This multi-jurisdictional hazard mitigation plan includes Cottonwood County and the cities of Bingham Lake, Comfrey, Jeffers, Mountain Lake, Storden, Westbrook and Windom, Minnesota. This project was supported by Grant Award Number EMC-2007-PC-0004 awarded by the Federal Emergency Management Agency (FEMA). Points of View or opinions in this document are those of the author and do not represent endorsement by FEMA or reflect FEMA’s views.
Cottonwood County All Hazard Mitigation Plan
August 2011

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For more information on local hazard mitigation, contact:

Cottonwood County Emergency Management,
902 – 5th Ave, Suite 101
Windom, MN 56101
http://www.co.cottonwood.mn.us/emergencymanagement.html
507.832.8255

Southwest Regional Development Commission,
2401 Broadway Ave, Ste 1
Slayton, MN 56172
http://www.swrdc.org/
507.836.8547
Executive Summary

This hazard mitigation plan documents the multi-jurisdictional, multi-hazard mitigation planning update process in Cottonwood County, Minnesota, which is intended to meet the requirements of the federal Disaster Mitigation Act of 2000.

The Cottonwood County All-Hazard Mitigation Plan is intended to protect public health, safety and welfare by coordinating mitigation of natural and man-made hazards, and to meet FEMA requirements.

This project was undertaken so that all local units of government in Cottonwood County that wished to participate could become eligible to adopt the plan. All incorporated municipalities participated in the County’s hazard mitigation planning process: Bingham Lake, Comfrey, Jeffers, Mountain Lake, Storden, Westbrook and Windom, Minnesota. The City of Comfrey—most of which is located in Brown County and is covered by the Brown County All Hazard Mitigation Plan—also chose to participate in this planning process as well.

Cottonwood County and the cities of Comfrey and Windom participate in the National Flood Insurance Program (NFIP). No other cities have identified Flood Hazard Areas.

The Cottonwood County All-Hazard Mitigation Planning Team identified the following natural and man-made hazards as High Rank Hazards for Cottonwood County:

- Tornado / Straight-line Winds
- Hazardous Materials

The Planning Team considered improving weather warning systems and modernizing FEMA floodplain maps to be the top priority mitigation actions. The plan identifies specific actions for each participating jurisdiction to address identified hazards.

This plan is formatted to follow FEMA guidance. Chapter One introduces the concept of multi-hazard mitigation planning, in one section. Section I describes all-hazard mitigation programs in Minnesota and provides a profile of Cottonwood County.

Chapter Two covers prerequisites for eligibility to adopt this multi-hazard mitigation plan in multiple jurisdictions, in two sections. Section II describes the plan adoption process. Section III describes multi-jurisdictional participation in the planning process.
Chapter Three documents the process used in developing this plan. Section IV describes the planning process, the All Hazard Mitigation Planning Team, public involvement, and existing plans, studies, reports and technical information used in the planning process.

Chapter Four is the risk assessment of hazards facing the county, in multiple sections. Section V describes identified natural and technological hazards. Section VI provides a profile of identified hazards. Section VII provides an overview of vulnerability to identified hazards. Section VIII addresses Repetitive Loss Properties. Section IX addresses risks to structures. Section X addresses estimates of potential losses. Section XI provides an analysis of development trends. Section XII addresses multi-jurisdictional risk analysis for participating jurisdictions.

Chapter Five documents goals, objectives and mitigation strategies that the All-Hazard Mitigation Planning Team developed through the all-hazard mitigation planning process. Section XIII describes mitigation goals and objectives. Section XIV describes the comprehensive range of specific mitigation actions identified. Section XV addresses NFIP compliance. Section XVI describes implementation of mitigation actions. Section XVII addresses the multi-jurisdictional nature of mitigation actions.

Chapter Six documents procedures for long-term plan maintenance. Section XVIII describes monitoring, evaluating and updating the plan. Section XIX addresses incorporation of this plan into existing planning mechanisms. Section XX addresses the need for continued public involvement.

This planning process has been conducted by the Southwest Regional Development Commission (SRDC) and Cottonwood County Emergency Management in accordance with current guidance provided by US Federal Emergency Management Agency (FEMA) and Minnesota Homeland Security and Emergency Management (HSEM).

This project was supported by Grant Award Number EMC-2007-PC-0004 awarded by the Federal Emergency Management Agency (FEMA). Points of View or opinions in this document are those of the author and do not represent endorsement by FEMA or reflect FEMA’s views.
CHAPTER 1: INTRODUCTION

This Chapter introduces the concept of multi-hazard mitigation planning. Section I describes all-hazard mitigation programs in Minnesota and provides a profile of Cottonwood County.

I. Mitigation Planning

Natural and manmade hazards present risks throughout Minnesota. Rain and snow bring threats of flooding and utility failure. At any time, we may need to respond to the impacts of fire or tornado, riot or radiation. Our local units of government, first responders and emergency managers know how to effectively respond to hazards as they occur. We can also protect our communities by planning for hazard mitigation before disaster strikes.

What is Hazard Mitigation Planning? The 2008 Minnesota All-Hazard Mitigation Plan (MAHMP) offers this definition: “Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to people and property from natural or human caused hazards and their effects.” According to the U.S. Federal Emergency Management Agency (FEMA) State and Local Mitigation Planning Fact Sheet:

Hazard mitigation planning is the process State, local, and tribal governments use to identify risks and vulnerabilities associated with natural disasters, and to develop long-term strategies for protecting people and property in future hazard events. The process results in a mitigation plan that offers a strategy for breaking the cycle of disaster damage, reconstruction, and repeated damage, and a framework for developing feasible and cost-effective mitigation projects. Under the Disaster Mitigation Act of 2000 (Public Law 106-390), State, local and tribal governments are required to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance.

The American Planning Association guide Hazard Mitigation: Integrating Best Practices into Planning offers that “Mitigation, a cornerstone of emergency management, is defined as taking sustained actions to reduce or eliminate the long-term risks to people and property from hazards.” Author James Schwab, AICP, is even more direct in Planning Magazine: “Hazard mitigation essentially is the art and science of reducing risks of future losses.”

Emergency management involves a cycle through which communities prepare, respond and recover from emergencies and disasters. Hazard mitigation is also part of this cycle and serves two primary purposes—to protect people and property, and to limit the costs of disaster response and recovery.
Figure 1-1 Local Units of Government

Cottonwood County, MN

- Railroads
- Trunk Highways
- Rivers
- City
- Township
- County

SRDC 10.10
Source: ESRI, DNR, MnDOT

This project was supported by Grant Award number EMC-2007-PC-0027 awarded by the Federal Emergency Management Agency (FEMA). Points of view or opinions in this document are those of the author and do not represent endorsement by FEMA or reflect FEMA views.
A. Purpose and Authority

The rising costs of natural and human-caused disasters at the end of the 20th century led many leaders to consider how to better protect people and their communities. Congress passed the Disaster Mitigation Act of 2000 (DMA2K) (PL 106-390) to establish a unified national hazard mitigation program. DMA2K amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Stafford Act), which in turn had amended the Disaster Relief Act of 1974. DMA2K placed new emphasis on hazard mitigation planning in state and local units of government, requiring adoption of mitigation plans as a prerequisite for certain assistance programs.

A multi-hazard or “All-Hazards” approach to mitigation planning encompasses both natural and manmade hazards. Following the 2001 attacks on New York City and Washington, DC, and the subsequent reorganization of FEMA and the nation’s homeland security structure, many mitigation planning efforts explicitly incorporated technological hazards arising from human activities, both accidental and intended. While local hazard mitigation plans are only required to address natural hazards, the All-Hazards approach considers a comprehensive array of both risks and potential mitigation actions.

FEMA has implemented hazard mitigation planning requirements through federal regulations (44 CFR 201). In Minnesota, the Homeland Security and Emergency Management (HSEM) division of the Department of Public Safety (DPS) works with FEMA to implement disaster mitigation efforts. The Minnesota Department of Natural Resources (DNR) is also involved with mitigation as the agency responsible for implementation of FEMA’s National Flood Insurance Program (NFIP) and floodplain management in the state.

A.1 Federal Mitigation Funding Programs

FEMA administers several programs that provide hazard mitigation funding, for which HSEM applies for funding on behalf of local subapplicants. Typically grants allow a cost-share of 75 to 90 percent federal funding for eligible projects. Section Two of the Minnesota All-Hazard Mitigation Plan describes five different FEMA hazard mitigation assistance programs. Any projects funded by these programs must demonstrate a positive cost-benefit ratio—the benefits of the mitigation action must demonstrably outweigh the costs. Programs described in the 2008 MAHMP include the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), Repetitive Flood Claims (RFC), and Severe Repetitive Loss (SRL).
A.1.a Hazard Mitigation Grant Program (HMGP)
HMGP provides funds in accordance with priorities identified in hazard mitigation plans to implement mitigation measures during disaster recovery. State and local governments, certain private non-profit organizations, and tribes are eligible sub-applicants through HSEM. Examples of eligible projects include:

- Acquiring and relocating structures from hazard-prone areas
- Retrofitting structures to protect them from floods, high winds, earthquakes, or other natural hazards
- Constructing certain types of minor and localized flood control projects
- Constructing safe rooms inside schools or other buildings in tornado-prone areas
- Hazard mitigation planning

A.1.b Pre-Disaster Mitigation (PDM)
PDM provides funds for hazard mitigation planning and implementation prior to a disaster event. State-level agencies, tribes, local government, and public colleges are eligible sub-applicants through HSEM. Examples of eligible projects include:

- Voluntary acquisition of real property for open space
- Elevation of existing public or private structures
- Retrofitting existing structures to meet building codes
- Construction of safe rooms for public or private structures that meet certain FEMA requirements
- Hydrologic and hydraulic studies/analyses, engineering and drainage studies for project design and feasibility
- Vegetation management
- Protective measures for utilities, water, sewer, roads and bridges
- Storm water management to reduce/eliminate long-term flood risk

Source: FEMA HMA Guidance
**A.1.c Flood Mitigation Assistance (FMA)**

FMA implements cost-effective measures to reduce or eliminate long-term risk of flood damage to NFIP structures. State-level agencies, tribes, and local government are eligible sub-applicants through HSEM. Eligible projects include:

- Acquisition, structure demolition, or structure relocation with the property deed restricted for open space uses in perpetuity
- Elevation of structures
- Dry floodproofing of non-residential structures
- Minor structural flood control activities

**A.1.d Repetitive Flood Claims (RFC)**

RFC intends to reduce/eliminate long-term risk to structures with one or more NFIP claim. State-level agencies, tribes, and local government that cannot meet FMA requirements for cost-share or management capacity are eligible sub-applicants through HSEM. Project grants are available for acquisition, structure demolition, or structure relocation of insured structures, with the property deed restricted for open space uses in perpetuity.

**A.2.e Severe Repetitive Loss (SRL)**

SRL Pilot Program is intended to reduce/eliminate risk to severe repetitive loss properties. There are currently no such properties in the county.

**B. FEMA Guidance and Plan Review**

FEMA provides a publication, *Local Multi-Hazard Mitigation Planning Guidance* (the “Blue Book”) to provide guidance to local governments to meet the requirements of 44 CFR §201.6 Local Mitigation Plans. The Blue Book includes a Plan Review Crosswalk which outlines the process for review of local mitigation plans.

This All-Hazard Mitigation Plan is intended to document the process that Cottonwood County and participating jurisdictions undertook to meet the *Local Multi-Hazard Mitigation Planning Guidance* and Crosswalk requirements as stated in the July 1, 2008 publication. The remainder of this document (chapters 2-6) is structured according to the outline of the Crosswalk to permit easy and accurate Federal and State review of the local process and the results thereof.

**B.1 Plan Submittal and Review Procedures**

Federal rules require that this plan be submitted to HSEM for initial review and coordination, with the State then forwarding the plans to FEMA’s Regional Office in Chicago for formal review and approval. HSEM provided advice throughout the mitigation planning process.
After FEMA review, the agency may require changes to meet requirements. Once FEMA judges the all-hazards mitigation plan “approvable pending adoption,” the plan will then be forwarded to participating jurisdictions for adoption. (See section II below.) The plan must be updated within 5 years of initial approval, and any changes once again reviewed and approved by FEMA, in order to continue funding eligibility (Section XVIII).

B.2 Planning Resources

In addition to the Blue Book, FEMA provides a number of other planning tools that were consulted prior to and during the local all-hazard mitigation planning process. These included:

U.S. Federal Emergency Management Agency (FEMA) *Hazard Mitigation Grant Program Fact Sheet* (June 2007)


U.S. Federal Emergency Management Agency (FEMA) “Mitigation Ideas: Possible Mitigation Measures by Hazard Type” Region V (September 2002)

U.S. Federal Emergency Management Agency (FEMA) *Pre-Disaster Mitigation Grant Program Fact Sheet* (June 2007)

U.S. Federal Emergency Management Agency (FEMA) *State and Local Mitigation Planning Fact Sheet* (March 2007)


The HAZUS-MH (Hazards US-Multi-Hazard) GIS risk assessment software program available from FEMA was partially utilized in this plan. Improving data for HAZUS should be considered in preparing for the next plan update.

This project was supported by Grant Award Number FEMA-DR-1717-MN awarded by the Federal Emergency Management Agency (FEMA). Points of View or opinions in this document are those of the author and do not represent endorsement by FEMA or reflect FEMA’s views.

B.3 Flood Mitigation Planning

In 2007, FEMA amended 44 CFR 201 to incorporate mitigation planning requirements for the FMA program (I.A.1.c above). The changes combined the local mitigation plan requirement for all hazard mitigation assistance programs include FMA as well as HMGP, PDM and SRL programs; required that jurisdictions with NFIP repetitive loss properties (I.A.1.d) address such properties in their assessment and mitigation strategies, and required that jurisdictions in NFIP include a strategy for continued compliance with the NFIP in the mitigation plan.
B.4 Multi-Jurisdictional & Other Local Organizations

For the purpose of hazard mitigation, FEMA considers a Local Government having jurisdiction as “any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments..., regional or interstate government entity, or agency or instrumentality of a local government.” (44CFR§201.2) Special considerations are given by FEMA for school districts, private nonprofit organizations, and multi-jurisdictional private nonprofit utilities (such as Rural Electric Cooperatives).

FEMA requires that ALL participating jurisdictions meet the requirements for mitigation planning in 44CFR§201.6. The Blue Book specifically requires that each participating jurisdiction address:

- Risks, where they differ from the county
- Mitigation actions (actions must be identified for each jurisdiction)
- Participation in the planning process (attending meetings, contributing research, data, or other information, commenting on drafts of the plan); and
- Adoption (each jurisdiction must formally adopt the plan).

It is intended that this plan will document how each and every one of these requirements was intended to be met by all participating jurisdictions.

C. Profile of Cottonwood County

Cottonwood County is located on the Buffalo Ridge of southwestern Minnesota. In a clockwise manner, the following counties are adjacent: Redwood (north), Brown, Watonwan, Martin, Jackson (south), Nobles, and Murray.

Cottonwood County’s population in the 2010 U.S. Census was 12,167, for a density of 18 persons per square mile. There are 16 incorporated municipalities wholly within the county, 1 municipality that crosses the county line (Comfrey), and 18 townships in Cottonwood County. The City of Windom is the county seat and had 4,646 residents counted in 2010.

US Highway 71 runs north-south through the city of Windom, with access to I-90 at Jackson. MN Trunk Highway (TH) 60 runs on a diagonal through the cities of Mountain Lake, Bingham Lake and Windom, providing a major link between the Twin Cities and Sioux City, Iowa, with access to I-90 at Worthington.

<table>
<thead>
<tr>
<th>Cities</th>
<th>Townships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bingham Lake</td>
<td>Amboy</td>
</tr>
<tr>
<td>Comfrey</td>
<td>Amo</td>
</tr>
<tr>
<td>Jeffers</td>
<td>Ann</td>
</tr>
<tr>
<td>Mountain Lake</td>
<td>Carson</td>
</tr>
<tr>
<td>Storden</td>
<td>Dale</td>
</tr>
<tr>
<td>Westbrook</td>
<td>Delton</td>
</tr>
<tr>
<td>Windom</td>
<td>Germantown</td>
</tr>
<tr>
<td></td>
<td>Great Bend</td>
</tr>
<tr>
<td></td>
<td>Highwater</td>
</tr>
<tr>
<td></td>
<td>Lakeside</td>
</tr>
<tr>
<td></td>
<td>Midway</td>
</tr>
<tr>
<td></td>
<td>Mountain Lake</td>
</tr>
<tr>
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<tr>
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<tr>
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<td>Springfield</td>
</tr>
<tr>
<td></td>
<td>Storden</td>
</tr>
<tr>
<td></td>
<td>Westbrook</td>
</tr>
</tbody>
</table>
The Union Pacific Railroad runs parallel to Highway 60. TH 30 runs east-west through Jeffers, Storden and Westbrook.

C.1 Demographics
Cottonwood County shares many of the opportunities and challenges common in rural Minnesota and the Midwest. Population in Southwest Minnesota has been generally contracting for several decades. The population of Cottonwood County peaked at over 16,000 in 1960.

Approximately 70% of county residents live in cities and the rest in the rural townships, including the unincorporated community of Delft (Carson Twp). The Minnesota Demographic Center estimates are an average 2.24 persons per households in the cities and 2.58 persons per household in the townships.

According to analysis in the Cottonwood County Comprehensive Plan (2005), over half of the county’s population lived on farms in 1950, while in 2000 only

<table>
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<th></th>
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<tbody>
<tr>
<td>Cottonwood</td>
<td>14,887</td>
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<td>12,694</td>
<td>12,167</td>
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</tr>
<tr>
<td>Jackson</td>
<td>14,352</td>
<td>13,690</td>
<td>11,677</td>
<td>11,268</td>
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</tr>
<tr>
<td>Lincoln</td>
<td>8,143</td>
<td>8,207</td>
<td>6,890</td>
<td>6,429</td>
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</tr>
<tr>
<td>Lyon</td>
<td>24,273</td>
<td>25,207</td>
<td>24,789</td>
<td>25,425</td>
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<td>Murray</td>
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<td>9,660</td>
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<td>Nobles</td>
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<td>Pipestone</td>
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<td>Redwood</td>
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<td>Rock</td>
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<tr>
<td>Minnesota</td>
<td>5,303,925</td>
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</table>

Source: US Census

<table>
<thead>
<tr>
<th>Minor Civil Division</th>
<th>2009 Population</th>
<th>2009 Households</th>
<th>Persons Per Household</th>
</tr>
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<td>66</td>
<td>2.09</td>
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<tr>
<td>Amo township</td>
<td>139</td>
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<tr>
<td>Ann township</td>
<td>167</td>
<td>73</td>
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<td>Bingham Lake city</td>
<td>145</td>
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<tr>
<td>Carson township</td>
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<td>Comfrey city (part)</td>
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<td>5</td>
<td>2.00</td>
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<tr>
<td>Dale township</td>
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<td>Delton township</td>
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<td>Germantown township</td>
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<td>Jeffers city</td>
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<td>Lakeside township</td>
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<td>Midway township</td>
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<td>Mountain Lake city</td>
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<td>825</td>
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</tr>
<tr>
<td>Mountain Lake township</td>
<td>404</td>
<td>90</td>
<td>3.81</td>
</tr>
<tr>
<td>Rose Hill township</td>
<td>150</td>
<td>57</td>
<td>2.63</td>
</tr>
<tr>
<td>Selma township</td>
<td>180</td>
<td>80</td>
<td>2.25</td>
</tr>
<tr>
<td>Southbrook township</td>
<td>65</td>
<td>27</td>
<td>2.41</td>
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<tr>
<td>Springfield township</td>
<td>123</td>
<td>54</td>
<td>2.28</td>
</tr>
<tr>
<td>Storden city</td>
<td>235</td>
<td>106</td>
<td>2.22</td>
</tr>
<tr>
<td>Storden township</td>
<td>147</td>
<td>73</td>
<td>2.01</td>
</tr>
<tr>
<td>Westbrook city</td>
<td>664</td>
<td>337</td>
<td>1.97</td>
</tr>
<tr>
<td>Westbrook township</td>
<td>265</td>
<td>94</td>
<td>2.37</td>
</tr>
<tr>
<td>Windom city</td>
<td>4,323</td>
<td>1,944</td>
<td>2.13</td>
</tr>
<tr>
<td>Cottonwood</td>
<td>11,096</td>
<td>4,757</td>
<td>2.26</td>
</tr>
</tbody>
</table>

Source: MN Demographic Center
12% did. At the same time, the rural non-farm population grew from 4% of all residents in 1950 to 22% in 2000. The 2000 Census found that 95% of Cottonwood County residents were White, and 80% of residents had a high school or higher education. The median age was 42 years old.

Figure 1-3 Population Pyramid

2000 CENSUS: COTTONWOOD COUNTY
POPULATION PYRAMIDS

![Population Pyramid Image]

2000 Population for all races:
Cottonwood County

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Male</th>
<th>Female</th>
<th>All Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>118</td>
<td>118</td>
<td>118</td>
</tr>
<tr>
<td>5-9</td>
<td>235</td>
<td>235</td>
<td>235</td>
</tr>
<tr>
<td>10-14</td>
<td>353</td>
<td>353</td>
<td>353</td>
</tr>
<tr>
<td>15-19</td>
<td>478</td>
<td>478</td>
<td>478</td>
</tr>
<tr>
<td>20-24</td>
<td>29</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>25-29</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>30-34</td>
<td>22</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>35-39</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>40-44</td>
<td>44</td>
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<tr>
<td>45-49</td>
<td>44</td>
<td>44</td>
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<tr>
<td>50-54</td>
<td>47</td>
<td>47</td>
<td>47</td>
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<tr>
<td>55-59</td>
<td>43</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>60-64</td>
<td>43</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>65-69</td>
<td>43</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>70-74</td>
<td>43</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>75-79</td>
<td>43</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>80-84</td>
<td>43</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>85+</td>
<td>43</td>
<td>43</td>
<td>43</td>
</tr>
</tbody>
</table>

Source: MN Demographic Center
C.2 Employment

Cottonwood County is part of a strong agricultural region in Southwest Minnesota. The city of Windom has employment in manufacturing, trade and medical care, with many residents of adjacent counties commuting into the county—according to the US Census (2000) the greatest numbers of commuters come from Jackson and Redwood counties.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total All Industries</td>
<td>4,894 5,040 5,013</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>120 172 203</td>
</tr>
<tr>
<td>Construction</td>
<td>266 264 243</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>930 1,368 1,409</td>
</tr>
<tr>
<td>Trade, Transportation and Utilities</td>
<td>1,116 945 912</td>
</tr>
<tr>
<td>Information</td>
<td>72 59 50</td>
</tr>
<tr>
<td>Financial Activities</td>
<td>160 151 124</td>
</tr>
<tr>
<td>Professional and Business Services</td>
<td>265 96 72</td>
</tr>
<tr>
<td>Education and Health Services</td>
<td>1,272 1,295 1,283</td>
</tr>
<tr>
<td>Leisure and Hospitality</td>
<td>258 279 294</td>
</tr>
<tr>
<td>Other services</td>
<td>140 123 123</td>
</tr>
<tr>
<td>Public Administration</td>
<td>298 286 298</td>
</tr>
</tbody>
</table>

n/a—not available, categories may not sum due to non-disclosure

Source: QCEW

Table 1-5
Cottonwood County Major Employers

<table>
<thead>
<tr>
<th>Employer</th>
<th>Products/Services</th>
<th>Number of Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toro Co</td>
<td>Lawn and Garden Equipment</td>
<td>660</td>
</tr>
<tr>
<td>PM Windom</td>
<td>Animal Slaughtering &amp; Processing</td>
<td>500</td>
</tr>
<tr>
<td>Windom Public Schools ISD #177</td>
<td>Elementary &amp; Secondary Schools</td>
<td>180</td>
</tr>
<tr>
<td>Sogge Memorial Good Samaritan</td>
<td>Skilled Nursing Care Facilities</td>
<td>170</td>
</tr>
<tr>
<td>Cottonwood County</td>
<td>Government Services</td>
<td>130</td>
</tr>
<tr>
<td>Mountain Lake Public Schools</td>
<td>Elementary &amp; Secondary Schools</td>
<td>110</td>
</tr>
<tr>
<td>Windom Area Hospital</td>
<td>General Medical &amp; Surgical Hospitals</td>
<td>100</td>
</tr>
<tr>
<td>Good Samaritan Village</td>
<td>Nursing Care Facilities</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: DEED, City of Windom

Local employment has remained strong in the recent downturn, and the local unemployment rate has paced or kept below the statewide and national averages. The 2009 Annual Average Unemployment Rate for Cottonwood County was 6.5%, compared to 8% in Minnesota and 9.3% for the U.S. nationwide (not seasonally adjusted). Toro Co
announced just before Christmas 2010 that they hired 45 new workers from a 30-mile radius to meet increased demand for snow blowers and lawn machines.

