Calhoun Countywide Multi-Hazard Mitigation Plan

April, 2011

Prepared for:

Calhoun County
Batchtown, Village of
Brussels, Village of
Hamburg, Village of
Hardin, Village of
Kampsville, Village of

Prepared By:

Stantec

In Partnership With:

IEMA
Illinois Emergency Management Agency

Prepared By Stantec | One Team Infinite Solutions

Calhoun Countywide Multi- Hazard Mitigation Plan

Calhoun County, Illinois

April 2011

Executive Summary

Natural hazards are an unavoidable part of daily life. The communities participating in this plan are subject to natural hazards that can impact the quality of life, and have the capability of destroying property, threatening lives, disrupting businesses and impacting infrastructure. Calhoun County has experienced natural hazards, including tornados, flooding, severe winter storms, extreme temperatures, and drought. There is little that citizens can do to control the forces of these events. However, citizens and communities can reduce the negative impact of natural hazards through mitigation measures. The Federal Emergency Management Agency (FEMA) defines hazard mitigation as "any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards." The purpose of this plan is to identify the risks associated with the hazards that threaten Calhoun County and identify ways to reduce these risks through mitigation activities for current structures and infrastructure and to lessen the impacts on future growth. These mitigation activities include structural projects, education and outreach efforts, capital improvement projects, etc. FEMA encourages the use of hazard mitigation to develop a complete document that can be modified and updated as needed.

Hazard Mitigation Grant Program

This plan was developed through a Hazard Mitigation Grant Program grant. The Hazard Mitigation Grant Program (HMGP) is intended to assist state and local governments in recovery efforts following a disaster and development of long term natural hazard reduction plans. The HMGP grant will assist Calhoun County in mitigating the exposure of the County and its residents to natural disasters through analysis and planning efforts. This plan was also developed with the cooperation of the Illinois Emergency Management Agency.

Table of Contents

EXECUTIVE SUMMARY E.1

1.0 INTRODUCTION 1

1.1 AREA CLIMATE 4
1.2 COUNTY WATERSHEDS 5
1.3 ADOPTION BY THE LOCAL GOVERNING BODY 7
1.4 JURISDICTION PARTICIPATION 7

2.0 PLANNING PROCESS 8

2.1 DESCRIPTION OF THE PLANNING PROCESS 8
2.2 THE PLANNING TEAM 9
2.3 PUBLIC INVOLVEMENT 10
2.3.1 Public Meetings 10
2.3.2 Multi-Media Outreach 11
2.3.3 Public Hazards Questionnaire 12
2.3.4 Public Review of Draft Plan 12
2.3.5 Final Plan Access 12
2.4 INCORPORATION OF EXISTING DOCUMENTS 12

3.0 RISK ASSESSMENT 14

3.1 IDENTIFYING HAZARDS 14
3.1.1 Natural Hazards Not Identified Within the Plan 14
3.1.2 Hazards Identified Within the Plan 16
3.2 PROFILING THE HAZARD 16
3.2.1 Drought 17
3.2.1.1 Description 17
3.2.1.2 Drought Impacts 19
3.2.1.3 Drought History 20
3.2.1.4 Future Probability 20
3.2.2 Earthquake 21
3.2.2.1 Description 21
3.2.2.2 Earthquake Magnitude 23
3.2.2.3 Earthquake Effects 24
3.2.2.4 Likelihood of Occurrence 25
3.2.3 Earthquake History 26
3.2.3.1 Probable Future Occurrences 28
3.2.4 Extreme Heat 29
3.2.4.1 Description 29

Table of Contents

3.2.4.2 Effects of Extreme Heat 30
3.2.4.3 Extreme Heat History 31
3.2.4.4 Future Probability 32
3.2.5 Flood 32
3.2.5.1 Description 32
3.2.5.2 National Flood Insurance Program 34
3.2.5.3 Common Flood-Related Terms 34
3.2.5.4 Flood Impacts 36
3.2.5.5 Background 37
3.2.5.6 Flood History 37
3.2.5.7 Future Probability 40
3.2.6 Severe Storm (Thunderstorm, Lightning, and Hail) 41
3.2.6.1 Descriptions 41
3.2.6.2 Effects of Severe Storms 43
3.2.6.3 Background 44
3.2.6.4 Severe Storm History 44
3.2.6.5 Future Probability 46
3.2.7 Severe Winter Storms 46
3.2.7.1 Description 46
3.2.7.2 Possible Effects 47
3.2.7.3 Severe Winter Storm History 48
3.2.7.4 Future Probability 49
3.2.8 Tornadoes 50
3.2.8.1 Description 50
3.2.8.2 Tornado Intensity 51
3.2.8.3 Tornado Impacts 52
3.2.8.4 Tornado History 53
3.2.8.5 Future Probability 54
3.3 ASSESSING VULNERABILITY 55
3.3.1 Assessing Vulnerability – Overview 55
3.3.2 Multi-Jurisdictional Risk Assessment Methodology 57
3.3.2.1 Assessing Vulnerability - Historical Occurrences and Future Probability 59
3.3.2.2 Assessing Vulnerability – Incorporating Structural Risk 59
3.3.2.3 Assessing Vulnerability – Incorporating Critical Facilities 61
3.3.2.4 Assessing Vulnerability – Incorporating Population 62
3.3.3 Identifying Structures and Estimating Losses 63
3.3.4 Assessing Vulnerability – Population at Risk 68
3.3.4.1 Existing Population at Risk 68
3.3.4.2 Population and Developmental Trends 69

4.0 MITIGATION STRATEGY 69

4.1 DEFINITION OF MITIGATION 69
4.2 LOCAL HAZARD MITIGATION GOALS 70
4.3 IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIVITIES 70

Table of Contents

4.3.1 Mitigation Activities by Type 73
4.4 IMPLEMENTATION OF MITIGATION ACTIVITIES 74
4.4.1 Activity Prioritization 74
4.4.2 Activity Benefit-Cost Review 75
4.4.3 Activity Funding and Implementation 75
4.5 LOCAL MITIGATION STRATEGY AND CAPABILITIES ASSESSMENT 75
4.5.1 Local Mitigation Practices 76
4.5.2 Available Funding Resources 77

5.0 PLAN MAINTENANCE 81

5.1 MONITORING, EVALUATING, AND UPDATING THE PLAN 81
5.1.1 Monitoring 81
5.1.2 Evaluating 81
5.1.3 Updating 81
5.2 IMPLEMENTATION THROUGH EXISTING PROGRAMS 82
5.3 CONTINUED PUBLIC PARTICIPATION 82

6.0 ADDITIONAL STATE REQUIREMENTS 82

7.0 CONCLUSION 83

Appendices:

Appendix A – Adoption Resolutions and Executive Orders
Appendix B – Documentation of Meetings
Appendix C – Hazard Mitigation Questionnaire
Appendix D – Questionnaire Results
Appendix E – Profiling Hazard Event Tables
Appendix F – Community Maps
Appendix G – National Climatic Data Center Event Records
Appendix H – Mitigation Action Items
Appendix I – Illinois Emergency Management Agency Worksheet 3a
Appendix J – Countywide Multi-Hazard Plan Crosswalk

Table of Contents

Figures:

