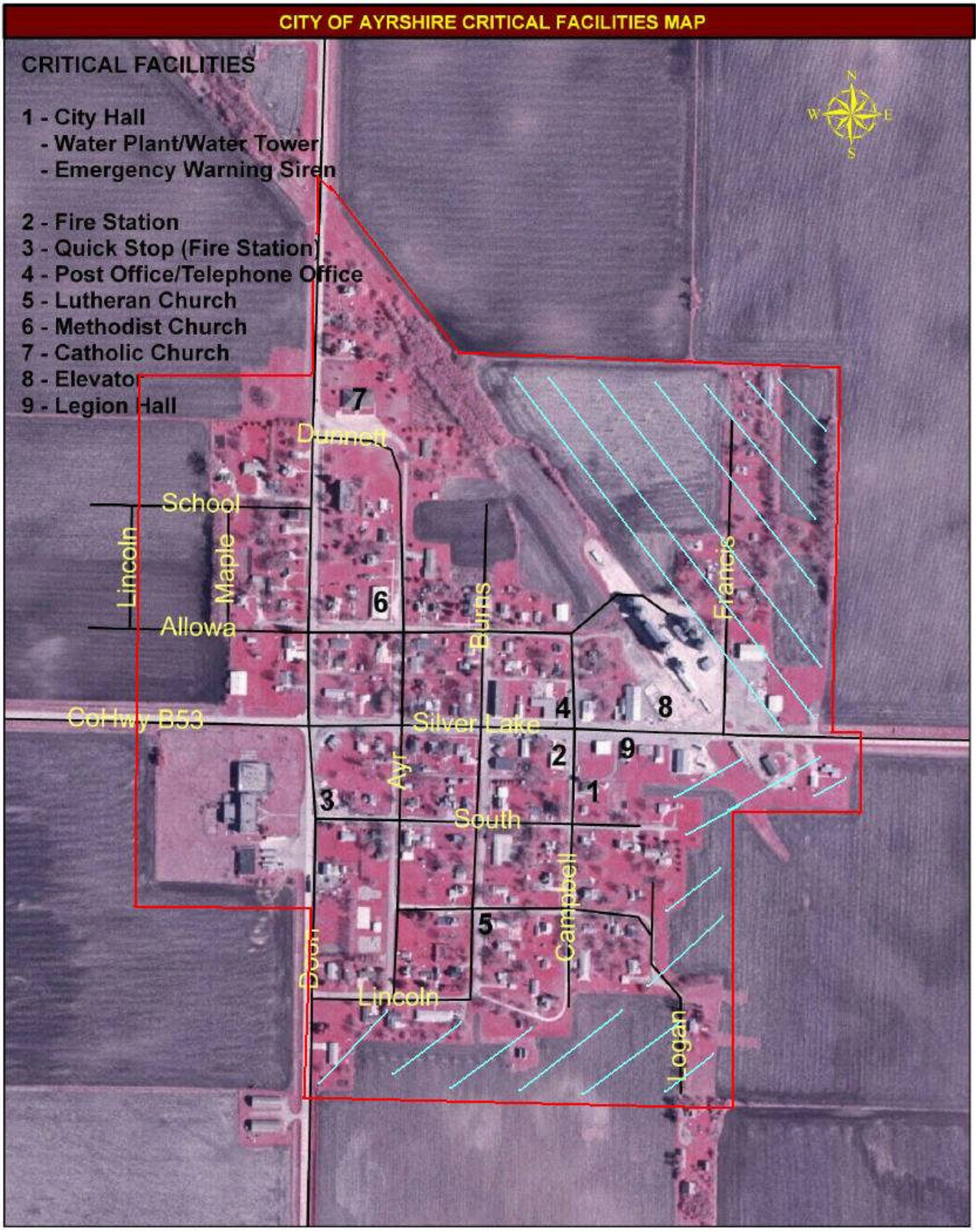
Floodplain Ordinance	No
Floodplain Compliance Officer	(For assistance in the administration of the floodplain regulations, contact the Iowa Department of Natural Resources)

Future Plans and Mechanisms

The City of Ayrshire planning committee stated they would try to incorporate the mitigation strategies developed in the plan in their community actions and other community planned documents if they occur. The committee also stated they would draw from other community mechanisms when applicable to add into the mitigation strategies and mitigation requirements of their hazard mitigation plan.

In preparation of this plan, existing plans and other technical information was considered. The purpose of this review was to give consideration to existing information before setting future mitigation goals.

Plan/Document	If yes last year updated	Plan/Document	If yes last year updated
Comprehensive/Landuse plan	Yes	Capital Improvement Plan	No
Local Emergency Plan	No	Local Recovery Plan	No
Local Mitigation Plan	No 2007	County Mitigation Plan	No
Economic Development Plan	No	Flood Ordinance or Plan	No
School Mitigation Plan	No	Zoning Ordinance	Yes
Building Code	No	Subdivision	No
Tree Trimming Ordinance	Yes	Nuisance Ordinance	Yes
Storm Water Ordinance	No		


CITY OF AYRSHIRE CRITICAL FACILITIES MAP
CRITICAL FACILITIES
1 - City Hall
- Water Plant/Water Tower
- Emergency Warning Siren
2 - Fire Station
3 - Quick Stop (Fire Station)
4 - Post Office/Telephone Office
5 - Lutheran Church
6 - Methodist Church
7 - Catholic Church
8 - Elevator
9 - Legion Hall
N
W
E
S
7
Dunnell
School
Lincoln
Maple
6
Allowa
Burns
Francis
Co Hwy B53
4
8
Silver Lake
2
9
Ayr
1
3
South
Campbell
5
Lincoln
Logan

Critical Facilities and Assessed Values

	Critical Facilities	Estimated Replacement Value
1	City Hall/Water Plant/Water Tower/Warning siren	$780,000.00
2	Fire Station	$255,000.00
3	Quick Stop Gas Station	$235,500.00
4	Post Office/ Telephone	$450.19
5	Lutheran Church	$82,240.00
6	Methodist Church	$188,180.00
7	Catholic Church	$408,590.00
8	Elevator	$244,360.00
9	Legion Hall	Same as City Hall Same Bldg

Hazard Risk Assessment

The Palo Alto County Hazard Mitigation Planning Committee determined the countywide hazard rankings. The city was also provided with information and statistics relevant to hazards affecting Ayrshire, including records of past events and damages. The city was asked to review the information from the countywide rankings and determine if highest risk hazards for the county applied to Ayrshire, and if not, how Ayrshire's situation differs from the county. Based on this discussion, prevalent hazards were determined for Ayrshire. Along with the information and statistics provided, the people present were asked to draw upon their knowledge and experiences of hazards affecting Ayrshire. After the discussion among the planning team, it was decided that the City of Ayrshire would re-prioritize the hazards of the countywide ranking for their jurisdictional portion of the plan. The city eliminated many of the hazards that were in the countywide ranking, such as: expansive soils, river flood and dam failure. The planning team decided that those hazards did not apply to Ayrshire.

It is recognized that Ayrshire may be susceptible to other hazards, such as the other hazards in the State of Iowa Hazard Mitigation Plan, but those hazards are not considered to be a high risk and are not examined at this time. However, if it is later determined that a hazard affecting Ayrshire does pose a higher risk than originally determined, it will be examined at that time or when the plan is updated.

Hazard Ranking-City of Ayrshire	
1	Severe Winter Storm
2	Windstorm
3	Hailstorm
4	Extreme Heat
5	Tornado
6	Thunderstorm and Lightning
7	Grass and Wildland Fire
8	Flash Flood
9	Drought

Iowa Identified Mitigation Actions

The following are the actions that were identified by the local planning committee:

- Educate the public about the hazard risks of natural hazards (public awareness)
- Continue storm spotter training/education for firefighters, police and other City officials.
- Promote the use of NOAA radios and/or buy
- Purchase generator(s)
- Implement good neighbor program/list of persons needing special attention
- Have a debris management program/plan/sites/equipment
- Purchase fire equipment /apparatus
- Fire/EMT training
- Designate gathering points(storm shelter) after events
- Look into Joining NFIP and getting map
- Utilize burn ban when needed
- Develop Plans to address utility outages and emergencies
- Maintain/update plan to contact utility companies
- Remove dead vegetation

The Ayrshire Planning Team and Palo Alto County are responsible for overseeing the implementation of this plan. Palo Alto County Emergency Management and other county and local agencies will assist with implementing and administering this plan. The mitigations actions were discussed with a high, medium and low priority ranking in mind. **High (H) –** Jurisdictions valued this as something that had the highest effect on helping the community and people survive severe weather events. Also the cost could be easily obtained or funding has already been set aside. **Medium (M) –** These were valued at the jurisdictions as projects that where ranked in between the other two priority groups. **Low (L) –** These mitigation actions have the least effect on protecting human life from severe weather events and therefore have been given the lowest priority. Or the cost is too high at this point in time and makes it unlikely to be acted upon in present future. Priorities for each mitigation action are discussed in the Mitigation Actions, Section 6. Another factor in the implementation of the mitigation actions was their benefit versus how much the project would cost. Economics of implementing mitigation actions were considered when the planning team discussed the priority of projects. Cost estimates were given by the Palo Alto County Planning Committee to help display which actions were of a higher importance and fit in the economic goals of the county/cities/schools. Those estimates can be reference in Section 6. The Implementation Schedule for the mitigation activities, whether ongoing or considered, will be subject to the availability of Federal, State, and local funding. Continuing (ON) = Ongoing (responsible entity regularly participates in or supports); Short Term (ST) = 1-5 years to initiate or accomplish; and Long Term (LT) = 5 or more years to initiate or accomplish.

Once the plan is completed, approved, and adopted, local governments will be eligible for funding assistance from FEMA for mitigation strategies put forth in the plan. Potential funding resources include the FEMA Pre-Disaster Mitigation Program (PDM) and FEMA Hazard Mitigation Grant Program (HMGP). No timeframe was identified in implementing these mitigation actions will be acted upon as funding become available. It was discussed that additional mitigation actions would be examined during the update process. The mitigation actions that were discussed were what the Ayrshire Planning Committee wanted to have included in the hazard mitigation plan.

Plan Maintenance

Plan maintenance involves taking action to ensure that the plan stays current with information, priorities are still in order, and goals and objectives are maintained and updated. To accomplish this, the plan will be reviewed by the planning team annually and be incorporated into other city plans. Additionally, a comprehensive update is required at least once every 5 years and submitted to FEMA for certification. The

revised plan will be adopted by the city council. To assist with the update, information is to be collected by the city annually to document efforts, hazard events, and other pertinent activities to mitigate hazards. Part of plan maintenance is maintaining the planning team. The planning team is composed of local elected officials, city employees and other interested parties. This is an important part of plan maintenance in order to reconvene the planning team when necessary.

Monitoring

The Ayrshire Planning Team and Palo Alto County Emergency Management are responsible for monitoring this portion of the plan. The plan will be monitored based on the mitigation strategies identified in the plan and the reported progress to accomplish the work. Projects that are complete will be monitored for effectiveness. Any strategies that are removed from the plan will be examined and documented. An annual reporting sheet is included in this plan for the city to keep track of the mitigation process.

Incorporation into Existing Plans

The city is responsible for reviewing its local plans, codes, and ordinances and amending documents as they see appropriate. As appropriate, information and actions from this plan will be incorporated into comprehensive or community builder plans during review and update processes. A worksheet is provided to record what information from this plan is incorporated to other plans.

Continued Public Participation

The public will be involved in the implementation of the plan at city council meetings and general public meetings. Mitigation actions and implementation strategies will be discussed at city council meetings and an opportunity for public input will be encouraged. This process will ensure opportunity for public awareness of hazards and threats faced by the community and actions planned to eliminate or reduce impacts. To promote continued public participation, meetings where the plan will be discussed will have public notice posted.

Incorporation into Other Plans

Date	Plan or Document	Information Incorporated into Plan or Document

Plan Updates Concerning Ayrshire

When updating the plan please contact the Palo Alto County Emergency Management for assistance.

Date	Page	Change

Previous Plan – 9/27/07 - Expired

Section (Below are Examples-Use headings from plan)	Updates	Comments:
Purpose and Planning Process	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Community Background, Profile, Services/Facilities	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard Analysis/Risk Assessment	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard and Activities Prioritization	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard Vulnerability Assessment	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Mitigation Actions	Yes	Was a previous expired plan, all data needed to be updated and reassessed.

Section 9.3 Curlew

Planning Committee Members:

Kay Freck	City Clerk
Wyman Travis	Mayor
Becky Travis	Councilmember
Robby Johnson	Council Member
Donita Hellickson	resident of Curlew
Cherie Thuemling	resident of Curlew
Kathryn Kramer	Postmaster of Curlew U.S. Post Office

City Contact:

Kay Freck, City Clerk 712-855-2448

Planning Process

Meetings were held throughout the planning process to collect information and share that information with the general public and the planning team. Notices for meetings were posted at city hall or the school where the meeting was being held. Agendas and minutes for meetings are included in the Appendix.

Utilities

City of Curlew	
Water	Private Wells
Wastewater **Treatment**	Private Septic
Storm Sewer	**None**
Electric	Alliant Energy
Contact	800-255-4368
Natural Gas	Private LP Tanks
Contact	Home Owners
Telecom	NW Communications
Contact	800-249-5251

Floodplain Ordinance	No
Floodplain Compliance Officer	NA - (For assistance in the administration of the floodplain regulations, contact the Iowa Department of Natural Resources)

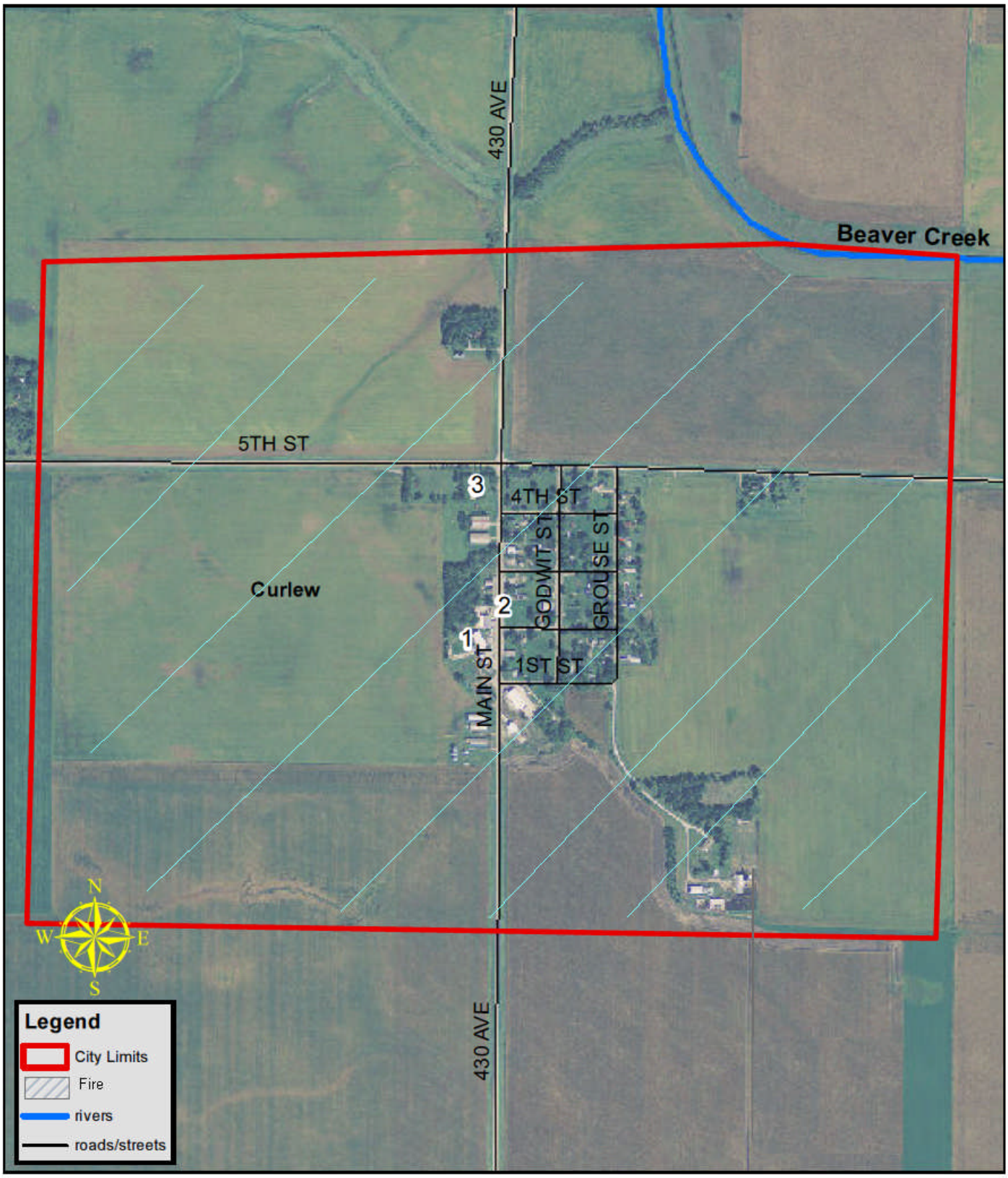
Future Plans and Mechanisms

The City of Curlew planning committee stated they would try to incorporate the mitigation strategies developed in the plan in their community actions and other community planned documents if they occur. The committee also stated they would draw from other community mechanisms when applicable to add into the mitigation strategies and mitigation requirements of their hazard mitigation plan.