There were 865 farms in Cottonwood County in 2007, 4% more than counted by the US Census of Agriculture in 2002. Sixty percent (60%) of farmers list farming as their primary occupation. The average size of a farm was 441 acres, and the average farm reported sales of $278,000. Most acres were planted to corn or soybeans. Cottonwood County is the 5th largest producer of sheep and goats and 9th largest producer of cattle in Minnesota. Cottonwood County also had the 6th highest inventory of broiler chickens in the state.

C.3 Natural Environment

Southwest Minnesota has a typical humid, mid-continental climate, with cold, dry continental polar air dominating in the winter and hot, dry tropical air masses from the Southwest meeting warm, moist maritime air masses from the Gulf of Mexico in the summer. Weather patterns circulate counter-clockwise and generally enter the county from the west to southwest and sometimes the south.

According to the National Climatic Data Center (NCDC), the average (mean) temperature at Windom ranges from 13 F in January to 72 F in July. Cottonwood County has average annual precipitation of 29 inches (Minnesota’s state-wide median since 1890 is about 26 inches). Typically 70% of precipitation falls May to September. Annual precipitation can vary widely—while 21 inches was measured in 2003, almost 37 inches of precipitation was observed during 2005 (State Climatology Office – DNR Waters).

University of Minnesota Remote Sensing and Geospatial Analysis Laboratory analysis indicates that 82% of land in Cottonwood County was in agricultural use in the year 2000. This accounts for over 341,000 of the 415,000 acres in the county. About 7% of land is in grass/shrub/wetland, while 6.3% is classified “urban”. The same analysis found that less than 1.5% (5,280 acres) of the county is considered “impervious” or developed such that water will run off rather than soak into the ground.

Southwestern Minnesota has a conspicuous feature called the Coteau des Prairies, meaning “highland of the prairies” or “hill of grasses”, which bisects Cottonwood County. This is a ridge that extends northwest to southeast across South Dakota, Minnesota and on into Iowa. The rolling topography of the county consists of glacial till on top of Sioux Quartzite and Cretaceous sandstone bedrock. Depth to bedrock is variable, deepest in the western part of the county, with outcrops of Quartzite in the northeast. Pre-settlement vegetation consisted of grasslands and hardwood forests in river-bottom stands. The NRCS Soil Survey of Cottonwood County Minnesota, the Soil Survey Geographic (SSURGO) Database and the NRCS Web Soil Survey describe much more detailed soil properties and interpretations. The most current soils data is available through the NRCS website at soils.usda.gov.
Five major watersheds cross the county borders (see Figure 1-4). The three larger watersheds include the Cottonwood River Watershed which encompasses the north-central and western portion of the county covering about 245 square miles or 38% of the county land area; the Watonwan River Watershed which covers the eastern portion of the county and contains 198 square miles or 31% of the county land area; and the West Fork Des Moines River Watershed located in the southwestern and central portions of the county covering 165 square miles or 25% of the county land area. The two smaller watersheds include the Middle Minnesota Watershed (also called the Little Cottonwood River Watershed) which starts close to the center of the County and continues to the very northeastern edge of Cottonwood County covering 39 square miles or 6% of the land area; and the smallest one, the Blue Earth Watershed which covers only 1.3 square miles in the southeastern corner of the county. All but the Des Moines drain into the Minnesota River.

The following rivers and creeks drain within these watersheds:

- **Cottonwood River Watershed**: Dry Creek, Dutch Charley Creek, Highwater Creek, Mound Creek, Pell Creek
- **Watonwan River Watershed**: Watonwan River, North Fork of the Watonwan River, South Fork of the Watonwan River, Unnamed Branch
- **West Fork Des Moines Watershed**: Des Moines River, Heron Lake Outlet
- **Middle Minnesota River Watershed**: Little Cottonwood River
- **Blue Earth River Watershed**: no named streams

In addition to flowing creeks and streams, there are about 30 bodies of still water in Cottonwood County covering 5,824 acres of land and average about 170 acres each in size. Surface waters are typically undeveloped and most of the runoff and drainage water is not retained. There are also many wetlands scattered across the region. According to MN DNR, “a wetland has mostly wet soil, is saturated with water either above or just below the surface and is covered with plants that have adapted to wet conditions.” Wetlands provide many benefits to humans including the reduction of flooding by means of storage during high flows, filtration of pollutants and sediment, groundwater and aquifer recharge, wildlife habitat and aesthetic appeal. Much of the drainage of wetlands within the region occurred prior to the 1980s, when policies were enacted to prevent future wetland loss.

Hazards posed by flooding and potential dam failure are profiled in Section VI below.

### C.4 Infrastructure

Infrastructure is the basic physical and organizational structure needed for the operation of a city or region—the skeleton and nervous system of a community. These facilities may be public, like the road system, or private, like telecommunications systems. No matter the ownership, infrastructure is characterized by long-term, capital-
intensive investments that are interdependent and vulnerable to both natural and technological hazards.

C.4.a Transportation Networks
Cottonwood County’s transportation network is designed to serve the needs of many modes of traffic. The Minnesota Department of Transportation (MnDOT) works with the County Engineer and municipal authorities to construct, maintain and regulate a comprehensive system of roads, rail and airports for public and private use.

Functional Classification is used by the FHWA to determine eligibility for Federal emergency relief funds should roads be damaged by flooding or other natural disaster. I-90 to the south is the highest classification as an Interstate Highway. MN Trunk Highway (TH) 60 and US Hwy 71 are classified as Principal Arterial highways. TH 30 and TH 62 are classified as Minor Arterial highways.

One railroad serves Cottonwood County. The Union Pacific railroad operates two main corridors within Minnesota, constituting 724 miles of track. One of these runs from the Twin Cities through Worthington and continues through Sioux City, IA, and Omaha, NE. This line primarily serves coal shipments and unit trains with agricultural commodities. There are 21 public rail crossings; 12 are marked with active warning devices.

The Windom Municipal Airport is located about three miles north of the developed part of the City of Windom on US Highway 71. The longest runway is 3,600 feet, and is paved and lighted. There is a beacon as a navigational aid and an automated weather observation station (AWOSA).

C.4.b Utilities
Electrical service is provided in Cottonwood County by investor-owned utilities, rural electric cooperatives and municipal service providers:

- Alliant Energy
- South Central Electric Assn (member-owned cooperative based in St. James with an outpost in Jeffers), and portions along county lines served by Brown County REA, Federated Rural Electric, Nobles Cooperative Electric and Redwood Electric Coop
- Mountain Lake, Westbrook and Windom municipal utilities

Minnesota Energy Resources provide natural gas service in limited areas.

Telephone service is provided by several different firms also, including Citizens Telecomm, Century Tel, Qwest Corp, Redwood County TelCo, Western TelCo, and Windom municipal utilities.
NOAA Weather Radio All Hazards (NWR) is a nationwide network of radio stations broadcasting continuous weather information directly from the nearest National Weather Service office. NWR broadcasts official Weather Service warnings, watches, forecasts and other hazard information 24 hours a day, 7 days a week. Working with the Federal Communication Commission's (FCC) Emergency Alert System, NWR is an "All Hazards" radio network, making it the single source for comprehensive weather and emergency information. Cottonwood County is covered by KXI31 Jeffers, at 162.450 MHz. WNG702 Fulda, MN, at 162.425 MHz, can also be received in parts of the county. Cottonwood County's Specific Alert Message Encoding (SAME) code is 027033.

FEMA is working to develop the Integrated Public Alert and Warning System (IPAWS) as the next-generation alert and warning network. IPAWS will expand on the Emergency Alert System (EAS) by adding new technologies to traditional audio-only radio and television alerts, including cell phone, residential phone, Internet and the capability to broadcast one message over more media to more people before, during and after a disaster.

Five Wellhead Protection Areas (WPA) and Drinking Water Supply Management Areas (DWSMA) have been designated by the Minnesota Department of Health (MDH) in Cottonwood County (Figure 1-4 above). Red Rock Rural Water System has recently completed several projects to extend rural water system in Cottonwood County and adjacent counties. These projects offer additional options for redundant water supplies by interconnections within the system and between other suppliers.

**C.4.c Public Services**

A critical and essential role of local government is to provide public services. The Cottonwood County Sheriff’s Office provides law enforcement throughout
the county. The cities of Comfrey, Mountain Lake, Westbrook, and Windom have their own police forces.

Five fire departments provide volunteer fire protection in Cottonwood County, with fire stations located the cities of Jeffers, Mountain Lake, Storden, Westbrook and Windom. Portions of the county are served by fire districts based in adjacent counties. Ambulance service is provided from Jeffers, Mountain Lake, Westbrook and Windom.

- Jeffers Fire Department, 106 S Deaver Avenue, Jeffers MN 56145
- Mountain Lake Fire Department/Ambulance, 930 3rd Avenue, Mountain Lake MN 56159 (Fire department is located on 300 block of 11th Street)
- Storden Fire Department, 501 Anderson, Storden MN 56174
- Westbrook Fire Department, 556 1st Avenue, Westbrook MN 56183
- Windom Fire Department/Ambulance, 444 9th Street PO BOX 38, Windom MN 56101
- Comfrey Fire Department:, 120 Brown Street East PO Box 175, Comfrey MN 56019

Windom Area Hospital and Westbrook Medical Center are both Level IV trauma centers managed by Sioux Falls-based Sanford Health. Worthington Regional Hospital is the closest Level III trauma center. Level II trauma centers are located in Sioux Falls, SD.

Several different public school districts serve Cottonwood County, four of which have facilities inside the county—Mountain Lake, Red Rock Central (Jeffers), Westbrook-Walnut Grove, and Windom Area schools. Mountain Lake Christian School is a private facility located in Mountain Lake.

<table>
<thead>
<tr>
<th>Public Services</th>
<th>Bingham Lake</th>
<th>Comfrey</th>
<th>Jeffers</th>
<th>Mountain Lake</th>
<th>Storden</th>
<th>Westbrook</th>
<th>Windom</th>
<th>Rural Cottonwood Co.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Law Enforcement</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>County Sheriff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City Police</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
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<td>Fire Stations</td>
<td>(Brown Co)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Health Care</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambulance</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Hospital</td>
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<td></td>
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<td>School Buildings</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K-12</td>
<td>K-5</td>
<td>K-12</td>
<td>7-12</td>
<td>K-3, 4-6</td>
<td>7-12</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 2: PREREQUISITES

This Chapter covers prerequisites for eligibility to adopt this multi-hazard mitigation plan in multiple jurisdictions. Section II describes the plan adoption process. Section III describes multi-jurisdictional participation in the planning process.

II. Multi-Jurisdictional Plan Adoption

Requirement §201.6(c)(5): For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Following passage of the Disaster Mitigation Act of 2000 (DMA2K), counties in southwestern Minnesota worked cooperatively with the Southwest Regional Development Commission (SRDC) to inform local units of government, agencies, businesses, education, nonprofit organizations and other local citizens about the importance of hazard mitigation. This updated plan is the result of that ongoing effort.

A. Jurisdictions Represented in this Plan

Cottonwood County is located in Southwest Minnesota along the Iowa border. With a population of about 12,000, the county is a primarily rural, agricultural area. It was the intent of this planning process that all local units of government in the county should be covered by the multi-jurisdictional County plan.

On 8 January 2008, the Cottonwood County Board of Commissioners discussed the need and desire of the County to develop an All Hazard Mitigation Plan. The Board of Commissioners decided at this meeting to approve a resolution of participation. The resolution stated that the Board would allow County Staff to participate in plan development, provide comments and suggestions, and consider adopting the final approved All-Hazard Mitigation Plan. All cities in the county passed similar statements of intention to participate in the process.

At the time that this planning process was begun, HSEM had encouraged townships to also be formally involved. No townships in the County have full-time staff nor do they exercise complete statutory land use control. While no longer required, the following townships in the county did pass formal resolutions of participation.

- Amboy Township
- Ann Township
- Carson Township
- Dale Township
- Germantown Township
- Great Bend Township
- Lakeside Township
- Midway Township
- Mountain Lake Township
- Rosehill Township
- Southbrook Township
- Storden Township
- Westbrook Township
Statements of Intention are included as Addendum A.

B. Adoption Procedure
Each jurisdiction participating in the plan must formally adopt the updated plan after FEMA provisionally approves the document (Section 1.B.1). Typically local jurisdictions adopt the plan by resolution.

Minnesota Statutes §375.51 Subd.1 requires that a “public hearing shall be held before the enactment of any ordinance adopting or amending a comprehensive plan or official control...” While it is not necessary to adopt this plan by ordinance, it is essential that the plan is compatible with other official county and city plans and ordinances.

As stated in Section I, the County will consider formal adoption of the All-Hazard Mitigation Plan once FEMA deems this plan “approvable pending adoption.” After County approval, staff will work with each participating local unit of government to facilitate the local adoption of the plan. HSEM requires that participating jurisdictions adopt the plan within six months or less of provisional FEMA approval.

C. Supporting Documentation
Resolutions of Adoption from each participating jurisdiction that chooses to adopt this updated plan will be appended in Appendix A, after FEMA approval.
III. Multi-Jurisdictional Planning Participation

Requirement §201.6(a)(3): Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process ... Statewide plans will not be accepted as multi-jurisdictional plans.

Cottonwood County undertook the all-hazard mitigation planning process with the stated intention that all communities in the county should be eligible to participate and be covered by this plan. Only the largest cities in Cottonwood County have full-time staff and they all rely on County Emergency Management as a clearinghouse for intergovernmental cooperation. Cottonwood County Emergency Management maintains regular communication with all local units of government in the county.

Most of the City of Comfrey is located in Brown County. Comfrey is covered by the Brown County All Hazard Mitigation Plan currently in effect, but also participated on the Cottonwood County Planning Team.

A. How Each Jurisdiction Participated in this Plan

Table 2-1 summarizes participation by each jurisdiction participating in this plan. As stated above in Section II.A, all incorporated cities in the county approved formal Statements of Intention demonstrating their commitment to undertake this process.

All but one city had staff and/or elected officials representing them on the Cottonwood County All Hazards Mitigation Planning Team (see next section); staff followed-up with that city by telephone. Most cities submitted the Capabilities Worksheet required by HSEM (Section IV.E). Finally, each of the cities has at least one mitigation strategy identified for natural hazards (Chapter 5, Section XIV).

<table>
<thead>
<tr>
<th>Local Unit of Government</th>
<th>Resolution of Participation</th>
<th>Representative on Planning Team</th>
<th>Capabilities Worksheet</th>
<th>Mitigation Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cottonwood Co.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bingham Lake</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Comfrey</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Jeffers</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Mountain Lake</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Storden</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Westbrook</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Windom</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Cities not present at team meetings were consulted on strategies by telephone or personal visit. After the final team meetings, SRDC staff and County Emergency Management followed-up with each city to confirm mitigation strategies selected.

A.1 Participation Provisions Post-Approval
FEMA guidance explains a process that potential partners can follow to become part of the planning process, or “join” the mitigation plan, after FEMA approval (pp. 21-23 of the FEMA “Blue Book” referenced in Section I.B above). The plan may be required to be revised in full or by a new annex documenting additional planning work for that specific area.

Any jurisdiction wishing to modify (or join) the plan at a later date should contact Cottonwood County Emergency Management.

Figure 2-1 Flooding at Island Park in Windom, 2010

Source: Cottonwood County Emergency Management
CHAPTER 3: PLANNING PROCESS

The planning process is as important as the plan itself. This Chapter documents the process used in developing this plan. Section IV describes the planning process, the All Hazard Mitigation Planning Team, public involvement, and existing plans, studies, reports and technical information used in the planning process.

IV. Documentation of the Planning Process

Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and

(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

A. Description of the Planning Process

Southwest Regional Development Commission (SRDC) initiated an application to MN Homeland Security and Emergency Management (HSEM) for sub-grantee funding to work with Cottonwood County to complete multi-jurisdictional hazard mitigation plans for each county. Notice of approval under the Pre-Disaster Mitigation Guidance (EMC-2007-PC-0004) was received by SRDC with an effective date of 10 September 2007. An executed Sub-Grantee Agreement was approved by SRDC on 13 November 2007, at which time formal work on the project began. As noted above, the Cottonwood County Board of Commissioners passed a Resolution of Intention to participate in the all-hazard mitigation process on 8 January 2008.

Development Planner John C. Shepard, AICP, has served as primary staff planner on hazard mitigation plans for SRDC since 2005. Cottonwood County’s Emergency Manager coordinated local logistics, including soliciting resolutions of participation, public communications (Addendum D), recruiting the Planning Team (next section) and providing data for analysis.
Mark Marcy served as Cottonwood County Emergency Management Director at the beginning of the planning process through 2009, when he left to join HSEM. The planning process was put on hold until the second half of 2010, after Kimberly Hall became Cottonwood County Emergency Management Director. Two flooding events in 2010, and turnover in other County staff also extended the planning process.

Cottonwood County Emergency Management arranged all meetings and SRDC staff facilitated the meetings. Overall there were six public meetings during this project:

1. The All-Hazard Mitigation Planning Team organized at the first meeting in March 2008.
2. The Planning Team met to review the community profile and hazard profiles in May 2008, identifying hazards present in the county.
3. The Planning Team ranked hazards county-wide by consensus at a meeting in July 2008.
4. A public Open House was held at the Cottonwood County Law Enforcement Center in February 2009 to present Hazard Identification results and solicit comments on goals and objectives for mitigation. Hazardous weather conditions affected participation.
5. On 18 November 2010, members of the Planning Team discussed a comprehensive range of specific mitigation items for each participating jurisdiction.
6. On 2 February 2011, SRDC and the Emergency Manager met with staff from DNR, the County and the City of Windom to specifically discuss the NFIP and requirements to maintain compliance, as well as potential mitigation items.

SRDC staff drafted this plan document based on input from the Planning Team, local units of government and community stakeholders, as well as review and guidance from HSEM.

B. The All Hazard Mitigation Planning Team

At the beginning of the planning process, Cottonwood County Emergency Management identified potential volunteers to serve on the All-Hazard Mitigation Planning Team. These included city council members and city staff; township board members; county commissioners, elected officials, and county staff; first responders, law enforcement, and essential services providers. Lincoln County is a rural community and few local units of government have paid full-time staff. Members of the Planning Team were recruited in an open and inclusive process to represent knowledge and views of those people who will make the plan a reality.

The County Emergency Manager called meetings of the Planning Team, and will keep this group informed of progress on the plan and future updates. Individuals listed in Table 3-1 participated in the Planning Team over the course of the planning process. Meeting notes for Planning Team meetings and the public open house, including attendees and dates of meetings, are included in Addendum E.
The Planning Team developed the following statement regarding their intent for this project:

*The Cottonwood County All-Hazard Mitigation Plan is intended to protect public health, safety and welfare by coordinating mitigation of natural and man-made hazards, and to meet FEMA requirements.*

### C. Public Involvement

In rural communities, the public cannot help but become involved in local government. Intergovernmental coordination was essential if this plan was to be more than a document gathering dust on a shelf. SRDC and Cottonwood County Emergency Management provided information to all local units of government in the county about the all hazards mitigation planning process and opportunities for participation. Formal participation was solicited multiple times in 2008 and 2009. SRDC Staff met with the County Township Association to discuss the hazard mitigation process. No townships in the county have paid staff, and most township mitigation activities are managed by the County. All incorporated municipalities and several townships approved resolutions of participation in public meetings (Section II.A).

Public Notice of all Planning Team meetings was posted at the Courthouse according to local practice. As there are no local television stations, most residents, businesses and organizations receive local news through the community newspaper and radio station. SRDC staff discussed progress on the hazard mitigation plan several times on the community radio station, KDOM. Sample copies of Public Communication are provided in Addendum D.
D. Other Opportunities for Involvement
Hazard mitigation has been a regional effort in Southwest Minnesota, with many opportunities for involvement provided for neighboring communities, agencies involved in hazard mitigation, and businesses, academia, and other relevant private and non-profit interests. SRDC has worked (or was working during plan development) with regional Minnesota counties on their hazard mitigation plans:

- Jackson County (2008)
- Lincoln County (2010)
- Lyon County (2010)
- Murray County (2005; update in progress)
- Nobles County (2005; update 2011)
- Pipestone County (2010)
- Redwood County (2005; update in progress)
- Rock County (2007)

D.1 Public Hearing
Minnesota Statutes provide for a Comprehensive Planning process. Upon plan completion, SRDC intends to post the plan on their website. The County will make copies available to the public, local governments, and county departments. A Public Hearing is to be scheduled for public review prior to adoption, with due public notice. The adoption process for this plan is explained in Section II above.

E. Existing Plans, Studies, Reports and Technical Information
Many sources of local, state, federal and private information were used during the hazard mitigation process. The coordinated use and consideration of these diverse data sources form a sound basis for this plan and implementation activities.

The following references were specifically consulted during the planning process.

- Cambridge Systematics, Minnesota Comprehensive Statewide Freight and Passenger Rail Plan Draft. (December 2009)
- Cambridge Systematics, Minnesota Comprehensive Statewide Freight and Passenger Rail Plan Draft Technical Memorandum. (July 2009)
- Clarion Associates, Airport Land Use Compatibility Manual, Minnesota Department of Transportation Office of Aeronautics (September 2006)
- Cottonwood County Environmental Office and Southwest Regional Development Commission, Cottonwood County Comprehensive Plan (2005)
- Cottonwood County Environmental Office and Southwest Regional Development Commission, Local Water Management Plan (2007)
Josiah, Scott and Mike Majeski, “Living Snow Fences”, University of Minnesota Extension #FO-07277-GO (2002)
Minnesota Department of Public Safety, Fire in Minnesota, State Fire Marshall (2009)
Minnesota Department of Transportation, Minnesota Comprehensive Highway Safety Plan (December 2004).
Minnesota Historical Society, Governor: Disaster Relief Records: Tyler tornado relief records (1918-1921), State Archives.
Minnesota Homeland Security and Emergency Management (HSEM), Minnesota All-Hazard Mitigation Plan (April 2008)
Murray County All Hazard Mitigation Task Force and Southwest Regional Development Commission, Murray County All Hazard Mitigation Plan (2005)
Wind Science Engineering Center (WSEC), Texas Tech University, A Recommendation for an Enhanced Fujita Scale (EF-Scale), National Weather Service (June 2004).

E.1 Capabilities Worksheets
As discussed in Section III.A above, the county and several municipalities completed a Capabilities Worksheet required by HSEM, identifying planning capabilities, policies/ordinances, programs, studies and reports, staff, and community partners relevant to hazard mitigation. The Worksheet is attached as Addendum B.

Several documents were referenced extensively in the planning process, including the county comprehensive (land use) plan and development ordinance and water management plans. Other policies and ordinances were referenced more generally in the planning process. Specific items, such as city comprehensive plans, capital
improvement plans, building codes and other local resources, were used in selection of potential mitigation measures. County and city staff were consulted by the Planning Team throughout the planning process.

E.2 Description of the Jurisdiction
The FEMA Blue Book gives a special consideration, that “The planning team should consider including a current description of the jurisdiction... to provide a context for understanding the mitigation actions that will be implemented to reduce the jurisdiction’s vulnerability”.¹

See Chapter I, Section I.C, for a brief profile of the county.

Figure 3-1 Wind turbines on TH30, Jeffers

Source: J.C. Shepard

¹ Local Multi-Hazard Mitigation Planning Guidance, p. 27
CHAPTER 4: RISK ASSESSMENT

This Chapter profiles hazards facing the county. Section V describes identified natural and technological hazards. Section VI provides a profile of identified hazards. Section VII provides an overview of vulnerability to identified hazards. Section VIII addresses Repetitive Loss Properties. Section IX addresses risks to structures. Section X addresses estimates of potential losses. Section XI provides an analysis of development trends. Section XII addresses multi-jurisdictional risk analysis for participating jurisdictions.

V. Identifying Hazards

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

The 2008 Minnesota State All-Hazard Mitigation Plan (MAHMP) includes a detailed hazard analysis, the result of a risk and vulnerability assessment conducted state-wide. Those hazards were themselves selected by Minnesota Homeland Security and Emergency Management (HSEM) from a comprehensive list of natural hazards identified by the Federal Emergency Management Agency (FEMA) in 1997, as well as relevant human-caused hazards. The state-wide risk assessment is intended to satisfy the requirements of the federal Disaster Mitigation Act of 2000 (DMA2K).