Figure 1. Calhoun County (in red) location map
Figure 2. Calhoun County land cover map
Figure 3. Illinois Physiographic Regions
Figure 4. Calhoun County Watersheds
Figure 5. Palmer Drought Severity Index
Figure 6. Palmer Drought Severity Index Map, 1895-1995
Figure 7. IEMA Earthquake Intensity Probability Map
Figure 8. IEMA Earthquake Epicenter Map
Figure 9. Temperature versus Relative Humidity Scale
Figure 10. Home in Hamburg shows the high water mark from the 1997 flood.
Figure 11. Home in Hamburg was raised above the base flood elevation using FEMA grant funding.
Figure 12. Flooding structurally damaged this building during the 1993 flood.
Figure 13. This sandbag wall prevented floodwaters from impacting Hardin during the 1973 flood. At right is the Jersey County Grain Elevator.
Figure 14. The blizzard of 1978 caused drifts of several feet in height and shut down many communities across the Midwest for several days.
Figure 15. Wind Zones in the United States
Figure 16. Home in the County was partially destroyed and the trees in the background severely damaged due to a tornado.
Figure 17. Illinois Tornado Touchdowns, 1950-1998
Figure 18. The buildings on these properties were removed and a park developed in their place to reduce flood exposure.
Figure 19. Mitigation Activity Development Worksheet

Table of Contents

Tables:

Table 1. Land Cover Data
Table 2. Jurisdiction Represented by the Plan
Table 3. Stakeholder Meetings Scheduled
Table 4. Hazard Risk Factor Table Key
Table 5. Summary of Drought Risk Factors
Table 6. Modified Mercalli Intensity Scale for Earthquakes
Table 7. Summary of Earthquake Risk Factors
Table 8. Heat Index/Heat Disorders Impacts
Table 9. Summary of Extreme Heat Risk Factors
Table 10. NFIP Policies and Claims in Calhoun County
Table 11. Calhoun County Declarations – Floods
Table 12. Repetitive Loss Property Summary
Table 13. Flood Probability
Table 14. Summary of Flood Risk Factors
Table 15. Hail Conversion Chart
Table 16. Calhoun County Declarations - Floods
Table 17. Summary of Severe Storms Risk Factor
Table 18. Calhoun County Emergency Declarations – Severe Winter Storms
Table 19. Severe Winter Storms Risk Factors
Table 20. Fujita Scale for Tornadoes
Table 21. Tornado Probability
Table 22. Summary of Tornado Risk Factors
Table 23. Calhoun County Vulnerability Ranking
Table 24. Historical Occurrences and Future Probability
Table 25. Fiscal Vulnerability
Table 26. Vulnerable Critical Facilities
Table 27. Vulnerable Population
Table 28. Structural Vulnerability by Type for the Entire County
Table 29. Structural Vulnerability by Type for the Floodplains Only
Table 30. Critical Facilities – Countywide
Table 31. Critical Facilities – FEMA Mapped Flood Hazard Only
Table 32. Repetitive Loss
Table 33. Flood Vulnerable Population
Table 34. Activity Prioritization

Table of Contents

List of Acronyms:

CDBG	Community Development Block Grant
EMPG	Emergency Management Performance Grant
EOP	Emergency Operations Plan
ER	Emergency Relief
EWP	Emergency Watershed Protection
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Studies
FMA	Flood Mitigation Assistance Program
GIS	Geographic Information Systems
HAZUS-MH	Hazards U.S. Multi-Hazard
HI	Heat Index
HMGP	Hazard Mitigation Grant Program
IDNR	Illinois Department of Nartual Resources
IEMA	Illinois Emergency Management Agency
MMI	Modified Mercalli Intensity
NCDC	National Climatic Data Center
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
OSLAD	Open Space Lands Acquisition and Development
PA	Public Assistance Grant Program
PDSI	Palmer Drought Severity Index
RL	Repetitive Loss
SRL	Severe Repetitive Loss
STAPLEE	Social, Technical, Administrative, Political, Legal, Environmental, and Economic
USACE	United States Army Corps of Engineers
WRDA	Water Resources and Development Act

1.0 Introduction

Calhoun County is located in west-central Illinois, approximately 30 miles northwest of downtown St. Louis, Missouri. The county is bounded on the west and south by the Mississippi River, the east by the Illinois River, and the north by Pike County. Calhoun County is approximately 284 square miles in size, with 5,084 residents as of the 2000 U.S. Census. There are no bridges across the Mississippi River into Calhoun County, but there is one bridge across the Illinois River at Hardin and there are two ferries across the Illinois River and another that operates across the Mississippi River. The ferries across the Illinois River are the only two ferries operated by the Illinois Department of Transportation.

Figure 1. Calhoun County (in red) location map

There is not a predominant employment category in the County according to the 2000 Census; however, 8.4% of the population of Calhoun County works in the agricultural industry, compared to 1.0% statewide. The Census data also indicate that slightly over 50% of the workforce is employed outside of Calhoun County, with the majority working around St. Louis. Calhoun County is part of the St. Louis metropolitan statistical area. The per capita income for the residents of Calhoun County was $16,785, with a median household income of $34,375, which is 82% of the national median income.

There are five incorporated villages and eight unincorporated communities in Calhoun County. These are:

Villages: Batchtown, Brussels, Hamburg, Hardin, and Kampsville.

Unincorporated Communities: Beechville, Belleview, Deer Plain, Gilead, Golden Eagle, Meppen, Michael, and Mozier.

Community Information:

Village of Batchtown: Batchtown is approximately 1.9 square miles in size, with a population of 218 people according to the 2000 Census.

Village of Brussels: Brussels is a small community, only 0.6 square miles in size, with 141 residents, as of the 2000 Census.

Village of Hamburg: Hamburg lies on the Mississippi River in the north central part of Calhoun County. Hamburg covers 0.7 square miles, with a population of 126 people.

Village of Hardin: Hardin is the county seat of Calhoun County and is the largest community in the area. As of the 2000 Census, there were 959 people living in Hardin, which is 2.3 square miles in size. Hardin is on the Illinois River, in the center of Calhoun County.

Village of Kampsville: Kampsville is the northernmost incorporated community and is the second largest village in Calhoun County, with a population of 302 people. Kampsville is also the location of one of the ferries across the Illinois River.

Land use in the county is predominately agricultural. According to the land cover data, as calculated by 1999 and 2000 photometric analysis, 95% of Calhoun County is agricultural. Approximately 2% of the County is classified as urban and 1.3% of the County is classified as seasonally wet to permanently open water. Figure 2 shows the land cover of the County. The following table is a summary of the land cover data, provided by the Illinois Department of Agriculture.