In preparation of this plan, existing plans and other technical information was considered. The purpose of this review was to give consideration to existing information before setting future mitigation goals.

Plan/Document	If yes last year updated	Plan/Document	If yes last year updated
Comprehensive/Landuse plan	No	Capital Improvement Plan	No
Local Emergency Plan	No	Local Recovery Plan	No
Local Mitigation Plan	No	County Mitigation Plan	No
Economic Development Plan	No	Flood Ordinance or Plan	No
School Mitigation Plan	No	Zoning Ordinance	No
Building Code	No	Subdivision	No
Tree Trimming Ordinance	Yes	Nuisance Ordinance	Yes
Storm Water Ordinance	No		

CITY OF CURLEW CRITICAL FACILITIES MAP



Critical Facilities and Assessed Values

	Critical Facilities	Estimated Replacement Value
1	City Hall/Social Center	$150,000.00
2	City Post Office	$100,000.00
3	City Park	$25,000.00

Hazard Risk Assessment

The Palo Alto County Hazard Mitigation Planning Committee determined the countywide hazard rankings. The city was also provided with information and statistics relevant to hazards affecting Curlew, including records of past events and damages. The city was asked to review the information from the countywide rankings and determine if highest risk hazards for the county applied to Curlew, and if not, how Curlew's situation differs from the county. Based on this discussion, prevalent hazards were determined for Curlew. Along with the information and statistics provided, the people present were asked to draw upon their knowledge and experiences of hazards affecting Curlew. After the discussion among the planning team, it was decided that the City of Curlew would re-prioritize the hazards of the countywide ranking for their jurisdictional portion of the plan. The city eliminated many of the hazards that were in the countywide ranking, such as: landslide and sinkhole. The planning team decided that those hazards did not apply to Curlew.

It is recognized that Curlew may be susceptible to other hazards, such as the other hazards in the State of Iowa Hazard Mitigation Plan, but those hazards are not considered to be a high risk and are not examined at this time. However, if it is later determined that a hazard affecting Curlew does pose a higher risk than originally determined, it will be examined at that time or when the plan is updated.

Hazard Ranking-City of Curlew	
1	Severe Winter Storm
2	Windstorm
3	Hailstorm
4	Extreme Heat
5	Tornado
6	Thunderstorm and Lightning
7	Grass and Wildland Fire
8	Flash Flood
9	Drought

Iowa Identified Mitigation Actions

The following are the actions that were identified by the local planning team:

- Educate the public about the hazard risks of natural hazards (public awareness)
- Continue storm spotter training/education for firefighters, police and other City officials.
- Promote the use of NOAA radios and/or buy
- Enforce tree trimming
- Upgrade or install new warning sirens
- Purchase generator(s)
- Backup city records
- Implement good neighbor program/list of persons needing special attention
- Construct FEMA safe room(s)

- Upgrade snow removal equipment(purchase)
- Designate gathering points(storm shelter) after events
- Establish a cell phone program for alerts.
- Look into Joining NFIP and getting map

The Curlew Planning Team and Palo Alto County are responsible for overseeing the implementation of this plan. Palo Alto County Emergency Management and other county and local agencies will assist with implementing and administering this plan. The mitigations actions were discussed with a high, medium and low priority ranking in mind. **High (H) –** Jurisdictions valued this as something that had the highest effect on helping the community and people survive severe weather events. Also the cost could be easily obtained or funding has already been set aside. **Medium (M) –** These were valued at the jurisdictions as projects that where ranked in between the other two priority groups. **Low (L) –** These mitigation actions have the least effect on protecting human life from severe weather events and therefore have been given the lowest priority. Or the cost is too high at this point in time and makes it unlikely to be acted upon in present future. Priorities for each mitigation action are discussed in the Mitigation Actions, Section 6. Another factor in the implementation of the mitigation actions was their benefit versus how much the project would cost. Economics of implementing mitigation actions were considered when the planning team discussed the priority of projects. Cost estimates were given by the Palo Alto County Planning Committee to help display which actions were of a higher importance and fit in the economic goals of the county/cities/schools. Those estimates can be reference in Section 6. The Implementation Schedule for the mitigation activities, whether ongoing or considered, will be subject to the availability of Federal, State, and local funding. Continuing (ON) = Ongoing (responsible entity regularly participates in or supports); Short Term (ST) = 1-5 years to initiate or accomplish; and Long Term (LT) = 5 or more years to initiate or accomplish.

Once the plan is completed, approved, and adopted, local governments will be eligible for funding assistance from FEMA for mitigation strategies put forth in the plan. Potential funding resources include the FEMA Pre-Disaster Mitigation Program (PDM) and FEMA Hazard Mitigation Grant Program (HMGP). No timeframe was identified in implementing these mitigation actions will be acted upon as funding become available. It was discussed that additional mitigation actions would be examined during the update process. The mitigation actions that were discussed were what the Curlew Planning Committee wanted to have included in the Hazard Mitigation Plan.

Plan Maintenance

Plan maintenance involves taking action to ensure that the plan stays current with information, priorities are still in order, and goals and objectives are maintained and updated. To accomplish this, the plan will be reviewed by the planning team annually and be incorporated into other city plans. Additionally, a comprehensive update is required at least once every 5 years and submitted to FEMA for certification. The revised plan will be adopted by the city council. To assist with the update, information is to be collected by the city annually to document efforts, hazard events, and other pertinent activities to mitigate hazards. Part of plan maintenance is maintaining the planning team. The planning team is composed of local elected officials, city employees and other interested parties. This is an important part of plan maintenance in order to reconvene the planning team when necessary.

Monitoring

The Curlew Planning Team and Palo Alto County Emergency Management are responsible for monitoring this portion of the plan. The plan will be monitored based on the mitigation strategies identified in the plan and the reported progress to accomplish the work. Projects that are complete will be monitored for effectiveness. Any strategies that are removed from the plan will be examined and documented. An annual reporting sheet is included in this plan for the city to keep track of the mitigation process.

Incorporation into Existing Plans

The city is responsible for reviewing its local plans, codes, and ordinances and amending documents as they see appropriate. As appropriate, information and actions from this plan will be incorporated into comprehensive or community builder plans during review and update processes. A worksheet is provided to record what information from this plan is incorporated to other plans.

Continued Public Participation

The public will be involved in the implementation of the plan at city council meetings and general public meetings. Mitigation actions and implementation strategies will be discussed at city council meetings and an opportunity for public input will be encouraged. This process will ensure opportunity for public awareness of hazards and threats faced by the community and actions planned to eliminate or reduce impacts. To promote continued public participation, meetings where the plan will be discussed will have public notice posted.

Incorporation into Other Plans

Date	Plan or Document	Information Incorporated into Plan or Document

Plan Updates Concerning Curlew

When updating the plan please contact the Palo Alto County Emergency Management for assistance.

Date	Page	Change

Previous Plan

No previous plan.

Section 9.4 Cylinder

Planning Committee Members:

Dave Waldschmidt	City Council
Art Mueller	Mayor
Kayra Weisbrod	City Clerk
Harry Bormann	City Council

City Contact:

Kayra Weisbrod , City Clerk 712-424-3344

Planning Process

Meetings were held throughout the planning process to collect information and share that information with the general public and the planning team. Notices for meetings were posted at city hall or the school where the meeting was being held. Agendas and minutes for meetings are included in the Appendix.

Utilities

City of Cylinder	
Water	Private Wells
Contact	Home Owners
Wastewater Treatment	City of Cylinder / Kuehl and Payer
Contact	
Storm **Sewer**	**None**
Electric	MidAmerican Energy
Contact	800-358-6265
Natural Gas	MidAmerican Energy
Contact	800-358-6265
Telecom	**ATC** Cablevision
Contact	712-426-2815
	Northwest One Inc
	712-776-2612
	Iowa Telecommunications
	877-901-4692

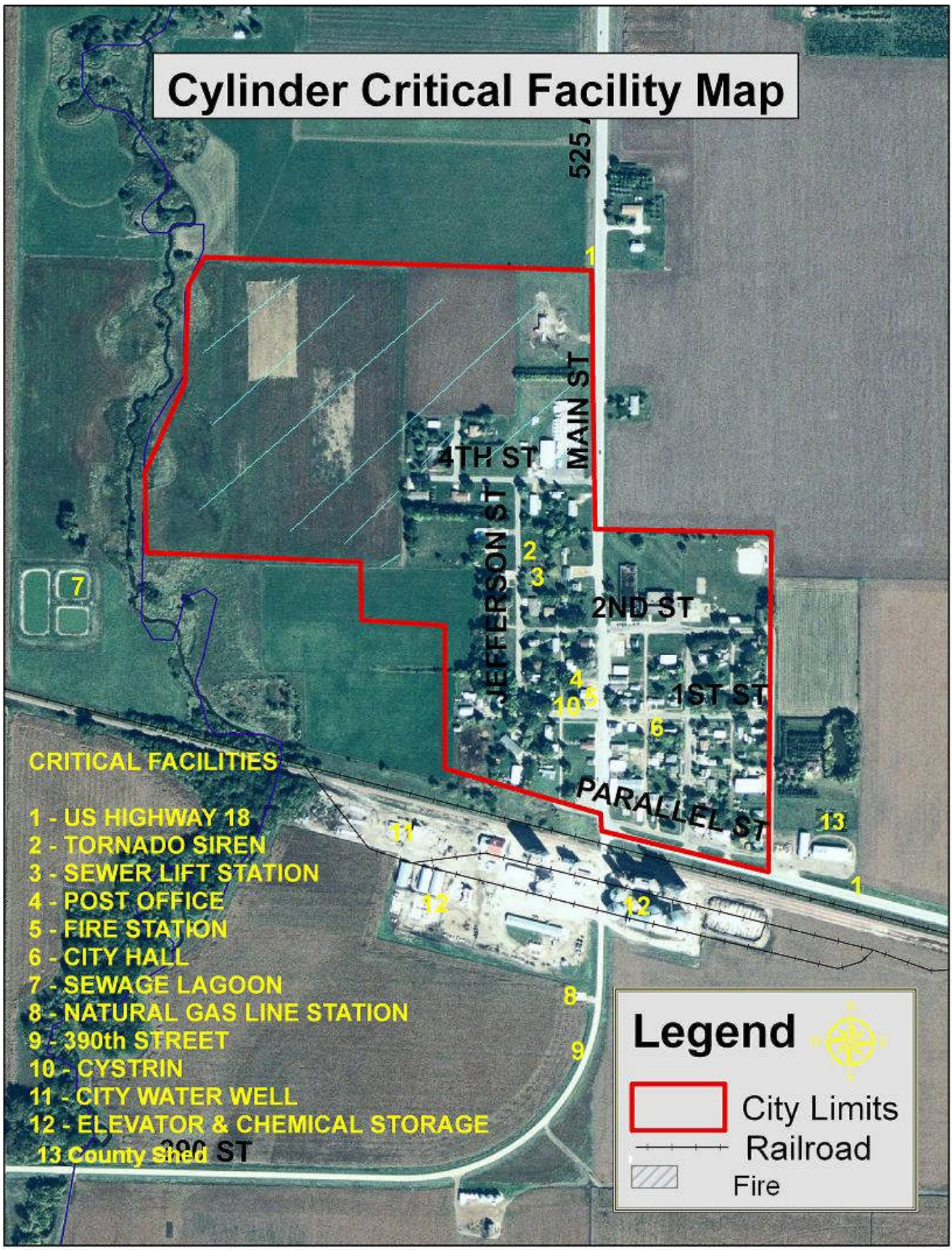
Floodplain Ordinance	No
Floodplain Compliance Officer	NA - (For assistance in the administration of the floodplain regulations, contact the Iowa Department of Natural Resources)

Future Plans and Mechanisms

The City of Cylinder planning committee stated they would try to incorporate the mitigation strategies developed in the plan in their community actions and other community planned documents if they occur. The committee also stated they would draw from other community mechanisms when applicable to add into the mitigation strategies and mitigation requirements of their hazard mitigation plan.

In preparation of this plan, existing plans and other technical information was considered. The purpose of this review was to give consideration to existing information before setting future mitigation goals.

Plan/Document	If yes last year updated	Plan/Document	If yes last year updated
Comprehensive/Landuse plan	No	Capital Improvement Plan	No
Local Emergency Plan	No	Local Recovery Plan	No
Local Mitigation Plan	Yes 2009	County Mitigation Plan	No
Economic Development Plan	No	Flood Ordinance or Plan	No
School Mitigation Plan	No	Zoning Ordinance	No
Building Code	No	Subdivision	No
Tree Trimming Ordinance	No	Nuisance Ordinance	Yes
Storm Water Ordinance	No		


Cylinder Critical Facility Map
525
MAIN ST
4TH ST
JEFFERSON ST
2ND ST
1ST ST
PARALLEL ST
390 ST
CRITICAL FACILITIES
1 - US HIGHWAY 18
2 - TORNADO SIREN
3 - SEWER LIFT STATION
4 - POST OFFICE
5 - FIRE STATION
6 - CITY HALL
7 - SEWAGE LAGOON
8 - NATURAL GAS LINE STATION
9 - 390th STREET
10 - CYSTRIN
11 - CITY WATER WELL
12 - ELEVATOR & CHEMICAL STORAGE
13 County Shed
Legend
City Limits
Railroad
Fire

Critical Facilities and Assessed Values

	Critical Facilities	Estimated Replacement Value
1	US HWY 18	n/a
2	Tornado Siren	18,500
3	Sewer Lift Station	35,380
4	Post Office	closed
5	Fire Station	235,480
6	City Hall	89,750
7	Sewage Lagoon	750,000
8	Natural Gas Line Station	500,000
9	390th St	n/a
10	Water Well	35,000
11	Elevator Chemical Storage	550,500

Hazard Risk Assessment

The Palo Alto County Hazard Mitigation Planning Committee determined the countywide hazard rankings. The city was also provided with information and statistics relevant to hazards affecting Cylinder, including records of past events and damages. The city was asked to review the information from the countywide rankings and determine if highest risk hazards for the county applied to Cylinder, and if not, how Cylinder's situation differs from the county. Based on this discussion, prevalent hazards were determined for Cylinder. Along with the information and statistics provided, the people present were asked to draw upon their knowledge and experiences of hazards affecting Cylinder. After the discussion among the planning team, it was decided that the City of Cylinder would re-prioritize the hazards of the countywide ranking for their jurisdictional portion of the plan. The city eliminated many of the hazards that were in the countywide ranking, such as: expansive soils, river flood and dam failure. The planning team decided that those hazards did not apply to Cylinder.