A. Description of All Hazards

There are many natural and man-made hazards that that put Minnesota at risk. A “major disaster” is an event which the President of the United States determines warrants federal aid to supplement state and local recovery efforts. The state of Minnesota was included in Presidential Disaster Declarations 40 times between 1965 and 2007, according to the MAHMP.

Presidential Disaster Declaration #1941 was declared in 2010 for 29 counties in southern Minnesota, including Cottonwood County, for severe storms and flooding beginning on September 22, 2010. These counties were eligible for Public Assistance. In the spring of 2010, Presidential Disaster Declaration #1900 was declared for 25 counties and several tribes for flooding. Cottonwood County was eligible for Public Assistance.

The following Presidential Disaster Declarations were detailed in the 2005 edition of the MAHMP:

Key: PA = Public Assistance Program (formerly Infrastructure Support Program)
      IA = Individual Assistance
      HM = Hazard Mitigation Grant Program
#1212 in 7 Counties
4/1/1998 Severe Storms & Tornadoes
PA, IA, HM

#1158 in 40 Counties
1/16/1997 Severe Winter Storms & Blizzards, Snow Emergency Declaration
PA

#1151 in 12 Counties:
1/7/1997 Severe Ice Storm
PA, HM

#255 in 70 Counties:
4/18/1969 Flooding
PA, IA

### A.1 Methodology

Mitigation Planning Team took hazards detailed in the then-current edition of the MAHMP plan as a starting point. As detailed in Section IV above, each hazard was evaluated against data on disaster incidents in the county and local knowledge of hazards experienced. Thoroughly discussing each state-wide hazard, the Team combined some hazards for ease of assessment and development of mitigation actions. To these were added local concerns for hazards posed by Agricultural Disease and Methamphetamine Laboratories. Certain state-wide hazards that the team considered of no local risk were eliminated from discussion. These included:

- Coastal Erosion—there are no coasts in Southwest Minnesota.
- Nuclear Generating Plants—none are located in or near Southwest Minnesota.

After the 2008 revision of the MAHMP was published, working categories of hazards were harmonized with those used in the current edition.

The Planning Team evaluated reports of incidents and local knowledge to evaluate location, extent, occurrences and probability of future events. Hazard events were categorized on potential frequency, potential severity, risk level and hazard rank. The details of the hazard profiles are presented in the Section VI. Results of the planning team’s Hazard ranking are presented in the Section VII.

Natural Hazards affecting the jurisdiction include:

- Agricultural Disease (animal and crop)
- Blizzards and Severe Winter Storms
- Drought
- Extreme Temperatures
- Fire—Wildfire
- Flooding
- Hail
- Severe Summer Storms (including Lightning)
- Tornado and Straight-line Winds

Technological Hazards affecting the jurisdiction include:

- Dam Failure (combined with flooding for analysis)
- Hazardous Materials
- Public Health and Infectious Disease
- Fire—Structure & Vehicle Fires (combined with wildfire for analysis)
- Terrorism and Civil Disturbance

A.2 Locations Affected by Hazards

The topography, vegetation and development pattern of Cottonwood County is fairly homogeneous across the 18 townships and 7 cities in the county. Most areas of the county are equally at risk from each of the natural and technological hazards considered in this plan, with the single exception of flooding which is highly dependent on topography.

However, different types of infrastructure and critical facilities will be affected differently by each hazard. These are addressed for each hazard below.

VI. Profiling Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the ... location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

In this section, Natural hazards present in Cottonwood County are described in alphabetical order for ease of reference, followed by Technological Hazards.

A. Natural Hazards

This section describes natural hazards which are considered a risk in the county. These natural hazards include those caused by climatological, geological, hydrological or other events of the physical rather than man-made world. As the 2008 edition of the Minnesota All-Hazard Mitigation Plan (MAHMP) points out on page 66:
Natural hazards are natural events that threaten lives, property, and other assets. Often, natural hazards can be predicted. They tend to occur repeatedly in the same geographical locations because they are related to weather patterns or physical characteristics of an area. Natural hazards such as flood, fire, tornado, and windstorms affect thousands of people each year.

Natural hazards considered in this plan include agricultural diseases, blizzards and winter storms (including ice and extreme cold), drought, fire, flooding (including dam failure), severe summer storms (including hail, lightning and extreme heat), and tornado and straight-line winds.

Much of the data in this section is referenced from the National Climatic Data Center (NCDC) Storm Events database. According to the National Oceanic and Atmospheric Administration (NOAA) Satellite and Information Service website:

NCDC receives Storm Data from the National Weather Service. The National Weather service receives their information from a variety of sources, which include but are not limited to: county, state and federal emergency management officials, local law enforcement officials, skywarn spotters, NWS damage surveys, newspaper clipping services, the insurance industry and the general public.²

A.1 Agricultural Disease (animal or crop)
Agriculture is the economic foundation of Cottonwood County and Southwest Minnesota. Animal and crop-related diseases have the potential to inflict both large economic losses and logistical hazards on the community.

The 2005 edition of the Minnesota State All-Hazard Mitigation Plan addressed “Infectious Disease / Environmental Outbreak” in Annex A12. The current state hazard plan addresses both animal and human diseases under Infectious Disease Outbreak (pp169-173). This plan addresses human diseases along with other Technological Hazards in the next section of this chapter.

A.1.a Locations Affected by the Hazard
Major incidents of agricultural disease have the potential to affect trees, crop and animal agriculture in Cottonwood County. The Planning Team felt that outbreaks of concern are likely to be of major severity, but limited to a specific location.

Animal Transmitted Diseases pose the greatest threat to farms and pastures. Insects, pests and disease pose a risk to both agriculture and tree-cover. A majority of land in the county is used for agriculture and is at risk for agricultural diseases.

² [http://www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)
A.1.b  Extent of the Hazard

Animal Transmitted Diseases

Animal Transmitted Diseases, especially Foreign Animal Diseases (FAD) such as Hoof and Mouth Disease and Bovine Spongiform Encephalopathy (BSE-Mad Cow Disease), threaten animal agriculture. The United States has been free of Hoof and Mouth Disease since 1929 due to effective prevention programs initiated by the Federal Government. Essential efforts to prevent animal transmitted disease include coordination with the federal & state governments and local veterinarians. Public education and risk communication are essential strategies to assist in the response.

When an infection of foot and mouth disease or BSE is confirmed, the only effective way to control the disease is isolation and culling of an entire herd. Isolation and mass culling of neighboring herds would also likely be necessary. These cattle would have to be properly disposed of depending on the numbers involved. While this is not a direct threat to human health beyond carcass management, the mental health of the families affected by the loss of their livelihood could be a significant problem, for law enforcement and the community as a whole.

The threat of bovine tuberculosis (TB) has impacted agriculture in Minnesota recently. In April 2008, USDA downgraded Minnesota’s status, requiring Minnesota cattle producers to do additional testing when shipping animals out of state. According to the Board of Animal Health website, bovine TB can be difficult to diagnose, “as cattle can be infected for a long period of time before showing any outward signs of TB.” In October 2010, the majority of Minnesota was upgraded to Bovine TB Accredited–Free.

Birds, including poultry, are susceptible to animal transmitted diseases. For example, Exotic Newcastle disease is a contagious and fatal viral disease affecting all species of birds. Previously known as velogenic viscerotropic Newcastle disease, Exotic Newcastle is, according to the USDA one of the most infectious diseases in the world. Exotic Newcastle affects the respiratory, nervous and digestive systems of birds. Strict biosecurity practices are essential to prevent introduction of such diseases into commercial, backyard or pet bird flocks. (Avian influenza and West Nile diseases are discussed below with Public Health Infectious Disease.)

Minnesota’s Dept. of Agriculture (MDA), Board of Animal Health, Dept. of Health, and Homeland Security and Emergency Management (HSEM) are working with local agencies to effectively mitigate any and all effects of hazards on animal agriculture.
Plant Pests and Diseases

Plant diseases cause a loss of yields or damage to the infected plant. Certain tree diseases may weaken their structure and create a hazardous situation where property damage or serious bodily injury may result from falling limbs or the entire tree toppling. It is imperative that arborists, landcapers, and ground maintenance personnel recognize the signs that a particular tree may present an imminent hazard.

The Worthington Daily Globe reported in May 2010 that local ash trees were being infected by anthracnose fungal leaf spots, due to cool damp spring weather. While a one-time infection is unlikely to cause long-term damage to an otherwise healthy tree, in many cases fungi are involved in tree diseases that result in a tree becoming a hazard. A tree with slowed growth, branch dieback, smaller than normal leaves or needles, excessive cone or seed set, premature autumn leaf coloration, or severe winter twig kill may be exhibiting early symptoms of a disease. Nothing can be done for a tree once it is infected nor is it likely that fungus can be completely eliminated from the soil or general area around the tree once the tree is removed.

Some of the more notable pests infest cornfields. Corn rootworm and European corn borer are two major pests that pose serious potential loss of income to farmers. Seed companies have been able to genetically enhance corn varieties to provide some level of protection. Soybean fields are often attacked by soybean cyst nematode and soybean aphids. Seed companies have begun developing hybrids that have resistance to certain types of cyst nematode. Soybean aphids became a wide-spread problem in the last decade, and must be addressed with commercial spray.

There is increasing concern regarding Ash trees in rural and urban forests. Ash became a preferred quick-growing street tree and shade tree across the USA after elm trees succumbed to Dutch Elm Disease. MDA and University of Minnesota Extension Service provide information on a variety of insects and pests. The Emerald Ash Borer is an insect that attacks and kills ash trees. According to the MDA, the adults are small, iridescent green beetles that live outside of trees during the summer months. The larvae are grub or worm-like and live underneath the bark of ash trees. Trees are killed by the tunneling of the larvae under the tree's bark. According to a story in Planning Magazine (“Diversifying the Urban Forest”, February 2010), Minnesota could lose all of its ash trees within 10 years. In 2010, MDA released a species of stingless wasps in infested parts of the state as a biological control strategy. The City of Windom has formed the Windom Tree Commission to address concerns about the EAB and promote a healthy urban forest.
Relationship to Other Hazards—Cascading Effects
The US Federal Bureau of Investigation (FBI) considers any FAD outbreak as a crime scene until proven otherwise. Agri-terrorism has been threatened by sources both domestic and foreign.

A.1.c Previous Occurrences of the Hazard
There have not been any recent large-scale occurrences of hazardous animal transmitted disease in the area. Some occurrence of crop pests and diseases happens each year. In 2009, Emerald Ash Borer was found in St. Paul, and will likely become an increasing concern throughout Greater Minnesota.

A.1.d Probability of Future Events of this Hazard
Agricultural Disease is likely to occur in the area. The Cottonwood County All-Hazard Mitigation Planning Team considered it highly likely to occur in any year (see Hazard Identification Worksheet in Section V below).

A.2 Blizzards and Winter Storms, Ice and Extreme Cold
Minnesota experiences winter weather from mid-Autumn through the winter season into early spring. Heavy snowfall and extreme cold can immobilize large regions at the same time. All types of winter storms can be accompanied by extreme cold—both absolute temperatures and wind chill. The MAHMP covers Severe Winter Storms, Blizzards, and Ice and Ice Storms in Section Four: Hazard Analysis.

Cottonwood County is covered by the Sioux Falls, South Dakota, office of the National Weather Service. Since the area is in the Sioux Falls major media market, the county benefits from receiving news of impending weather events from the West.

A.2.a Locations Affected by the Hazard
Winter storms typically affect large areas at the same time. Rural homes and farms face the threat of isolation and utility failure during winter storms. Roads closed due to hazardous winter weather also may make it difficult for emergency responders to access individuals located in remote rural areas. Given the rural nature of the county and the distance between cities, residents of smaller communities often face similar conditions.

A.2.b Extent of the Hazard
There are several types of winter storm events typical for this area. Heavy snow events in Minnesota are considered to be 6 or more inches of snow in a 12-hour period, or 8 or more inches in a 24-hour period. Snow is considered heavy when visibilities drop below one-quarter mile regardless of wind speed. Heavy snows can lead to building collapse as well as creating a hazard to residents and travelers.
Ice storms include freezing rain, freezing drizzle and sleet (see section on Severe Storms below for information on hail storms, which more typically occur in the spring and summer seasons). Sleet forms from rain that turns to ice pellets while still in the air. Freezing rain freezes when it hits the ground, creating a coating of ice on roads, trees and power lines. Ice storms often lead to utility outages.

Ice storms combined with high winds often threaten the electrical power grid. Typical power outages are due to localized storm events and utility crews can respond and restore power within hours. A complete power outage, however, has the potential to be a catastrophic event, due to the extensive systems that rely on remote power generation. Water and sewer service rely on electrical pumping stations. Individual home furnaces may be able to run on natural gas or propane, but usually need electricity to circulate warm air or hot water throughout a building.

Blizzards are the most violent type of winter storm. A blizzard occurs with sustained or frequent gusts to 35 miles per hour or greater and considerable amounts of falling and/or blowing snow (reducing visibility to less than a quarter mile) for three hours or longer. Temperature is not taken into consideration when the National Weather Service issues a Blizzard Warning; however, the nature of these storms typically leads to extreme cold.

Blizzards and winter storms create hazardous driving conditions for considerable amounts of time. In addition to slippery ice, drifting can close roads and block sight lines at intersections. According to MnDOT, “Drift-free roads are achievable through two mitigation strategies, proper road design and/or the use of snow fences. A suitably designed roadway will promote snow deposition in ditches rather than on the roadway and blowing snow that does reach the road will move across without drifting. Snow fences can also help maintain clear roadways by capturing blowing snow upwind of a problem area and storing that snow over the winter season.”

Extreme cold temperatures lead to direct dangers to people and animals. As NOAA points out in public education ("Dangers of Winter Weather" flyer, undated):

*Infants and the elderly are most susceptible to prolonged exposure to the cold, which can cause potentially life-threatening conditions such as hypothermia and frostbite. Below freezing temperatures can damage vegetation and cause pipes to freeze and burst inside homes.*
Studies by NOAA researchers (Fransen & Wilhelmi 2007) show that more deaths across the nation are attributed to winter storms rather than to cold weather events. However, different populations are more at risk to different events. Men 40-49 years old were most vulnerable to both types of events. Over half of winter-weather deaths occurred in a vehicle, and 30% occurred outdoors.

**Relationship to Other Hazards—Cascading Effects**

Heavy snows and rapid snow melt are primary contributors to seasonal spring flooding.

### A.2.c Previous Occurrences of the Hazard

Southwest Minnesota has a long history of severe winter weather. According to the Minnesota Climatology Working Group, the term “blizzard” originated in the region, just across the state line in Iowa:

> Mar 14-16, 1870 blizzard struck northern Iowa and SW Minnesota with up to 16 inches of snowfall. First use of the term "blizzard" (from boxing, meaning volley of punches) by the Esterville, IA Vindacator newspaper. The term blizzard was not used by the U.S. Signal Corps Weather Service until 1876.

Winter storms (snow & ice events) covering all or part of Cottonwood County—often a much larger area—have been documented 62 times in the National Climatic Data Center (NCDC) Storm Events database since 1993 (47 times this decade, Table 4-1 below). No deaths or injuries have been directly attributed to these storms, and few have attributed property damage.

The largest amount of damage documented was $13 million dollars for an ice storm across Southwest Minnesota on 14-18 November 1996:

> An ice storm consisting of several periods of freezing rain caused widespread damage to power lines and poles, and to trees. Power lines snapped, cable wires were ripped down, and tree debris littered and blocked some roads. Thousands lost power, some for 5 days. Travel was curtailed by icy surfaces and there were numerous accidents, although no serious injuries were reported. The ice storm was described as the worst in 40 years in the Worthington area. Many small farm structures were damaged. A 600 foot radio tower in Worthington was toppled. Schools and business were forced to close. Damage continued after the ice storm ended, including some damage occurring when ice melted unequally during later milder weather.

On 29-30 January 2001, freezing rain produced ice storm conditions across Southwest Minnesota. The freezing rain was followed by 3 to 7 inches of snow, along with winds gusting to 40 mph which caused blowing and drifting snow.
Travel became difficult, and many businesses and schools closed. There was $80,000 in property damage attributed to the storm.

Table 4-1
NCDC Snow & Ice Events in Cottonwood County
Since 2000

<table>
<thead>
<tr>
<th>Counties</th>
<th>Date</th>
<th>Time</th>
<th>Type</th>
<th>Dth</th>
<th>Inj</th>
<th>PrD</th>
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<td>Heavy Snow</td>
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<td>0</td>
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<td>0</td>
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<td>1/29/2001</td>
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<td>20K</td>
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<td>Winter Storm</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cottonwood, Jackson, Lincoln, Lyon, Murray, Nobles, Pipestone, Rock</td>
<td>11/26/2001</td>
<td>7:00 AM</td>
<td>Heavy Snow</td>
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<td>0</td>
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</tr>
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<td>3/14/2002</td>
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<td>0</td>
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<td>Winter Weather/mix</td>
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TOTALS: 0 0 240K
Another winter storm on 14 March 2002 brought freezing rain and snow across the region. Travel was extremely difficult due to ice covered roads and snow that fell on top of the ice. Ice accumulation also caused widespread tree damage. There was $100,000 in property damage across the area attributed to the storm. The “Christmas Blizzard” of 23-26 December 2009 produced 14-20 inches of heavy snow and sustained winds of 25-30 mph, closing roads to holiday travelers across southern Minnesota, the Dakotas and northwest Iowa. Weight of the snow collapsed a commercial greenhouse in Windom.

In storms not listed by NCDC, wind-blown snow overnight 9-10 January 2010 stranded motorists on US 71 north of TH 30. Then again on Monday 25 January, high winds closed area highways closing schools and filling local motels. One hundred students spent the night at Westbrook’s high school. The *Cottonwood County Citizen* reported that more than 70 motorists spent the night at the Windom Community Center in a story in which the County Sheriff reminded readers to dress for Minnesota’s winter weather. The most recent winter storm event listed in the NCDC database occurred on 13-15 February 2010, when 2-4” of snow combined with existing deep snow cover were swept by strong northwest winds to produce blowing and drifting snow across Southwest Minnesota. Slick roads and reduced visibility led to numerous accidents in the region. Several winter storm and blizzard warnings were issued in the fall of 2010, causing roads, schools and businesses to close.

A.2.d *Probability of Future Events of this Hazard*
Winter storms are highly likely in the area; they occur every year.

A.3 *Drought*
Drought is defined as a prolonged period of dry weather with very little or no precipitation. There are four types of drought: meteorological drought (departure from average), hydrological drought (shortfall of stream flows or groundwater), agricultural drought (soil moisture deficiencies), and socioeconomic or water management drought.

Typically, a droughty weather pattern lasts long enough to cause a serious depletion of surface and ground waters. The effects of a drought are difficult to precisely measure. They can easily be seen in rural areas as many of the crops will display drought stress. Effect on the public water supply is not as easily observed.

A.3.a *Locations Affected by the Hazard*
Drought patterns are typically regional, affecting large areas at the same time. Areas with well-drained soils may be more likely to experience adverse impacts to crops. Areas that rely on individual wells for drinking water supplies may also be more likely to experience shortages than areas with access to redundant municipal and rural water suppliers.
A.3.b  **Extent of the Hazard**

Cottonwood County relies heavily on agriculture, leading to ongoing concern for protecting water. Corn and soybeans can be hurt by drought conditions. Livestock operations are affected by loss of feedstocks, pasture and general forage, as well as drinking water. Reduced yield due to a drought event has an economic impact on individual farmers, secondary suppliers who buy and sell crops and livestock, tertiary retailers and local governments that rely on sales taxes. Industrial users also rely heavily on water for processes.

The Minnesota Department of Health has worked with water suppliers to develop Wellhead Protection Plans (WHP) to help protect long-term quality and quantity of drinking water. Wellhead Protection Areas (WHPAs) and Drinking Water Supply Management Areas (DWSMAs) are mapped on Figure 1-4 in Chapter 1.

The Minnesota Department of Natural Resources (DNR) also has an important role in integrated planning for water conservation. The MAHMP explains the statutory process DNR undertakes to define water use priorities when water supplies are limited.

**Relationship to Other Hazards—Cascading Effects**

Drought will increase the risk of fires. Drought can also make animals and plants more susceptible to agricultural diseases and pests.

A.3.c  **Previous Occurrences of the Hazard**

The U.S. Drought Monitor provides an online snapshot of drought conditions across the state and nation. The NCDC database documents six drought events in the region from 1999-2007. No estimate of crop damage is included. Dry weather beginning in August 1999 through spring 2000 affected eight of the nine counties in the Southwest Regional Development Commission service area.

In 2007, dry conditions at the start of July combined with sparse rainfall to create severe drought conditions across Cottonwood, Murray, Pipestone and Lincoln counties. NOAA describes the effects:

*Crops such as corn and soybeans, as well as pasture land and general forage were deemed hurt by the drought. In addition to the crop losses, the pasture and forage losses led to difficulties in livestock operations. The amount of the losses could not readily be assessed before harvest, but were suspected to be substantial.*

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3 http://drought.unl.edu/dm
A.3.d  Probability of Future Events of this Hazard
The Cottonwood County All-Hazard Mitigation Planning Team considered that droughts occasional occurrences (1%-10% chance in next year).

A.4  Fire (wildfire and structures)
Each year, reports FEMA, more than 4,000 Americans die and more than 25,000 are injured in fires, many of which could have been prevented. Direct property loss due to fires is estimated at $8.6 billion annually. According to the Minnesota State Fire Marshall’s report *Fire in Minnesota*, a fire is reported on average in Minnesota every 34 minutes and there is an EMS run every four minutes. Fires can occur in any community and pose a threat year-round.

A.4.a  Locations Affected by the Hazard
The risk of fire affects all locations. Jeffers and Storden Townships are considered by DNR to be at higher risk for wildfire in particular due to concentrations of conservation land.

While wildfires typically occur in forests and grasslands, crops (cornfields for example) can also burn. Isolated rural structures can be at risk due to long response times and limited water supplies. However, there are many risks in town, such as fire in one structure spreading to adjacent properties.

A.4.b  Extent of the Hazard

Wildfire
Wildfire occurs when an uncontrolled fire spreads through vegetation, posing danger and destruction of property. They often begin unnoticed, spread quickly, and can be highly unpredictable. While more typical in rugged Northern or Western forested areas these days, prairie fires were a natural part of the environment across the Great Plains prior to settlement. The State hazard plan categorizes wildfires into three types:

- Wildland fires in grasslands, brush and forests;
- Interface fires where natural landscapes meet urbanized areas
- Prescribed burns, intentionally set or natural fires that are allowed to burn for beneficial purposes

Factors such as topography, fuel and weather affect wildfire behavior. Fire intensity tends to increase during daytime heating. Large parcels of land left fallow in conservation and natural areas may be susceptible to grass fire even when properly managed. Gusty winds and low relative humidity create conditions for wildfire to spread rapidly in dry grasses and crops. Farm fields with row crops, ditches and rights-of-way along railroad tracks are also vulnerable, in particular to the errant spark or carelessly discarded cigarette.
Prolonged periods of high temperatures and/or high winds increase the risk of wildfires.

Structure and Vehicle Fires
Structure and vehicle fires are treated as technological (man-made) hazards by the State hazard plan. They are presented here with wildfires, because their sources (e.g. lightning, arson) and the responsible parties (primarily volunteer fire departments) are essentially the same. These types of non-wildfire incidents are classified by the State hazard plan into four broad types:

- Residential Structures
- Public and Mercantile Structures
- Industrial Structures
- Vehicles

Statewide, 75% of structure fires in Minnesota are residential fires. Half of structure fires are caused by cooking accidents (mostly from unattended cooking equipment), with heating accounting for 12% (mostly fireplace/chimney), and open flames for 10% of structure fires. Careless smoking is the leading cause of fires in which people died. Smoke alarms were absent or non-operating in 1 of 4 fatal residential fires in the state. Statewide in 2009, there were over 300 fires reported at agricultural production and storage sites, almost half of which were crops or orchards.

The State Fire Marshall participates in Fire Prevention Week each October, and encourages local fire department participation. MN DNR also participates in the national Firewise program, which addresses wildfire risks to homes in the wildland/urban interface.

Relationship to OtherHazards—Cascading Effects
Wildfires can destroy vegetation, which can cause erosion and worsen flooding. There is also the potential for wildfire, structure fires, or vehicle fires to ignite hazardous materials. For example, many farms have anhydrous ammonia and other agricultural chemicals, which can cause serious difficulties for emergency response.