Table 1. Land Cover Data

Cover Type	Percent Cover
Agricultural	31.9%
Forested	20.2%
Grassland	30.5%
Urban	12.1%
Wetland	2.7%
Water	2.7%

Source: Illinois Dept. of Commerce, Statewide Mosaic of Land Cover of Illinois, 2000

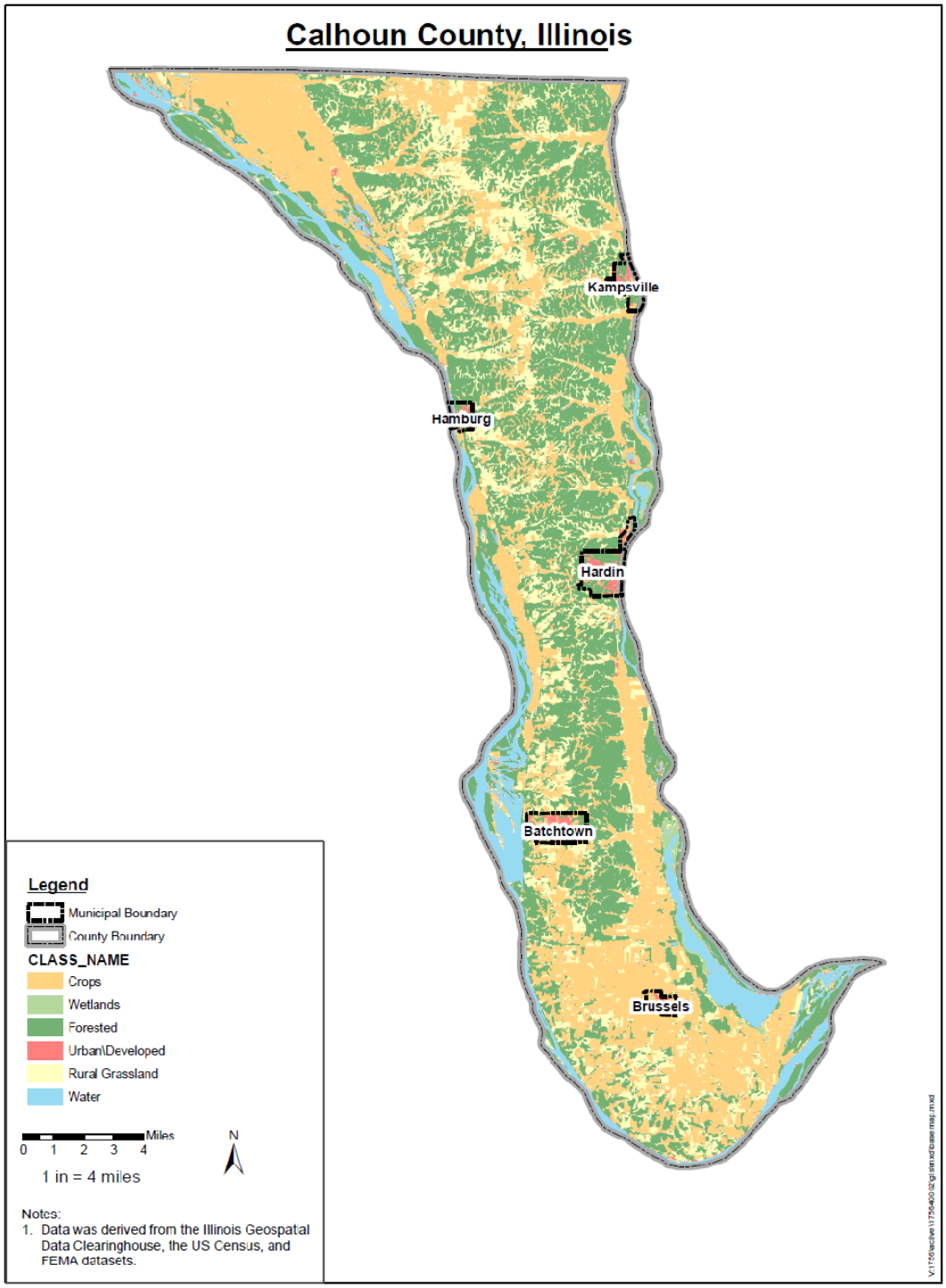
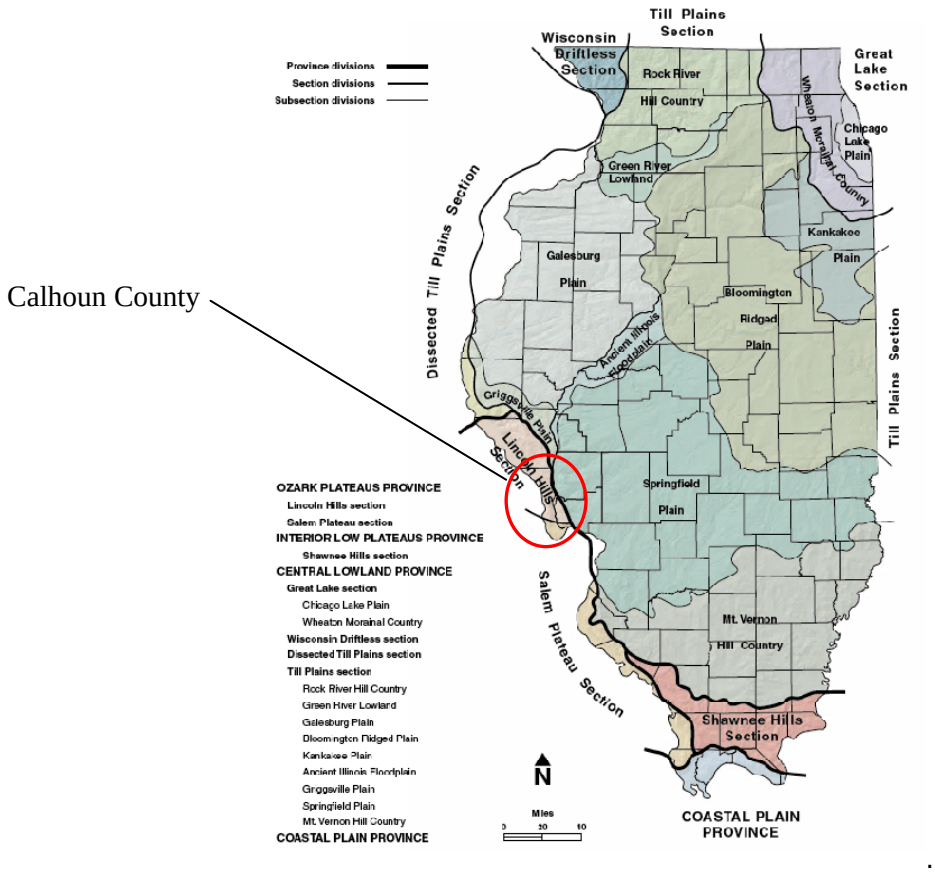


Figure 2. Calhoun County land cover map

1.1 AREA CLIMATE

The climate in Illinois is described as continental with all four seasons. There are generally substantial annual and diurnal temperature, humidity, and pressure system fluctuations, and the area has cold winters and hot summers. The average annual temperature in the central portion of the state, where Calhoun County and its jurisdictions are located, is approximately 56°F. During the summer, there is an average of 40 days with temperatures over 90°F, with an overall average high in the 80's during the summer. Temperatures for the winter season are: approximately 80 days at or below 32°F, with average highs in the mid 40's and lows in the teens. Calhoun County averages approximately 40 inches of precipitation per year, with snow and ice accounting for approximately 10 inches of that total each year.