It is recognized that Cylinder may be susceptible to other hazards, such as the other hazards in the State of Iowa Hazard Mitigation Plan, but those hazards are not considered to be a high risk and are not examined at this time. However, if it is later determined that a hazard affecting Cylinder does pose a higher risk than originally determined, it will be examined at that time or when the plan is updated.

Hazard Ranking-City of Cylinder	
1	Severe Winter Storm
2	Windstorm
3	Hailstorm
4	Extreme Heat
5	Tornado
6	Thunderstorm and Lightning
7	Grass and Wildland Fire
8	Flash Flood
9	Drought

Iowa Identified Mitigation Actions

The following are the actions that were identified by the local planning team:

- Educate the public about the hazard risks of natural hazards (public awareness)
- Continue storm spotter training/education for firefighters, police and other City officials.
- Enforce tree trimming
- Enforce snow ordinances
- Upgrade or install new warning sirens
- Purchase generator(s)
- Implement good neighbor program/list of persons needing special attention
- Have a debris management program/plan/sites/equipment
- Construct FEMA safe room(s)
- Look into Joining NFIP and getting map
- Purchase portable pumps

The Cylinder County Planning Team and Palo Alto County are responsible for overseeing the implementation of this plan. Palo Alto County Emergency Management and other county and local agencies will assist with implementing and administering this plan. The mitigations actions were discussed with a high, medium and low priority ranking in mind. **High (H) –** Jurisdictions valued this as something that had the highest effect on helping the community and people survive severe weather events. Also the cost could be easily obtained or funding has already been set aside. **Medium (M) –** These were valued at the jurisdictions as projects that where ranked in between the other two priority groups. **Low (L) –** These mitigation actions have the least effect on protecting human life from severe weather events and therefore have been given the lowest priority. Or the cost is too high at this point in time and makes it unlikely to be acted upon in present future. Priorities for each mitigation action are discussed in the Mitigation Actions, Section 6. Another factor in the implementation of the mitigation actions was their benefit versus how much the project would cost. Economics of implementing mitigation actions were considered when the planning team discussed the priority of projects. Cost estimates were given by the Palo Alto County Planning Committee to help display which actions were of a higher importance and fit in the economic goals of the county/cities/schools. Those estimates can be reference in Section 6. The Implementation Schedule for the mitigation activities, whether ongoing or considered, will be subject to the availability of Federal, State, and local funding. Continuing (ON) = Ongoing (responsible entity regularly participates in or supports); Short Term (ST) = 1-5 years to initiate or accomplish; and Long Term (LT) = 5 or more years to initiate or accomplish.

Once the plan is completed, approved, and adopted, local governments will be eligible for funding assistance from FEMA for mitigation strategies put forth in the plan. Potential funding resources include the FEMA Pre-Disaster Mitigation Program (PDM) and FEMA Hazard Mitigation Grant Program (HMGP). No timeframe was identified in implementing these mitigation actions will be acted upon as funding become available. It was discussed that additional mitigation actions would be examined during the update process. The mitigation actions that were discussed were what the Cylinder Planning Committee wanted to have included in the Hazard Mitigation Plan.

Plan Maintenance

Plan maintenance involves taking action to ensure that the plan stays current with information, priorities are still in order, and goals and objectives are maintained and updated. To accomplish this, the plan will be reviewed by the planning team annually and be incorporated into other city plans. Additionally, a comprehensive update is required at least once every 5 years and submitted to FEMA for certification. The revised plan will be adopted by the city council. To assist with the update, information is to be collected by the city annually to document efforts, hazard events, and other pertinent activities to mitigate hazards. Part of plan maintenance is maintaining the planning team. The planning team is composed of local elected officials,

city employees and other interested parties. This is an important part of plan maintenance in order to reconvene the planning team when necessary.

Monitoring

The Cylinder Planning Team and Palo Alto County Emergency Management are responsible for monitoring this portion of the plan. The plan will be monitored based on the mitigation strategies identified in the plan and the reported progress to accomplish the work. Projects that are complete will be monitored for effectiveness. Any strategies that are removed from the plan will be examined and documented. An annual reporting sheet is included in this plan for the city to keep track of the mitigation process.

Incorporation into Existing Plans

The city is responsible for reviewing its local plans, codes, and ordinances and amending documents as they see appropriate. As appropriate, information and actions from this plan will be incorporated into comprehensive or community builder plans during review and update processes. A worksheet is provided to record what information from this plan is incorporated to other plans.

Continued Public Participation

The public will be involved in the implementation of the plan at city council meetings and general public meetings. Mitigation actions and implementation strategies will be discussed at city council meetings and an opportunity for public input will be encouraged. This process will ensure opportunity for public awareness of hazards and threats faced by the community and actions planned to eliminate or reduce impacts. To promote continued public participation, meetings where the plan will be discussed will have public notice posted.

Incorporation into Other Plans

Date	Plan or Document	Information Incorporated into Plan or Document

Plan Updates Concerning Cylinder

When updating the plan please contact the Palo Alto County Emergency Management for assistance.

Date	Page	Change

Previous Plan - 6/1/09 - Current

Section (Below are Examples-Use headings from plan)	**Updates**	**Comments:**
Purpose and Planning Process	Yes	Some minor changes from their 6/1/09 approved plan
Community Background, Profile, Services/Facilities	Yes	Some minor changes on updating numbers of services and facilities.
Hazard Analysis/Risk Assessment	Yes	Used the County ranking and tailored it to the City.
Hazard and Activities Prioritization	Yes	Updated previous plan.
Hazard Vulnerability Assessment	Yes	Updated numbers.
Mitigation Actions	Yes	Added a few activities

Section 9.5 Emmetsburg

Planning Committee Members:

John Bird	City Administrator
Kim Kibbie	City Clerk
Steve Finer	Council
Brian Malm	Council
Myrna Heddinger	Mayor

City Contact:

John Bird, City Administrator 712-852-4030

Planning Process

Meetings were held throughout the planning process to collect information and share that information with the general public and the planning team. Notices for meetings were posted at city hall or the school where the meeting was being held. Agendas and minutes for meetings are included in the Appendix.

Utilities

City of Emmetsburg	
Water	Emmetsburg **Municipal** Utilities
Contact	712-852-3285
Wastewater Treatment	Emmetsburg Municipal Utilities
Contact	712-852-3942
Storm Sewer	City Operated
Electric	MidAmerican Energy
Contact	800-358-6265
Natural Gas	Emmetsburg Municipal Utilities
Contact	712-852-3942
	MidAmerican Energy
	800-358-6265
Telecom	Iowa Telecom Service
Contact	877-901-4692

Floodplain Ordinance	Yes
Floodplain Compliance Officer	NA - (For assistance in the administration of the floodplain regulations, contact the Iowa Department of Natural Resources)

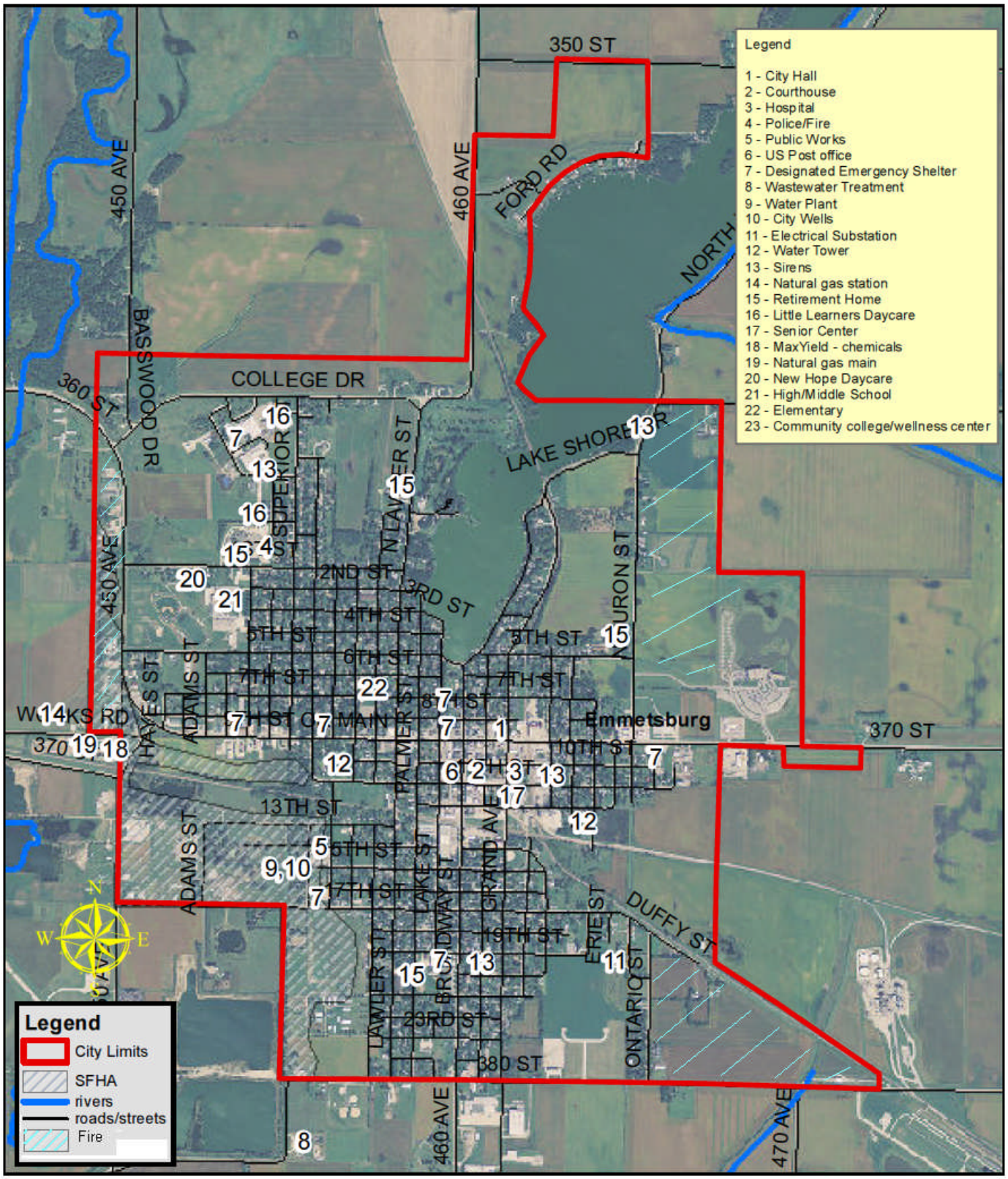
Future Plans and Mechanisms

The City of Emmetsburg planning committee stated they would try to incorporate the mitigation strategies developed in the plan in their community actions and other community planned documents if they occur. The committee also stated they would draw from other community mechanisms when applicable to add into the mitigation strategies and mitigation requirements of their hazard mitigation plan.

In preparation of this plan, existing plans and other technical information was considered. The purpose of this review was to give consideration to existing information before setting future mitigation goals.

Plan/Document	If yes last year updated	Plan/Document	If yes last year updated
Comprehensive/Landuse plan	Yes	Capital Improvement Plan	Yes
Local Emergency Plan	Yes	Local Recovery Plan	No
Local Mitigation Plan	No 2005	County Mitigation Plan	No
Economic Development Plan	Yes	Flood Ordinance or Plan	Yes
School Mitigation Plan	Yes	Zoning Ordinance	Yes
Building Code	Yes	Subdivision	Yes
Tree Trimming Ordinance	Yes	Nuisance Ordinance	Yes
Storm Water Ordinance	Yes		

CITY OF EMMETSBURG CRITICAL FACILITIES MAP



Critical Facilities and Assessed Values

	Critical Facilities	Estimated Replacement Value
1	City Offices (1)	$465,000
2	Palo Alto County Courthouse (2)	$1,829,640
3	Police/Fire Dept (3)	$895,000
4	Palo Alto County Hospital (4)	$17,510,780
5	Public Works Building (5)	$335,000
6	U.S. Post Office (6)	$261,720
7a	Designated Emergency Shelter:	
	Bethany Evangelical Lutheran Church 703 Broadway (7a)	$886,720
7b	Designated Emergency Shelter: First Methodist Episcopal Church 801 Broadway (7b)	$831,340
7c	Designated Emergency Shelter: Our Savior's Lutheran Church Highway 18 E (7c)	$180,260
7d	Designated Emergency Shelter: Holy Family Roman Catholic Church 2001 Broadway (7d)	$1,401,830
7e	Designated Emergency Shelter: Grace Baptist Church of Emmetsburg 209 N State St (7e)	$895,770
7f	Designated Emergency Shelter: Saint Pauls Evangelical Lutheran Church 805 Harrison St (7f)	$951,020
7g	Designated Emergency Shelter: Veterans of Foreign Affairs Highway 4 W (7g)	$380,440
7h	Designated Emergency Shelter: Iowa Lakes Community College (7h)	Value included with Community College (23)
8	Wastewater Treatment (8)	$10,890,000
9	Water Plant (9)	$3,117,000
10	City Wells (10)	$291,000
11	Electrical Substation (11)	$90,400
12	Water Tower (12)	$1,466,300
13	Outdoor Warning Siren (13)	$32,900
14	Natural Gas Border Station (14)	$120,000
15a	Retirement Home/Assisted Living: Willow Ridge Senior Independent (15a)	Value included with Palo Alto County Hospital (4)
15b	Retirement Home/Assisted Living: Care Center 2601 17th Street (15b)	$625,580
15c	Retirement Home/Assistant Living: Emmetsburg Care center 2405 21st street (15c)	$1,262,520
15d	Retirement Home/Assistant Living: Kathleen's Residential Care, 1505 5th Street (15d)	$579,800
15e	Retirement Home/Assistant Living: Lakeside Lutheran Home 301 N Lawler Street (15e)	$1,955,140
16	Little Learners Daycare (16)	Value included with Palo Alto County Hospital (4)
17	Senior Center (17)	$226,090
18	MaxYield- Ag Chemicals (18)	$593,300

19	Head Start (19)	Value included with Community College (23)
20	New Hope Daycare (20)	$50,600
21	High/Middle School (21)	$8,599,180
22	Elementary School (22)	$1,805,440
23	Iowa Lakes Community College & Library & Wellness Center (23)	$20,017,130

Hazard Risk Assessment

The Palo Alto County Hazard Mitigation Planning Committee determined the countywide hazard rankings. The city was also provided with information and statistics relevant to hazards affecting Emmetsburg, including records of past events and damages. The city was asked to review the information from the countywide rankings and determine if highest risk hazards for the county applied to Emmetsburg, and if not, how Emmetsburg's situation differs from the county. Based on this discussion, prevalent hazards were determined for Emmetsburg. Along with the information and statistics provided, the people present were asked to draw upon their knowledge and experiences of hazards affecting Emmetsburg. After the discussion among the planning team, it was decided that the City of Emmetsburg would re-prioritize the hazards of the countywide ranking for their jurisdictional portion of the plan. The city eliminated many of the hazards that were in the countywide ranking, such as: expansive soil. The planning team decided that those hazards did not apply to Emmetsburg.

It is recognized that Emmetsburg may be susceptible to other hazards, such as the other hazards in the State of Iowa Hazard Mitigation Plan, but those hazards are not considered to be a high risk and are not examined at this time. However, if it is later determined that a hazard affecting Emmetsburg does pose a higher risk than originally determined, it will be examined at that time or when the plan is updated.