A.4.c Previous Occurrences of the Hazard
Fires occur periodically throughout the county, in both cities and townships. The State of Minnesota gathers information on fire response through the National Fire Incident Reporting System of the US Fire Administration. A new web-based reporting system is in use effective January 2009. All of the fire departments in Cottonwood County reported to the State Fire Marshall in 2009. There was one arson (Incendiary Incidents) and 42 fire runs reported in the county in 2009 (down from 53 in 2008) with a total loss of $1,067,500. There
have been no fire deaths reported in Cottonwood County over the past 25 years.

The National Weather Service issues Grassland Fire Danger statements from April 1st to November 15th each year. The DNR is the lead state agency for wildfire response and prevention across the state, and offers training and other resources for local fire departments. The State hazard plan reported on one fairly recent wildfire incident indicative of risk in the region—a 300 acre grassfire in 2003 that burned some small sheds near Windom.

A.4.d Probability of Future Events of this Hazard
There are structure fires and wildfires every year.

A.5 Flooding / Dam Failure
Floods are one of the most common hazards across the United States. Flooding can occur anytime, anywhere. Seemingly benign streams can overflow their banks from a sudden rainstorm, quick snowmelt or blockage of the channel. Lakes or reservoirs can slowly retain water or quietly creep up the shore. City sewers can back up and pour into private basements and onto public streets. Dams can break.

Minnesota DNR administers most state water law, including regulating work in public waters, control of appropriation and use of water, and ensuring the safety of dams. DNR classifies dam structures in three categories:

- High Hazard: any loss of life or serious hazard to public;
- Significant: possible health hazard or probable loss of high-value property;
- Low: property loss restricted to rural outbuildings and local roads.

A.5.a Locations Affected by the Hazard
The Federal Emergency Management Agency (FEMA) maps the probability of flood waters inundating floodplains. Specifically, FEMA works with local communities to map the Special Flood Hazard Area (SFHA), commonly known as the 100-year floodplain, where they calculate a 1% chance of a flood event any given year. Within the SFHA lie the floodway, in which water can be expected at any time, and the flood fringe which is vulnerable to flood events. In some areas, a 0.2% annual probability area (500-year floodplain) is also mapped.

FEMA has developed Flood Insurance Rate Maps (FIRMs) for many communities across the United States. FEMA now posts these online, along with “FIRMettes”—a “full-scale portion of a FEMA Flood Insurance Rate Map (FIRM) that you create yourself online by selecting the desired area from an image of a Flood Insurance Rate Map.”
There are mapped floodplains across the extent of Cottonwood County, but most areas are narrow, following streams and creeks. These include Dutch Charley, Highwater, and Dry creeks, a couple ditch systems, and the Cottonwood and Watonwan rivers. Other areas are broader, encompassing lake shores and historic wetland areas, especially around Talcot Lake on the Murray County line and all along the Des Moines River.

**City of Comfrey**
A one-square-block public park in the Brown County portion of Comfrey is mapped as floodplain. No part of Comfrey’s floodplain is in Cottonwood County.

**City of Windom**
Mapped floodplains extend throughout the city of Windom (See Figure 4-2). The city is built on the West Fork of the Des Moines River, a braided stream with numerous meanders and islands. Zone AE extends outside the river banks in three locations:

- Mapped floodplain reaches up TH 60 along the UP railroad past 11st street, putting about 14 city blocks at risk;
- Floodplain crosses River Road (County Road 13) between 12th and 13th streets, reaching into the County Fairgrounds;
The floodway and floodplain are mapped up Perkins Creek south of the high school across the north central part of Windom.

While the Flood Insurance Rate Maps for Cottonwood County and Windom were updated in the 1980s, they have not been digitized, making it difficult to analyze the extent of flood hazards.

Figure 4-2 Floodplain Map for City of Windom

Source: FEMA FIRMette

**Dams**

An Emergency Action Plan (EAP) is required for all High Hazard dams, implemented in the County Emergency Operations Plan (EOP). Currently there are no High Hazard rated dams in Cottonwood County. There are three Significant-rated dams: Mountain Lake (MN DNR), Windom Dam on the Des Moines, and Schoper-Bush (Cottonwood County) on Dry Creek north of Jeffers.
The Windom Dam is currently breeched and under study. There are also several low-risk dams owned by DNR and Cottonwood County along tributaries to the Blue Earth, Des Moines, and Watonwan rivers.

A.5.b Extent of the Hazard

Flooding occurs with the accumulation of water outside a normal water body, typically into a floodplain. FEMA defines a flood as:

“A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from:

- Overflow of inland or tidal waters;
- Unusual and rapid accumulation or runoff of surface waters from any source;
- Mudflow; or
- Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above.”

Further, a “flash flood” is considered to occur with “6 inches or more rainfall within a 24 hour period... The rationale for using these criteria is that a rainfall of six inches in a 24-hour period is near the 100-year return period in Minnesota” (Minnesota Climatology Working Group).

The National Flood Insurance Program (NFIP) was created by Congress to help property owners to protect themselves financially. NFIP offers flood insurance in communities that agree to adopt and enforce ordinances to reduce the risk of flooding. In Minnesota, the DNR administers floodplain management programs. Homeland Security and Emergency Management (HSEM) administers FEMA’s flood response, recovery and mitigation programs. According to NFIP’s website:

"Floodplain management" refers to an overall community program of corrective and preventive measures for reducing future flood damage. These measures generally include zoning, subdivision, or building requirements, and special-purpose floodplain ordinances. FEMA works closely with state and local officials to identify flood hazard areas and flood risks. Floodplain management requirements within high-risk areas, known as Special Flood Hazard Areas (SFHAs), are designed to prevent new development from increasing the flood threat and to protect new and existing buildings from anticipated flood events. Communities participating in the NFIP must require permits for all development in the SFHA. Permit files must contain documentation to substantiate how buildings are actually constructed. The community must also ensure that construction materials and methods used will minimize future flood damage. In return, the federal government makes
flood insurance available for almost every building and its contents within the community.⁴

Measures to mitigate flood risk include acquisition of property in the floodplain, flood proofing, relocation, and flood warning systems. Currently, Cottonwood County and the cities of Comfrey and Windom participate in the NFIP.

A city may choose to go beyond minimum NFIP requirements to promote flood mitigation and restrict activities within the floodplain. The NFIP’s Community Rating System (CRS), a voluntary incentive program, recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. CRS communities receive discounted flood insurance premium rates in recognition of reduced flood risks. No communities in Southwest Minnesota currently participate in the CRS.

Threats to transportation systems are addressed in more detail in the next section. Special issues occur with infrastructure in a flood event. Communities can mitigate the effects of flooding by asking certain questions before areas are inundated, such as:

- Are telephone switching stations vulnerable? Local phone/cable distribution lines?
- Electrical switching stations? Local power distribution?
- Are natural gas systems and meters flood-proofed?
- Are all underground fuel storage tanks inventoried and flood-proofed?
- How can homeowners be contacted to shut off and secure propane tanks, home fuel oil tanks, etc?
- To what level are public wells, water treatment, and sewage treatment plants protected from flood events?
- Is there a plan to move police, fire, public works, and city equipment, to high ground if needed?
- How will debris be managed and collected post-flood?

Relationship to Other Hazards—Cascading Effects
Flooding can interfere with emergency response to fires, as seen in Grand Forks, North Dakota, during the Red River Flood of 1997. Flooding or increased moisture/humidity levels can allow for increased insect pest infestations. Flooding can also create Public Health emergencies and contaminate water supplies.

⁴ http://www.floodsmart.gov
**A.5.c Previous Occurrences of the Hazard**

Severe flood events are uncommon in Cottonwood County. There is a stream gauge on the West Fork Des Moines River at Windom. The highest historical crest at that location is 24.7 feet on 10 July 1969. The 3rd highest crest occurred at 21.57 ft on 27 April 2001, 8th highest at 19.7 ft on 16 March 2007 and 9th highest at 19.5 ft on 5 May 2006. The NCDC database (Table 4-2) records thirteen flood events in and around the county between 1997 and 2010—most of which are classified as flash flood events.

As in much of Minnesota, seasonal spring flooding from snowmelt is a common occurrence in late winter and early spring. The NCDC database has general event information, but does not record local property damage as a result of most of these events. For example:

*Snowmelt flooding began in late March [1997] and continued through the end of the month. River flooding occurred on the Redwood, Rock, and on the upper West Fork Des Moines Rivers. Lowlands including farmland, roads, basements, and a few homes were flooded. The worst flooding occurred along the Rock River in Luverne and elsewhere in Rock County with many roads flooded, and considerable park and tree damage. Flood damage was roughly estimated to be in the hundreds of thousands of dollars at the end of March, and this did not include damage from farmland flooding which could not even be estimated until later in the year. Also, any damage estimates could not be complete because the flooding was continuing into the next month.*

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<td>Flood</td>
</tr>
</tbody>
</table>

Source: National Climatic Data Center
“Flash flood” events are often caused by heavy spring rains. In June 2010, heavy rain caused minor flooding near Mountain Lake and along the Des Moines River in the Windom area. These events are often highly localized, affecting roads more than structures.

In September 2010, as this plan revision was being finalized, rains throughout the month saturated soils in Southern Minnesota. Beginning on 22 September, widespread heavy rains caused flash flooding across Eastern South Dakota, Southern Minnesota, and Western Wisconsin, leading the Governor of Minnesota to declare a State of Emergency, including Cottonwood County.

There have been two recent incidents of dam failure in the county, both noted in the MAHMP although neither posed a risk to lives or structures. In the spring of 2007, a 17’ section of gate on the south side of Talcot Lake Dam needed repair after steel trusses on the gate rusted out, allowing water to flow through the gate. According to the Tri-County News, DNR replaced the damaged gate with 24 steel stop logs. Also in 2007, stream bank erosion caused the failure of the Windom Dam abutment adjacent to Island Park, scouring a new channel around the dam. The City and DNR have been studying construction (including removal) and funding options at the site. The local DNR hydrologist has stated that the existing dam has no impact during major floods.

A.5.d  Probability of Future Events of this Hazard
Flooding is likely to occur each year. The Cottonwood County All-Hazard Mitigation Planning Team considered further dam failures unlikely.

A.6  Severe Summer Storms, Hail, Lightning, Extreme Heat
During the spring, summer and autumn, severe thunderstorms, lightning and hail can be commonplace. The Minnesota All-Hazard Mitigation Plan covers lightning, hail, windstorms, and extreme heat temperatures. (Windstorms and Tornado events are addressed below.)

A.6.a  Locations Affected by the Hazard
Summer storms typically affect large areas at the same time. Hail can be extremely damaging to crops in rural areas, as well as vehicles and building roofs.

A.6.b  Extent of the Hazard
Thunderstorms, which occur most frequently from mid-May through mid-July, are the most common type of severe summer storm. Thunderstorms are usually localized, produced by cumulonimbus clouds, accompanied by lightning, and have strong wind gusts, heavy rains, and sometimes hail or tornados.
Lightning occurs to balance the difference between positive and negative discharges within a cloud, between two clouds, and between the cloud and ground. For example, a negative charge at the base of the cloud is attracted to a positive charge on the ground. A lightning bolt happens when the difference between the charges is great enough. The charge is usually strongest on tall buildings, trees, and other objects protruding from the surface. Consequently, these objects are more likely to be struck than lower objects.

While cloud-to-ground lightning poses the greatest threat to people and objects on the ground, it accounts for only 20 percent of all lightning strikes. The remaining lightning occurs within the cloud, from cloud to cloud, or from the ground to the cloud. The most common type of lightning is lightning occurring within a cloud.

Hail is an ice product produced in severe thunderstorms. It is formed when strong updrafts within the cumulonimbus cloud carry water droplets above the freezing level or when ice pellets in the cloud collide with water droplets. The water droplets freeze or attach themselves to the ice pellets and begin to freeze as strong updraft winds toss the pellets and droplets back up into colder regions of the cloud. Both gravity and downdrafts in the cloud pull the pellets down, where they encounter more droplets that attach and freeze and are tossed once again to higher levels in the cloud. This process continues until the hail becomes too heavy to be supported by the updrafts and falls to the ground.

The Tornado and Storm Research Organisation in the UK has developed a scale to measure increments of intensity or damage potential related to hail size and characteristics. The TORRO Hailstorm Intensity Scale ranges from H0 (hard hail causing no damage) to H10 (super hailstorms with hail >100mm diameter causing extensive structural damage and the risk of severe or fatal injuries to people caught in the open).  

In Minnesota, most hail ranges in size from pea-size (1/4 of an inch) to golf-ball size (1 ¾ of an inch). Larger hailstones occur less frequently. Strong updrafts are necessary within the cloud to form hail, and are usually associated with severe thunderstorms. Coverage areas for individual hailstorms are highly variable and spotty due to the changing nature of the cumulonimbus cloud. While almost all areas of southern Minnesota can expect some hail during the summer months, most hail is not large enough to cause significant crop damage or property damage.

Extreme heat temperatures often accompany severe summer storms. The combination of high temperatures and exceptionally humid conditions can

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5 See [http://www.torro.org.uk](http://www.torro.org.uk) for more detailed information on the scale.
prove deadly. Heat stress can lead to heat cramps, heat exhaustion and heatstroke, and death. According to the US Centers for Disease Control (CDC), more than 300 Americans die annually from excessive heat exposure—during 1979-2003, more people in the US died from extreme heat than from hurricanes, lightning, tornadoes, flood and earthquakes combined.

Figure 4-3 TORRO Hail Scale

<table>
<thead>
<tr>
<th>Size code</th>
<th>Maximum Diameter mm</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5-9</td>
<td>Pea</td>
</tr>
<tr>
<td>1</td>
<td>10-15</td>
<td>Mothball</td>
</tr>
<tr>
<td>2</td>
<td>16-20</td>
<td>Marble, grape</td>
</tr>
<tr>
<td>3</td>
<td>21-30</td>
<td>Walnut</td>
</tr>
<tr>
<td>4</td>
<td>31-40</td>
<td>Pigeon’s egg &gt; squash ball</td>
</tr>
<tr>
<td>5</td>
<td>41-50</td>
<td>Golf ball &gt; Pullet’s egg</td>
</tr>
<tr>
<td>6</td>
<td>51-60</td>
<td>Hen’s egg</td>
</tr>
<tr>
<td>7</td>
<td>61-75</td>
<td>Tennis ball &gt; cricket ball</td>
</tr>
<tr>
<td>8</td>
<td>76-90</td>
<td>Large orange &gt; Soft ball</td>
</tr>
<tr>
<td>9</td>
<td>91-100</td>
<td>Grapefruit</td>
</tr>
<tr>
<td>10</td>
<td>&gt;100</td>
<td>Melon</td>
</tr>
</tbody>
</table>

Source: TORRO

Relationship to Other Hazards—Cascading Effects
Heavy rain can cause flash flood events, and may threaten transportation infrastructure. Lightning often starts structure and wildfires. Extreme heat can lead to public health emergencies.

A.6.c Previous Occurrences of the Hazard
The NCDC database lists 70 hail events in Cottonwood County from 1956 to 2010, with an accumulation of $1.221 million damage. These events ranged from reported softball-sized hail in 1961 to many incidents of penny-sized hail, which is considered to be severe (Table 4-3).

A storm in 2003 with 1” hail resulted in $1.2 million in reported property and crop damage in the Mountain Lake area, damaging vehicles, cracking windows and damaging homes. Another storm in 2000 caused $20,000 in crop damage...
near Westbrook. However, dollar-cost damage is not consistently reported in the database.

The *MAHMP* documents a July 1995 extreme heat event which included Cottonwood County in a large affected area. Dew points in the 70s and 80s combined with temperatures in the 90s and low 100s caused two deaths across Minnesota from a combination of heat exhaustion and dehydration. A June 2003 windstorm caused widespread tree damage, including downed power lines, with over $1 million property damage.

<table>
<thead>
<tr>
<th>Location or County</th>
<th>Date</th>
<th>Time</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cottonwood Co.</td>
<td>7/4/1961</td>
<td>2100</td>
<td>3.00 in.</td>
</tr>
<tr>
<td>Cottonwood Co.</td>
<td>7/21/1979</td>
<td>2144</td>
<td>2.75 in.</td>
</tr>
<tr>
<td>Cottonwood Co.</td>
<td>5/29/1980</td>
<td>1445</td>
<td>2.75 in.</td>
</tr>
<tr>
<td>Cottonwood Co.</td>
<td>7/20/1979</td>
<td>1830</td>
<td>2.50 in.</td>
</tr>
<tr>
<td>Cottonwood Co.</td>
<td>7/12/1979</td>
<td>1644</td>
<td>2.00 in.</td>
</tr>
<tr>
<td>Cottonwood Co.</td>
<td>6/21/1956</td>
<td>2100</td>
<td>1.75 in.</td>
</tr>
<tr>
<td>Cottonwood Co.</td>
<td>7/21/1981</td>
<td>1715</td>
<td>1.75 in.</td>
</tr>
<tr>
<td>Cottonwood Co.</td>
<td>4/20/1985</td>
<td>2125</td>
<td>1.75 in.</td>
</tr>
<tr>
<td>Cottonwood Co.</td>
<td>4/20/1985</td>
<td>2135</td>
<td>1.75 in.</td>
</tr>
<tr>
<td>Cottonwood Co.</td>
<td>6/14/1985</td>
<td>1655</td>
<td>1.75 in.</td>
</tr>
<tr>
<td>Cottonwood Co.</td>
<td>7/3/1985</td>
<td>1850</td>
<td>1.75 in.</td>
</tr>
<tr>
<td>Cottonwood Co.</td>
<td>5/29/1986</td>
<td>1600</td>
<td>1.75 in.</td>
</tr>
<tr>
<td>Jeffers</td>
<td>6/28/1997</td>
<td>3:50 PM</td>
<td>1.75 in.</td>
</tr>
<tr>
<td>Delft</td>
<td>6/29/2005</td>
<td>6:00 PM</td>
<td>1.75 in.</td>
</tr>
<tr>
<td>Storden</td>
<td>6/7/2007</td>
<td>12:28 AM</td>
<td>1.75 in.</td>
</tr>
<tr>
<td>Windom</td>
<td>7/21/2009</td>
<td>12:50 PM</td>
<td>1.75 in.</td>
</tr>
</tbody>
</table>

*Source: National Climatic Data Center*

**A.6.d Probability of Future Events of this Hazard**

Severe Summer Storms are highly likely to take place every year, including hail. In the Planning Team’s experience, extreme heat is an occasional event with less than 10% chance any year. Individuals can and should mitigate their individual exposure to these hazards.

**A.7 Tornado and Straight-line Winds**

Tornados are the most violent of all storm types experienced in Minnesota. A tornado is a rapidly rotating column of air that is spawned from a cumulonimbus cloud. When it drops to the ground, it can create significant property damage and loss of life. While not as damaging as a tornado, windstorms can and do produce substantial damage over wider areas at one time.
A.7.a Locations Affected by the Hazard

A tornado or straight-line wind can hit anywhere, anytime. When an extreme wind event hits a populated area, potential damage can range anywhere from minor inconvenience to total devastation. FEMA places Southern Minnesota in Wind Zone IV, subject to winds of up to 250 mph (consistent with ASCE 7-05 criteria).

A.7.b Extent of the Hazard

The most severe windstorms usually occur (and do the most damage) during severe thunderstorms in the spring and summer months. These include tornados, downbursts, or straight line winds. Straight-line winds have similar effects to tornados without the rotational damage pattern. Downbursts are created by a column of sinking air, capable of producing straight-line winds in excess of 150 mph. Winds of greater than 60 mph are also associated with intense spring and fall low-pressure systems. These winds can inflict damage to buildings and overturn high profile vehicles.

Figure 4-4 Enhanced F-Scale for Tornado Damage

An update to the original F-scale by a team of meteorologists and wind engineers, to be implemented in the U.S. on 1 February 2007.

<table>
<thead>
<tr>
<th>F Number</th>
<th>FINTA SCALE</th>
<th>DERIVED EF SCALE</th>
<th>OPERATIONAL EF SCALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>40-72</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>73-112</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>113-157</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>158-207</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>208-250</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>261-318</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

**IMPORTANT NOTE ABOUT ENHANCED F-SCALE WINDS**: The Enhanced F-scale still is a set of wind estimates (not measurements) based on damage. It uses three-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators listed below. These estimates vary with height and exposure. Important: The 3 second gust is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured, “one minute mile” speed.

Source: NOAA
Tornados are most likely to occur during warm humid spells during May, June, July, and August but have occurred as early as March and as late as November in Minnesota. They are sometimes referred to as cold air funnels after the passage of a cold front when the air is much less humid, but the air aloft is very cold creating enough instability to make funnel clouds. Tornados occur during the warmest part of the day (late afternoon or early evening) and over 80 percent of tornados occur between noon and midnight.

The severity of tornadic damage is measured by the Fujita Tornado Scale, with a sliding scale from F0 to F5 depending on wind speed. An F5, the most damaging type of tornado, has winds of over 261 miles per hour and can disintegrate strong frame buildings. Beginning in 2007, the ‘Enhanced F Scale’ is now being used to estimate the scale of a tornado (See page 86 of the MAHMP). The EF Scale relies on 28 damage indicators to typical structures from small outbuildings and schools, to trees and towers (Figure 4-4).

A tornado’s path typically ranges from 250 feet to a quarter of a mile in width. The speed a tornado travels varies but commonly is between 20 mph and 30 mph. Most tornados stay on the ground for less than five minutes. Tornados frequently move from the southwest to the northeast but this also varies and cannot be counted on in all instances.

Relationship to Other Hazards—Cascading Effects
Severe winds, as noted, typically accompany thunderstorms and hail events. Hail may also accompany a tornado or severe wind event. A tornado event, and many straight-line wind storms, can lead to total destruction of buildings and wide-scale casualties. There are often fires and potential public health emergencies. Catastrophic events such as these may also create the potential for civil unrest.

A.7.4 Previous Occurrences of the Hazard
The NCDC database lists 70 general thunderstorm and high wind events reported for Cottonwood County from 1973 to 2010. In June 2003, thunderstorm winds caused widespread damage in the Mountain Lake area, damaging roofs, vehicles and power lines amounting to about $1 million property damage. In August 2005, thunderstorm winds blew off the roof of an apartment building in Westbrook and damaged the lumber yard and school bus barn, causing about $100,000 property damage.

There are 15 tornado events listed in the NCDC database from 1952 through 2010, from F0 to one F3, (Table 4-4). Three injuries were attributed to a 1976 F2 event and three to the 1998 F3 event. There was just one tornado event
recorded from the 1950s, none in the 1960s, three in the 1970s, and two in the 1980s and 1990s.

On Sunday 29 March 1998, an F3 tornado began in Murray County southwest of Westbrook as part of an unseasonably-strong outbreak. NCDC tracks the twister 39 miles eastward across Cottonwood County. The National Weather Service Twin Cities Office attributes a 67-mile path—the longest continuous tornado path recorded in Minnesota.⁶ After hitting a church east of Jeffers on Highway 30 and the city of Comfrey on the county line, the tornado grew to F4 strength in Brown County killing an elderly man. The tornado destroyed numerous farms, farm equipment, buildings, trees, power lines and poles, vehicles, and other structures including 75% of the buildings in Comfrey. Property damage was estimated by NCDC at $30 million. The thirteen tornadoes spawned by the storm caused almost a quarter of a billion dollars in damage. On 1 April 1998 seven counties including Cottonwood County were declared federal disaster areas.

<table>
<thead>
<tr>
<th>Table 4-4</th>
<th>NCDC Tornado Events in Cottonwood County</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location or County</strong></td>
<td><strong>Date</strong></td>
</tr>
<tr>
<td>1 COTTONWOOD</td>
<td>6/23/1952</td>
</tr>
<tr>
<td>2 COTTONWOOD</td>
<td>7/27/1971</td>
</tr>
<tr>
<td>3 COTTONWOOD</td>
<td>6/14/1976</td>
</tr>
<tr>
<td>4 COTTONWOOD</td>
<td>6/28/1979</td>
</tr>
<tr>
<td>5 COTTONWOOD</td>
<td>6/13/1981</td>
</tr>
<tr>
<td>6 COTTONWOOD</td>
<td>6/14/1985</td>
</tr>
<tr>
<td>7 COTTONWOOD</td>
<td>6/16/1992</td>
</tr>
<tr>
<td>8 Westbrook</td>
<td>3/29/1998</td>
</tr>
<tr>
<td>9 Jeffers</td>
<td>8/7/2000</td>
</tr>
<tr>
<td>10 Storden</td>
<td>7/14/2003</td>
</tr>
<tr>
<td>11 Windom</td>
<td>6/29/2005</td>
</tr>
<tr>
<td>12 Mountain Lake</td>
<td>8/1/2006</td>
</tr>
<tr>
<td>13 Jeffers</td>
<td>6/11/2008</td>
</tr>
<tr>
<td>14 Storden</td>
<td>7/7/2009</td>
</tr>
<tr>
<td>15 Storden</td>
<td>6/25/2010</td>
</tr>
<tr>
<td><strong>TOTALS:</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: National Climatic Data Center

In the last decade, an August 2000 F1 tornado caused $1500,000 damage in a path 100 yards wide over a mile near Jeffers when it destroyed a barn and other farm buildings. A June 2008 F0 tornado tracked 2 miles with a path 50 yards wide north of Jeffers, causing about $5,000 damage to outbuildings.