The land area of Calhoun County is approximately 284 square miles with roughly 387.7 miles of mapped streams and rivers, not including the adjacent Illinois and Mississippi Rivers. The County is situated in the Lincoln Hills and Salem Plateau Sections of the Ozark Plateau physiographic region, as shown in the figure below. The topography is generally steeply sloped valleys with relatively flat floodplains and stream terraces through the majority of the county. Elevations range from more than 800 feet above sea level in the center of the county to less than 480 feet above sea level on the western and eastern sides of the county. The southern portion of the County, south of Schleeper Lane, is much flatter, with maximum elevations of approximately 600 feet above sea level. The southeastern portion of the county has been heavily impacted by the confluence of the Illinois and Mississippi Rivers, essentially becoming a delta of the Illinois River.



Source: Illinois State Geological Survey

Figure 3. Illinois Physiographic Regions

1.2 COUNTY WATERSHEDS

Calhoun County is divided between the Illinois and Mississippi River watersheds. The figure below shows the watershed divide in Calhoun County (red line). Calhoun County has many watersheds, which are fairly small (less than 20 square miles), draining into either the Mississippi or Illinois Rivers.

Figure 4. Calhoun County Watersheds

1.3 ADOPTION BY THE LOCAL GOVERNING BODY

The Calhoun Countywide Multi-Hazard Mitigation Plan, hereafter known as "the Plan" adheres to the guidelines outlined in *44 CFR, Section 201.6*.

As the Plan's Administrator, Calhoun County submitted the Plan to the Illinois Emergency Management Agency (IEMA) and the FEMA Region V for review and comment. After the state and federal reviewers certified that the Plan was approved, Calhoun County then forwarded the Plan to each participating jurisdiction for formal adoption. Signed copies of the executed orders for each jurisdiction are included in **Appendix A** of the Plan.

The following jurisdictions are represented by the Plan.

Table 2. Jurisdiction Represented by the Plan

Community	FEMA Community ID	Adoption Date
Batchtown, Village of	170877	
Brussels, Village of	170747	
Hamburg, Village of	170734	
Hardin, Village of	170738	
Kampsville, Village of	170735	
Calhoun County	170018	

1.4 JURISDICTION PARTICIPATION

At the start of the planning process, a stakeholder meeting was held, which included representation from four of the six jurisdictions within Calhoun County. The consultant hired to assist in the planning and authoring of the Plan explained the purpose of a Hazard Mitigation Plan and the requirements for inclusion in the Plan as follows:

a. Provide representation during planning meetings.

b. Submit an inventory of plans, data, and reports relevant to hazard mitigation planning.

c. Review and complete the Multi-Hazard Mitigation Survey at http://gis01.stantec.com/calhouncounty/.

d. Identify critical "at-risk" structures and facilities.

e. Develop community-wide mitigation goals.

f. Submit a prioritized list of mitigation activities.

g. Review and comment on the draft plan.

h. Incorporate the Plan into existing planning efforts.

i. Formally adopt the Plan.

j. Participate in plan maintenance through yearly reviews and five year updates.

All five communities and the County met the requirements for participation in the Plan.

2.0 Planning Process

The Calhoun Countywide Multi-Hazard Mitigation Plan is developed as a multi-hazard, multi-jurisdictional plan for the communities within Calhoun County, Illinois. The Calhoun County Emergency Services and Disaster Agency served as the Plan's administrator and is the primary point of contact for the Plan. Stantec Consulting Services Inc. (Stantec) assisted in the development of the plan, facilitated community coordination, and supported the County through the plan approval process.

2.1 DESCRIPTION OF THE PLANNING PROCESS

The process used to develop the Plan was based upon FEMA's 386-8 Multi-Jurisdictional Planning document. Specifically, the planning process focused upon soliciting comprehensive feedback from stakeholders and the general public through meetings, open houses, interactive questionnaires, and document comment forms.

Phases of the planning effort were consistent with the original scope of work included in the Fiscal Year 2010 Hazard Mitigation Grant Program grant application and complied with FEMA recommended approaches including:

a. Focusing toward including all jurisdictions within the County.

b. Forming a multi-tiered planning team with clearly defined roles and responsibilities.

c. Providing opportunities 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.

d. Providing extensive public outreach and opportunities for involvement.

e. Reviewing and incorporating existing plans, studies, reports, and technical information, as appropriate.

f. Conducting thorough hazard profiling and comprehensive risk assessment.

g. Developing mitigation goals and actions prioritized for each community.

h. Providing opportunities for the public to comment on the Plan during the drafting stage and prior to plan approval.

i. Developing plan maintenance procedures that keep the Plan up to date.

2.2 THE PLANNING TEAM

The planning process was designed to maximize stakeholder involvement and participation to create a viable plan, complete with risk identification and risk mitigation strategies. Public involvement was an integral part of the development of the Plan and provides access to a broader cross section of county residents than the elected officials and interested professionals in the stakeholder group. The planning process, however, primarily relied on stakeholder involvement and participation guidance throughout all phases of the Plan.

Stantec was contracted by Calhoun County to facilitate the Plan's development and to perform analysis and mapping and support development of the plan.

Together, the Planning Team was represented by the following groups:

Chief Elected Officials. Consisted of the County's senior leadership for each participating jurisdiction including the County Chairman, Board Members, and Village Presidents. This group authorized and committed the necessary resources and personnel to ensure that each jurisdiction was properly represented and met the participation requirements.

Planning Committee. Consisted of one person as the primary point of contact from each jurisdiction responsible for collecting data, reviewing plans/studies, facilitating public input, developing mitigation goals and actions for each of their jurisdictions, and helping draft the Plan. The Planning Committee was also responsible for coordinating future plan maintenance including yearly reviews and five-year updates.

Plan Consultant. Stantec was responsible for facilitating plan development, analysis, mapping, and document preparation support.

Appendix B contains a list of all meeting participants and the jurisdictions they represented.

2.3 PUBLIC INVOLVEMENT

The Calhoun County planning process was designed to maximize public participation. Public participation, for the purpose of the Plan, is defined as an opportunity for each jurisdiction and the citizens of that community to participate in the planning process. Opportunities for public participation were offered through multiple public stakeholder meetings and public informational meetings, a publicly available website, a questionnaire, and additional future plan maintenance opportunities. In addition, representatives of neighboring counties and jurisdictions were solicited for their input into the planning process and the results of the plan. Documentation announcing the meetings and soliciting input from the public and stakeholders is available in **Appendix B**.

Opportunities for the public to participate were provided in the following ways:

a. Planning Team stakeholder meetings were open to the public.

b. Open public meetings were held to inform the public of the planning process and to request participation.

c. A questionnaire was placed online allowing the public to participate in the Plan and give their additional feedback for possible plan inclusion.

d. Draft plan text and supporting information were made available via the website for public input and review.

e. Public opportunities for review of the final plan.

f. Placement of the draft plan at executive offices as well as other community centers.

In addition, the above opportunities were advertised in local newspapers and by local media, including radio. The Planning Team worked together to incorporate relevant feedback from the public into all phases of plan development.

2.3.1 Public Meetings

Three public meetings were held during the development of the Plan, as shown in the table below. The meetings were publicized through local newspaper announcements, radio announcements, letters to public officials, and a web link from the County's government homepage.