Hazard Ranking-City of Emmetsburg	
1	Severe Winter Storm
2	Windstorm
3	Hailstorm
4	Extreme Heat
5	Tornado
6	Thunderstorm and Lightning
7	Grass and Wildland Fire
8	Flash Flood
9	River Flood
10	Drought
11	Dam Failure

Iowa Identified Mitigation Actions

The following are the actions that were identified by the local planning team:

- Make improvements to the City's sanitary sewer collection system
- Educate the public about the hazard risks of natural hazards (public awareness)
- Continue storm spotter training/education for firefighters, police and other City officials.
- Enforce tree trimming
- Upgrade or install new warning sirens
- Purchase generator(s)

- Backup city records
- Implement good neighbor program/list of persons needing special attention
- Construct FEMA safe room(s)
- Purchase fire equipment /apparatus
- Fire/EMT training
- Establish a cell phone program for alerts.
- Establish SOP's for road closures
- Purchase barricades and other traffic equipment
- Enforce floodplain regulations
- Close flooded roads and add signage
- Purchase sandbagging equipment and appropriate accessory equipment
- Inspection plan of all public buildings
- Keep Palo Alto operations Plan up to date
- Utilize burn ban when needed
- Monitor and evaluate dams

The Emmetsburg Planning Team and Palo Alto County are responsible for overseeing the implementation of this plan. Palo Alto County Emergency Management and other county and local agencies will assist with implementing and administering this plan. The mitigations actions were discussed with a high, medium and low priority ranking in mind. **High (H) –** Jurisdictions valued this as something that had the highest effect on helping the community and people survive severe weather events. Also the cost could be easily obtained or funding has already been set aside. **Medium (M) –** These were valued at the jurisdictions as projects that where ranked in between the other two priority groups. **Low (L) –** These mitigation actions have the least effect on protecting human life from severe weather events and therefore have been given the lowest priority. Or the cost is too high at this point in time and makes it unlikely to be acted upon in present future. Priorities for each mitigation action are discussed in the Mitigation Actions, Section 6. Another factor in the implementation of the mitigation actions was their benefit versus how much the project would cost. Economics of implementing mitigation actions were considered when the planning team discussed the priority of projects. Cost estimates were given by the Palo Alto County Planning Committee to help display which actions were of a higher importance and fit in the economic goals of the county/cities/schools. Those estimates can be reference in Section 6. The Implementation Schedule for the mitigation activities, whether ongoing or considered, will be subject to the availability of Federal, State, and local funding. Continuing (ON) = Ongoing (responsible entity regularly participates in or supports); Short Term (ST) = 1-5 years to initiate or accomplish; and Long Term (LT) = 5 or more years to initiate or accomplish.

Once the plan is completed, approved, and adopted, local governments will be eligible for funding assistance from FEMA for mitigation strategies put forth in the plan. Potential funding resources include the FEMA Pre-Disaster Mitigation Program (PDM) and FEMA Hazard Mitigation Grant Program (HMGP). No timeframe was identified in implementing these mitigation actions will be acted upon as funding become available. It was discussed that additional mitigation actions would be examined during the update process. The mitigation actions that were discussed were what the Emmetsburg Planning Committee wanted to have included in the Hazard Mitigation Plan.

Plan Maintenance

Plan maintenance involves taking action to ensure that the plan stays current with information, priorities are still in order, and goals and objectives are maintained and updated. To accomplish this, the plan will be reviewed by the planning team annually and be incorporated into other city plans. Additionally, a comprehensive update is required at least once every 5 years and submitted to FEMA for certification. The revised plan will be adopted by the city council. To assist with the update, information is to be collected by the city annually to document efforts, hazard events, and other pertinent activities to mitigate hazards. Part of

plan maintenance is maintaining the planning team. The planning team is composed of local elected officials, city employees and other interested parties. This is an important part of plan maintenance in order to reconvene the planning team when necessary.

Monitoring

The Emmetsburg Planning Team and Palo Alto County Emergency Management are responsible for monitoring this portion of the plan. The plan will be monitored based on the mitigation strategies identified in the plan and the reported progress to accomplish the work. Projects that are complete will be monitored for effectiveness. Any strategies that are removed from the plan will be examined and documented. An annual reporting sheet is included in this plan for the city to keep track of the mitigation process.

Incorporation into Existing Plans

The city is responsible for reviewing its local plans, codes, and ordinances and amending documents as they see appropriate. As appropriate, information and actions from this plan will be incorporated into comprehensive or community builder plans during review and update processes. A worksheet is provided to record what information from this plan is incorporated to other plans.

Continued Public Participation

The public will be involved in the implementation of the plan at city council meetings and general public meetings. Mitigation actions and implementation strategies will be discussed at city council meetings and an opportunity for public input will be encouraged. This process will ensure opportunity for public awareness of hazards and threats faced by the community and actions planned to eliminate or reduce impacts. To promote continued public participation, meetings where the plan will be discussed will have public notice posted.

Incorporation into Other Plans

Date	Plan or Document	Information Incorporated into Plan or Document

Plan Updates Concerning Emmetsburg

When updating the plan please contact the Palo Alto County Emergency Management for assistance.

Date	Page	Change

Previous Plan - 3/9/05 - Expired

Section (Below are Examples-Use headings from plan)	**Updates**	**Comments:**
Purpose and Planning Process	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Community Background, Profile, Services/Facilities	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard Analysis/Risk Assessment	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard and Activities Prioritization	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard Vulnerability Assessment	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Mitigation Actions	Yes	Was a previous expired plan, all data needed to be updated and reassessed.

Section 9.6 Graettinger

Planning Committee Members:

Mike Flaherty	Resident
Chris McGrauth	Resident
Wayne Anderson	Councilmember
Kevin Hanson	Mayor
Sandra Henderson	City Clerk
Kenneth Ebeling	Resident
Ken Smith	Councilmember

City Contact:

Sandra Henderson, City Clerk 712-859-3742

Planning Process

Meetings were held throughout the planning process to collect information and share that information with the general public and the planning team. Notices for meetings were posted at city hall or the school where the meeting was being held. Agendas and minutes for meetings are included in the Appendix.

Utilities

City of Graettinger	
Water	Graettinger Municipal Utilities
Contact	712-859-3742
Wastewater Treatment	Graettinger Municipal Sewer Utility
Contact	712-859-3742
Storm Sewer	None
Electric	Graettinger Municipal Light Plant
Contact	712-859-3844
Natural Gas	Graettinger Municipal Gas Utilities
Contact	712-859-3934
Telecom	River Valley Telecommunications
Contact	712-859-3300

Floodplain Ordinance	No
Floodplain Compliance Officer	NA - (For assistance in the administration of the floodplain regulations, contact the Iowa Department of Natural Resources)

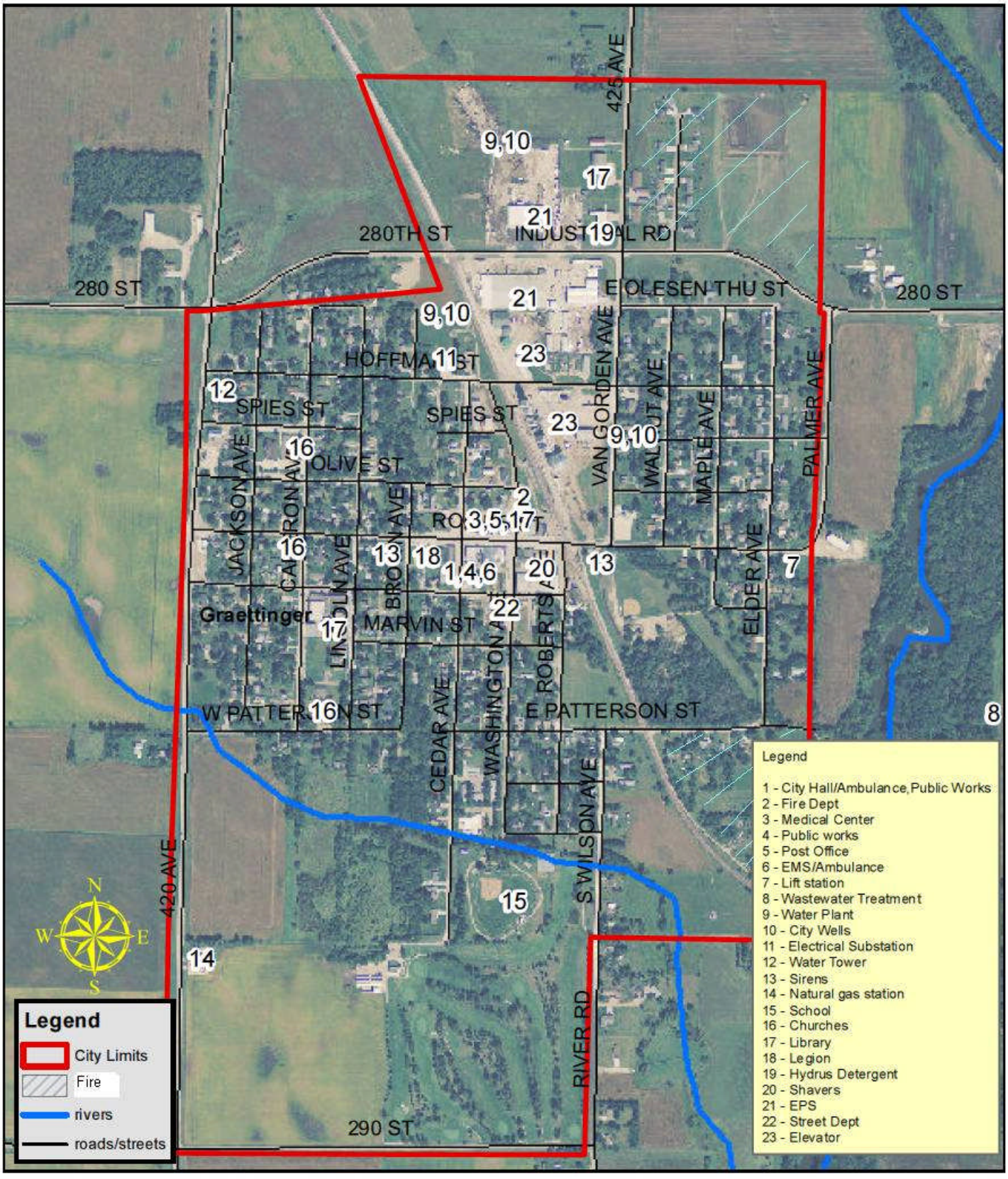
Future Plans and Mechanisms

The City of Graettinger planning committee stated they would try to incorporate the mitigation strategies developed in the plan in their community actions and other community planned documents if they occur. The committee also stated they would draw from other community mechanisms when applicable to add into the mitigation strategies and mitigation requirements of their hazard mitigation plan.

In preparation of this plan, existing plans and other technical information was considered. The purpose of this review was to give consideration to existing information before setting future mitigation goals.

Plan/Document	If yes last year updated	Plan/Document	If yes last year updated
Comprehensive/Landuse plan	Yes	Capital Improvement Plan	No
Local Emergency Plan	No	Local Recovery Plan	No
Local Mitigation Plan	No 2005	County Mitigation Plan	No
Economic Development Plan	No	Flood Ordinance or Plan	No
School Mitigation Plan	Yes	Zoning Ordinance	Yes
Building Code	No	Subdivision	Yes
Tree Trimming Ordinance	Yes	Nuisance Ordinance	Yes
Storm Water Ordinance	No		

CITY OF GRAETTINGER CRITICAL FACILITIES MAP



Critical Facilities and Assessed Values

	Critical Facilities	Estimated Replacement Value
1	City Offices/ Ambulance/ Public Works	$480,978
2	Fire Department	$185,000
3	Palo Alto Co. Family Medical Clinic	$147,580
4	Public Works Building	$269,462
5	U.S. Post Office	$20,000
6	EMS/Ambulance Shed	$100,000
7	Lift Station	$20,000
8	Wastewater Lagoons	$3,000,000
9	Pool	$190,000
10	City Wells	$104,204
11	Electrical Substation	$234,330
12	Water Tower	$339,534
13	Outdoor Warning Sirens	$20,000
14	Natural Gas Boarder Station	$36,647
15	Library	$504,867
16	Churches	
	16a. United Methodist Church- 102 S. Cameron AVE	$675,770
	16b. Immaculate Conception Catholic Church- 503 W Olive Street	$2,058,020
	16c. Bethel Lutheran Church- 401 W Patterson Street	$1,396,110
17	Graettinger-Terril School	$2,297,340
18	Legion	$107,500
19	Hydrus Detergent	$50,000
20	Shavers	$545,130
21	EPS	$2,076,140
22	Street Department	$269,462
23	Elevator	$3,509,682
24	Park Shelters	$156,175

Hazard Risk Assessment

The Palo Alto County Hazard Mitigation Planning Committee determined the countywide hazard rankings. The city was also provided with information and statistics relevant to hazards affecting Graettinger, including records of past events and damages. The city was asked to review the information from the countywide rankings and determine if highest risk hazards for the county applied to Graettinger, and if not, how Graettinger's situation differs from the county. Based on this discussion, prevalent hazards were determined for Graettinger. Along with the information and statistics provided, the people present were asked to draw upon their knowledge and experiences of hazards affecting Graettinger. After the discussion among the planning team, it was decided that the City of Graettinger would re-prioritize the hazards of the countywide ranking for their jurisdictional portion of the plan. The city eliminated many of the hazards that were in the countywide ranking, such as: expansive soils and dam failure. The planning team decided that those hazards did not apply to Graettinger.

It is recognized that Graettinger may be susceptible to other hazards, such as the other hazards in the State of Iowa Hazard Mitigation Plan, but those hazards are not considered to be a high risk and are not examined at

this time. However, if it is later determined that a hazard affecting Graettinger does pose a higher risk than originally determined, it will be examined at that time or when the plan is updated.

Hazard Ranking-City of Graettinger	
1	Severe Winter Storm
2	Windstorm
3	Hailstorm
4	Extreme Heat
5	Tornado
6	Thunderstorm and Lightning
7	Grass and Wildland Fire
8	Flash Flood
9	River Flood
10	Drought

Identified Mitigation Actions

The following are the actions that were identified by the local planning team:

- Make improvements to the City's sanitary sewer collection system
- Educate the public about the hazard risks of natural hazards (public awareness)
- Continue storm spotter training/education for firefighters, police and other City officials.
- Promote the use of NOAA radios and/or buy
- Enforce snow ordinances
- Enforce tree trimming
- Upgrade or install new warning sirens
- Purchase generator(s)
- Implement good neighbor program/list of persons needing special attention
- Construct FEMA safe room(s)
- Purchase fire equipment/ apparatus
- Fire/EMT training
- Bury Utility lines
- Upgrade snow removal equipment(purchase)
- Exercise disaster response training
- Look into Joining NFIP and getting map

The Graettinger Planning Team and Palo Alto County are responsible for overseeing the implementation of this plan. Palo Alto County Emergency Management and other county and local agencies will assist with implementing and administering this plan. The mitigations actions were discussed with a high, medium and low priority ranking in mind. **High (H) –** Jurisdictions valued this as something that had the highest effect on helping the community and people survive severe weather events. Also the cost could be easily obtained or funding has already been set aside. **Medium (M) –** These were valued at the jurisdictions as projects that where ranked in between the other two priority groups. **Low (L) –** These mitigation actions have the least effect on protecting human life from severe weather events and therefore have been given the lowest priority. Or the cost is too high at this point in time and makes it unlikely to be acted upon in present future. Priorities for each mitigation action are discussed in the Mitigation Actions, Section 6. Another factor in the implementation of the mitigation actions was their benefit versus how much the project would cost. Economics of implementing mitigation actions were considered when the planning team discussed the priority of projects. Cost estimates were given by the Palo Alto County Planning Committee to help display which actions were of a higher importance and fit in the economic goals of the county/cities/schools. Those estimates can be reference in Section 6. The Implementation Schedule for the mitigation activities, whether

ongoing or considered, will be subject to the availability of Federal, State, and local funding. Continuing (ON) = Ongoing (responsible entity regularly participates in or supports); Short Term (ST) = 1-5 years to initiate or accomplish; and Long Term (LT) = 5 or more years to initiate or accomplish.

Once the plan is completed, approved, and adopted, local governments will be eligible for funding assistance from FEMA for mitigation strategies put forth in the plan. Potential funding resources include the FEMA Pre-Disaster Mitigation Program (PDM) and FEMA Hazard Mitigation Grant Program (HMGP). No timeframe was identified in implementing these mitigation actions will be acted upon as funding become available. It was discussed that additional mitigation actions would be examined during the update process. The mitigation actions that were discussed were what the Graettinger Planning Committee wanted to have included in the Hazard Mitigation Plan.