A.7.d Probability of Future Events of this Hazard

Tornado and straight-line wind events are highly likely to take place in any year. The Minnesota All-Hazard Mitigation Plan calculates a 21% annual probability of a tornado event in Cottonwood County.

A.8 Other Natural Hazards

Geologic maps also show Cottonwood County to be located outside areas prone to sinkholes and Karst land subsidence. There are minimal problems with stream bank erosion causing subsidence, most closely related to flooding events.

Based on maps showing seismic activity in the United States, the potential for an earthquake of any significant magnitude is minimal over 50 years. However, efforts to mitigate the effects of hazards such as tornados or severe storms can also mitigate the potential effects of a seismic event.

B. Technological Hazards

This section provides information on the nature of technological hazards—those caused by humans rather than nature—which are a risk in Cottonwood County. These hazards are primarily caused directly by people or in the case of disease spread person to person, rather than by natural events. The nature of this hazard covers acts both intentional and accidental. As FEMA explained in their 2003 planning guide, Integrating Manmade Hazards Into Mitigation Planning:

*The term “technological hazards” refers to the origins of incidents that can arise from human activities such as the manufacture, transportation, storage, and use of hazardous materials.*

The Disaster Mitigation Act of 2000 (DMA2K) encourages local jurisdictions to address all likely hazards facing the community. Although FEMA does not typically fund mitigation efforts to address man-made threats, it is essential to consider all hazards to assure public health, safety and welfare.

Man-made hazards considered in this plan include public violence (domestic civil unrest and international-based terrorism), hazardous materials, and public health and infectious disease. Dam failure is addressed above in Section A with Flooding. Structure fires are addressed above with Wildfires.
B.1 Civil Unrest and Terrorism

Several large-scale man-made disasters have highlighted the need to address technological hazards along with natural hazards. The 1995 destruction of the federal building in Oklahoma City and the 2001 World Trade Center and Pentagon attacks demonstrate the need to protect our citizens, in large cities and small.

FEMA’s Integrating Manmade Hazards Into Mitigation Planning guide explains:

The term “terrorism” refers to intentional, criminal, malicious acts. There is no single, universally accepted definition of terrorism, and it can be interpreted in many ways. Officially, terrorism is defined in the Code of Federal Regulations as “...the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.” (28 CFR, Section 0.85). The Federal Bureau of Investigation (FBI) further characterizes terrorism as either domestic or international, depending on the origin, base, and objectives of the terrorist organization; however, the origin of the terrorist or person causing the hazard is far less relevant to mitigation planning than the hazard itself and its consequences.

For the purposes of this guide, “terrorism” refers to the use of Weapons of Mass Destruction (WMD), including biological, chemical, nuclear, and radiological weapons; arson, incendiary explosive, and armed attacks; industrial sabotage and intentional hazardous materials releases; and “cyberterrorism.” Within these general categories, however, there are many variations. Particularly in the area of biological and chemical weapons, there are a wide variety of agents and ways for them to be disseminated.

Violence in public places can erupt anywhere, anytime. Specific hazards in this category may include:

- Conventional bomb/explosive devise
- Biological, chemical or radiological agent (see also Hazardous Materials hazard below)
- Arson/incendiary attack (see also Fire hazard above)
- Armed attack
- Cyber-terrorism
- Agri-terrorism

B.1.a Locations Affected by the Hazard

Public buildings and facilities, such as the Courthouse, schools and utilities, are potential targets for domestic or international terrorists. Agricultural chemical depots may also be targets. Isolated rural farmsteads may also be inviting staging grounds for terroristic groups or individuals, away from watchful eye of law enforcement.
B.1.b  Extent of the Hazard

Domestic Concerns
The MAHMP defines domestic terrorism as involving groups or individual whose unlawful activities are directed at elements of our government or population without foreign direction. Domestic Preparedness focuses on mitigating these activities without foreign direction.

The US Department of Homeland Security (DHS) and the FBI classify domestic threats in four broad categories—special interest, rightwing, leftwing, and lone wolf. While current monitoring is typically classified at the Law Enforcement Sensitive (LES) level, the MAHMP notes that there are specific areas of concern within Minnesota. Two examples specifically cited in that plan (p.168):

- Both lone gunmen and small organized cells have planned and carried out attacks in public places, such as the school shootings at Red Lake (2005).
- Minnesota’s growing migrant worker populations, including East African, South East Asian, and other ethnic groups, have numerous documented affiliations with criminal/gang-related activity. As well, the American Nazi Party has been active within the state.

International Concerns
Threats from abroad are typically addressed at the federal level. The state Mitigation Plan defines international terrorism as involving groups or individuals whose terrorist activities are foreign-based and/or directed by countries or groups outside of the United States or whose activities transcend national boundaries. The state plan notes:

*The local FBI Joint Terrorism Task Force (JTTF) is among the most active in the nation, addressing the issue of overseas financial transfers and groups such as Al Qaeda, Hizballah, Hamas, Al-Ittihad al-Islami and Islamic Jihad. These cases provide examples that the threat of terrorism warrants attention and consideration.*

Relationship to Other Hazards—Cascading Effects
The nature of domestic or international terrorism is inherently unpredictable. Cascading effects depend on the specifics of the event. Release of anthrax or other biological agents could lead to animal and crop disaster. Destruction of a dam could lead to flooding. Destruction of an industrial or farm chemical site could lead to a hazardous material crisis. Destruction of any structure would also likely lead to fires.
B.1.c  Previous Occurrences of the Hazard
Cottonwood County has been fortunate not to have experienced many incidents that could be classified as terrorism. The All-Hazard Mitigation Planning Team identified no recent events within the county.

B.1.d  Probability of Future Events of this Hazard
While there have been no recent events of this type, the Cottonwood County All-Hazard Mitigation Planning Team expected that some sort of this type of event could be likely to occur locally (between 10-100% chance in the next year).

B.2  Hazardous Materials
Hazardous materials are found everywhere, from farm to home. A hazardous material is any item which has the potential to cause harm to humans, animals, or the environment, by itself or through interaction with other factors. Spilled material can be costly to clean up and may render the area of the spill unusable for an extended period of time. Water supplies become contaminated by the introduction of point and non-point source pollutants into public ground water and/or surface water supplies.

B.2.a  Locations Affected by the Hazard
Hazardous materials may be present and passing through Cottonwood County at any time on highways or by rail. Manufacturing plants in or near city limits use hazardous materials daily. Agricultural chemicals are distributed from the cities and used on farms. Methamphetamine has been a particular concern in rural communities.

B.2.b  Extent of the Hazard
Federal law defines certain hazardous chemicals, and requirements for emergency planning for facilities at which hazardous substances are present. According to the MAHMP, about 6,000 facilities across the state report under the Federal Emergency Planning and Community Right-To-Know Act to the Minnesota Department of Public Safety (DPS) and US Environmental Protection Agency (EPA).\(^7\) As of 2009, chemical use was reported to the EPA Toxic Release Inventory by Poet Biorefining (Ethanol 2000), Bingham Lake for Acetaldehyde, Acrolein, Ammonia, Formaldehyde, Methanol, and Hexane.

Chemicals
Chemicals used in manufacturing and agriculture (e.g. anhydrous ammonia) are a local concern, whether in fixed site storage or in transit by rail, truck or tractor. There are also hazards associated with the use of radiological materials

\(^7\) http://www.epcra.state.mn.us/
and equipment at the hospitals, although the Planning Team does not consider these greater than typical.

Land use activities and farming practices can have significant impacts on vulnerable aquifers. The State hazard plan notes the threat:

The hazards come in the form of contamination [from] current industry and EPA Superfund projects, runoff with oil and other chemicals from paved surfaces, traces of pharmaceuticals found in waterways, topsoil washed from farm fields and construction sites, and wastewater that was not thoroughly treated.

Aquifers in the region are often shallow and have a high potential of contamination from nitrate leaching. Deeper aquifers may not be suitable for water supplies due to naturally occurring contaminants, such as sulfur, or because of slow well recharge. Nitrates have found to be a specific problem in the region.

Pipelines
The State Fire Marshall’s Pipeline Safety Team (SFMPST) oversees pipeline operations in Minnesota. The National Pipeline Mapping System identifies a Northern Border Pipeline Company natural gas pipeline that enters Cottonwood County south of Mountain Lake and runs northwest between Windom and Bingham Lake, Storden and Westbrook; there is a large distribution station on this line near Garvin in Lyon County. A Northern Natural Gas Co line runs to Windom and Mountain Lake from Jackson.

Meth
Methamphetamine laboratories have posed problems to rural communities for a number of years. Methamphetamine (commonly referred to as “meth”) is a powerful stimulant drug that is similar to a family of drugs called amphetamines. According to the Rand Drug Policy Research Center, amphetamines are the most widely used illicit drug worldwide, after marijuana, and “regional data systems, law-enforcement agencies, and county hospitals indicate that meth is the most significant problem facing the populations they serve.”

Meth is a synthetic or man-made drug. The drug is often manufactured in clandestine labs in locations including houses, apartments, motels, vehicles, or wooded areas. Recipes for meth are available on the internet. Meth production starts with over-the-counter medications that include pseudoephedrine or ephedrine in their contents and is often made using anhydrous ammonia. The hazardous chemicals used in meth production usually
leave the manufacturing site uninhabitable with very expensive cleanup required by property owners or the public.

Response
Local response agencies maintain equipment for immediate action, and rely on state resources for HAZMAT assessment and cleanup. According to the HSEM website:

The Hazardous Materials Regional Response Team Program consists of ten Chemical Assessment Teams and four Emergency Response Teams under contract with the Department of Public Safety. The teams are strategically located throughout the state to provide an immediate response to hazardous materials emergencies threatening public safety. Chemical Assessment Teams assist local authorities by providing technical assistance, air monitoring and decontamination. Emergency Response Teams provide local authorities with spill mitigation assistance. Local authorities may request a team response by contacting the Minnesota Duty Officer.

A Chemical Assessment Team is located in Marshall.

Relationship to Other Hazards—Cascading Effects
Hazardous materials incidents may occur in conjunction with or cause fires. Contamination of aquifers would make it more difficult to respond to drought. Hazardous materials facilities may also become a target for vandalism or terrorist activity.

B.2.c Previous Occurrences of the Hazard
Hazardous material incidents can occur in different locations:

- Fixed site facilities
- Highway and rail transportation
- Air transportation
- Pipeline transportation

Recent hazardous material events have been mostly limited to the discovery of underground storage tanks and other minor incidents. With trunk highways and railroads crossing the county, hazardous materials may be traveling through the area at any time. Marine transportation is not a concern in Southwest Minnesota. Recent changes in state law regulating the sale of ingredients used in the manufacture of methamphetamine has reduced incidents; however, meth labs are still a concern in the region.

Almost all water for public consumption in Southwest Minnesota is sourced from underground aquifers, rather than surface waters. Wellhead Protection Plans are in place to address threats to some public water supplies. As
discussed above regarding the hazard from drought, MDH has worked with cities and rural water suppliers to develop these plans to protect vulnerable aquifers. Wellhead Protection activities prevent well contamination by managing potential contaminant sources in the land area that contributes water to the well.

There is often a direct flow relationship between surface waters and aquifers, especially shallow aquifers. The federal Clean Water Act requires states to adopt water-quality standards to protect these waters from pollution. A number of waterways in the county are listed as impaired by the Minnesota Pollution Control Agency (MPCA), including the West Fork Des Moines, Dutch Charlie Creek, Little Cottonwood River, Watonwan River, and Judicial Ditch 1.

**B.2.d Probability of Future Events of this Hazard**

The Cottonwood County All-Hazard Mitigation Planning Team identified hazardous materials events as highly likely risks in the county (100% chance in any year). Many aquifers are already polluted and further pollution is likely to occur if not carefully protected.

**B.3 Public Health and Infectious Disease**

Local government has been increasingly concerned with public health since the 19th century. Cities first installed public sewers to safely dispose of waste that threatened public health. Laws regulated building types and quality to assure light and fresh air, toilets and running water. Public health services today face new challenges to counter ever-evolving infectious disease.

The Minnesota Department of Health (MDH) works with DPS, the federal Centers for Disease Control (CDC) and other agencies to prepare for large-scale emergencies of many types. Infectious diseases can present wide threats to many people, or very narrow threats to highly susceptible populations. An “epidemic” is a disease that occurs suddenly in numbers clearly in excess of normally expected rates. A “pandemic” is an epidemic that spreads across a large region. The state mitigation plan notes:

*If an epidemic event were to occur, deaths could be in the many hundreds of thousands across the nation. If the health of the general public is perceived to be threatened on a large scale, riots or states of lawlessness are a possibility.*

**B.3.a Locations Affected by the Hazard**

People throughout the county are potentially affected by this hazard.

**B.3.b Extent of the Hazard**

Many infectious diseases are preventable and controllable. Standard procedures involve collection of accurate assessment data, outbreak detection
and investigation, and development of appropriate control strategies based on specific epidemiological data. These activities require close collaboration between health care providers, clinical laboratories, state and local health departments, and federal agencies.

Certain infectious diseases are considered more likely to present a public health emergency hazard in rural Minnesota.

Influenza virus has three distinct antigenic types (A, B, and C). Epidemic disease can be caused by types A and B with type C causing little to no disease. Illness caused by type B influenza virus will primarily affect humans while illness caused by type A influenza virus can affect both humans and many animal species including birds and swine. The flu is different from a cold. The flu usually comes on suddenly and may include these symptoms: fever, headache, tiredness (can be extreme), dry cough, sore throat, nasal congestion, and body aches. The flu season in the United States is from October to April and on average 10 to 20 percent of the population will be infected with about 36,000 deaths and 114,000 hospitalizations every year. Persons over the age of 65 years, people of any age with chronic medical conditions, and very young children are most likely to have complications from influenza infection.

Severe acute respiratory syndrome (SARS) is a viral respiratory illness that was recognized as a global threat in 2003. The illness usually begins with a high fever (greater than 100.4 degrees F). Other symptoms may include headache, an overall feeling of discomfort, body aches, and diarrhea. After 2-7 days, SARS patients may develop a dry, nonproductive cough and a majority of the patients develop pneumonia. SARS is caused by a previously unrecognized coronavirus, spread by close person-to-person contact, and is thought to be spread by respiratory droplets produced when an infected person coughs or sneezes. People are contagious when they have symptoms and most contagious when they develop a fever and cough.

While Bovine Tuberculosis (TB) is a concern for animals in any rural community (see agricultural disease above), human Tuberculosis also occurs periodically. According to the CDC, TB is a disease caused by a bacterium called Mycobacterium tuberculosis, which is spread through the air. The bacteria usually attack the lungs, but can attack any part of the body. TB can be fatal if not treated properly.

In 2002, West Nile Virus (an arboviral encephalitis) was identified in Minnesota for the first time. Mosquitoes transmit both Western Equine Encephalitis and West Nile viruses. Both diseases can cause debilitating encephalitis in people and horses.
Vaccine-preventable diseases such as Measles, Rubella, Polio and Smallpox are no longer commonplace in the United States. Due to the threat of terrorism, there has been public concern and fear regarding Smallpox. Smallpox is a serious, contagious, and sometimes fatal infectious disease. The only prevention for Smallpox is vaccination. Variola major is the most severe and most common form of Smallpox, with an extensive rash and high fever.

Relationship to Other Hazards—Cascading Effects
A public health emergency will affect the ability to respond and recover from any other natural or technological hazard incident. Plans need to be in place to control the potential for civil disturbance in a severe public health event.

B.3.c Previous Occurrences of the Hazard
Cottonwood-Jackson Community Health Service (CoJAK) works with the Minnesota Department of Health (MDH) and local medical providers to prepare for public health emergencies. There have been no major public health emergencies in the county in recent years.

Influenza is a common seasonal occurrence. Influenza type A virus has caused three pandemics in the past century worldwide with significant loss of life. Pandemics occur because the type A influenza virus is very unstable, and new subtypes can appear through genetic drifts or shifting. Outbreaks of influenza in avian populations have increased with bird to human transmission occurring frequently. Currently, the only effective method of controlling avian influenza is the culling of affected animals.

In 2009, the US Centers for Disease Control and Prevention (CDC) tracked “H1N1 (sometimes called “swine flu”)... a new influenza virus causing illness in people. This new virus was first detected in people in the United States in April 2009. This virus is spreading from person-to-person worldwide, probably in much the same way that regular seasonal influenza viruses spread.” The MDH tracked early widespread influenza-like activity in Minnesota for 10 weeks starting in September 2009.

A public health emergency has the potential to tax human infrastructure responsible for critical community services. Local government, businesses and organizations must plan for redundancy and succession of responsibility in response to any of the hazards in this plan, from a potential pandemic to a long blizzard that can keep people from their normal duties for an extended period of time.
B.3.d  Probability of Future Events of this Hazard

People contract seasonal influenza every year. The Cottonwood County All-Hazard Mitigation Planning Team identified the risk for Public Health and Infectious Disease events as likely, as incidents such as the flu occur every year.

VII. Assessing Vulnerability: Overview

Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction’s vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Hazards are a fact of life. They are going to occur. The All-Hazards Mitigation approach seeks to reduce the chances of hazards occurring, and when they do occur to minimize their effects on people and property. While we are all at some risk from hazards, through this process we can reduce our vulnerability to the effects of hazards.

In the preceding sections of this chapter, this plan identified hazards at risk to Cottonwood County and profiled previous hazard events. In the following sections of this chapter, the plan summarizes vulnerability of the community in terms of structures and potential monetary losses.

A. Summary of Vulnerability

The 2008 Minnesota All-Hazard Mitigation Plan (MAHMP) offers an explanation of the concept of vulnerability in the context of hazard mitigation:

> *Vulnerability is the extent to which something is damaged by a hazard. Value is how much something is worth. Although the concept may generate disagreement, it is possible to assign a value to many community “assets” including physical components such as buildings and infrastructure, functional ones such as government or business operations, and even injuries and casualties.*

Asset identification provides a risk assessment method to compare the costs and benefits of different methods of mitigation. The MAHMP includes a detailed risk assessment of the most likely hazards which also have the greatest potential for mitigation. The four such hazards in the 2008 edition of the MAHMP included:

- Flood
- Tornado
- Windstorms (thunderstorms & straight-line winds)
- Wildfire
Figures from state-level analysis give a broad idea of local vulnerability to these hazards (see impacts below). Over $1,600,000 in fire-related losses were reported for Cottonwood County in 2008. The MAHMP calculates about $620,000 annualized estimated loss from tornados, $57,000 from other windstorms, and $40,000 from flooding each year.

A.1 Hazard Ranking Worksheets
As detailed in Section IV.A and B, as well as Section V.A above, the Cottonwood County All Hazard Mitigation Planning Team met to assess hazards using worksheets developed by the former Minnesota Planning agency. For each hazard, the team evaluated potential frequency, spatial extent, potential severity, risk level, and hazard rank. The scope of the vulnerability assessment is to describe risks to the county as a whole.

The Team considered locations throughout the entire county (except local flood hazard areas) at equal risk for each hazard; however, potential impacts of each hazard vary by the type of hazard as described in the individual hazard profile sections.

Results of the Planning Team’s ranking are presented in Figure 4-5. Hazards were ranked for the entire county—one place is as likely to be stuck by a blizzard, tornado, or public health emergency as any other. The one unique risk is flooding and dam failure which was considered for mapped floodplains and known dam locations.

As shown in the worksheet, frequency criteria included: Unlikely=<1% chance in the next 100 years, Occasional= 1% and 10% in next year, Likely=between 10% and 100% in next year, Highly Likely 100% chance. Extent: Minor=<10% area affected, Limited=10% to 25% area affected, Major=25% to 50% area affected, Substantial=>50% area affected.

The Planning Team considered the County’s subjective Risk Level, based on data compiled, as typically minimal, limited, high, and very high. The overall Hazard Ranks were then set as Low, Moderate, and High based on the Team’s evaluation of this plan’s data, mitigation measures available and public input.

Tornado and Straight-line Winds, and Hazardous Materials were considered the highest rank hazards for Cottonwood County.
Table 4-5 Cottonwood County Hazard Identification Worksheet

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Potential Frequency</th>
<th>Spatial Extent</th>
<th>Potential Severity</th>
<th>Risk Level</th>
<th>Hazard Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NATURAL HAZARDS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tornado / Straight-line Winds</td>
<td>Highly Likely</td>
<td>Local</td>
<td>Substantial</td>
<td>Average</td>
<td>HIGH</td>
</tr>
<tr>
<td>Agricultural Disease (Animal &amp; Crop)</td>
<td>Highly Likely</td>
<td>Local</td>
<td>Major</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Blizzard / Severe Winter Storms</td>
<td>Highly Likely</td>
<td>Countywide</td>
<td>Major</td>
<td>Average</td>
<td>Moderate</td>
</tr>
<tr>
<td>Flooding</td>
<td>Occasional</td>
<td>Local</td>
<td>Minor</td>
<td>Average</td>
<td>Moderate</td>
</tr>
<tr>
<td>Hail</td>
<td>Highly Likely</td>
<td>Countywide</td>
<td>Major</td>
<td>Average</td>
<td>Moderate</td>
</tr>
<tr>
<td>Drought</td>
<td>Occasional</td>
<td>Countywide</td>
<td>Major</td>
<td>Average</td>
<td>Moderate</td>
</tr>
<tr>
<td>Earthquake</td>
<td>Unlikely</td>
<td>Countywide</td>
<td>Major</td>
<td>Ltd</td>
<td>Low</td>
</tr>
<tr>
<td>Extreme Heat</td>
<td>Occasional</td>
<td>Countywide</td>
<td>Ltd</td>
<td>Average</td>
<td>Low</td>
</tr>
<tr>
<td>Severe Summer Storms / Lightning</td>
<td>Highly Likely</td>
<td>Countywide</td>
<td>Substantial</td>
<td>Average</td>
<td>Low</td>
</tr>
<tr>
<td>Wildfire</td>
<td>Highly Likely</td>
<td>Local</td>
<td>Minor</td>
<td>Average</td>
<td>Low</td>
</tr>
<tr>
<td><strong>TECHNOLOGICAL HAZARDS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hazardous Materials</td>
<td>Highly Likely</td>
<td>Local</td>
<td>Major</td>
<td>High</td>
<td>HIGH</td>
</tr>
<tr>
<td>Dam Failure</td>
<td>Unlikely</td>
<td>Local</td>
<td>Ltd</td>
<td>Average</td>
<td>Moderate</td>
</tr>
<tr>
<td>Meth Labs</td>
<td>Highly Likely</td>
<td>Local</td>
<td>Substantial</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Public Health Infectious Disease</td>
<td>Likely</td>
<td>Countywide</td>
<td>Major</td>
<td>Average</td>
<td>Moderate</td>
</tr>
<tr>
<td>Fires (Structures)</td>
<td>Highly Likely</td>
<td>Local</td>
<td>Major</td>
<td>Average</td>
<td>Low</td>
</tr>
<tr>
<td>Terrorism and Civil Disturbance</td>
<td>Likely</td>
<td>Local</td>
<td>Minor</td>
<td>Average</td>
<td>Low</td>
</tr>
</tbody>
</table>

For Potential Frequency, *Unlikely* if <1% chance in the next 100 years, *Occasional* = 1% and 10% in next year, *Likely* = between 10% and 100% in next year. *Highly Likely* = 100% in next year.

For Potential Severity, *Limited* = <10% area affected destroyed, *Minor* = 10% to 25% area affected, *Major* = 25% to 50% area affected, *Substantial* = >50% area affected.

Risk Level is subjective ranking by Task Force members based on previous categories.