Table 3. Stakeholder Meetings Scheduled		
Date	**Purpose of Meeting**	**Location**
03/04/10	Kickoff Meeting, Data Collection	Calhoun County High School auditorium
06/24/10	Hazard Assessment and Mitigation Activities	Calhoun County High School auditorium
03/24/11	Mitigation Activity Implementation and Funding	Calhoun County High School auditorium

The Plan Kickoff Meeting held on March 4, 2010 included a presentation to inform community representatives and the public about the hazard mitigation planning process and the benefits for each jurisdiction. The focus of the meeting was to introduce the planning process, request assistance from the public/private sector and citizens, collect hazard data and critical facilities, and encourage continued participation in the planning and implementation process. During this meeting, Mr. Gene Breden of the Calhoun County Emergency Services and Disaster Agency was identified as the Plan's primary point of contact for public input or questions and the primary contact between the County and the Plan's consultant.

The Stakeholder Hazard Assessment and Mitigation Activities Meeting held on June 24, 2010, included a presentation sharing the results of the hazard identification surveys, hazard profiles, and hazard assessments. During this meeting, participants were encouraged to define mitigation goals and consider actions in a manner that weighted priority, funding, and mitigation methodology.

The planning consultant and local plan administrators provided guidance throughout both meetings and shared ideas for maximizing stakeholder input. Minutes for each meeting were kept by Stantec and made available to the public, as well as the presentations. They are provided in **Appendix B** of this Plan.

2.3.2 Multi-Media Outreach

The Planning Team worked to develop and host a website for purposes of promoting planning meetings, hazard questionnaires, storing documents, facilitating Plan review and providing general plan information to the public and stakeholders.

The site allowed users to upload, download, and access sections of the hazard plan and supporting documents. The result allowed the public to easily obtain and comment on the Plan during both draft stages and prior to Plan adoption. The site was also used to disseminate brochures, past presentations, meeting minutes, other example hazard plans,

promote FEMA mitigation project programs and link to the Illinois Emergency Management Agency for additional support.

Meeting announcements and discussions about the hazard mitigation planning process were also published in local newspapers and community notifications.

2.3.3 Public Hazards Questionnaire

The Planning Team worked to develop and approve a hazard questionnaire, which is attached as **Appendix C**. The purpose was to solicit additional feedback from the community in regard to perceived threats, vulnerabilities and general awareness of the risks associated with natural hazards. Questionnaires and brochures were disseminated to community representatives and also made available on the Hazard Mitigation Planning website: http://gis01.stantec.com/calhouncounty.

Between promoting the survey in local newspapers, the website, and the Planning Team, 21 participants completed the survey. The results were ultimately used to support the Plan's Risk Assessment. Questionnaire results are summarized in **Appendix D**.

2.3.4 Public Review of Draft Plan

The draft plan was assembled and provided to the public and Planning Team for review on February 24, 2011. The public and planning teams were given two weeks to provide comments. Hardcopy versions of the draft plan were delivered to each jurisdiction's City Hall, while electronic versions were made accessible from the Hazard Mitigation Plan website: http://gis01.stantec.com/calhouncounty. A press release was issued to encourage the public to access and comment on the plan. Comments received were then submitted to the planning consultant during the pre-approval plan review.

2.3.5 Final Plan Access

Following local adoption and FEMA approval of the Plan, the document will be made available to the public at each municipal office building in the county, including the offices of the Villages of Batchtown, Brussels, Hamburg, Hardin, and Kampsville; and, the Calhoun County government center. In addition, the document will be posted temporarily at the project website: http://gis01.stantec.com/calhouncounty.

2.4 INCORPORATION OF EXISTING DOCUMENTS

Existing plans, studies, reports, and technical information were collected from the communities during the planning process and at meetings. The Planning Team members reviewed and identified common problems, development policies, mitigation strategies, and other policies, plans, programs, and regulations. As part of this effort, the Team contacted

numerous agencies seeking local hazard data, existing plans, partnerships, common goals, projects, and commitment to an all natural hazards mitigation plan. This outreach included soliciting information from federal, state, and local resources.

The following are examples of the types of information used to identify natural hazards, vulnerable areas and assets, mitigation actions, and mitigation projects.

Zoning and Subdivision Ordinances. The ordinances adopted by the County prohibit most development in floodplains and "land subject to inundation" to minimize the danger and financial losses of flooding. The Zoning Ordinance does allow development which would not be overly impacted by flooding, such as parks, golf courses, playgrounds, etc.

Emergency Operations Plan (EOP). Calhoun County maintains an Emergency Operations Plan. The plan is a source for hazard identification and emergency operation procedures. Procedures include lists of roles and responsibilities of persons/departments in charge of dispatching support during a natural hazard, rules that are followed, evacuation routes, etc.

Floodplain Ordinance. This ordinance was adopted in 2004 to prevent damages caused by flooding and to regulate development in the floodplain. The permit requires existing buildings impacted by a flood to be re-built in such a way to minimize future damages. In addition, the ordinance prohibits development in the floodplain without a permit from the Zoning Administrator. No development in the flood hazard area is permitted to increase the base flood elevation or impact other properties.

Flood Insurance Rate Maps (FIRMs). Calhoun County's Flood Insurance Rate Maps were published between 1981 and 1984. The data was digitized by the State of Illinois and the data was used in correlation with geographic information systems (GIS) to estimate structural vulnerability and critical facilities that are located within area floodplains.

Illinois State Hazard Mitigation Plan. The state hazard mitigation plan was useful in providing information for each hazard (i.e. identifying hazards), vulnerability classes, and assessment methods.

National Flood Insurance Program (NFIP). The County and each of the communities, with the exception of Batchtown, enrolled in the NFIP from 1981 through 1984. The NFIP establishes standards for development in the floodplain and provides flood insurance to property owners. The NFIP also maintains a database, which contains information regarding the number and value of flood insurance policies in each jurisdiction, the value of any claims paid, and the number of repetitive loss structures in the communities.

These plans, reports, and studies are incorporated or referenced throughout the Plan. If any plans, report, or studies were not included in the plan or if new documents are published, they may be added to the Plan during the next update.

3.0 Risk Assessment

The Risk Assessment portion of this Plan identifies, profiles, and assesses the natural hazards that are known to affect Calhoun County. The process incorporates describing each hazard and its effects, researching past events, documenting recorded damages, and assessing the probability and consequences of the event happening again.

3.1 IDENTIFYING HAZARDS

Natural hazards in the United States occur in many forms. They can be weather related such as flash floods, severe thunderstorms (hail, wind, and tornadoes), severe winter storms (snow, ice, and frigid temperatures), and coastal storms (hurricanes, storm surges, and tsunamis). Geological hazards can include volcanoes, earthquakes, and landslides. Hazards can be climatologic including drought, excessive heat, and wildfires; or they can also be driven by topography and hydrology, which affects riverine flooding from upstream rain or snow events. Understanding and identifying these hazards and their relationship to land, infrastructure, and population is the first step to achieving risk awareness.

Hazards known to impact the U.S. include:

- Avalanche
- Coastal Storms
- Drought
- Earthquake
- Extreme Heat
- Flood
- Hailstorm
- Hurricane
- Mine Subsidence
- Severe Winter Storm
- Tornado
- Tsunami
- Volcano
- Wildfire
- Windstorm

The Illinois Natural Hazard Mitigation Plan considered the following natural hazards:

- Drought
- Earthquake
- Extreme Heat
- Floods
- Severe Storms and Tornadoes
- Severe Winter Storms

3.1.1 Natural Hazards Not Identified Within the Plan

Some natural hazards have little or no effect on Calhoun County and were not addressed in this Plan. They include avalanches, landslides, coastal storms, hurricanes, mine subsidence or karst, volcanoes, and wildfires. While, these hazards were determined to present little to

no threat within Calhoun County, they are not precluded from being incorporated into future updates of the Plan as new information is discovered.