Plan Maintenance

Plan maintenance involves taking action to ensure that the plan stays current with information, priorities are still in order, and goals and objectives are maintained and updated. To accomplish this, the plan will be reviewed by the planning team annually and be incorporated into other city plans. Additionally, a comprehensive update is required at least once every 5 years and submitted to FEMA for certification. The revised plan will be adopted by the city council. To assist with the update, information is to be collected by the city annually to document efforts, hazard events, and other pertinent activities to mitigate hazards. Part of plan maintenance is maintaining the planning team. The planning team is composed of local elected officials, city employees and other interested parties. This is an important part of plan maintenance in order to reconvene the planning team when necessary.

Monitoring

The Graettinger Planning Team and Palo Alto County Emergency Management are responsible for monitoring this portion of the plan. The plan will be monitored based on the mitigation strategies identified in the plan and the reported progress to accomplish the work. Projects that are complete will be monitored for effectiveness. Any strategies that are removed from the plan will be examined and documented. An annual reporting sheet is included in this plan for the city to keep track of the mitigation process.

Incorporation into Existing Plans

The city is responsible for reviewing its local plans, codes, and ordinances and amending documents as they see appropriate. As appropriate, information and actions from this plan will be incorporated into comprehensive or community builder plans during review and update processes. A worksheet is provided to record what information from this plan is incorporated to other plans.

Continued Public Participation

The public will be involved in the implementation of the plan at city council meetings and general public meetings. Mitigation actions and implementation strategies will be discussed at city council meetings and an opportunity for public input will be encouraged. This process will ensure opportunity for public awareness of hazards and threats faced by the community and actions planned to eliminate or reduce impacts. To promote continued public participation, meetings where the plan will be discussed will have public notice posted.

Incorporation into Other Plans

Date	Plan or Document	Information Incorporated into Plan or Document

Plan Updates Concerning Graettinger

When updating the plan please contact the Palo Alto County Emergency Management for assistance.

Date	Page	Change

Previous Plan – 1/12/05 - Expired

Section (Below are Examples-Use headings from plan)	Updates	Comments:
Purpose and Planning Process	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Community Background, Profile, Services/Facilities	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard Analysis/Risk Assessment	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard and Activities Prioritization	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard Vulnerability Assessment	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Mitigation Actions	Yes	Was a previous expired plan, all data needed to be updated and reassessed.

Section 9.7 Mallard

Planning Committee Members:

Lyle Larson	Mayor
Glen Simonson	Council
Larry Akridge	Council
Becky Larson	City Clerk
Karl Johnson	Council
Tara Rae Hoch	Council

City Contact:

Becky Larson City Clerk 712-425-3527

Planning Process

Meetings were held throughout the planning process to collect information and share that information with the general public and the planning team. Notices for meetings were posted at city hall or the school where the meeting was being held. Agendas and minutes for meetings are included in the Appendix.

Utilities

City of Mallard	
Water	Mallard Municipal Utilities
Contact	712-425-3527
Wastewater Treatment	Mallard Municipal Utilities
Contact	712-425-3527
Storm Sewer	None
Electric	Alliant Energy
Contact	800-255-4268
Natural Gas	Private LP Tanks
Contact	Home Owners
Telecom	**Iowa** Telecom
Contact	877-901-4692
	Northwest Communications
	712-776-2612

Floodplain Ordinance	No
Floodplain Compliance Officer	NA - (For assistance in the administration of the floodplain regulations, contact the Iowa Department of Natural Resources)

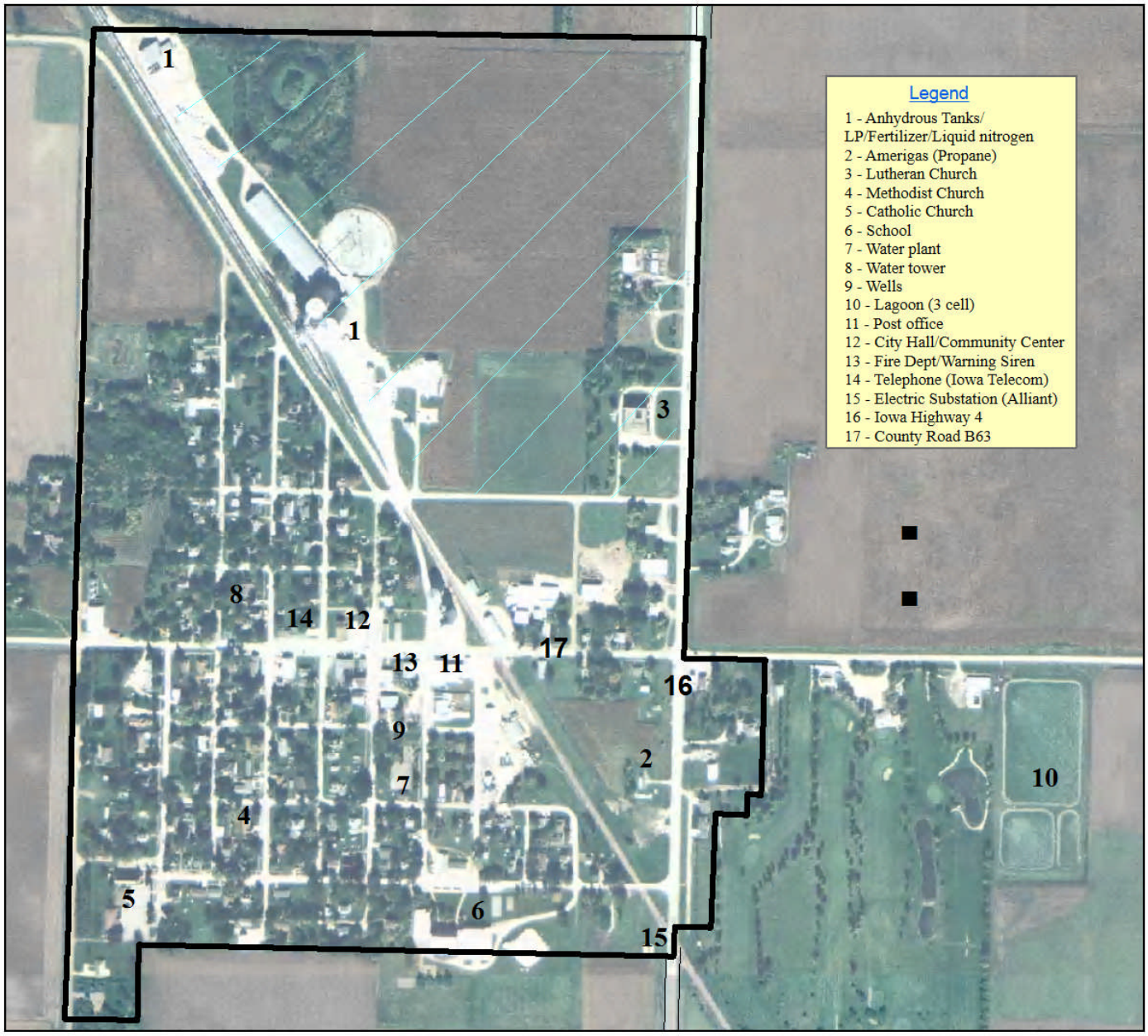
Future Plans and Mechanisms

The City of Mallard planning committee stated they would try to incorporate the mitigation strategies developed in the plan in their community actions and other community planned documents if they occur. The committee also stated they would draw from other community mechanisms when applicable to add into the mitigation strategies and mitigation requirements of their hazard mitigation plan.

In preparation of this plan, existing plans and other technical information was considered. The purpose of this review was to give consideration to existing information before setting future mitigation goals.

Plan/Document	If yes last year updated	Plan/Document	If yes last year updated
Comprehensive/Landuse plan	Yes	Capital Improvement Plan	No
Local Emergency Plan	No	Local Recovery Plan	No
Local Mitigation Plan	Yes 2009	County Mitigation Plan	No
Economic Development Plan	No	Flood Ordinance or Plan	No
School Mitigation Plan	Yes	Zoning Ordinance	No
Building Code	No	Subdivision	No
Tree Trimming Ordinance	Yes	Nuisance Ordinance	Yes
Storm Water Ordinance	No		

City of Mallard
Critical Facilities Map



Legend

1 - Anhydrous Tanks/ LP/Fertilizer/Liquid nitrogen
2 - Amerigas (Propane)
3 - Lutheran Church
4 - Methodist Church
5 - Catholic Church
6 - School
7 - Water plant
8 - Water tower
9 - Wells
10 - Lagoon (3 cell)
11 - Post office
12 - City Hall/Community Center
13 - Fire Dept/Warning Siren
14 - Telephone (Iowa Telecom)
15 - Electric Substation (Alliant)
16 - Iowa Highway 4
17 - County Road B63

Legend

- City Limits
- Fire
- rivers
- roads/streets

NWIPDC - mapping services

Map Prepared By: NORTHWEST IOWA PLANNING AND DEVELOPMENT COMMISSION
GOVERNMENTAL SERVICES CENTER
217 WEST 5TH STREET, BOX 1493 SPENCER, IOWA 51301
(712) 262-7225 FAX: (712) 262-7665 WWW.NWIPDC.ORG

Critical Facilities and Assessed Values

	Critical Facilities	Estimated Replacement Value
1	Anhydrous Tanks/LP/Fertilizer	n/a
2	Amerigas (LP)	$500,000.00
3	Lutheran Church	$845,470.00
4	Methodist Church	$586,800.00
5	Catholic Church	$682,120.00
6	School	$350,000.00
7	Water plant	$500,000.00
8	Water Tower	$500,000.00
9	Wells	$600,000.00
10	Lagoons (3 cell)	$2,500,000.00
11	Potential shelter	$100,000.00
12	City Hall/Community Center/Library	$300,000.00
13	Fire Dept/Warning Siren	$270,000.00
14	Telephone	$150,000.00
15	Electrical Substation	$150,000.00
16	Iowa Hwy 4	n/a
17	County RD B63	n/a

Hazard Risk Assessment

The Palo Alto County Hazard Mitigation Planning Committee determined the countywide hazard rankings. The city was also provided with information and statistics relevant to hazards affecting Mallard, including records of past events and damages. The city was asked to review the information from the countywide rankings and determine if highest risk hazards for the county applied to Mallard, and if not, how Mallard's situation differs from the county. Based on this discussion, prevalent hazards were determined for Mallard. Along with the information and statistics provided, the people present were asked to draw upon their knowledge and experiences of hazards affecting Mallard. After the discussion among the planning team, it was decided that the City of Mallard would re-prioritize the hazards of the countywide ranking for their jurisdictional portion of the plan. The city eliminated many of the hazards that were in the countywide ranking, such as: expansive soils, river flooding and dam failure. The planning team decided that those hazards did not apply to Mallard.

It is recognized that Mallard may be susceptible to other hazards, such as the other hazards in the State of Iowa Hazard Mitigation Plan, but those hazards are not considered to be a high risk and are not examined at this time. However, if it is later determined that a hazard affecting Mallard does pose a higher risk than originally determined, it will be examined at that time or when the plan is updated.

Hazard Ranking-City of Mallard	
1	Severe Winter Storm
2	Windstorm
3	Hailstorm
4	Extreme Heat
5	Tornado
6	Thunderstorm and Lightning

7	Grass and Wildland Fire
8	Flash Flood
9	Drought

Identified Mitigation Actions

The following are the actions that were identified by the local planning team:

- Educate the public about the hazard risks of natural hazards (public awareness)
- Continue storm spotter training/education for firefighters, police and other City officials.
- Enforce tree trimming
- Purchase generator(s)
- Have a debris management program/plan/sites/equipment
- Encourage energy/communications companies for improvements
- Bury Utility lines
- Upgrade snow removal equipment(purchase)
- Designate gathering points(storm shelter) after events
- Look into Joining NFIP and getting map

The Mallard Planning Team and Palo Alto County are responsible for overseeing the implementation of this plan. Palo Alto County Emergency Management and other county and local agencies will assist with implementing and administering this plan. The mitigations actions were discussed with a high, medium and low priority ranking in mind. **High (H) –** Jurisdictions valued this as something that had the highest effect on helping the community and people survive severe weather events. Also the cost could be easily obtained or funding has already been set aside. **Medium (M) –** These were valued at the jurisdictions as projects that where ranked in between the other two priority groups. **Low (L) –** These mitigation actions have the least effect on protecting human life from severe weather events and therefore have been given the lowest priority. Or the cost is too high at this point in time and makes it unlikely to be acted upon in present future. Priorities for each mitigation action are discussed in the Mitigation Actions, Section 6. Another factor in the implementation of the mitigation actions was their benefit versus how much the project would cost. Economics of implementing mitigation actions were considered when the planning team discussed the priority of projects. Cost estimates were given by the Palo Alto County Planning Committee to help display which actions were of a higher importance and fit in the economic goals of the county/cities/schools. Those estimates can be reference in Section 6. The Implementation Schedule for the mitigation activities, whether ongoing or considered, will be subject to the availability of Federal, State, and local funding. Continuing (ON) = Ongoing (responsible entity regularly participates in or supports); Short Term (ST) = 1-5 years to initiate or accomplish; and Long Term (LT) = 5 or more years to initiate or accomplish.

Once the plan is completed, approved, and adopted, local governments will be eligible for funding assistance from FEMA for mitigation strategies put forth in the plan. Potential funding resources include the FEMA Pre-Disaster Mitigation Program (PDM) and FEMA Hazard Mitigation Grant Program (HMGP). No timeframe was identified in implementing these mitigation actions will be acted upon as funding become available. It was discussed that additional mitigation actions would be examined during the update process. The mitigation actions that were discussed were what the Mallard Planning Committee wanted to have included in the Hazard Mitigation Plan.

Plan Maintenance

Plan maintenance involves taking action to ensure that the plan stays current with information, priorities are still in order, and goals and objectives are maintained and updated. To accomplish this, the plan will be reviewed by the planning team annually and be incorporated into other city plans. Additionally, a comprehensive update is required at least once every 5 years and submitted to FEMA for certification. The

revised plan will be adopted by the city council. To assist with the update, information is to be collected by the city annually to document efforts, hazard events, and other pertinent activities to mitigate hazards. Part of plan maintenance is maintaining the planning team. The planning team is composed of local elected officials, city employees and other interested parties. This is an important part of plan maintenance in order to reconvene the planning team when necessary.

Monitoring

The Mallard Planning Team and Palo Alto County Emergency Management are responsible for monitoring this portion of the plan. The plan will be monitored based on the mitigation strategies identified in the plan and the reported progress to accomplish the work. Projects that are complete will be monitored for effectiveness. Any strategies that are removed from the plan will be examined and documented. An annual reporting sheet is included in this plan for the city to keep track of the mitigation process.

Incorporation into Existing Plans

The city is responsible for reviewing its local plans, codes, and ordinances and amending documents as they see appropriate. As appropriate, information and actions from this plan will be incorporated into comprehensive or community builder plans during review and update processes. A worksheet is provided to record what information from this plan is incorporated to other plans.

Continued Public Participation

The public will be involved in the implementation of the plan at city council meetings and general public meetings. Mitigation actions and implementation strategies will be discussed at city council meetings and an opportunity for public input will be encouraged. This process will ensure opportunity for public awareness of hazards and threats faced by the community and actions planned to eliminate or reduce impacts. To promote continued public participation, meetings where the plan will be discussed will have public notice posted.

Incorporation into Other Plans

Date	Plan or Document	Information Incorporated into Plan or Document

Plan Updates Concerning Mallard

When updating the plan please contact the Palo Alto County Emergency Management for assistance.

Date	Page	Change

Previous Plan – 6/1/09 - Current

Section (Below are Examples-Use headings from plan)	**Updates**	**Comments:**
Purpose and Planning Process	Yes	Some minor changes from their 6/1/09 approved plan
Community Background, Profile, Services/Facilities	Yes	Some minor changes on updating numbers of services and facilities.
Hazard Analysis/Risk Assessment	Yes	Used the County ranking and tailored it to the City.
Hazard and Activities Prioritization	Yes	Updated previous plan.
Hazard Vulnerability Assessment	Yes	Updated numbers.
Mitigation Actions	Yes	Added a few activities

Section 9.8 Rodman

Planning Committee Members:

Lynn Anthony	Resident
Ruby Besch	City Council
Danny Hutchison	Resident
Sean Leners	Resident
Ben Bishop	Resident
Ron Thilges	Resident
Rose Fokken	City Council
Jean Hyslop	Mayor

City Contact:

Missy Hall, City Clerk 712-887-4444

Planning Process

Meetings were held throughout the planning process to collect information and share that information with the general public and the planning team. Notices for meetings were posted at city hall or the school where the meeting was being held. Agendas and minutes for meetings are included in the Appendix.