SRDC, adapted from Minnesota Planning.
B. Impacts of Hazards on the Community
The All-Hazard Mitigation Planning Team considered the county and each participating jurisdiction at equal risk for all hazards, aside from the risk of flooding/dam failure. However, certain hazards are likely to cause greater impacts to the community. Ag Disease and Drought, for example, have the potential to greatly impact the local economy, but neither typically poses a threat to buildings, infrastructure nor critical public facilities.

B.1 Natural Hazards
Because the unpredictable nature of natural hazards to which the jurisdictions are vulnerable (other than floods) make one area as vulnerable as any other area, all buildings and facilities are considered to have equal vulnerability to potential loss.

B.1.a Blizzards and Winter Storms
Severe winter weather is common in Minnesota and this is considered a Moderate Rank hazard by the Planning Team. Winter storms have immediate impacts on local communities, including the potential for injuries, need to clear snow and ice from public streets, recover from utility failure and possibly provide emergency shelters for travelers and dislocated residents. Winter storms can also cause lost productivity and disruptions in the local workforce, with public and private employees unable to work regular hours.

Among the most vulnerable citizens are school children. Area school districts and bus companies closely monitor winter storm weather. The Cottonwood County Citizen reported on events in January 2010 in which two Mountain Lake busses went into the ditch after an early dismissal, as did the rescue vehicles sent to pull them out. Four Windom busses became stuck the same day. Even with modern forecasting and communications technology, students can be stranded in rural areas in extreme cold temperatures.

The accumulated effects of winter storms and blizzard conditions also pose a risk to structures from snow load on roofs. Only the City of Mountain Lake and City of Windom have adopted the Building Code, so there are few local provision to enforce construction standards in the county. Vulnerable structures can easily collapse under the weight of heavy snow and/or high winds.

Analysis of specific infrastructure and structure dollar-cost vulnerability is not possible since winter storms can (and do) impact any portion of the study area. Based on currently available data, modeling future losses would only be possible for total losses with excessive margins of error. Future storm events could be tracked specifically as they occur and used to model local vulnerability to winter storms in future updates.
South Central Electric Association (SCEA) provided information for this plan on their electrical distribution infrastructure. SCEA provides electric service to approximately 4,000 members of which over 1,500 of these members reside in Cottonwood County.

Much of the SCEA electric distribution system was built in the 1930’s and 1940’s. Today SCEA has 1,216 miles of overhead electric distribution lines and 1,044 miles of underground. Cottonwood County has approximately 591 miles of overhead and 393 miles of SCEA underground distribution power lines installed. Approximately 43% of SCEA overhead and underground distribution lines are in Cottonwood County.

The early SCEA system was constructed overhead using very long pole span lengths. The conductor used was primarily 6A or 8A copperweld, with some plain steel conductors. Copperweld has steel that rusts and becomes brittle over time. These lines can break easily in storms, resulting in a far greater likelihood of outages caused by downed power lines. SCEA has been replacing the older system as part of its normal work plans. As of today approximately 427 miles of older overhead single lines remain in Cottonwood County. The estimated cost to replace these older single phase lines, using today’s costs, would be in excess of $12 million.

Many of SCEA’s wooden distribution poles are reaching their end of life. SCEA has an annual pole testing program. In the past couple of years the number of rejected poles identified by testing has increased significantly. In 2009,
approximately 1,803 electrical distribution poles were tested in Cottonwood County. Of those tested 261 or 14.5% of the poles were rejected. During the 2010 pole testing cycle, 152 or 16% of the poles tested were rejected. The number of rejected poles appears to be averaging over 4 to 6 times higher that of similar size electrical distribution systems. This means either the pole must be changed out with a new pole or the line must be completely rebuilt. Since the conductors are also reaching their end of life and are failing, most lines must be rebuilt. A majority of the lines will be replaced underground. Based on the latest pole testing approximately $2.5 - 4.0 million will be required to reconstruct the lines in Cottonwood County identified by pole tests. As pole testing continues, it estimated that the total costs could climb to $12 million. The cost to replace one pole on a single phase overhead distribution line is estimated to be $900 per pole. This does not include the cost of the wire and other hardware.

SCEA electrical distribution system remains very vulnerable to the weather. In the past 15 years very few extreme storms have impacted SCEA. According to cooperative records, only 4 major storms accounting for approximately $307,000 storm related damage occurred during this period. Neighboring utilities have been impacted much more during this same time period. Many of these same utilities have rebuilt much of their distribution system, as the result of winter ice storms, during the past 15 - 20 years. SCEA was fortunate to have missed these storms, but in turn remains more vulnerable.

Plans and Programs

- Real-time weather monitoring stations can provide current temperatures, dew point, wind speed, wind direction, and barometric pressure.
- Wind chill warnings and advisories are issued by the National Weather Service according to local criteria.
- Soil & Water Conservation Districts (SWCD) and MnDOT have promoted natural snow fences to protect highways against drifting snow.
- The County Engineer and local cities are working closely with MnDOT to improve the safety of transportation in all weather.
- Electric utility providers identify and clean up areas of the county and communities that are most likely to experience damage to power lines from falling tree limbs.

Gaps and Deficiencies

- The effective range of warning systems is limited. Weather radios should be more widely used.
• Local radio stations provide warnings, but increasingly radio features non-local satellite programming.
• Many local residents are resistant to zoning and building codes that could assure higher standards for new construction.
• Many people commute long distances to work, increasing exposure to winter weather hazards, especially ice and ice storms.
• There is limited federal/state funding for back-up power generators, which could provide redundant electrical supply.
• Individual homeowners should be encouraged to plan ahead for inevitable seasonal outages.

Existing Mitigation Efforts
Rural electric and municipal power utilities have been working for several years to harden electric utilities against winter storms. Redundancies in utility systems can further reduce outages resulting from storms.

B.1.b Fires
The State Fire Marshall reports that there were $1,664,150 in fire-related losses reported in Cottonwood County in 2008, for $33,962 average dollar loss per fire.

Plans and Programs
• Cottonwood County is served by local volunteer departments.
• The county and most cities regulate the development of new building through zoning. The state electrical inspectors inspect commercial structures for potential fire hazards.
• Firefighters participate in mandatory fire fighting training classes offered by the State.
• Firefighters are offered the opportunity to participate in wildfire training classes offered by the Minnesota Department of Natural Resources-Forestry Department.
• The NFPA’s Firewise program encourages local solutions for wildfire safety
• Prescribed (or controlled) burns in the right locations (and in the right weather conditions) reduce fuel load, while also benefiting native prairie restoration.
• The County and cities can enact burning bans to decrease the potential for structure fires and wildfires.

Gaps and Deficiencies
• An increasing number of properties are used for recreation or conservation. Management plans providing maintenance of these properties (including cutting tall grass, thinning trees, prescribed
burning, and removal of low-hanging branches around structures) can mitigate the risk of wildfire.

Existing Mitigation Measures
In a discussion on the future perspectives for fire mitigation, the MAHMP notes on page 174:

Funding for fire suppression and education for non-wildfire programs... do not normally come through FEMA. However, there may be a situation in the future where a water system needs protected or a special education program will be needed.

B.1.c Flooding
As we saw in Section VI.A.5 (Flooding/Dam Failure) above, mapped floodplains in Cottonwood County are primarily limited to perennial streams and the braided channel of the West Fork Des Moines River. The City of Comfrey’s mapped floodplain consists of the city park (on the Brown County side). The primary concern for flooding in Cottonwood County is in and near the city of Windom along the Des Moines and tributaries.

As there are no “Q3” digitized FIRM maps for the county, SRDC staff performed a rudimentary GIS analysis buffering DNR’s layer of perennial streams to approximate DNR riverine Shoreland areas. Next, the buffer was visually compared to printed FIRM panels and examined to identify general locations of rural structures close to floodplains across the entire county. The FSA 2010 aerial imagery used was taken during high water, indicating areas prone to ponding. While many rural residences are built close to creeks and streams, this analysis identified only about a dozen farm sites likely at risk. This is partly due to continuing farm consolidation and subsequent building site abandonment—when a farm site is flooded out, it was likely not rebuilt.

It is difficult to accurately measure the extent of the mapped floodplain at the scale the County FIRM panels are printed, and the most questionable sites were located along creeks in the northern part of the county with narrow floodplains. The City of Windom FIRM panels, while updated in 1989, are easier to scale but do not align with other GIS or CAD maps such as the city’s legal parcel map.

SRDC, County, City and DNR staff analyzed printed maps block-by-block to identify areas at risk in the city. Generally, there is perennial flooding in and around the current Windom Dam and Island Park area. Although the dam has technically failed the river pattern has not changed much, as the park acts as a flood relief area. The mapped 500 year floodplain extends over much of the city west of the Union Pacific railroad tracks; however, there has been minimal
flooding experienced since the last major event in the 1960s. The 100-year mapped floodplain includes:

- A commercial corridor along South TH 60/US 71 commercial corridor, with a few residential buildings in the mix;
- Homes with lots extending into the Des Moines River/River Road, and
- Perkins Creek, including a commercial corner where US 71 meets TH 60 from the north; Perkins Creek runs thru the north central part of town near two schools and Cottonwood County Fairgrounds, and tends to back up when there is high water in the Des Moines.

Visual analysis suggests approximately 315 parcels covered in part or whole by the 100-year mapped floodplain. This figure likely over-exaggerates the risk due to both drainage improvements and parcel consolidation (one modern structure built on multiple small lots) but is the best figure available at this time. There have been periodic drainage projects, such as over-sizing bridges and installing retention ponds, resulting in very little realized flood damages in recent memory.

According to the MAHMP, Cottonwood County received $614,000 in federal and state flooding-related public assistance for federal Disaster #993. The MAHMP also reports that the county experienced $2.3 million in agricultural losses from water-related insurance claims from 1994-2006. This is slightly less than Watonwan County to the east and half as much as Murray County to the west.

Overall, the MAHMP calculates Cottonwood County to have an Annual Estimated Loss from flooding of $39,215.

Plans and Programs

- The county and the City of Windom have official FIRM maps identifying flood hazard areas. Local zoning ordinances can control permitted land uses in these areas, what can be built, and how.
- FEMA’s National Flood Insurance Program (NFIP) provides an option for local property owners to protect their structures in communities that participate.
- On-site stormwater detention can slow runoff, slowing potential flash flood events and improving the quality of runoff.

Gaps and Deficiencies

- Many local residents are resistant to leaving stream-side property, even if it is located in a designated floodplain.

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8 Minnesota All Hazard Mitigation Plan (2008) Table 37
9 Minnesota All Hazard Mitigation Plan (2008) Public Assistance Damage, Table 49
Existing land use plans do not necessarily address flood plain protection.

Local match for mitigation projects (such as acquisition of property) will likely become even more difficult to fund as local government assistance is further cut back.

**Existing Mitigation Efforts**
The City of Windom has completed drainage and retention projects to minimize flooding in the city. For example, the 4th Avenue bridge on Perkins Creek was oversized when it was replaced several years ago.

**B.1.d  Tornado and Straight-line Winds / Severe Summer Storms**
Severe wind events cause impacts from the minor debris to structural failure and full-scale devastation. Residents and travelers must be warned of impending danger immediately before and during a Tornado or severe Straight-line Wind event. Local units of government in many places provide safe rooms in emergency shelters for travelers and dislocated residents.

Severe summer storms also put great stress on utilities and structures. Lightning can cause fires and personal injury, even death. While hail can certainly damage buildings the greater impact is felt locally from damage to agricultural crops.

In addition to direct damage from these hazards, the community is vulnerable to cascading effects such as fires, storm-related flash floods, hazardous materials incidents, and infrastructure failure (particularly utility failure). Clean-up from a severe wind event will impact community resources including solid waste disposal.

The *MAHMP* calculated a 0.2105 annual probability of a Tornado in Cottonwood County, with an estimated $620,701 annualized loss.\(^{10}\) The State plan calculated a 0.95 annual probability of a Windstorm event, with $56,666 estimated annualized loss.\(^{11}\) The *MAHMP* also lists over $552,000 in agricultural losses from wind-related insurance claims in Cottonwood County (1994-2006) but does not analyze these loses in greater detail.\(^{12}\)

**Plans and Programs**
- The severe storm spotters network, sponsored by the National Weather Services (NWS), enlists the help of trained volunteers to spot severe storm conditions and report this information to the NWS. No tornado warnings

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\(^{10}\) *Minnesota All Hazard Mitigation Plan* (2008) Table 40
\(^{11}\) *Minnesota All Hazard Mitigation Plan* (2008) Table 43
\(^{12}\) *Minnesota All Hazard Mitigation Plan* (2008) Table 45
are given unless the storm has been spotted by someone or is confirmed by NWS radar reports.

- Most of the county’s cities have emergency sirens that can be activated to warn residents in the event of a tornado. NOAA’s Public Alert weather radios provide warnings indoors.
- Heat advisories are issued by the National Weather Service when the heat index exceeds 95 degrees and the relative humidity is at least 50 percent.
- Wastewater treatment plants are required to test discharges after major rains events to determine whether or not discharges meet PCA guidelines for acceptable levels of waste.

Gaps and Deficiencies

- The effective range of warning systems is limited. Weather radios should be more widely used. Local radio stations provide warnings, but increasingly feature non-local satellite programming.
- Many local emergency siren systems must be replaced soon as they wear out and technology standards improve.
- Additional resources and training are necessary for the storm spotters network to function continuously.
- Local match for construction projects (such as safe rooms) will likely become even more difficult to fund as local government assistance declines.
- Many local residents are resistant to zoning and building codes that could assure higher standards for new construction.

Existing Mitigation Efforts

After the 1998 tornado, the Comfrey city building was reconstructed with reinforced concrete safe areas, and all residents in received weather radios. The EOC is located in the basement of the concrete Law Enforcement Center.

B.2 Technological Hazards

Human-caused hazards tend to pose a risk to individuals and groups of people more than distinct structures. Public Health Emergencies, by their very nature, are focused on people. Perpetrators of Domestic or International Terrorism incidents may target any public or private structure in the county. Hazardous Materials (including methamphetamine) pose a danger to any buildings and transportation routes used in their manufacture, use or transportation.

More detailed analysis of vulnerability to man-made disasters should be undertaken if technological hazards are included in future updates to this plan.
B.2.a Plans and Programs

- The County Emergency Operations Plan is the go-to source for responding to both natural and man-made hazards. The County and each city should constantly monitor updates for the EOP.
- County Emergency Management works closely with Community Health Services to mitigate and effectively respond to potential Public Health Emergencies.

B.2.b Gaps and Deficiencies

- The County is currently in the process of updating radio equipment and networks to be compliant with federal regulations.
- An aging population puts the county at greater risk of Public Health Emergencies. As more citizens dependent on life-support are living in their own homes rather than care facilities, they may be vulnerable to utility outages.
- Emergency responders are in need of specialized equipment to deal with hazardous materials. This equipment is often expensive, single use items.
- Hazardous materials and other pollution in watersheds can directly influence water quality of well recharge areas.

VIII. Assessing Vulnerability: Addressing Repetitive Loss Properties

Requirement §201.6(c)(2)(ii): [The risk assessment] must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.

Repetitive loss properties are defined by FEMA as having two or more losses of at least $1,000 each paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978. A Severe Repetitive Loss (SRL) property is defined by FEMA as a residential property covered under NFIP that has at least four NFIP claim payments over $5,000 each and the cumulative amount of such claims exceeds $20,000. An SRL property may also be one for which at least two separate NFIP payments have been made with the cumulative amount of the building portion of these claims exceeding the market value of the building.

As of February 2010, there were no repetitive loss properties identified in the county.
IX. Assessing Vulnerability: Identifying Structures

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area ... .

This initial edition of the All-Hazard Mitigation Plan focused on getting the hazard mitigation approach off the ground in the participating jurisdictions, and aligning the risk assessment in this chapter with current FEMA guidance. Future updates should perform additional data collection and analysis to identify vulnerable structures in greater detail. An analysis should also be done on future planned buildings, infrastructure and critical facilities.

A. Existing Critical Facilities

No particular critical facilities in Cottonwood County are uniquely at risk from identified hazards. The primary Emergency Operations Center is located in the basement of the Law Enforcement Center (LEC) in Windom, with mobile equipment that can be relocated to the County Courthouse if necessary. The basement of the LEC also serves as an initial storm shelter; when additional space is necessary the Windom Community Center and the BARC center are utilized. There is also a community center in each city which could be made available for shelter.

Section I.C.4 above includes brief profiles of local utility and public service providers.

<table>
<thead>
<tr>
<th>Name or Description of Asset</th>
<th>Critical Facilities (#)</th>
<th>In Flood Plain (#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Court House</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>County Offices</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>City Offices</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Police Stations</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Fire Stations</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Hospitals</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Long-term Care Facilities</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Schools</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Colleges</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Community Centers</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Emergency Operations Centers</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Bridges</td>
<td>150</td>
<td>unknown</td>
</tr>
<tr>
<td>Transportation Dept. Facilities</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Public Works Facilities</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Emergency Shelter</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Source: Cottonwood County, SRDC
Special consideration may be necessary in time of natural or man-made disasters for historic and locally significant structures and places. Several locations in Cottonwood County are listed on the National Register of Historic Places.

<table>
<thead>
<tr>
<th>Location</th>
<th>Building Date</th>
<th>Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mtn Lake</td>
<td>1888</td>
<td>Queen Anne</td>
</tr>
<tr>
<td>Westbrook</td>
<td>1900</td>
<td>Rail vernacular</td>
</tr>
<tr>
<td>Windom</td>
<td>1904</td>
<td>Classical Revival</td>
</tr>
<tr>
<td>Delton Twp</td>
<td></td>
<td>Pre-settlement</td>
</tr>
<tr>
<td>Mtn Lake</td>
<td></td>
<td>Pre-settlement</td>
</tr>
</tbody>
</table>

Source: Minnesota Historical Society

X. Assessing Vulnerability: Estimating Potential Losses

*Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate ... .*

In Section VII above this plan discussed vulnerability of the county to hazards in general terms. It can be useful to describe vulnerability in terms of dollar losses, to provide a common framework for local, State and Federal agencies to measure the risk of hazards to structures.

A. Structures Vulnerable to Natural Hazards

To better understand local risks, the All Hazard Mitigation Planning Team took a closer look at two natural hazards, tornados and flooding. The results of this analysis are presented below.

Future updates of this plan should carefully consider the need to collect additional data to enable a full range of monetary estimates of potential losses from hazard events. This would include structure, contents and function losses to present a full picture of the potential total loss for each asset.

A.1 Tornado Hazard Analysis

The wind blows on the Buffalo Ridge of Southwest Minnesota, making this area prime territory for development of wind energy conversion systems. The region is also, as we saw in Section VI.A.7 of this chapter, vulnerable to tornado and straight-line wind events.
### Table 4-8

**Potential Structure Vulnerability to F4/F5 Tornado Events**

Estimated Market Value 2010

<table>
<thead>
<tr>
<th>City</th>
<th>No. Parcels w/ Structures</th>
<th>Value of Structures</th>
<th>At-Risk* Structures</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>City of Bingham Lake</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Agricultural</td>
<td>3</td>
<td>$133,900</td>
<td>3</td>
<td>$120,510</td>
</tr>
<tr>
<td>Commercial</td>
<td>3</td>
<td>$820,900</td>
<td>3</td>
<td>$738,810</td>
</tr>
<tr>
<td>Education/Govt</td>
<td>3</td>
<td>$84,900</td>
<td>3</td>
<td>$76,410</td>
</tr>
<tr>
<td>Industrial</td>
<td>10</td>
<td>$1,863,500</td>
<td>9</td>
<td>$1,677,150</td>
</tr>
<tr>
<td>Residential</td>
<td>73</td>
<td>$2,925,200</td>
<td>66</td>
<td>$2,632,680</td>
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<tr>
<td><strong>Vulnerable Structures</strong></td>
<td>83</td>
<td>$5,245,560</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>City of Comfrey (pt)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial</td>
<td>1</td>
<td>$92,700</td>
<td>1</td>
<td>$83,430</td>
</tr>
<tr>
<td>Industrial</td>
<td>1</td>
<td>$106,300</td>
<td>1</td>
<td>$95,670</td>
</tr>
<tr>
<td>Residential</td>
<td>8</td>
<td>$600,100</td>
<td>7</td>
<td>$540,090</td>
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<tr>
<td><strong>Vulnerable Structures</strong></td>
<td>9</td>
<td>$791,190</td>
<td></td>
<td></td>
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<tr>
<td><strong>City of Jeffers</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Agricultural</td>
<td>4</td>
<td>$208,300</td>
<td>4</td>
<td>$187,470</td>
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<td>Commercial</td>
<td>34</td>
<td>$699,400</td>
<td>31</td>
<td>$629,460</td>
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<td>Education/Govt</td>
<td>11</td>
<td>$2,157,000</td>
<td>10</td>
<td>$1,941,300</td>
</tr>
<tr>
<td>Industrial</td>
<td>9</td>
<td>$1,434,100</td>
<td>8</td>
<td>$1,290,690</td>
</tr>
<tr>
<td>Non-Profit</td>
<td>2</td>
<td>$227,100</td>
<td>2</td>
<td>$204,390</td>
</tr>
<tr>
<td>Residential</td>
<td>8</td>
<td>$6,736,700</td>
<td>73</td>
<td>$6,063,030</td>
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<tr>
<td><strong>Vulnerable Structures</strong></td>
<td>227</td>
<td>$10,316,340</td>
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<td></td>
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<tr>
<td><strong>City of Mountain Lake</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural</td>
<td>4</td>
<td>$487,600</td>
<td>4</td>
<td>$438,840</td>
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<tr>
<td>Commercial</td>
<td>66</td>
<td>$3,625,400</td>
<td>59</td>
<td>$3,262,860</td>
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<td>Education/Govt</td>
<td>21</td>
<td>$7,928,900</td>
<td>19</td>
<td>$7,136,010</td>
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<tr>
<td>Industrial</td>
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<td>$3,449,500</td>
<td>20</td>
<td>$3,104,550</td>
</tr>
<tr>
<td>Non-Profit</td>
<td>13</td>
<td>$6,777,700</td>
<td>12</td>
<td>$6,099,930</td>
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<tr>
<td>Residential</td>
<td>811</td>
<td>$46,741,700</td>
<td>730</td>
<td>$42,067,530</td>
</tr>
<tr>
<td><strong>Vulnerable Structures</strong></td>
<td>843</td>
<td>$62,109,720</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>City of Storden</strong></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Agricultural</td>
<td>2</td>
<td>$3,600</td>
<td>2</td>
<td>$3,240</td>
</tr>
<tr>
<td>Commercial</td>
<td>25</td>
<td>$494,500</td>
<td>23</td>
<td>$445,050</td>
</tr>
<tr>
<td>Education/Govt</td>
<td>9</td>
<td>$398,000</td>
<td>8</td>
<td>$358,200</td>
</tr>
<tr>
<td>Industrial</td>
<td>4</td>
<td>$358,600</td>
<td>4</td>
<td>$322,740</td>
</tr>
<tr>
<td>Non-Profit</td>
<td>3</td>
<td>$457,800</td>
<td>3</td>
<td>$412,020</td>
</tr>
<tr>
<td>Residential</td>
<td>137</td>
<td>$4,510,500</td>
<td>123</td>
<td>$4,059,450</td>
</tr>
<tr>
<td><strong>Vulnerable Structures</strong></td>
<td>162</td>
<td>$5,600,700</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>City of Westbrook</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural</td>
<td>11</td>
<td>$857,900</td>
<td>10</td>
<td>$772,110</td>
</tr>
<tr>
<td>Commercial</td>
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<td>$1,600,400</td>
<td>1+</td>
<td>$1,440,360</td>
</tr>
<tr>
<td>Education/Govt</td>
<td>18</td>
<td>$3,276,700</td>
<td>16</td>
<td>$2,949,030</td>
</tr>
<tr>
<td>Industrial</td>
<td>n/a</td>
<td>$460,200</td>
<td>1+</td>
<td>$414,180</td>
</tr>
<tr>
<td>Non-Profit</td>
<td>10</td>
<td>$1,233,200</td>
<td>9</td>
<td>$1,109,880</td>
</tr>
<tr>
<td>Residential</td>
<td>368</td>
<td>$18,012,000</td>
<td>331</td>
<td>$16,210,800</td>
</tr>
<tr>
<td><strong>Vulnerable Structures</strong></td>
<td>368</td>
<td>$22,896,360</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>City of Windom</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural</td>
<td>4</td>
<td>$35,500</td>
<td>4</td>
<td>$31,950</td>
</tr>
<tr>
<td>Commercial</td>
<td>195</td>
<td>$20,062,500</td>
<td>176</td>
<td>$18,056,250</td>
</tr>
<tr>
<td>Education/Govt</td>
<td>12</td>
<td>$51,722,000</td>
<td>11</td>
<td>$46,549,800</td>
</tr>
<tr>
<td>Industrial</td>
<td>13</td>
<td>$9,012,600</td>
<td>12</td>
<td>$8,111,340</td>
</tr>
<tr>
<td>Non-Profit</td>
<td>14</td>
<td>$13,883,400</td>
<td>13</td>
<td>$12,495,060</td>
</tr>
<tr>
<td>Residential</td>
<td>1879</td>
<td>$149,466,000</td>
<td>1691</td>
<td>$134,519,400</td>
</tr>
<tr>
<td><strong>Vulnerable Structures</strong></td>
<td>1905</td>
<td>$219,763,800</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Assuming a 90% destruction rate per National Weather Service
n/a not available

Source: Cottonwood County Assessor

Cottonwood County AHMP August 2011  

p.79
Large tornadoes have left paths of destruction ¼-mile wide or wider, which on the right course would destroy most if not all of any one of the cities in this county. As discussed above, the F3 tornado that hit Comfrey in 1998 destroyed three-quarters of the structures in town. The National Weather Service has suggested that vulnerability of small towns to an EF4 or EF5 scale tornado might be estimated by looking at the recent experience of Greensburg, Kansas (population 1,500). Approximately 95% of that city was destroyed in 2007.