The following section defines why these hazards were excluded from the Plan.

Avalanche and Landslides. The topography and climate of Calhoun County area are not conducive to the occurrence of avalanches or landslides. No historical events have been recorded in the Calhoun County area.

Coastal Storms and Hurricanes. Calhoun County area is approximately 800 miles from the nearest coast. The immediate effects of coastal storms (hurricanes, storm surge, and tsunamis) are not felt in Calhoun County. The secondary effects, or remnants of hurricanes, may produce severe thunderstorms and flooding in the area and those hazards are addressed separately by the Plan.

Subsidence. Mine subsidence is defined as the collapse of underground mines resulting in direct damage to a surface structure. Land subsidence occurs when the ground sinks to a lower than normal level, typically as a result of karst geology. Calhoun County has no active or closed mines; therefore, this does not present a threat and is not covered in this Plan.

Volcanoes. More than 50 volcanoes in the U.S. have erupted one or more times in the past 200 years. Volcanoes produce a wide variety of hazards that can take lives and destroy property. Active volcanoes in North America are in California, Oregon, Washington, Alaska, Mexico, Canada, and the Caribbean Islands. Large explosive eruptions can endanger people and property hundreds of miles away and even affect global climate. However, there are no active volcanoes within 950 miles of the Calhoun County area. Volcanic activity as a hazard is judged to be minimal and will not be addressed in this Plan.

Wildfire. A wildfire is an uncontrollable burning of grasslands, brush, or woodlands. The potential for wildfire depends upon surface fuel characteristics, weather conditions, recent climate conditions, topography, and fire behavior. Neither Calhoun County nor its jurisdictions have a history of wildfire; thus, fires will not be addressed in this Plan.

Data sources utilized to determine which hazards to focus on include historic data, reports, plans, flood ordinances, past hazard events, flood insurance claims, land use regulations for hazard data, local records of the emergency management offices, local newspapers, historical knowledge of Planning Team participants, local officials and community members, as well as GIS information from Illinois state sources and the Hazards U.S. Multi-Hazard software (HAZUS-MH).

Additional research used to identify hazards included interviews with knowledgeable officials and residents in the planning area, the use of FEMA and other web based databases and information sources that identify hazards by geographic locations, United States Army Corps of Engineers (USACE) flood data, FIRM, Flood Insurance Studies (FIS), GIS, and additional available historic data including information on past hazard events.

3.1.2 Hazards Identified Within the Plan

The Planning Team carefully considered regional hazard data, past documented events, and other known sources of hazard information to identify the natural hazards most likely to affect Calhoun County. The hazards identified are also consistent with those detailed within the State's Hazard Mitigation Plan and are:

- Drought
- Earthquake
- Extreme Heat
- Floods
- Severe Storms
- Severe Winter Storms
- Tornadoes

3.2 PROFILING THE HAZARD

The following section is provided to describe each hazard, its associated causes and effects, and the historical occurrences of each of the hazards in Calhoun County. These Hazard Profiles have been created using the best available data from a variety of resources including, but not limited to, the National Climatic Data Center (NCDC), National Weather Service (NWS), Illinois State Water Survey, Illinois State Climatology Center, FEMA Hazard Mapping website, local agencies and newspaper articles, and the approved Illinois State Hazard Mitigation Plan. As part of the profile, each hazard has a summary table like the table below, which defines each variable. The tables are presented individually with each hazard and are also collected together in **Appendix E**.

In addition, a map of each community is presented in **Appendix F**. For the majority of the hazards identified in this plan, the entire County is at-risk equally. In other words, a thunderstorm or earthquake is equally likely to impact a community without regard to geography. However, for floods, the impacted area is confined to the FEMA-mapped 100-year floodplain for this plan. Therefore, each map also shows the floodplains in the community, if there are any, and the hazard assessment for flooding was based on these geographical boundaries.

Table 4. Hazard Risk Factor Table Key	
Period of Occurrence	The normal time of year when a hazard occurs.
Number of Events to Date	The number of past events reported to the NCDC between 1950 and 2009.
Annual Chance Probability	The number of past events divided by time of record.
Location of Impacts	The area most commonly impacted by a natural hazard.
Potential Impacts	Impacts typically associated with a particular natural hazard.
Injury or Death	The number of injuries or deaths reported to the NCDC.

3.2.1 Drought

3.2.1.1 Description

A drought is defined as the cumulative deficit of precipitation relative to what is normal for a region over an extended period of time. Unlike other natural hazards, a drought is a non-event that evolves as a prolonged dry spell. Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought is a very dangerous situation.

When a drought begins or ends may be difficult to determine. Because the impacts of a drought accumulate slowly at first, a drought may not be recognized until it has become well established. A drought can be short, lasting just a few months, or persist for years before climatic conditions return to normal. While drought conditions can occur at any time throughout the year, the most damaging time is during the summer months due to the high temperatures. High temperatures, prolonged high winds, and low relative humidity can aggravate drought conditions.

The many aspects of drought reflect its varied impacts on people and the environment. Droughts can lead to economic losses such as unemployment, decreased land values, and agronomic losses. In 1998, over two billion dollars in property loss was credited to drought in the U.S.

The Palmer Drought Severity Index (PDSI) is the precipitation classification system used in the U.S. The PDSI was developed in 1965 and is a model used to estimate available water capacity based on recent precipitation and temperatures, in combination with the seasonal demand for water. The PDSI is an important climatological tool for evaluating the scope, severity, and frequency of prolonged periods of abnormally dry or wet weather. It can be used to help delineate disaster areas and indicate the availability of irrigation water supplies,

reservoir levels, range conditions, amount of stock water, and potential intensity of forest fires.

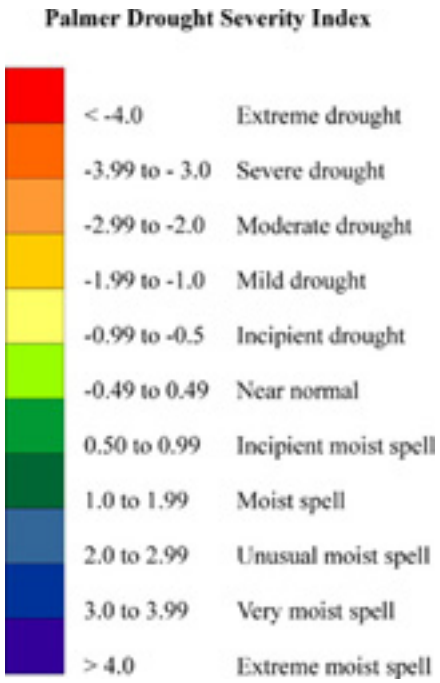


Figure 5. Palmer Drought Severity Index

Drought is measured in the PDSI according to the level of recorded precipitation against the average, or normal, amount of precipitation for a region. In the 100-year map for 1895 to 1995 below, Calhoun County and its multiple jurisdictions are within the 5% to 9.9% range for having a PDSI less than or equal to -3 (severe to extreme drought rating). In other words, there is a 5-10% annual probability of Calhoun County experiencing a severe or extreme drought.