Utilities

City of Rodman	
Water	City of Rodman
Contact	515-887-4444
Wastewater Treatment	Private Septic
Contact	Home Owners
Storm Sewer	**None**
Electric	Alliant Energy
Contact	800-255-4268
Natural Gas	Private LP Tanks
Telecom	Northwest Internet
Contact	712-776-2612

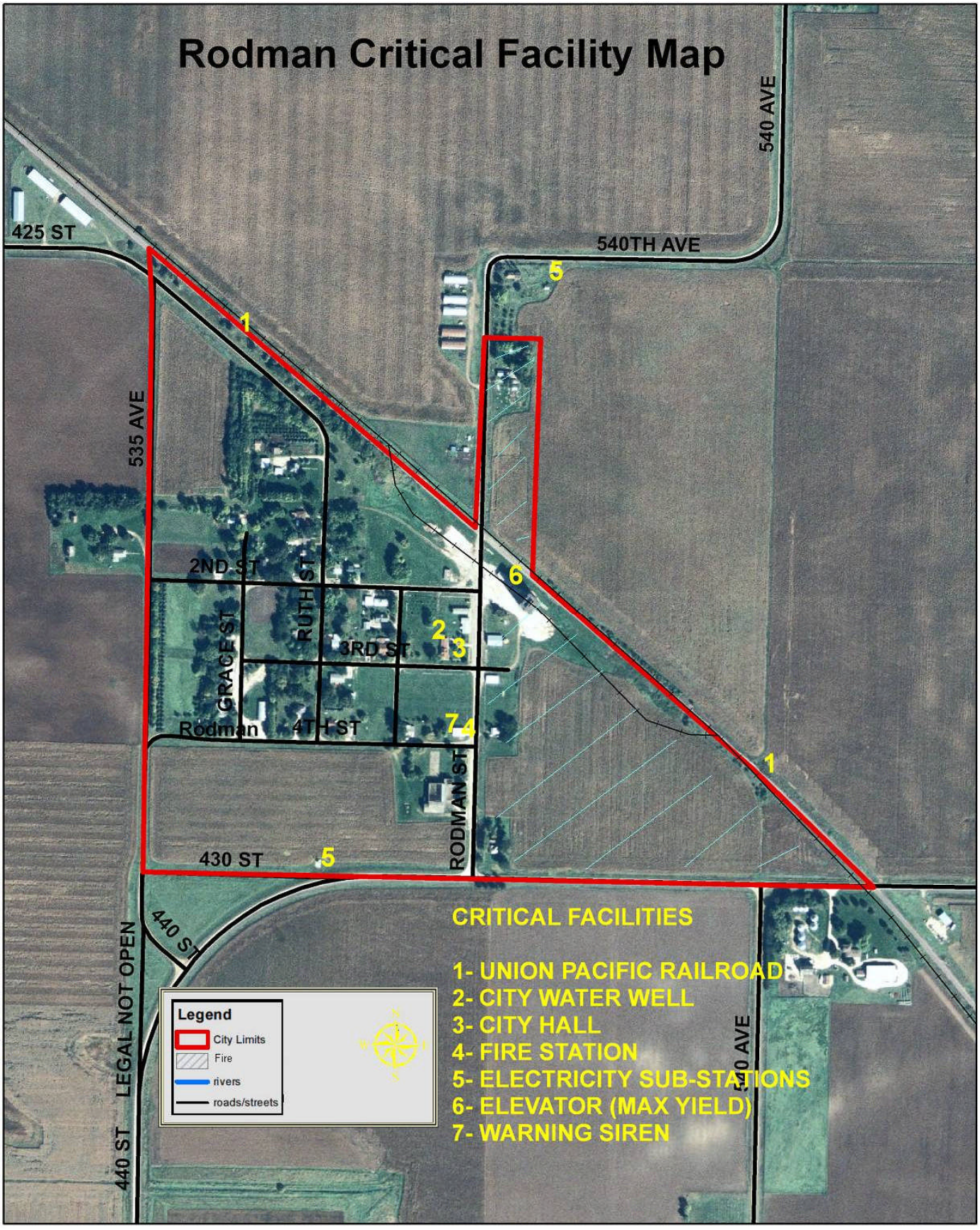
Floodplain Ordinance	No
Floodplain Compliance Officer	NA – (For assistance in the administration of the floodplain regulations, contact the Iowa Department of Natural Resources)

Future Plans and Mechanisms

The City of Rodman planning committee stated they would try to incorporate the mitigation strategies developed in the plan in their community actions and other community planned documents if they occur. The committee also stated they would draw from other community mechanisms when applicable to add into the mitigation strategies and mitigation requirements of their hazard mitigation plan.

In preparation of this plan, existing plans and other technical information was considered. The purpose of this review was to give consideration to existing information before setting future mitigation goals.

Plan/Document	If yes last year updated	Plan/Document	If yes last year updated
Comprehensive/Landuse plan	No	Capital Improvement Plan	No
Local Emergency Plan	No	Local Recovery Plan	No
Local Mitigation Plan	Yes 2009	County Mitigation Plan	No
Economic Development Plan	No	Flood Ordinance or Plan	No
School Mitigation Plan	No	Zoning Ordinance	No
Building Code	No	Subdivision	No
Tree Trimming Ordinance	No	Nuisance Ordinance	No
Storm Water Ordinance	No		


Rodman Critical Facility Map
425 ST
540TH AVE
540 AVE
535 AVE
2ND ST
RUTH ST
GRACE ST
3RD ST
4TH ST
Rodman
RODMAN ST
430 ST
440 ST
LEGAL NOT OPEN
440 ST
540 AVE
1
2
3
4
5
6
7
CRITICAL FACILITIES
1- UNION PACIFIC RAILROAD
2- CITY WATER WELL
3- CITY HALL
4- FIRE STATION
5- ELECTRICITY SUB-STATIONS
6- ELEVATOR (MAX YIELD)
7- WARNING SIREN
Legend
City Limits
Fire
rivers
roads/streets

Critical Facilities and Assessed Values

	Critical Facilities	Estimated Replacement Value
1	Union Pacific RR	n/a
2	City Water Well	$200,000.00
3	City Hall	$150,000.00
4	Fire Station	$180,000.00
5	Electrical Substation	$100,000.00
6	Elevator (Max Yield)	$250,000.00
7	Warning Siren	$20,000.00

Hazard Risk Assessment

The Palo Alto County Hazard Mitigation Planning Committee determined the countywide hazard rankings. The city was also provided with information and statistics relevant to hazards affecting Rodman, including records of past events and damages. The city was asked to review the information from the countywide rankings and determine if highest risk hazards for the county applied to Rodman, and if not, how Rodman's situation differs from the county. Based on this discussion, prevalent hazards were determined for Rodman. Along with the information and statistics provided, the people present were asked to draw upon their knowledge and experiences of hazards affecting Rodman. After the discussion among the planning team, it was decided that the City of Rodman would re-prioritize the hazards of the countywide ranking for their jurisdictional portion of the plan. The city eliminated many of the hazards that were in the countywide ranking, such as: expansive soils, river flood and dam failure. The planning team decided that those hazards did not apply to Rodman.

It is recognized that Rodman may be susceptible to other hazards, such as the other hazards in the State of Iowa Hazard Mitigation Plan, but those hazards are not considered to be a high risk and are not examined at this time. However, if it is later determined that a hazard affecting Rodman does pose a higher risk than originally determined, it will be examined at that time or when the plan is updated.

Hazard Ranking-City of Rodman	
1	Severe Winter Storm
2	Windstorm
3	Hailstorm
4	Extreme Heat
5	Tornado
6	Thunderstorm and Lightning
7	Grass and Wildland Fire
8	Flash Flood
9	Drought

Iowa Identified Mitigation Actions

The following are the actions that were identified by the local planning team:

- Educate the public about the hazard risks of natural hazards (public awareness)
- Continue storm spotter training/education for firefighters, police and other City officials.
- Upgrade or install new warning sirens
- Purchase generator(s)
- Backup city records
- Implement good neighbor program/list of persons needing special attention

- Have a debris management program/plan/sites/equipment
- Construct FEMA safe room(s)
- Purchase fire equipment /apparatus
- Fire/EMT training
- Encourage energy/communications companies for improvements
- Look into Joining NFIP and getting map
- Install hydrants
- Coordinate mutual aid in county

The Rodman Planning Team and Palo Alto County are responsible for overseeing the implementation of this plan. Palo Alto County Emergency Management and other county and local agencies will assist with implementing and administering this plan. The mitigations actions were discussed with a high, medium and low priority ranking in mind. **High (H) –** Jurisdictions valued this as something that had the highest effect on helping the community and people survive severe weather events. Also the cost could be easily obtained or funding has already been set aside. **Medium (M) –** These were valued at the jurisdictions as projects that where ranked in between the other two priority groups. **Low (L) –** These mitigation actions have the least effect on protecting human life from severe weather events and therefore have been given the lowest priority. Or the cost is too high at this point in time and makes it unlikely to be acted upon in present future. Priorities for each mitigation action are discussed in the Mitigation Actions, Section 6. Another factor in the implementation of the mitigation actions was their benefit versus how much the project would cost. Economics of implementing mitigation actions were considered when the planning team discussed the priority of projects. Cost estimates were given by the Palo Alto County Planning Committee to help display which actions were of a higher importance and fit in the economic goals of the county/cities/schools. Those estimates can be reference in Section 6. The Implementation Schedule for the mitigation activities, whether ongoing or considered, will be subject to the availability of Federal, State, and local funding. Continuing (ON) = Ongoing (responsible entity regularly participates in or supports); Short Term (ST) = 1-5 years to initiate or accomplish; and Long Term (LT) = 5 or more years to initiate or accomplish.

Once the plan is completed, approved, and adopted, local governments will be eligible for funding assistance from FEMA for mitigation strategies put forth in the plan. Potential funding resources include the FEMA Pre-Disaster Mitigation Program (PDM) and FEMA Hazard Mitigation Grant Program (HMGP). No timeframe was identified in implementing these mitigation actions will be acted upon as funding become available. It was discussed that additional mitigation actions would be examined during the update process. The mitigation actions that were discussed were what the Rodman Planning Committee wanted to have included in the hazard mitigation plan.

Plan Maintenance

Plan maintenance involves taking action to ensure that the plan stays current with information, priorities are still in order, and goals and objectives are maintained and updated. To accomplish this, the plan will be reviewed by the planning team annually and be incorporated into other city plans. Additionally, a comprehensive update is required at least once every 5 years and submitted to FEMA for certification. The revised plan will be adopted by the city council. To assist with the update, information is to be collected by the city annually to document efforts, hazard events, and other pertinent activities to mitigate hazards. Part of plan maintenance is maintaining the planning team. The planning team is composed of local elected officials, city employees and other interested parties. This is an important part of plan maintenance in order to reconvene the planning team when necessary.

Monitoring

The Rodman Planning Team and Palo Alto County Emergency Management are responsible for monitoring this portion of the plan. The plan will be monitored based on the mitigation strategies identified in the plan

and the reported progress to accomplish the work. Projects that are complete will be monitored for effectiveness. Any strategies that are removed from the plan will be examined and documented. An annual reporting sheet is included in this plan for the city to keep track of the mitigation process.

Incorporation into Existing Plans

The city is responsible for reviewing its local plans, codes, and ordinances and amending documents as they see appropriate. As appropriate, information and actions from this plan will be incorporated into comprehensive or community builder plans during review and update processes. A worksheet is provided to record what information from this plan is incorporated to other plans.

Continued Public Participation

The public will be involved in the implementation of the plan at city council meetings and general public meetings. Mitigation actions and implementation strategies will be discussed at city council meetings and an opportunity for public input will be encouraged. This process will ensure opportunity for public awareness of hazards and threats faced by the community and actions planned to eliminate or reduce impacts. To promote continued public participation, meetings where the plan will be discussed will have public notice posted.

Incorporation into Other Plans

Date	Plan or Document	Information Incorporated into Plan or Document

Plan Updates Concerning Rodman

When updating the plan please contact the Palo Alto County Emergency Management for assistance.

Date	Page	Change

Previous Plan – 7/20/09 - Current

Section (Below are Examples-Use headings from plan)	**Updates**	**Comments:**
Purpose and Planning Process	Yes	Some minor changes from their 7/20/09 approved plan
Community Background, Profile, Services/Facilities	Yes	Some minor changes on updating numbers of services and facilities.
Hazard Analysis/Risk Assessment	Yes	Used the County ranking and tailored it to the City.
Hazard and Activities Prioritization	Yes	Updated previous plan.
Hazard Vulnerability Assessment	Yes	Updated numbers.
Mitigation Actions	Yes	Added a few activities

Section 9.9 Ruthven

Planning Committee Members:

Regina Evans	Citizen
David Kirk	Mayor
Dave Smith	Citizen
Dave Conlon	Citizen
Hohn Conlon	Citizen
Justin Henningsen	City Council
Jay Schoning	City Council
Kay Suhr	City Clerk
Mitch Anderson	City Council

City Contact:

Kay Suhr, City Clerk 712-837-5355

Planning Process

Meetings were held throughout the planning process to collect information and share that information with the general public and the planning team. Notices for meetings were posted at city hall or the school where the meeting was being held. Agendas and minutes for meetings are included in the Appendix.

Utilities

City of Ruthven	
Water	City of Ruthven
Contact	712-837-5355
Wastewater **Treatment**	City of Ruthven
Contact	712-837-5355
Storm Sewer	None
Electric	MidAmerican Energy
Contact	800-358-6265
Natural Gas	MidAmerican Energy
Contact	800-358-6265
Telecom	River Valley Telecommunications
Contact	712-837-5522

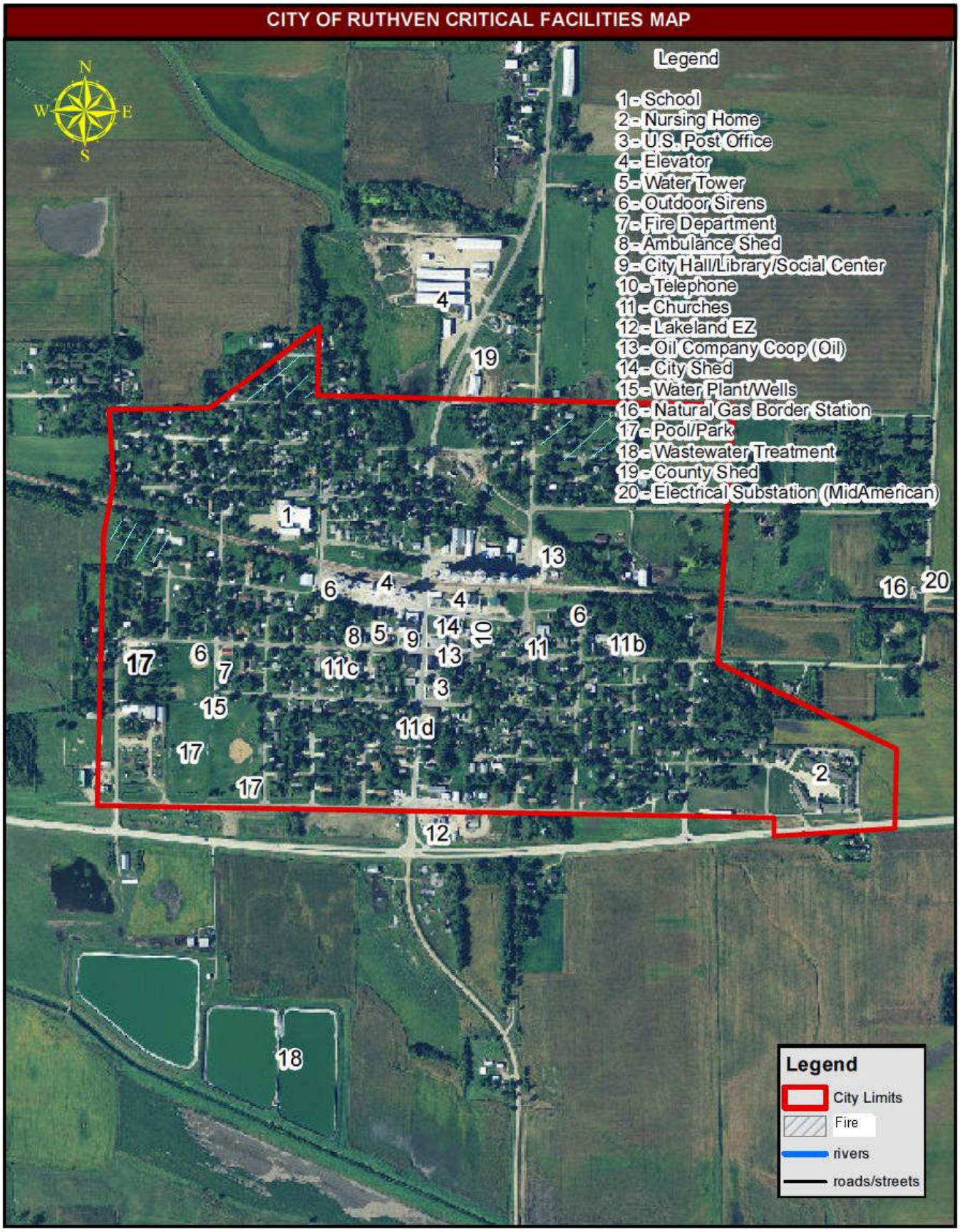
Floodplain Ordinance	No
Floodplain Compliance Officer	NA - (For assistance in the administration of the floodplain regulations, contact the Iowa Department of Natural Resources)

Future Plans and Mechanisms

The City of Ruthven planning committee stated they would try to incorporate the mitigation strategies developed in the plan in their community actions and other community planned documents if they occur. The committee also stated they would draw from other community mechanisms when applicable to add into the mitigation strategies and mitigation requirements of their hazard mitigation plan.