The County Assessor supplied the estimated market value for structures by type of occupancy in each city in the county. (Structure value was used, rather than the value of the entire parcel, assuming that land would retain value for rebuilding after an extreme storm event.) If we assume a 90% destruction rate from an EF4 or EF5 tornado event, we see in Table 4-7 the potential for extreme amounts of damage in each city. The County Assessor’s raw data also identifies multi-family housing in the cities of Comfrey, Jeffers, Mountain Lake, Westbrook and Windom. Apartment buildings may pose unique challenges in a rural community that should be specifically addressed in planning efforts.

### A.2 Flood Hazard Analysis

Through FEMA funding of Murray County’s AHMP update (which overlapped this planning process) SRDC acquired software to run FEMA’s HAZUS-MH extension for ArcGIS. HAZUS is a regional multi-hazard loss estimation model developed by FEMA and the National Institute of Building Sciences (NIBS). While analysis is conducted at the Census Tract and Census Block level, according to the documentation the primary purpose of HAZUS is to develop multi-hazard losses at a regional scale.

SRDC applied a **Level 1 Flood Hazard analysis** to the county—an “out-of-the-box” approach with data supplied by FEMA and USGS (See Addendum F for the complete report). A stream network was developed for basins greater than 10 square miles, and a Countywide Scenario generated for a typical 100-year return flood event (1% chance flood). HAZUS found potential building exposure of over 7,000 buildings in the county with a replacement value of $868 million (90% residential buildings).

At this scale, the model estimated that 7 buildings in Cottonwood County would be at least moderately damaged, none completely destroyed. The model estimated that 522 tons of debris would be generated, requiring 21 truckloads to remove. About 161 households would be displaced, with 193 people seeking temporary shelter in public shelters. The total economic loss was estimated at $11.4 million, with building-related losses of $11 million (Table 4-9).
The Polis Center at Indiana University and Geographic Information Sciences Lab at the University of Minnesota-Duluth also performed HAZUS MR4 Flood Hazard analysis for Minnesota HSEM, updating database information for certain parameters and running 1 square mile basins generated from 30meter Digital Elevation Model (DEM). The Polis-UMD model estimated 48 buildings damaged in a 100-year flood event with $11.3 million in building loss and $30.4 million in total economic loss. This model estimates 2,115 tons of debris (85 truckloads), 305 households displaced, and 515 people seeking shelter.

The Polis report does note that “aggregate losses reported in this study may be overstated”. SRDC’s HAZUS-generated 100-year return period polygons and the Polis-UMD HAZUS report were compared visually with the FIRM maps and with the shoreland layer calculated earlier in ArcMap GIS (Section VII.B.1.c above). HAZUS identifies certain areas at risk that are not covered by the FIRMs. Other areas covered by the FIRMs are not identified by HAZUS. Local staff examined high-impact hazard areas identified by Polis-UMD and discounted the analysis due to:

- Structures identified at risk were elevated out of the floodplain, as permitted by DNR and floodplain ordinances; or

---

Drainage projects have redirected flows and/or removed building sites from regulated floodplains. Inconsistencies in results may be due to limitations of the elevation dataset. Where HAZUS (at a Level 1 analysis) utilizes national-scale elevation data from USGS, new LiDAR-based elevation data under development in Minnesota could improve results. There are some other concerns with using the national-scale data provided with HAZUS. As with any model, HAZUS produces an approximation of the “real world”. The software is intended to be a tool for regional analysis, and needs additional time and effort to be used at a city or township-scale. Even so, local jurisdictions should more closely consider flood hazard risks in areas identified by HAZUS to better understand vulnerability and potential losses. Future updates should provide for local data collection to support further refinement, preferably a Level 2 HAZUS analysis.

XI. Assessing Vulnerability: Analyzing Development Trends

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

A. Land Uses and Development Trends

Land in Cottonwood County is typical of a prairie environment. About 82% of the county is used for active agriculture, with only 1.3% considered “impervious” (UMN Remote Sensing). Most commercial and industrial development has taken place within the cities.

As we saw in the Profile in Section I.C in Chapter 1, Cottonwood County is a rural community with a regional center at its county seat in Windom. The population of the county has declined since the 1980s; however, over the decades, the population of cities in the county has remained fairly stable. The population of townships has decreased as farms consolidate and family sizes contract.

Like much of Southwest Minnesota and the rural Midwest, the county’s population has become increasingly older and concentrated in cities as farms increase in size. While population may vary year to year, cities with employment opportunities have very low vacancy rates and are likely to continue attracting people looking for a high quality of life in Greater Minnesota.

Cottonwood County and the cities of Comfrey, Mountain Lake and Windom have comprehensive plans to guide future development. Cottonwood County and the cities of Comfrey, Mountain Lake, Storden, Westbrook and Windom have at least a basic zoning ordinance, which can protect property from future development in hazard areas. The cities of
Mountain Lake and Windom have also adopted the State Building Code to protect property and the public.

The growing number of wind energy conversion systems (WECS) or “wind farms” poses special challenges for public safety, in particular for emergency medical services and fire fighting in tall wind turbines. According to local wind turbine technicians, the most common problem for turbine failure is lightening. However, ice storms can also cause ice accumulation on turbine blades. Potential hazards from this “ice throw” can be mitigated by allowing sufficient setbacks from roads and structures. The City of Windom has adopted specific engineering requirements for proposed turbines in municipal limits.

Table 4-10
Projected Population by Age and Gender

<table>
<thead>
<tr>
<th>Age Group</th>
<th>2005 Male</th>
<th>2005 Female</th>
<th>2010 Male</th>
<th>2010 Female</th>
<th>2015 Male</th>
<th>2015 Female</th>
<th>2020 Male</th>
<th>2020 Female</th>
<th>2025 Male</th>
<th>2025 Female</th>
<th>2030 Male</th>
<th>2030 Female</th>
<th>2035 Male</th>
<th>2035 Female</th>
<th>2040 Male</th>
<th>2040 Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 4</td>
<td>358</td>
<td>321</td>
<td>360</td>
<td>350</td>
<td>380</td>
<td>370</td>
<td>390</td>
<td>380</td>
<td>360</td>
<td>370</td>
<td>350</td>
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<td>350</td>
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<td>320</td>
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<td>360</td>
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<td>370</td>
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<td>360</td>
<td>350</td>
<td>360</td>
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<td>10 to 14</td>
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<td>270</td>
<td>330</td>
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<td>30 to 34</td>
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<td>330</td>
<td>250</td>
<td>400</td>
<td>380</td>
<td>340</td>
<td>340</td>
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</tbody>
</table>

Gender totals 5,849 6,100 5,670 6,030 5,600 6,040 5,580 6,110 5,580 6,180 5,530 6,200 5,510 6,230
Total population 11,950 11,700 11,640 11,690 11,760 11,740 11,740 11,740 11,740 11,740 11,740 11,740 11,740 11,740

Source: Minnesota State Demographic Center, April 2007
XII. Multi-Jurisdictional Risk Analysis

Requirement §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment must assess each jurisdiction’s risks where they vary from the risks facing the entire planning area.

A. Risk Assessment for Participating Jurisdictions

The Cottonwood County All-Hazard Mitigation Planning Team’s consensus was that risks of identified hazards do not vary significantly across the planning area, with the exception of flooding. However, some hazards are more likely to affect the entire county at one time, and others are more likely to have localized affects. Section V of this chapter identifies hazards that pose a risk to jurisdictions in the county. Locations at risk are identified in Section VI. Section VII above assesses vulnerability of local jurisdictions to these hazards.

Tornados and straight-line winds, and hazardous materials were considered the highest rank hazards for Cottonwood County. Representatives of cities were also asked to rank priority hazards for their cities (Figure 4-7).

<table>
<thead>
<tr>
<th>City of Mountain Lake</th>
<th>City of Storden</th>
<th>City of Windom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Tornado/Straight-line Winds</td>
<td>Tornado/Straight-line Winds</td>
<td>Tornado/Straight-line Winds</td>
</tr>
<tr>
<td>2 Blizzards/Severe Winter Storms</td>
<td>Blizzards/Severe Winter Storms</td>
<td>Flooding</td>
</tr>
<tr>
<td>3 Public Health</td>
<td>Flooding</td>
<td>Hazardous Materials</td>
</tr>
<tr>
<td>4 Terrorism</td>
<td>Meth Labs</td>
<td>Public Health</td>
</tr>
<tr>
<td>5 Severe Summer Storms</td>
<td>Fires (Structures)</td>
<td>Blizzards/Severe Winter Storms</td>
</tr>
<tr>
<td>6 Hazardous Materials</td>
<td>Severe Summer Storms</td>
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<tr>
<td>7 Fires</td>
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</table>

Table 4-11 City Hazard Ranking
CHAPTER 5: MITIGATION STRATEGY

This Chapter documents goals, objectives and mitigation strategies that the All-Hazard Mitigation Planning Team developed through the all-hazard mitigation planning process. Section XIII describes mitigation goals and objectives. Section XIV describes the comprehensive range of specific mitigation actions identified. Section XV addresses NFIP compliance. Section XVI describes implementation of mitigation actions. Section XVII addresses the multi-jurisdictional nature of mitigation actions.

XIII. Local Hazard Mitigation Goals

Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

A. Description of Mitigation Goals and Objectives

Hazard mitigation is intended to protect our communities by reducing or eliminating long-term risk to people and property before a disaster strikes. Emergency management involves a cycle through which communities prepare, respond and recover from emergencies and disasters.

In selecting local mitigation goals, the All-Hazard Mitigation Planning Team considered the overall goal of this planning process (Chapter 3, Section IV.B) to protect public health, safety and welfare by coordinating mitigation of natural and man-made hazards, and to meet FEMA requirements. Goals are general guidelines that explain what local jurisdictions in the county want to achieve. Objectives define strategies or implementation steps for each participating jurisdiction to achieve those goals.

All local units of government in Cottonwood County were invited to review and comment on mitigation goals, objectives and strategies. Communities not represented in person were provided information individually. Goals and objectives were developed to address the different hazards. Potential objectives were ranked by the public at the Open House (Chapter 3, Section IV.D.1) and in a survey distributed to the All-Hazard Mitigation Planning Team, local elected officials and others in the county. Top-rated objectives included:

- HAZMAT/emergency management personnel are properly trained.
- Fire fighters/first responders have adequate training and equipment for hazardous material response.
- Weather warning systems are regularly tested and exercised.

The Planning team concentrated on developing strategies to meet objectives ranked higher at the Open House and in the survey. Proposed strategies are listed in the next section, each classified by type, with local partners likely to be involved in implementation.

It should be noted that not every hazard identified within the risk assessment has a goal outlined below. Goals were combined for certain hazards with similar mitigation measures. The
main benefit of the actions listed is the improved health, safety and welfare of the community and residents. The highest ranking hazards are listed first, followed by moderate rank hazards and finally low rank hazards.

As the communities in the county achieve the outlined objectives, new objectives and implementation strategies will be identified in future All Hazard Planning updates.

A.1 High Rank Hazards

A.1.a Hazard: Tornado and Straight-line Winds

Goal: Protect people and infrastructure from the impacts of high wind events.

Objectives:
- Weather warning systems are regularly tested and exercised.
- A comprehensive media plan (local radio, television, newspapers, web alerts) provides factual information about emergencies.
- County residents are educated on the importance and need to take responsibility for themselves and their families/neighbors in a severe storm event.
- Critical facilities have redundant service in case of utility failure.
- Property owners construct new facilities to building code.
- Storm shelters are designated in each community.

A.2.d Hazard: Hazardous Materials / Meth Labs

Goal: Improve effectiveness of local agencies in preventing and responding to hazardous material incidents.

Objectives:
- HAZMAT/emergency management personnel are properly trained.
- Fire fighters/first responders have adequate training and equipment for hazardous material response.
- Property owners understand their responsibilities to clean contaminated property.
- Wellhead protection plans are complete/maintained for all public water suppliers.
- Unused wells are properly abandoned to minimize contamination of groundwater.
- All communities and homeowners bring sewage treatment systems into compliance with state rules and regulations.
- Maps can be quickly made of areas affected by disasters.
A.2 Moderate Rank Hazards

A.2.a Hazard: Agricultural Disease (animal and plant)
Goal: Reduce risks to the county’s agriculture & amenities from disease and pest.

Objectives:
- Cottonwood County farmers and property owners understand and follow federal, state, and local guidelines to prevent ag disease and pests.
- A response plan clearly sets forth procedures for major ag disaster.

A.2.b Hazard: Severe Winter Storms—Blizzards & Extreme Cold
Goal: Minimize the impacts of severe winter weather.

Objectives:
- County residents are educated on the importance and need to take responsibility for themselves and their families/neighbors in a severe storm event.
- Current weather warning/travel advisory systems are tested and exercised.
- Property owners construct new facilities to building code.
- Electrical utilities bury power lines where possible to prevent storm-related outages.

A.2.c Hazard: Flooding & Dam Failure
Goal: Minimize the impacts of seasonal and storm-event flooding.

Objectives:
- Homeowners in identified flood plains have purchased flood insurance.
- New development is located outside of flood plains.
- FEMA floodplain maps are improved.
- Local Water Management reduces impacts of flooding / stream bank erosion.
- Cottonwood County / City of Windom establish programs to remove existing property from the 100-year floodplain.

A.2.d Hazard: Public Health and Infectious Disease
Goal: Reduce the threat and impact of infectious diseases through education and awareness.

Objectives:
- Medications and medical supplies are available for distribution in the case of emergency.
- Public is informed on effective measures to prevent the spread of infectious disease.
- An effective quarantine plan is in place to limit highly contagious diseases.
A.3 Low Rank Hazards

A.3.a Hazard: Drought / Extreme Heat
Goal: Minimize negative impacts caused by lack of precipitation and extreme heat.

Objectives:
- Wellhead protection plans are complete / maintained for all public water suppliers.

A.3.b Hazard: Severe Summer Storms—Lightning & Hail / Earthquake
Goal: Minimize the impacts of severe summer weather or potential geologic events.

Objectives:
- Critical facilities have redundant service in case of utility failure.

A.3.c Hazard: Fires—Structures and Wildfires
Goal: Eliminate or minimize impacts of natural and human-caused fires.

Objectives:
- Fire fighters/first responders have adequate resources.
- Public is informed on fire prevention and safety

A.3.d Hazard: Terrorism and Civil Disturbance
Goal: Protect residents and critical infrastructure from domestic or foreign threats.

Objectives:
- Law enforcement and emergency management maintain active information networks on potential threats.

A.4 Other Goals and Objectives

A.4.a Mitigation Plan Maintenance
Goal: Maintain the all-hazard mitigation plan in accordance with federal and state statute, rules and regulations.

Objectives:
- Update the plan as necessary and required.
XIV. Identification and Analysis of Mitigation Actions

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

A. Mitigation Actions and Projects

The All-Hazard Mitigation Planning Team discussed a wide range of potential mitigation measures based on their knowledge of the planning area and assessment of risks to the county. Strategies in place in other counties in the region formed the basis for discussion. Information provided by HSEM such as the FEMA Region V handout “Mitigation Ideas: Possible Mitigation Measures by Hazard Type” were also used to suggest possible action items.

Mitigation measures described in the State Hazard Mitigation Plan are classified by type:

- Prevention
- Property & Natural Resources Protection
- Public Education & Awareness
- Structural Projects
- Emergency Services

These categories provide a framework to develop local mitigation strategies. Particular mitigation action items were chosen by consensus of the Planning Team. The Team also considered certain other Emergency Services measures supporting preparedness, response and recover actions. While these actions may not be eligible for FEMA mitigation funding, they help understand the overall context of reducing and eliminating natural and technological hazards affecting the jurisdictions.

The Planning Team considered High Rank Hazards as top priorities for action. Prioritization of individual actions and projects will depend on local funding and personnel availability. Mitigation actions listed in this plan should be considered a priority for implementation by each and every participating jurisdiction. While an official cost benefit review was not conducted for any of the strategies, the estimated costs were discussed (See Section XVI below). Overall benefits to each jurisdiction were considered when selecting strategies to be included in the plan. A formal cost-benefit review would have to be completed prior to implementation of mitigation projects.
Benefit:
General: Mitigates hazards in general
Property: Mitigates hazards to property
Lives: Mitigates hazards to lives

Cost Estimates:
Low: In-kind services/projects with existing staff, typically part of ongoing workplan
Medium: Special projects, contracted services and/or cost-share involved
High: Major capital costs involved

A.1 High Rank Hazards

A.1.a Hazard: Tornado and Straight-line Winds

Strategies

1. Improve the weather warning system in at least one community each year.
   Who: CCEM, CCEO, CCSO, CiBL, CiC, CiJ, CiML, CiS, CiWb, CiWi
   Type: Structural
   Benefit: Lives
   Cost: High

2. Encourage all residents to have and use NOAA All Hazards Public Alert weather radios, preferably with Specific Alert Message Encoding (SAME) capability.
   Who: CCEM, CiBL, CiC, CiJ, CiML, CiS, CiWb, CiWi, Twp
   Type: Awareness
   Benefit: General
   Cost: Low

Table 5-1
Local Partners with Interest in All Hazards Mitigation
Cottonwood County, Minnesota

<table>
<thead>
<tr>
<th>Local Units of Government</th>
<th>Other Parties</th>
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</thead>
<tbody>
<tr>
<td>CCEM Cottonwood County Emergency Management</td>
<td>EMS Ambulance: First Responders</td>
</tr>
<tr>
<td>CCEO Cottonwood County Environmental Office / Floodplain Administrator</td>
<td>Fire Fire Districts</td>
</tr>
<tr>
<td>CCHWY Cottonwood County Highway Dept</td>
<td>Hosp Hospital and Clinics</td>
</tr>
<tr>
<td>CCSD Cottonwood County Sheriff’s Office</td>
<td>Sch Local School Districts</td>
</tr>
<tr>
<td>SWCD County Soil &amp; Water Conservation Dist.</td>
<td>RWS Rural Water Systems</td>
</tr>
<tr>
<td>CoJAK Cottonwood-Jackson Public Health</td>
<td>BWSR MN Board of Water &amp; Soil Resources</td>
</tr>
<tr>
<td>CiBL City of Bingham Lake</td>
<td>MDA MN Dept of Agriculture</td>
</tr>
<tr>
<td>CiC City of Comfrey</td>
<td>MDH MN Dept of Health</td>
</tr>
<tr>
<td>CiJ City of Jeffers</td>
<td>DNR MN Dept of Natural Resources</td>
</tr>
<tr>
<td>CiML City of Mountain Lake</td>
<td>MnDOT MN Dept of Transportation</td>
</tr>
<tr>
<td>CiS City of Storden</td>
<td>HSEM MN Division of Homeland Security</td>
</tr>
<tr>
<td>CiWb City of Westbrook</td>
<td>&amp; Emergency Management</td>
</tr>
<tr>
<td>CiWi City of Windom</td>
<td>Ext University of Minnesota Extension Service</td>
</tr>
<tr>
<td>TWP Townships</td>
<td>FSA US Farm Service Agency</td>
</tr>
<tr>
<td>ALL All Parties Listed</td>
<td>FEMA US Federal Emergency Management Agency</td>
</tr>
</tbody>
</table>
3. Increase support for the local storm spotters’ network.
   Who: CCEM, NOAA
   Benefit: General
   Type: Awareness
   Cost: Low

4. Review and update the EOP media plan to provide public information about all-hazard events.
   Who: CCEM, HSEM, FEMA
   Benefit: General
   Type: Awareness
   Cost: Low

5. Work with critical facilities such as hospitals and rural water suppliers to assure access to back-up power generation.
   Who: Utilities, CCEM, CoJAK, Hosp, RWS, MDH
   Benefit: Property, Lives
   Type: Protection
   Cost: Medium

6. Consider adopting building code for new construction.
   Who: CiWb
   Benefit: General, Property
   Type: Prevention
   Cost: Medium

7. Encourage residents to use licensed contractors.
   Who: CiBL, CiC, CiML, CiS, CiWb, CiWi
   Benefit: Property
   Type: Prevention
   Cost: Low

8. Plan for designated long-term shelter location(s) in case of disaster event.
   Who: CCEM, CiBL, CiML, CiWb, CiWi
   Benefit: Lives
   Type: Emerg Svcs
   Cost: Low

9. Educate public about benefit of safe rooms and funding sources available.
   Who: CCEM, CCEO, CiBL, CiC, CiJ, CiML, CiS, CiWb, CiWi
   Benefit: Lives
   Type: Awareness
   Cost: Low

10. Encourage construction of safe rooms in public facilities and parks.
    Who: CCEM, CCEO, Sch
    Benefit: Lives
    Type: Structural
    Cost: High


Strategies

1. Work with state and federal agencies to address hazardous materials and delivery systems that have the potential to impact the county and region.
   Who: CCEM, CCSO, CCEO, EMS, Fire, DPS, MPCA
   Benefit: General
   Type: Prevention
   Cost: Low

2. Review and update the County Emergency Operations Plan (EOP) for hazardous material incident information.
   Who: CCEM, HSEM
   Benefit: General
   Type: Prevention
   Cost: Low
3. Work with MDH to complete and implement Wellhead Protection Plans.
   Who: CCEO, SWCD, RWS, MDH
   Type: Prevention
   Benefit: General
   Cost: Medium

4. Work with state & local partners to implement and update Local Water
   Management Plan.
   Who: CCEO, SWCD, RWS, BWSR, DNR
   Type: Prevention
   Benefit: General
   Cost: Medium

5. Educate the public on ordinances that deal with responsibility for cleanup of
   contaminated property.
   Who: CCSO
   Type: Protection
   Benefit: General, Property
   Cost: Medium

6. Develop Geographic Information Systems (GIS) capability to map locations of fixed
   facilities using hazardous materials and associated transportation corridors.
   Who: CCEM, CCEO
   Type: Prevention
   Benefit: General
   Cost: Medium

### A.2 Moderate Rank Hazards

#### A.2.a Hazard: Agricultural Disease (animal and plant)

Strategies

1. Provide information on ag disease and prevention to producers & residents.
   Who: CCEO, SWCD, Ext, FSA
   Type: Awareness
   Benefit: General
   Cost: Low

2. Review the EOP for response and care of animals, including disposal, in an outbreak
   of disease or a major hazard event.
   Who: CCEM, CCEO, MDA, MPCA, Ext, FSA
   Type: Emerg Svcs
   Benefit: General
   Cost: Medium

3. Monitor invasive insect species, including emerald ash borer.
   Who: CCEO, CiML, CiWi, MDA, Ext
   Type: Prevention
   Benefit: General
   Cost: Low

#### A.2.b Hazard: Severe Winter Storms—Blizzards & Extreme Cold

Strategies

1. Work with communities to review and/or complete Continuity of Operations
   Planning, and encourage private businesses and families to prepare for all-hazard
   events.
   Who: CCEM
   Type: Emerg Svcs
   Benefit: General
   Cost: Medium
2. Work with MnDOT / local road authorities to identify and improve hazardous intersections and bridges.
   Who: CCHWY, CiBL, CiC, CiJ, CiML, CiS, CiWb, CiWi, Twp, railroad 
   Type: Prevention  
   Benefit: Property, Lives  
   Cost: High

3. Use road design and living snow fences to help control snow on roadways.
   Who: CCHWY, CCEO, SWCD, Twp, MnDOT 
   Type: Prevention  
   Benefit: General  
   Cost: Medium

4. Encourage road authorities to work with farmers to prevent cropping in road ROW.
   Who: CCHWY, Twp 
   Type: Prevention  
   Benefit: General  
   Cost: Low

5. Encourage property owners to maintain landscaping distances to overhead power lines.
   Who: CCEO, CiWb, CiWi, Utilities 
   Type: Prevention  
   Benefit: Property  
   Cost: Low

6. Require utility providers to have power lines buried and/or hardened against hazards, where feasible.
   Who: CCEM, CCEO, CiML, CiWb, CiWi, Utilities 
   Type: Protection  
   Benefit: Property  
   Cost: High

A.2.c Hazard: Flooding and Dam Failure.
Strategies: See Section XV (NFIP Compliance).