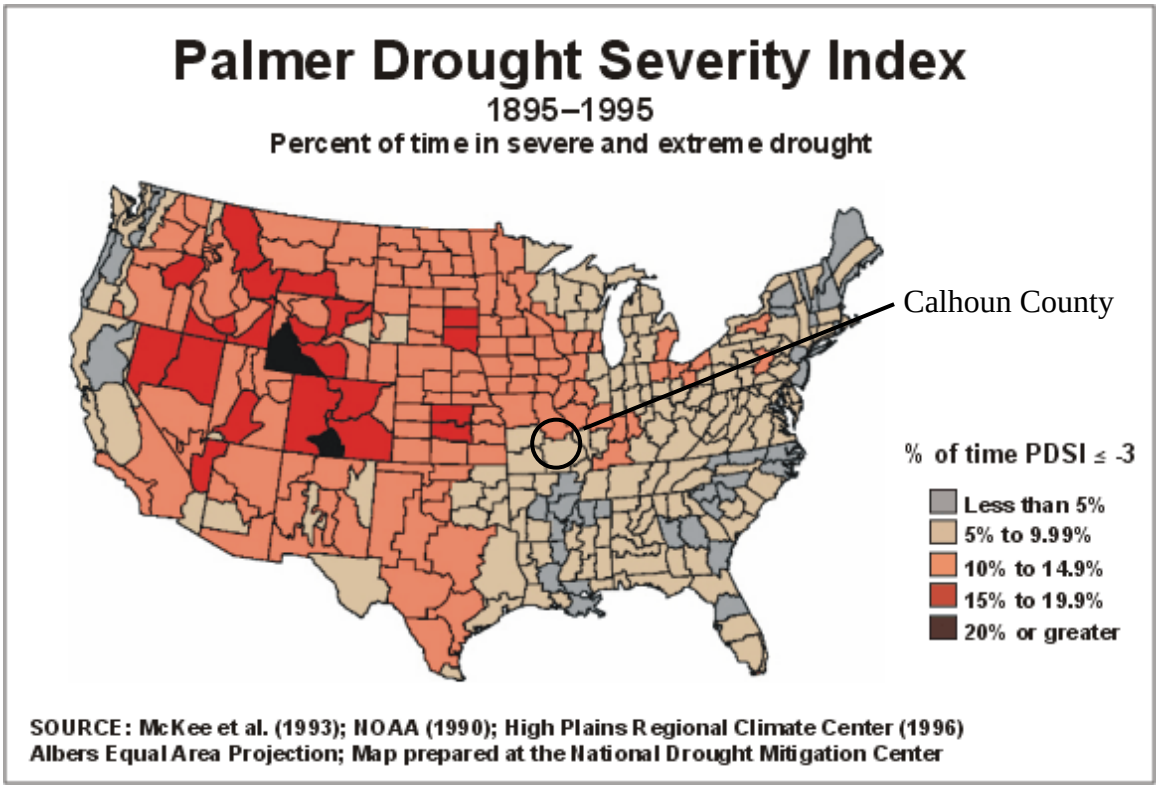


Figure 6. Palmer Drought Severity Index Map, 1895-1995

3.2.1.2 Drought Impacts

Crop failure is the most apparent effect of drought in that it has a direct impact on the economy and, in many cases, health (nutrition) of the population that is affected by it. Due to a lack of water and moisture in the soil, many crops will not produce normally or efficiently. In many cases, the crops may be lost entirely, causing loss of income to the farm and, potentially, loss of jobs for farm hands.

Water shortage is a very serious effect of drought in that the availability of potable water is severely decreased when drought conditions persist, especially if the water source is surface water. Springs, wells, streams, and reservoirs have been known to run dry due to the decrease in ground water, and, in extreme cases, navigable rivers have become unsafe for navigation as a result of drought.

Fire susceptibility is also increased with the lack of moisture associated with a drought. Dry conditions have been known to promote the occurrence of widespread wildfires and allow fires to spread more rapidly due to the dryness of the vegetation. In cases of extreme or prolonged drought, environmental degradation in the forms of erosion and ecological damage can be seen. As moisture in topsoil decreases and the ground becomes drier, the susceptibility to windblown erosion increases. As a drought is prolonged, root systems can be damaged and/or destroyed resulting in loss of habitat for some species and causing long-

term loss of productivity. In addition, during extended drought situations, the soil surrounding structures may subside, creating cracks in foundations and separation of foundations from above ground portions of the structure.

In Calhoun County, drought could lower river levels on the Illinois and Mississippi Rivers and low surface water levels can impact groundwater levels, thus impacting the sources of drinking water in the County.

3.2.1.3 Drought History

Information sources for this section include the NWS, the NCDC, and newspaper archives. See **Appendix G** for NCDC events for Calhoun County.

The following is an example of a drought event impacting Calhoun County:

> *Illinois experienced one of the driest spring, summer and fall periods on record from March 2005 to November 2005. This time frame of extreme drought lead to many problems felt throughout Illinois. Much of Illinois was declared an agriculture disaster by early August, several water wells dried up, and outdoor water restrictions/bans were put in place. Not only did the agriculture business suffer, but the Illinois River levels were too low to handle barges to carry the crops that did survive. An agricultural disaster was declared across most of the state, allowing farmers to obtain subsidized loans from the USDA*.

3.2.1.4 Future Probability

The probability of future occurrences calculation was based on drought type and number of past occurrences found in the table below. The probability is a 2% chance per year and could affect any jurisdiction within the county. Future updates should include information on a jurisdictional basis when possible. The table below summarizes the number of droughts since 1950, as recorded by the NCDC, along with the probability of a future drought based on the historic likelihood.

Table 5. Summary of Drought Risk Factors

Period of Occurrence	Generally during summer months or extended periods of no precipitation.
Number of Events to Date	1
Annual Chance Probability	2%
Location of Impacts	The most severe impacts are associated with agricultural land uses; however, water-related tourism industries may be impacted as well.

Table 5. Summary of Drought Risk Factors	
Potential Impacts	Activities that rely heavily on high water usage may be impacted significantly, including agriculture, tourism, wildlife protection, municipal water usage, commerce, recreation, and electric power generation. Droughts can lead to economic losses such as unemployment, decreased land values, and agronomic losses. Minimal risk of damage or cracking to structural foundations, due to soils.
Injury or Death	None Reported

3.2.2 Earthquake

3.2.2.1 Description

An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. The forces of plate tectonics have shaped the earth as the huge plates forming the earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual; at other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free releasing the stored energy and producing seismic waves, generating an earthquake.

Ground motion is the movement of the earth’s surface during earthquakes or explosions and is the catalyst for most of the damage during an earthquake. Ground motions are amplified by soft soils overlying hard bedrock, referred to as *ground motion amplification*. Ground motion amplification can cause an excess amount of damage during an earthquake, even to sites very far from the epicenter.

Earthquakes can affect hundreds of thousands of square miles; cause damage to property measured in the tens of billions of dollars; result in fatalities and injuries to widespread populations; and disrupt the social and economic functioning of the affected area. Earthquakes can collapse buildings and bridges, disrupt utilities, and sometimes trigger secondary disasters, such as landslides, avalanches, flash floods, fires, and destructive ocean waves (tsunamis). During an earthquake, buildings with foundations resting on unconsolidated fill and other unstable soil and trailers and homes not tied to their foundations are at special risk because they can be shaken off of their foundations.