In preparation of this plan, existing plans and other technical information was considered. The purpose of this review was to give consideration to existing information before setting future mitigation goals.

Plan/Document	If yes last year updated	Plan/Document	If yes last year updated
Comprehensive/Landuse plan	Yes	Capital Improvement Plan	No
Local Emergency Plan	No	Local Recovery Plan	No
Local Mitigation Plan	No -Exp	County Mitigation Plan	Yes
Economic Development Plan	No	Flood Ordinance or Plan	No
School Mitigation Plan	No	Zoning Ordinance	Yes
Building Code	No	Subdivision	No
Tree Trimming Ordinance	Yes	Nuisance Ordinance	Yes
Storm Water Ordinance	No		


CITY OF RUTHVEN CRITICAL FACILITIES MAP
N
W
E
S
Legend
1 - School
2 - Nursing Home
3 - U.S. Post Office
4 - Elevator
5 - Water Tower
6 - Outdoor Sirens
7 - Fire Department
8 - Ambulance Shed
9 - City Hall/Library/Social Center
10 - Telephone
11 - Churches
12 - Lakeland EZ
13 - Oil Company Coop (Oil)
14 - City Shed
15 - Water Plant/Wells
16 - Natural Gas Border Station
17 - Pool/Park
18 - Wastewater Treatment
19 - County Shed
20 - Electrical Substation (MidAmerican)
Legend
City Limits
Fire
rivers
roads/streets

Critical Facilities and Assessed Values

	Critical Facilities	Estimated Replacement Value
1	School	$2,500,000.00
2	Nursing Home	$1,600,000.00
3	Daycare	$75,000.00
4	Elevator	$450,000.00
5	Water Tower	$250,000.00
6	Outdoor Sirens	$75,000.00
7	Fire Dept	$300,000.00
8	amublance Shed	$100,000.00
9	Social Center	$100,000.00
10	Telephone	$500,000.00
11a	Catholic Church	$1,021,140.00
11b	Zion Lutheran Church	$999,580.00
11c	Methodist Chruch	$556,430.00
12	Lakeland EZ	$250,000.00
13	Oil company Coop	$250,000.00
14	City Shed	$200,000.00
15	Water Plant	$250,000.00
16	Natural Gas Border Station	$200,000.00
17	Pool/park	$350,000.00
18	Wastewater Treatment	$500,000.00
19	Wells	$500,000.00
20	Electrical Substation	$100,000.00

Hazard Risk Assessment

The Palo Alto County Hazard Mitigation Planning Committee determined the countywide hazard rankings. The city was also provided with information and statistics relevant to hazards affecting Ruthven, including records of past events and damages. The city was asked to review the information from the countywide rankings and determine if highest risk hazards for the county applied to Ruthven, and if not, how Ruthven's situation differs from the county. Based on this discussion, prevalent hazards were determined for Ruthven. Along with the information and statistics provided, the people present were asked to draw upon their knowledge and experiences of hazards affecting Ruthven. After the discussion among the planning team, it was decided that the City of Ruthven would re-prioritize the hazards of the countywide ranking for their jurisdictional portion of the plan. The city eliminated many of the hazards that were in the countywide ranking, such as: expansive soils, river flood and dam failure. The planning team decided that those hazards did not apply to Ruthven.

It is recognized that Ruthven may be susceptible to other hazards, such as the other hazards in the State of Iowa Hazard Mitigation Plan, but those hazards are not considered to be a high risk and are not examined at this time. However, if it is later determined that a hazard affecting Ruthven does pose a higher risk than originally determined, it will be examined at that time or when the plan is updated.

Hazard Ranking-City of Ruthven	
1	Severe Winter Storm
2	Windstorm
3	Hailstorm
4	Extreme Heat

5	Tornado
6	Thunderstorm and Lightning
7	Grass and Wildland Fire
8	Flash Flood
9	Drought

Iowa Identified Mitigation Actions

The following are the actions that were identified by the local planning team:

- Educate the public about the hazard risks of natural hazards (public awareness)
- Continue storm spotter training/education for firefighters, police and other City officials.
- Upgrade or install new warning sirens
- Purchase generator(s)
- Backup city records
- Implement good neighbor program/list of persons needing special attention
- Have a debris management program/plan/sites/equipment
- Construct FEMA safe room(s)
- Purchase fire equipment /apparatus
- Fire/EMT training
- Look into Joining NFIP and getting map

The Ruthven Planning Team and Palo Alto County are responsible for overseeing the implementation of this plan. Palo Alto County Emergency Management and other county and local agencies will assist with implementing and administering this plan. The mitigations actions were discussed with a high, medium and low priority ranking in mind. **High (H) –** Jurisdictions valued this as something that had the highest effect on helping the community and people survive severe weather events. Also the cost could be easily obtained or funding has already been set aside. **Medium (M) –** These were valued at the jurisdictions as projects that where ranked in between the other two priority groups. **Low (L) –** These mitigation actions have the least effect on protecting human life from severe weather events and therefore have been given the lowest priority. Or the cost is too high at this point in time and makes it unlikely to be acted upon in present future. Priorities for each mitigation action are discussed in the Mitigation Actions, Section 6. Another factor in the implementation of the mitigation actions was their benefit versus how much the project would cost. Economics of implementing mitigation actions were considered when the planning team discussed the priority of projects. Cost estimates were given by the Palo Alto County Planning Committee to help display which actions were of a higher importance and fit in the economic goals of the county/cities/schools. Those estimates can be reference in Section 6. The Implementation Schedule for the mitigation activities, whether ongoing or considered, will be subject to the availability of Federal, State, and local funding. Continuing (ON) = Ongoing (responsible entity regularly participates in or supports); Short Term (ST) = 1-5 years to initiate or accomplish; and Long Term (LT) = 5 or more years to initiate or accomplish.

Once the plan is completed, approved, and adopted, local governments will be eligible for funding assistance from FEMA for mitigation strategies put forth in the plan. Potential funding resources include the FEMA Pre-Disaster Mitigation Program (PDM) and FEMA Hazard Mitigation Grant Program (HMGP). No timeframe was identified in implementing these mitigation actions will be acted upon as funding become available. It was discussed that additional mitigation actions would be examined during the update process. The mitigation actions that were discussed were what the Ruthven Planning Committee wanted to have included in the Hazard Mitigation Plan.

Plan Maintenance

Plan maintenance involves taking action to ensure that the plan stays current with information, priorities are still in order, and goals and objectives are maintained and updated. To accomplish this, the plan will be reviewed by the planning team annually and be incorporated into other city plans. Additionally, a comprehensive update is required at least once every 5 years and submitted to FEMA for certification. The revised plan will be adopted by the city council. To assist with the update, information is to be collected by the city annually to document efforts, hazard events, and other pertinent activities to mitigate hazards. Part of plan maintenance is maintaining the planning team. The planning team is composed of local elected officials, city employees and other interested parties. This is an important part of plan maintenance in order to reconvene the planning team when necessary.

Monitoring

The Ruthven Planning Team and Palo Alto County Emergency Management are responsible for monitoring this portion of the plan. The plan will be monitored based on the mitigation strategies identified in the plan and the reported progress to accomplish the work. Projects that are complete will be monitored for effectiveness. Any strategies that are removed from the plan will be examined and documented. An annual reporting sheet is included in this plan for the city to keep track of the mitigation process.

Incorporation into Existing Plans

The city is responsible for reviewing its local plans, codes, and ordinances and amending documents as they see appropriate. As appropriate, information and actions from this plan will be incorporated into comprehensive or community builder plans during review and update processes. A worksheet is provided to record what information from this plan is incorporated to other plans.

Continued Public Participation

The public will be involved in the implementation of the plan at city council meetings and general public meetings. Mitigation actions and implementation strategies will be discussed at city council meetings and an opportunity for public input will be encouraged. This process will ensure opportunity for public awareness of hazards and threats faced by the community and actions planned to eliminate or reduce impacts. To promote continued public participation, meetings where the plan will be discussed will have public notice posted.

Incorporation into Other Plans

Date	Plan or Document	Information Incorporated into Plan or Document

Plan Updates Concerning Ruthven

When updating the plan please contact the Palo Alto County Emergency Management for assistance.

Date	Page	Change

Previous Plan - 9/12/07 - Expired

Section (Below are Examples-Use headings from plan)	Updates	Comments:
Purpose and Planning Process	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Community Background, Profile, Services/Facilities	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard Analysis/Risk Assessment	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard and Activities Prioritization	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard Vulnerability Assessment	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Mitigation Actions	Yes	Was a previous expired plan, all data needed to be updated and reassessed.

Section 9.10 West Bend

Planning Committee Members:

Dave Jergens	City of West Bends Gas/Public Works Superintendent
Jeff Miller	Councilmember
Paul Lauck	Councilmember
Jane Hanselman	Councilmember
Marilyn Schutz,	Mayor
Nate Newhouse	Planning & Zoning Commission
Ross Winkelhorst	Planning & Zoning Commission
Lisa Sewell	City Clerk
Kim Elbert	Deputy City Clerk
Jordan Peterson	Electric Superintendent
Mary Wilson	Planning & Zoning Commission
Rajean Eubank	Planning & Zoning Commission
Richard Jergens	Police Chief
Clinton Schneider	Fire Chief
Brian Bormann	Assistant Fire Chief
Joseph Montag	Councilmember

City Contact:

Lisa Sewell, City Administrator 712-887-2181

Planning Process

Meetings were held throughout the planning process to collect information and share that information with the general public and the planning team. Notices for meetings were posted at city hall or the school where the meeting was being held. Agendas and minutes for meetings are included in the Appendix.

Utilities

City of West Bend	
Water	West Bend Utilities
Contact	515-887-2181
Wastewater Treatment	City of West Bend
Contact	515-887-2181
Storm Sewer	None
Electric	West Bend Municipal Electric
Contact	515-887-5585
Natural Gas	West Bend Municipal
Contact	515-887-5585
Telecom	Northwest Telephone Cooperative Assoc.
Contact	712-776-2222

Floodplain Ordinance	No
Floodplain Compliance Officer	NA - (For assistance in the administration of the floodplain regulations, contact the Iowa Department of Natural Resources)

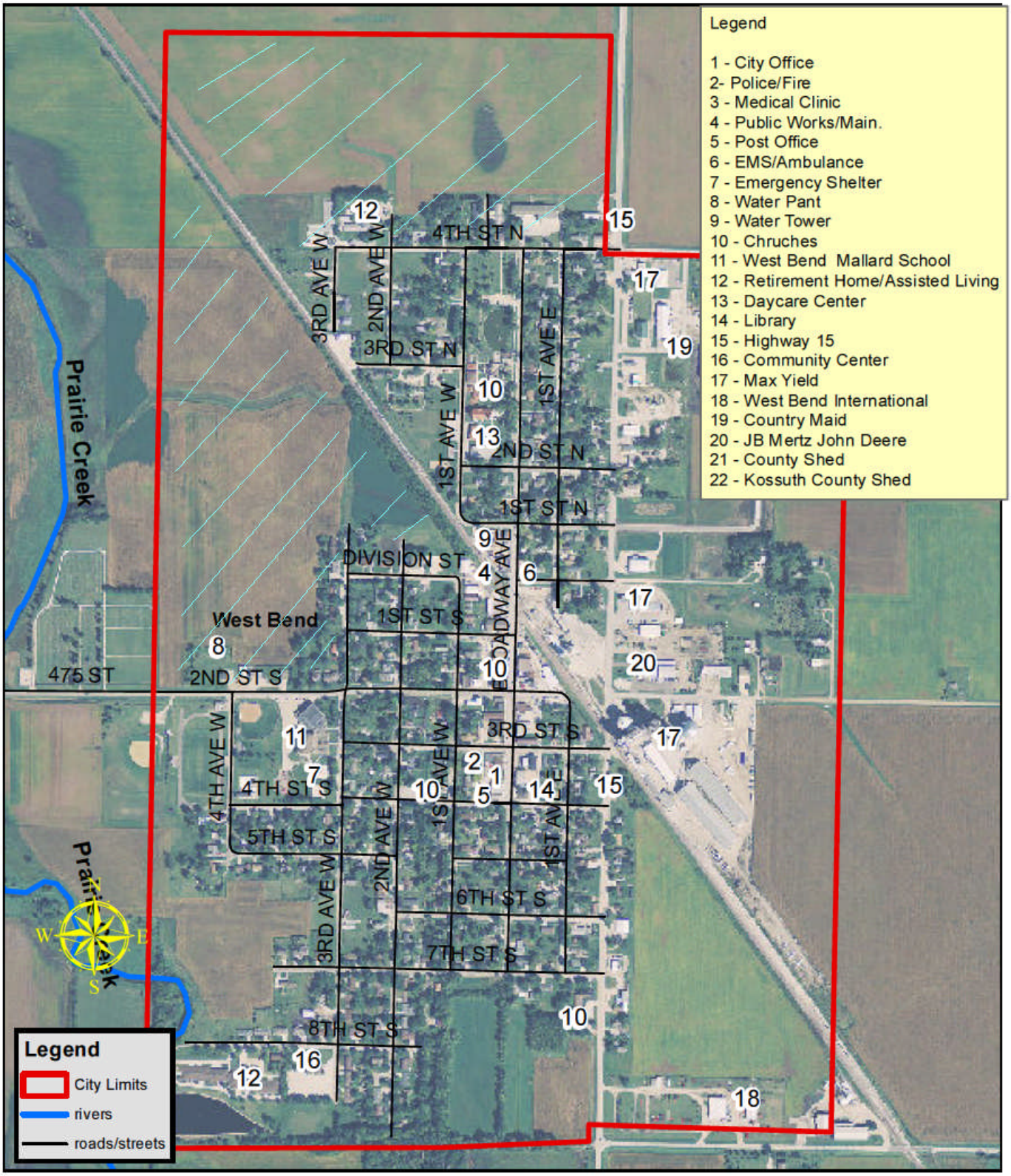
Future Plans and Mechanisms

The City of West Bend planning committee stated they would try to incorporate the mitigation strategies developed in the plan in their community actions and other community planned documents if they occur. The committee also stated they would draw from other community mechanisms when applicable to add into the mitigation strategies and mitigation requirements of their hazard mitigation plan.