A.2.d Hazard: Public Health and Infectious Disease
Strategies
1. Encourage the local Public Health agency to continue work with Minnesota Dept. of Health for the mass distribution of medicines and supplies for public health emergencies.
   Who: CoJAK, MDH, EMS, Fire, Hosp, CCEM 
   Type: Emerg Svcs 
   Benefit: Lives 
   Cost: Low

2. Provide information to public and private employers, schools and hospitals about potential infectious disease threats and prevention measures.
   Who: CoJAK, MDH, Sch, Hosp, CCEM 
   Type: Awareness 
   Benefit: General 
   Cost: Low

3. Develop a County quarantine plan, in coordination with local doctors and other health professionals in the county.
   Who: CoJAK, CCSO, EMS, Fire, Hosp, CCEM 
   Type: Awareness 
   Benefit: Lives 
   Cost: Low
A.3 Low Rank Hazards

Strategies
1. Educate the public on the importance of wellhead protection and water conservation.
   Who: CCEO, SWCD, RWS, BWSR
   Benefit: General
   Type: Prevention
   Cost: Low

A.3.b Hazard: Severe Summer Storms—Lightning & Hail / Earthquake
Strategies
1. Participate in “Severe Weather Awareness Week” each spring.
   Who: CCEM, CiBL, CiC, CiML, CiS, CiWb, CiWi
   Benefit: General
   Type: Awareness
   Cost: Low

2. Continue to enforce building code for new construction.
   Who: CiML, CiWi
   Benefit: General, Property
   Type: Prevention
   Cost: Medium

Strategies
1. Continue fire education, adding the nationally coordinated “Firewise” program.
   Who: Fire, Sch
   Benefit: General
   Type: Awareness
   Cost: Low

2. Work with owners of conservation properties on the proper use of controlled burns and firebreaks.
   Who: Fire, CCSO, SWCD, Twp, DNR
   Benefit: General, Property
   Type: Awareness
   Cost: Low

3. Continue to use mutual aid agreements and memoranda of understanding to improve coordination between state, local, and federal agencies, and appropriate private sector representatives.
   Who: ALL
   Benefit: General
   Type: Emerg Svcs
   Cost: Low

Strategies
1. Local governments complete and maintain thorough community risk and threat assessments.
   Who: CCEM, CCSO, LE
   Benefit: General, Property, Lives
   Type: Prevention
   Cost: Low
A.4 Other Strategies

A.4.a Mitigation Plan Maintenance

Strategies
1. Budget to perform additional data collection and analysis to identify vulnerable structures in specific detail in next plan update.
   Who: CCEM, CCEO
   Benefit: General
   Type: Prevention
   Cost: Medium

2. Budget to perform estimates of potential monetary losses to structures, contents and functions in specific detail in next plan update.
   Who: CCEM
   Benefit: General
   Type: Prevention
   Cost: Medium

B. Reducing the Effects of Hazards on New Buildings & Infrastructure

It is easier to do something right the first time than to fix it later on. Several strategies specifically address mitigating effects of hazards on new buildings and infrastructure.

For example, the strategy for Severe Winter Storms (A.2.b) to “Require utility providers to have power lines buried and/or hardened against hazards” would most likely be implemented with new construction. The Tornado strategy (A.1.a) to construct safe rooms could address new construction or retrofitting existing structures.

The flooding-related strategy in the next section (“Work closely with DNR on all development applications in identified flood hazard areas...”) specifically addresses new buildings and infrastructure. Improving floodplain maps also mitigates the effects of flooding and dam failure on any new buildings and infrastructure as well as existing structures.

C. Reducing the Effects of Hazards on Existing Buildings and Infrastructure

The majority of strategies identified in this section are concerned with protecting people, more so than property. Property can be replaced—people cannot. However, many strategies do address mitigating effects of natural and technological hazards on existing buildings and infrastructure.

An example is Wellhead Protection Plans (A.2.d Hazardous Materials) which protect existing aquifers and mitigate the need for new infrastructure. The strategy for Winter Storms (A.2.b) to “Use road design and living snow fences to help control snow on roadways” would most likely be used to improve existing roads and highways since few new roads are being built in the area.
XV. Identification and Analysis of Mitigation Actions: National Flood Insurance Program (NFIP) Compliance

Requirement: §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction’s participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate

A. Participation in the NFIP

FEMA’s National Flood Insurance Program (NFIP) is intended to provide flood insurance, assist with floodplain management and complete flood hazard mapping (See Chapter 4, Section VI.A.5 above). According to FEMA, nearly 20,000 communities across the United States participate in the voluntary program.

All of the participating jurisdictions in the county are listed in FEMA’s Community Status Book.\(^\text{14}\) Cottonwood County and the cities of Comfrey and Windom are currently participating in NFIP. Comfrey’s mapped floodplain is located in Brown County. No cities in the county are sanctioned for not participating.

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>NFIP Status</th>
<th>Initial FHBM</th>
<th>Initial FIRM</th>
<th>Current Effective Map Date</th>
<th>Joined Program (or Sanctioned)</th>
<th>Policies In Force#</th>
<th>Total Losses</th>
<th>Total Payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Comfrey</td>
<td>Participating</td>
<td>1974</td>
<td>2000</td>
<td>2009</td>
<td>2000</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>City of Windom</td>
<td>Participating</td>
<td>1973</td>
<td>1989</td>
<td>1989</td>
<td>1979</td>
<td>82</td>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^\text{14}\) http://www.fema.gov/fema/csb.shtm

Source: FEMA Community Status Book 11.2010, NFIP Insurance Statistics

B. Identification, Analysis and Prioritization of Actions Related to Continued Compliance in NFIP

The following strategies were identified based on the analysis of the Flooding and Dam Failure hazards in Chapter 4, Section VI.A.5, to meet the goals and objectives in Chapter 5, Section XIII.A.2 (Moderate Rank Hazards) above. Landslide or bank erosion hazards were also discussed as part of this hazard, since property damage typically only occurs in a flood event.

Individual strategies were selected by consensus and do not appear in rank order. The Planning Team discussed property acquisition, relocation and elevation; however, there have been no local flood insurance losses recorded and there is limited public support to spend public funds on these activities. Prioritization of individual actions and projects will depend on local funding and personnel availability. A formal cost-benefit review would have to be completed prior to implementation of mitigation projects.
B.1  Hazard: Flooding and Dam Failure

B.1.a  Strategies

1. Work with FEMA to modernize floodplain maps.  
   Who: CCEO, CiC, CiWi, DNR  
   Benefit: General, Property  
   Type: Prevention  
   Cost: Medium

2. Review and update floodplain protection in zoning ordinance.  
   Who: CCEO, CiC, CiWi, DNR  
   Benefit: General, Property  
   Type: Prevention  
   Cost: Low

3. Work closely with DNR on all development applications in identified flood hazard areas; have check box on building/zoning permit forms indicating flood hazard areas; discourage zoning variances in flood hazard areas.  
   Who: CCEO, CiWi  
   Benefit: General, Property  
   Type: Prevention  
   Cost: Low

4. Educate and encourage property owners and insurance agents on purchasing flood insurance.  
   Who: DNR, CCEO, CiC, CiWi  
   Benefit: General, Property  
   Type: Awareness  
   Cost: Low

5. Promote buffer system along creeks and streams that are prone to flooding (e.g. grass strips, CRP).  
   Who: SWCD, BWSR, Watershed Districts  
   Benefit: General, Property  
   Type: Natural Resources  
   Cost: Medium

6. Study programs to voluntarily acquire, relocate or elevate at-risk structures in floodplains.  
   Who: CCEM, CCEO, CiWi  
   Benefit: Property  
   Type: Protection  
   Cost: High
XVI. Implementation of Mitigation Actions

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

In this initial all-hazard mitigation plan, the All-Hazard Mitigation Planning Team concentrated on understanding the hazards present in the community and the wide range of potential mitigation strategies to address these hazards. Implementation of individual actions and projects will depend on local funding and personnel availability.

A. Action Prioritization

Throughout this process, staff and the Planning Team strove to achieve consensus. At the Public Open House, attendees indicated preferences for a wide range of objectives (Chapter 3, Section IV.D.1). The Planning Team then concentrated on selecting action items to meet the highest rank objectives.

The highest rank hazards identified by the Planning Team—Tornado/Windstorm, Hazardous Materials—received the majority of the Planning Team’s attention. It is intended that strategies to mitigate the highest rank hazards receive the top priority for implementation, followed by moderate rank hazards.

As stated in Section XIV above, Planning Team members considered a wide range of potential mitigation measures, including actions in place in other counties in the region, estimated costs and benefits of projects, and funding available. Individual strategies were selected by consensus of the Team.

A.1 Priority Action Items

Planning Team members were asked to prioritize individual mitigation action items in an online survey, considering benefits that would result from actions versus the cost of those actions. A scale of 1-5 was used, from low to high priority. The top results for strategies are listed in Table 5-3.

<p>| Table 5-3 |
| Priority Action Items for Cottonwood County |</p>
<table>
<thead>
<tr>
<th>Mitigation Strategy</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.1.a.1 Improve weather warning systems</td>
<td>4.4</td>
</tr>
<tr>
<td>B.1.a.1 Modernize floodplain maps</td>
<td>4.4</td>
</tr>
<tr>
<td>A.1.a.2 NOAA All-Hazards Radios</td>
<td>4.3</td>
</tr>
<tr>
<td>A.3.c.3 Mutual Aid/coordination</td>
<td>4.2</td>
</tr>
<tr>
<td>A.3.b.1 Severe Weather Awareness Week</td>
<td>4.2</td>
</tr>
<tr>
<td>A.1.a.4 Update EOP media plan</td>
<td>4.2</td>
</tr>
<tr>
<td>A.2.b.6 Bury/harden power lines</td>
<td>4.2</td>
</tr>
<tr>
<td>A.1.a.5 Critical facility back-up power</td>
<td>4.1</td>
</tr>
<tr>
<td>A.2.b.3 Living snow fences</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Source: All-Hazard Mitigation Planning Team
B. **Action Implementation and Administration**

Cottonwood County Emergency Management is the primary agency responsible for implementation and administration of this plan. The County will implement mitigation strategies within the next five years, and will seek appropriate funding to do so.

Local jurisdictions with comprehensive plans and land use controls will be strongly encouraged to incorporate applicable goals, objectives, and policies into their local plans upon their next update. Transmittal of the final plan will include a letter from the County Emergency Manager requesting that each participating jurisdiction 1) adopt this Hazard Mitigation Plan as a primary policy document, and 2) review and incorporate all applicable policies of this document into the community’s existing plans by inclusion or by reference.

Upon adoption of this plan, the County and participating cities should also at the same time evaluate development and management controls, such as zoning and floodplain ordinances, to maintain consistency with this plan.

C. **Cost-Benefit Review**

As explained in Section XIV above, formal cost benefit review is beyond the scope of this plan and was not conducted for strategies during this mitigation planning process. Page 63 of the *Local Multi-Hazard Mitigation Planning Guidance* (“Blue Book”, July 1, 2008) states:

> “Note that the mitigation planning regulation *does not* require plans to include a benefit cost analysis for projects. However, an economic evaluation is essential for selecting one or more actions from among many competing ones.” [emphasis in original]

The overall cost and funding available to implement strategies played a significant role in selection of proposed mitigation action items. A formal cost-benefit review would have to be completed prior to implementation of specific mitigation projects.

C.1 **Sources of Funding**

Certain mitigation actions lend themselves to specific funding sources. The following FEMA mitigation programs summarized in Chapter 1, Section I.A.1 should be considered for identified mitigation projects.

- HMGP: A.1.a.1, A.1.a.9, A.4.a.1, A.4.a.2
- PDM: A.1.a.1, A.1.a.9, A.2.b.6, A.4.a.1, A.4.a.2, B.1.a.6

Mitigation actions for Public Health Emergencies are typically led by Public Health Services, with funding through the Minnesota Department of Health and other
sources. The Minnesota Department of Natural Resources (DNR) assistance may be available for back-up power supply.

Mitigation funds may be available to address weather-related hazards to transportation systems through MnDOT/Federal Highway Administration (FHWA), County State Aid, and other County/Township/City-funded projects. MnDOT may pay $500-$700 per acre, per year for living snow fence projects in priority locations, which is often supplemented by the Conservation Reserve Program (CRP) through USDA Farm Service Agency and SWCD.

Mitigation action items for Drought may find funding from DNR, the Minnesota Board of Water and Soil Resources (BWSR), Minnesota Pollution Control Agency (MPCA), US Environmental Protection Agency (EPA) and US Department of Agriculture (USDA). Mitigation actions for flooding/dam failure beyond property acquisition, relocation and elevation may be fundable through DNR, BWSR, and local Soil & Water Conservation District sources. MPCA’s Project Priority List (PPL) is a conduit to water and sewer project funding.

Mitigation actions for Fires (both structure/vehicle fires and wildfires) may be fundable by local fire departments through FEMA’s Assistance to Firefighters Grants (AFG), Staffing for Adequate Fire and Emergency Response Grants (SAFER), Fire Prevention and Safety Grants (FP&S), Assistance to Firefights Fire Station Construction Grants (SCG) programs. The DNR also works with local fire departments to conduct wildfire training programs.

USDA-Rural Development also offers grants and low-interest loans to public agencies and certain other organizations for public purposes. USDA-RD has recently funded requests such as fire halls and equipment, water and sewer systems, and tornado sirens in the region. Other actions would have to be funded from general tax levies, ongoing program budgets, and by private citizens.
XVII. Multi-Jurisdictional Mitigation Actions

Requirement §201.6(c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

As explained in Chapter 2, Section III, Lincoln County is a rural community with few full-time paid public staff. Jurisdictions in the county rely on Lincoln County Emergency Management as a clearinghouse for intergovernmental cooperation. Lincoln County Emergency Management maintains regular communication with all local units of government in the county.

A. Action Items for Each Participating Jurisdiction

Action items are identified for each participating jurisdiction. These items were selected by the All Hazards Mitigation Planning Team with advice and consent by each participating jurisdiction—cities not in attendance at the Team meeting were consulted by the Emergency Management Director.

<table>
<thead>
<tr>
<th>Mitigation Strategy</th>
<th>Bingham Lake</th>
<th>Comfrey</th>
<th>Jeffers</th>
<th>Mountain Lake</th>
<th>Storden</th>
<th>Westbrook</th>
<th>Windom</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. 1.a Hazard: Tornado and Straight-line Winds</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>A.1.a.1</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>A.1.a.2</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>A.2.a Hazard: Agricultural Disease</td>
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<tr>
<td>A.2.b Hazard: Severe Winter Storms—Blizzards &amp; Extreme Cold</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>A.2.b.2</td>
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<tr>
<td>A.3.b Hazard: Severe Summer Storms—Lightning &amp; Hail / Earthquake</td>
<td>X</td>
<td></td>
<td></td>
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<td>A.3.b.1</td>
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<td>A.3.b.2</td>
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<td></td>
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<td>X</td>
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<tr>
<td>B. 1 Hazard: Flooding and Dam Failure</td>
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<tr>
<td>B.1.a.1</td>
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<td>B.1.a.2</td>
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<td>B.1.a.3</td>
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</tbody>
</table>
Each participating jurisdiction is responsible for selecting their mitigation action items, as well as funding and staffing implementation. The following contact information is current as of February 2011:

- Bingham Lake City Clerk, 1021 – 2nd Ave Ste #2, Bingham Lake, MN 56118
- Comfrey City Clerk, PO Box 175, Comfrey, MN 56019
- Jeffers City Clerk, PO Box 127, Jeffers, MN 56145
- Mountain Lake City Administrator, PO Box C, Mountain Lake, MN 56159
- Storden City Clerk, PO Box 146, Storden, MN 56174
- Westbrook City Clerk, PO Box 367, Westbrook, MN 56183
- Windom City Administrator, PO Box 38, Windom, MN 56101
- Cottonwood County Emergency Management, 902 – 5th Ave, Suite 101, Windom, MN 56101

Chapter II, Section II.A.1 describes how a jurisdiction may modify or join this plan after FEMA approval.

Figure 5-1 Jeffers Petroglyphs Historic Site

Source: Southwest Regional Development Commission
CHAPTER 6: PLAN MAINTENANCE

This Chapter documents procedures for long-term plan maintenance. Section XVIII describes monitoring, evaluating and updating the plan. Section XIX addresses incorporation of this plan into existing planning mechanisms. Section XX addresses the need for continued public involvement.

XVIII. Monitoring, Evaluating, and Updating the Plan

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

A. Method and Schedule for Monitoring this Plan

This All Hazard Mitigation Plan will be monitored continuously by the County Emergency Management Director as part of their annual work plan, particularly after a disaster event. The nature of the monitoring is to determine:

- if applications for Hazard Mitigation Assistance should be initiated
- the effectiveness of mitigation actions
- if any new actions are appropriate

Cottonwood County Emergency Management maintains regular contact with all jurisdictions in the county and will monitor the status and effectiveness of mitigation in the county.

B. Method and Schedule for Evaluating this Plan

FEMA requires that plans be reviewed, updated and re-approved within five years of initial adoption. Given the length of the planning cycle, the County Emergency Management Director should review and formally evaluate the plan within two and a half (2.5) years of adoption, as well after every disaster event, to adequately prepare for the plan update. Aspects of the mitigation plan to be evaluated are:

- the goals and objectives address current and expected conditions
- the nature, magnitude, and types of risk have changed
- the current resources are appropriate for implementing the plan
- there are implantation problems such as technical, political, legal, or coordination with other agencies
- the outcomes have occurred as expected (a demonstration of progress)
- the agencies and other partners have participated as originally proposes
C. Method and Schedule for Updating the Plan
Within three (3) years of adoption, the Emergency Management Director will formulate a work plan and seek input from All-Hazard Mitigation Planning Team members, local units of government and local residents and property owners to update plan content, goals and strategies. At that time, hazard-related items from local plans and projects will be incorporated into this plan. Emergency Management will also extend an invitation to any non-participating jurisdictions to join the planning process for the update.

Any revisions to this plan will be forwarded to the State of Minnesota’s HSEM and FEMA as required in the original adoption process.

XIX. Incorporation into Existing Planning Mechanisms

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

A. Local Planning Mechanisms Available for Incorporating Mitigation Requirements
During the course of this hazard mitigation planning process, the following relevant planning mechanisms were identified:

- Comprehensive Plan: Cottonwood County, Comfrey, Mountain Lake, Windom
- Capital Improvement Plan: Mountain Lake, Windom
- County Emergency Plan: Cottonwood County, Windom
- Economic Development Plan: Mountain Lake, Westbrook, Windom
- Watershed Plan: Cottonwood County
- Regional Development Plans: Southwest Regional Development Commission, including representatives from Cottonwood County, all townships and cities
- Zoning Ordinance: Cottonwood County, Comfrey, Mountain Lake, Storden, Westbrook, Windom
- Building Code: Mountain Lake, Windom
- Floodplain Ordinance: Cottonwood County, Comfrey, Mountain Lake, Windom
- Subdivision Ordinance: Cottonwood County, Mountain Lake, Westbrook, Windom

B. Incorporating Mitigation Strategies and Hazard Information in Other Plans and Ordinances
As discussed in Chapter 5, Section XVI.B above, upon adoption each participating jurisdiction should evaluate their existing plans and ordinances to incorporate goals, objectives and
strategies of the All-Hazard Mitigation Plan. The Emergency Management Director will work with elected County officials and other departments in this process.

XX. Continued Public Involvement

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

Continued public participation in hazard mitigation will be solicited through the ongoing work of Cottonwood County Emergency Management. Comments from the public on the AHMP will be received by County Emergency Management and forwarded to the All Hazard Mitigation Planning Team for discussion. Once adopted, a copy of the plan will be made available to public libraries in the county, and posted to the SRDC website.

Figure 6-1 Flooding on Perkins Creek in Windom, 2010

Source: Cottonwood County Emergency Management
APPENDIX

A. Resolutions of Adoption

To be appended following FEMA approval and adoption by each participating jurisdiction.
AUG 30 2011

Mr. Jim Russell
State Hazard Mitigation Officer
Minnesota Department of Public Safety
Division of Homeland Security
and Emergency Management
444 Cedar Street- Suite #223
St. Paul, Minnesota 55101-6223

Dear Mr. Russell:

Thank you for submitting the adoption documentation for the Cottonwood County Hazard Mitigation Plan. The plan was reviewed based on the local plan criteria contained in 44 CFR Part 201, as authorized by the Disaster Mitigation Act of 2000. Cottonwood County met the required criteria for a local hazard mitigation plan and the plan is now approved for the county. However, formal approval of this plan for the other participating jurisdictions is contingent upon their adoption of this plan.

The approval of this plan ensures continued availability of the full complement of Hazard Mitigation Assistance (HMA) Grants. All requests for funding, however, will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted.

We encourage Cottonwood County and the participating jurisdictions to follow the plan’s schedule for monitoring and updating the plan, and continue their efforts to implement the mitigation measures. The plan must be reviewed, revised as appropriate, resubmitted, and approved within five years in order to continue grant eligibility.

Please pass on our congratulations to the county on completing this significant action. If you or the community has any questions, please contact Tom Smith at (312) 408-5220.

Sincerely,

Christine Stack, Director
Mitigation Division
Resolution 11-08-23
Adoption of the Cottonwood County All-Hazard Mitigation Plan

WHEREAS, Cottonwood County has participated in the hazard mitigation planning process as established under the Disaster Mitigation Act of 2000, and

WHEREAS, the Act establishes a framework for the development of a County Hazard Mitigation Plan; and

WHEREAS, the Act as part of the planning process requires public involvement and local coordination among neighboring local units of government and businesses; and

WHEREAS, the Cottonwood County Plan includes a risk assessment including past hazards, hazards that threaten the County, an estimate of structures at risk, a general description of land uses and development trends; and

WHEREAS, the Cottonwood County Plan includes a mitigation strategy including goals and objectives and an action plan identifying specific mitigation projects and costs; and

WHEREAS, the Cottonwood County Plan includes a maintenance or implementation process including plan updates, integration of the plan into other planning documents and how Cottonwood County will maintain public participation and coordination; and

WHEREAS, the Plan has been shared with the Minnesota Division of Homeland Security and Emergency Management and the Federal Emergency Management Agency for review and comment; and

WHEREAS, the Cottonwood County All-Hazard Mitigation Plan will make the county and participating jurisdictions eligible to receive FEMA hazard mitigation assistance grants; and

WHEREAS, this is a multi-jurisdictional Plan and cities that participated in the planning process may choose to also adopt the County Plan.

NOW THEREFORE BE IT RESOLVED that Cottonwood County supports the hazard mitigation planning effort and wishes to adopt the Cottonwood County All-Hazard Mitigation Plan.

This Resolution was declared duly passed and adopted and was signed by the County Board Chairman and attested to by the County Auditor/Treasurer this 23rd day of August.

Ron Kuecker, County Board Chairman

Jan Johnson, County Auditor/Treasurer
Addendums

Addendums to the Cottonwood County All Hazard Mitigation Plan are available separately.

A. Statements of Intention by Jurisdiction

- Cottonwood County
- City of Bingham Lake
- City of Comfrey
- City of Jeffers
- City of Mountain Lake
- City of Storden
- City of Westbrook
- City of Windom
- Amboy Township
- Ann Township
- Carson Township
- Dale Township
- Germantown Township
- Great Bend Township
- Lakeside Township
- Midway Township
- Mountain Lake Township
- Rosehill Township
- Southbrook Township
- Storden Township
- Westbrook Township

B. Capabilities Assessment

C. All Hazards Mitigation List of Acronyms

D. Sample of Public Communication

E. Meeting Notes

F. HAZUS-MH Flood Scenario Report