In preparation of this plan, existing plans and other technical information was considered. The purpose of this review was to give consideration to existing information before setting future mitigation goals.

Plan/Document	If yes last year updated	Plan/Document	If yes last year updated
Comprehensive/Landuse plan	Yes	Capital Improvement Plan	No
Local Emergency Plan	Yes	Local Recovery Plan	No
Local Mitigation Plan	No- exp	County Mitigation Plan	No
Economic Development Plan	No	Flood Ordinance or Plan	No
School Mitigation Plan	No	Zoning Ordinance	Yes
Building Code	No	Subdivision	Yes
Tree Trimming Ordinance	Yes	Nuisance Ordinance	Yes
Storm Water Ordinance	Yes		

CITY OF WEST BEND CRITICAL FACILITIES MAP



Critical Facilities and Assessed Values

	Critical Facilities	Estimated Replacement Value
1	City Offices	$106,940.00
2	Police/Fire Dept.	Included with City Offices
3	Medical Clinic	$238,610.00
4	Public Works/City Maintenance	$23,310.00
		$98,100.00
5	U.S. Post Office	$60,180.00
6	EMS/Ambulance	Included with Medical Clinic
7	Designated Emergency Shelter (West Bend School)	$3,953,620.00
8	Water Plant/Wells	$545,000.00
9	Water Tower	$379,400.00
10	Apostolic Church	$689,169.00
10	Peace Lutheran Church	$457,700.00
10	SS Peter & Paul Catholic Church	$1,183,060.00
10	United Methodist Church	$498,150.00
11	West Bend Mallard School	$3,953,620.00
12	Retirement Home/Assisted Living	$1,069,260.00
		$940,120.00
13	Daycare Center-Wolverine Den	$798,100.00
14	Library	$120,750.00
15	Highway 15	N/A
16	Community Center	$237,010.00
17	Max Yield Coop-Grain Storage	$793,880.00
18	Grotto of the Redemption	$3,342,990.00
19	Electric Plant	$8,750,000.00

Hazard Risk Assessment

The Palo Alto County Hazard Mitigation Planning Committee determined the countywide hazard rankings. The city was also provided with information and statistics relevant to hazards affecting West Bend, including records of past events and damages. The city was asked to review the information from the countywide rankings and determine if highest risk hazards for the county applied to West Bend, and if not, how West Bend's situation differs from the county. Based on this discussion, prevalent hazards were determined for West Bend. Along with the information and statistics provided, the people present were asked to draw upon their knowledge and experiences of hazards affecting West Bend. After the discussion among the planning team, it was decided that the City of West Bend would re-prioritize the hazards of the countywide ranking for their jurisdictional portion of the plan. The city eliminated many of the hazards that were in the countywide ranking, such as: dam failure, and expansive soils. The planning team decided that those hazards did not apply to West Bend.

It is recognized that West Bend may be susceptible to other hazards, such as the other hazards in the State of Iowa Hazard Mitigation Plan, but those hazards are not considered to be a high risk and are not examined at this time. However, if it is later determined that a hazard affecting West Bend does pose a higher risk than originally determined, it will be examined at that time or when the plan is updated.

Hazard Ranking-City of West Bend	
1	Severe Winter Storm
2	Windstorm
3	Hailstorm
4	Extreme Heat
5	Tornado
6	Thunderstorm and Lightning
7	Grass and Wildland Fire
8	Flash Flood
9	River Flood
10	Drought

Iowa Identified Mitigation Actions

The following are the actions that were identified by the local planning team:

- Conduct sump pump study to ensure building sump pumps are not connected to sanitary sewer system.
- Make improvements to the City's sanitary sewer collection system
- Perform video televising of the collection system
- Educate the public about the hazard risks of natural hazards (public awareness)
- Continue storm spotter training/education for firefighters, police and other City officials.
- Promote the use of NOAA radios and/or buy
- Enforce snow ordinances
- Enforce tree trimming
- Upgrade or install new warning sirens
- Hold fundraisers and apply for Palo Alto Gaming grants for updates to warning sirens.
- Purchase generator(s)
- Look into getting map for flood plain maps

The West Bend Planning Team and Palo Alto County are responsible for overseeing the implementation of this plan. Palo Alto County Emergency Management and other county and local agencies will assist with implementing and administering this plan. The mitigations actions were discussed with a high, medium and low priority ranking in mind. **High (H) –** Jurisdictions valued this as something that had the highest effect on helping the community and people survive severe weather events. Also the cost could be easily obtained or funding has already been set aside. **Medium (M) –** These were valued at the jurisdictions as projects that where ranked in between the other two priority groups. **Low (L) –** These mitigation actions have the least effect on protecting human life from severe weather events and therefore have been given the lowest priority. Or the cost is too high at this point in time and makes it unlikely to be acted upon in present future. Priorities for each mitigation action are discussed in the Mitigation Actions, Section 6. Another factor in the implementation of the mitigation actions was their benefit versus how much the project would cost. Economics of implementing mitigation actions were considered when the planning team discussed the priority of projects. Cost estimates were given by the Palo Alto County Planning Committee to help display which actions were of a higher importance and fit in the economic goals of the county/cities/schools. Those estimates can be reference in Section 6. The Implementation Schedule for the mitigation activities, whether ongoing or considered, will be subject to the availability of Federal, State, and local funding. Continuing (ON) = Ongoing (responsible entity regularly participates in or supports); Short Term (ST) = 1-5 years to initiate or accomplish; and Long Term (LT) = 5 or more years to initiate or accomplish.

Once the plan is completed, approved, and adopted, local governments will be eligible for funding assistance from FEMA for mitigation strategies put forth in the plan. Potential funding resources include the FEMA

Pre-Disaster Mitigation Program (PDM) and FEMA Hazard Mitigation Grant Program (HMGP). No timeframe was identified in implementing these mitigation actions will be acted upon as funding become available. It was discussed that additional mitigation actions would be examined during the update process. The mitigation actions that were discussed were what the West Bend Planning Committee wanted to have included in the Hazard Mitigation Plan.

Plan Maintenance

Plan maintenance involves taking action to ensure that the plan stays current with information, priorities are still in order, and goals and objectives are maintained and updated. To accomplish this, the plan will be reviewed by the planning team annually and be incorporated into other city plans. Additionally, a comprehensive update is required at least once every 5 years and submitted to FEMA for certification. The revised plan will be adopted by the city council. To assist with the update, information is to be collected by the city annually to document efforts, hazard events, and other pertinent activities to mitigate hazards. Part of plan maintenance is maintaining the planning team. The planning team is composed of local elected officials, city employees and other interested parties. This is an important part of plan maintenance in order to reconvene the planning team when necessary.

Monitoring

The West Bend Planning Team and Palo Alto County Emergency Management are responsible for monitoring this portion of the plan. The plan will be monitored based on the mitigation strategies identified in the plan and the reported progress to accomplish the work. Projects that are complete will be monitored for effectiveness. Any strategies that are removed from the plan will be examined and documented. An annual reporting sheet is included in this plan for the city to keep track of the mitigation process.

Incorporation into Existing Plans

The city is responsible for reviewing its local plans, codes, and ordinances and amending documents as they see appropriate. As appropriate, information and actions from this plan will be incorporated into comprehensive or community builder plans during review and update processes. A worksheet is provided to record what information from this plan is incorporated to other plans.

Continued Public Participation

The public will be involved in the implementation of the plan at city council meetings and general public meetings. Mitigation actions and implementation strategies will be discussed at city council meetings and an opportunity for public input will be encouraged. This process will ensure opportunity for public awareness of hazards and threats faced by the community and actions planned to eliminate or reduce impacts. To promote continued public participation, meetings where the plan will be discussed will have public notice posted.

Incorporation into Other Plans

Date	Plan or Document	Information Incorporated into Plan or Document

Plan Updates Concerning West Bend

When updating the plan please contact the Palo Alto County Emergency Management for assistance.

Date	Page	Change

Previous Plan – 3/7/05 - Expired

Section (Below are Examples-Use headings from plan)	Updates	Comments:
Purpose and Planning Process	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Community Background, Profile, Services/Facilities	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard Analysis/Risk Assessment	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard and Activities Prioritization	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Hazard Vulnerability Assessment	Yes	Was a previous expired plan, all data needed to be updated and reassessed.
Mitigation Actions	Yes	Was a previous expired plan, all data needed to be updated and reassessed.

9.11 School Districts

Planning Committee Members:

One member from each school district made up this planning committee, however each school district came up with their own mitigation actions.

Contact	Title	School	Contact #	Website
Norene Bunt	Principal	Ruthven – Ayrshire	712-837-5211	http://www.ruthven.k12.ia.us/
Nancy Schmitz	Superintendent	West Bend – Mallard	515-887-7831	http://www.west-bend.k12.ia.us/
Jesse Ulrich	Superintendent	Graettinger – Terril	712-853-6111	http://www.gtschools.k12.ia.us/
John Joynt	Superintendent	Emmetsburg Community	712-852-3201	http://www.e-hawks.org/
Jean Hyslop	Principal	Emmetsburg Catholic	712-852-3464	http://www.emmetsburgcatholic.org/

Planning Process

Meetings were held throughout the planning process to collect information and share that information with the general public and the planning team. Notices for meetings were posted at city hall or the school where the meeting was being held. Agendas and minutes for meetings are included in the Appendix.

Plan and Mechanisms

The each school district follows an Emergency Response Procedures. They follow this for their emergency incidents needs. It was reviewed for this project.

Hazard Risk Assessment

The Palo County Hazard Mitigation Planning Committee determined the countywide hazard rankings. The school was also provided with information and statistics relevant to hazards affecting the region, including records of past events and damages. The school was asked to review the information from the countywide rankings and determine if highest risk hazards for the county applied to the school, and if not, how school's situation differs from the county. Based on this discussion, prevalent hazards were determined for the school district. Along with the information and statistics provided, the people present were asked to draw upon their knowledge and experiences of hazards affecting the school. After the discussion among the planning team, it was decided that the school district would re-prioritize the hazards of the countywide ranking for their jurisdictional portion of the plan. The city eliminated many of the hazards that were in the countywide ranking, such as: drought, expansive soils, River flood, grass or wildland fire, and dam failure. The planning team decided that those hazards did not apply to the schools.

It is recognized that school may be susceptible to other hazards, such as the other hazards in the State of Iowa Hazard Mitigation Plan, but those hazards are not considered to be a high risk and are not examined at this time. However, if it is later determined that a hazard affecting the school does pose a higher risk than originally determined, it will be examined at that time or when the plan is updated.

Hazard Ranking-Combine School Committee	
1	Severe Winter Storm
2	Windstorm
3	Hailstorm
4	Extreme Heat

5	Tornado
6	Thunderstorm and Lightning
7	Flash Flood

Identified Mitigation Actions

The following are the actions that were identified by the local planning team:

- Promote and/or purchase radios
- Purchas indoor warning sirens and supporting equipment
- Training students and teachers how to deal with hazards and supply information

Critical Facilities for each School District

Schools are reflected on cities critical facilities maps.

Emmetsburg Catholic	Critical Facilities	Address	Peak # of people vulnerable	Estimated Replacement Value	0.25	0.1	0.05
	School	1903 S Broadway	135	$1,892,000.00	$473,000.00	$189,200.00	$94,600.00
	Corrigan Hall	1903 S Broadway	135	$2,308,000.00	$577,000.00	$230,800.00	$115,400.00
Emmetsburg Community	Critical Facilities	Address	Peak # of people vulnerable	Estimated Replacement Value	0.25	0.1	0.05
	W. Elementary	602 Call St	300	$3,500,000.00	$875,000.00	$350,000.00	$175,000.00
	High/Middle School	205 King St	500	$18,500,000.00	$4,625,000.00	$1,850,000.00	$925,000.00
	Bus Barn	205 King St	35	$380,000.00	$95,000.00	$38,000.00	$19,000.00
	Sports Complex	205 King St	1000	$460,000.00	$115,000.00	$46,000.00	$23,000.00
Graettinger Terril	Critical Facilities	Address	Peak # of people vulnerable	Estimated Replacement Value	0.25	0.1	0.05
	School	400 W lost Island Graettinger	195	$9,353,525.00	$2,338,381.25	$935,352.50	$467,676.25
	Shop building	400 W lost Island Graettinger	195	$399,387.00	$99,846.75	$39,938.70	$19,969.35
	Garage	301 N Lincoln Graet	20	$6,243.00	$1,560.75	$624.30	$312.15
	Bus Barn	Graettinger	35	$24,974.00	$6,243.50	$2,497.40	$1,248.70
	School k-12	101 S Schooley Terril	200	$4,413,694.00	$1,103,423.50	$441,369.40	$220,684.70
	Shop	Terril	15	$250,000.00	$62,500.00	$25,000.00	$12,500.00
Ruthven Ayrshire	Critical Facilities	Address	Peak # of people vulnerable	Estimated Replacement Value	0.25	0.1	0.05
	PK-12	1505 N Washington Ruthven	300	$569,639.00	$142,409.75	$56,963.90	$7,120.49
	CSD Industrial Tech	1505 N Washington Ruthven	28	$343,610.00	$85,902.50	$34,361.00	$4,295.13
	CSD Bus Barn	1401 N Washington	4	$127,345.00	$31,836.25	$12,734.50	$1,591.81

		Ruthven					
	Athletic Complex	1103 Bruce St Ruthven	500	$9,271.00	$2,317.75	$927.10	$115.89
West Bend Mallard	Critical Facilities	Address	Peak # of people vulnerable	Estimated Replacement Value	0.25	0.1	0.05
	High/Middle School	303 3rd Av SW West Bend	260	$8,805,658.00	$2,201,414.50	$880,565.80	$440,282.90
	Elementary School	414 Micawber St Mallard	155	$7,032,181.00	$1,758,045.25	$703,218.10	$351,609.05

Plan Maintenance

Plan maintenance involves taking action to ensure that the plan stays current with information, priorities are still in order, and goals and objectives are maintained and updated. To accomplish this, the plan will be reviewed by the planning team annually and be incorporated into other school plans. Additionally, a comprehensive update is required at least once every 5 years and submitted to FEMA for certification. The revised plan will be adopted by the school board. To assist with the update, information is to be collected by the school annually to document efforts, hazard events, and other pertinent activities to mitigate hazards. Part of plan maintenance is maintaining the planning team. The planning team is composed of school officials. This is an important part of plan maintenance in order to reconvene the planning team when necessary.

Monitoring

The each school planning team and Palo Alto County Emergency Management are responsible for monitoring this portion of the plan. The plan will be monitored based on the mitigation strategies identified in the plan and the reported progress to accomplish the work. Projects that are complete will be monitored for effectiveness. Any strategies that are removed from the plan will be examined and documented. An annual reporting sheet is included in this plan for the city to keep track of the mitigation process.

Incorporation into Existing Plans

The city is responsible for reviewing its local plans, codes, and ordinances and amending documents as they see appropriate. As appropriate, information and actions from this plan will be incorporated into comprehensive or community builder plans during review and update processes. A worksheet is provided to record what information from this plan is incorporated to other plans.

Continued Public Participation

The public will be involved in the implementation of the plan at city council meetings and general public meetings. Mitigation actions and implementation strategies will be discussed at city council meetings and an opportunity for public input will be encouraged. This process will ensure opportunity for public awareness of hazards and threats faced by the community and actions planned to eliminate or reduce impacts. To promote continued public participation, meetings where the plan will be discussed will have public notice posted.

Incorporation into Other Plans

Date	Plan or Document	Information Incorporated into Plan or Document

Plan Updates Concerning Participating School District

When updating the plan please contact the Palo Alto County Emergency Management for assistance.

Date	Page	Change

Previous Plan

- No previous FEMA approved Plan.

Appendix