Most property damage and earthquake-related deaths are caused by the failure and collapse of structures. The level of damage depends upon the amplitude and duration of the shaking, which are directly related to the earthquake size, distance from the fault site, and regional geology.

Earthquake impacts may be highly variable depending on the location of the epicenter, demographics, geology, topography, and building codes. The Northridge, California, earthquake of January 17, 1994, struck a modern urban environment generally designed to withstand the forces of earthquakes. Relatively few lives were lost due to the earthquake, but its economic cost was estimated at $20 billion. Exactly one year later in Kobe, Japan, a densely-populated community less prepared for earthquakes than Northridge, was devastated by the most costly earthquake ever to occur. Property losses were projected at $96 billion, and at least 5,378 people were killed. These two earthquakes tested building codes and construction practices, as well as emergency preparedness and response procedures.

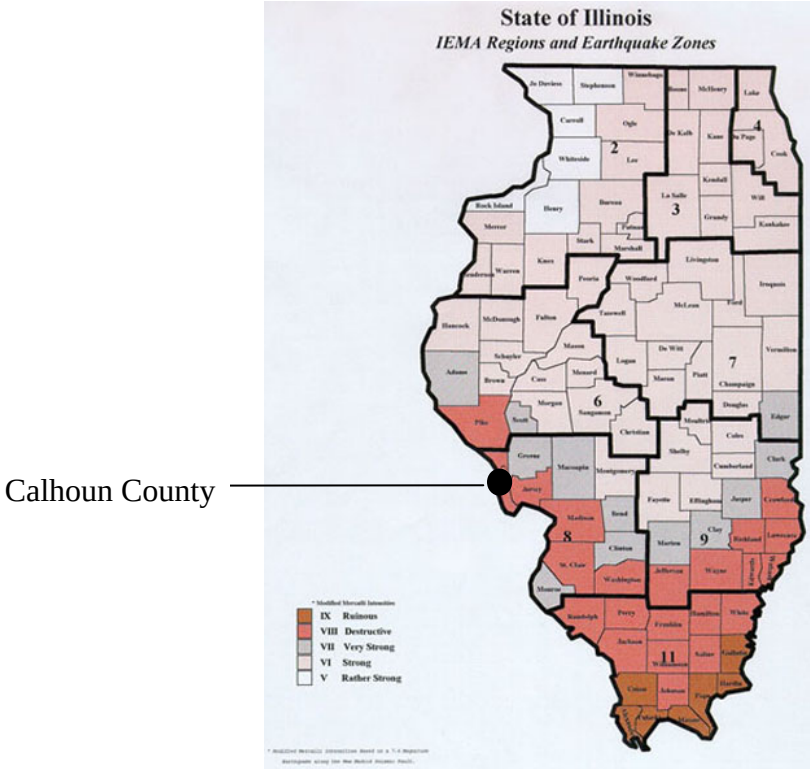


Figure 7. IEMA Earthquake Intensity Probability Map

The map above shows the relative probability of an area experiencing an earthquake of a relative intensity. California experiences the most frequent damaging earthquakes, but the largest earthquakes ever felt in the continental U.S. were along the New Madrid Fault in Missouri, where a series of quakes over three months in 1811-1812 included three quakes larger than a magnitude eight (8) on the Richter Scale. These earthquakes were felt over the entire eastern U.S., with portions of Missouri, Tennessee, Kentucky, Indiana, Illinois, Ohio, Alabama, Arkansas, and Mississippi experiencing the strongest ground shaking. Southern

Illinois would be severely impacted by an earthquake stemming from either the New Madrid Fault system around southern Missouri or the Wabash Valley fault system in eastern Illinois and western Indiana.

3.2.2.2 Earthquake Magnitude

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale that describes the energy release of an earthquake through a measure of shock wave amplitude. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale.

The Richter magnitude scale measures an earthquake's magnitude using an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude. The earthquake's magnitude is expressed in whole numbers and decimal fractions. Each whole number increase in magnitude represents a 10-fold increase in measured wave amplitude, or a release of 32 times more energy than the preceding whole number value.

The Modified Mercalli Scale measures the effect of an earthquake on the earth's surface. Composed of 12 increasing levels of intensity that range from unnoticeable shaking to catastrophic destruction, the scale is designated by Roman numerals. The intensity of each event corresponds with Roman numerals, with I corresponding to imperceptible (instrumental) events, IV corresponding to moderate (felt by people awake), to XII for catastrophic (total destruction). The lower values of the scale detail the manner in which people feel the earthquake, while the increasing values are based on observed structural damage. The intensity values are assigned after gathering responses to questionnaires administered to postmasters in affected areas in the aftermath of the earthquake.

A detailed description of the Modified Mercalli Scale of Earthquake Intensity and its correspondence to the Richter Scale is given in **Table 6**.

Table 6. Modified Mercalli Intensity Scale for Earthquakes

Scale	Intensity	Description	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only on seismographs	
II	Feeble	Some people feel it	<4.2
III	Slight	Felt by people resting; like a truck rumbling by	
IV	Moderate	Felt by people walking	
V	Slightly Strong	Sleepers awake; church bells ring	<4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves	<5.4

Table 6. Modified Mercalli Intensity Scale for Earthquakes

Scale	Intensity	Description	Corresponding Richter Scale Magnitude
VII	Very Strong	Mild Alarm; walls crack; plaster falls	<6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides are widespread	<7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards	<8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves	>8.1

Earthquakes strike suddenly and without warning and can occur at any time of the year, and at any time of the day or night. On a yearly basis, 70 to 75 damaging earthquakes occur throughout the world. Estimates of losses from a future earthquake in the U.S. approach $200 billion. There are 45 states and territories in the US at moderate to very high risk from earthquakes.

3.2.2.3 Earthquake Effects

The effects from earthquakes are caused by ground shaking, surface faulting, ground failure, and less commonly, tsunamis. Ground shaking is a term used to describe the vibration of the ground during an earthquake. As a generalization, the severity of ground shaking increases as magnitude increases, and decreases as distance from the source increases. Surface faulting is the differential movement of the two sides of a fracture at the earth's surface. Death and injuries from surface faulting are very unlikely, but casualties can occur indirectly through fault damage to structures.

Ground failure many times is induced by liquefaction which is a physical process, not a type of ground failure. Liquefaction occurs due to the shaking associated with an earthquake. As the seismic waves move through a soil, the soil temporarily loses strength and acts like a viscous fluid rather than solid soils. Lateral spreads involve the lateral movement of large blocks of soil as a result of liquefaction in a subsurface layer. Lateral spreads generally develop on gentle slopes, most commonly on those between 0.3 and 3 degrees. Horizontal movements on lateral spreads commonly are as much as 10 to 15 feet, but, where slopes

are particularly favorable and the duration of ground shaking is long, lateral movement may be as much as 100 to 150 feet. Lateral spreads usually break up internally, forming numerous fissures and scarps.

Earthquakes can impact human life, health and public safety. Power outages, utility and infrastructure damage, structural damage, fire outbreaks, damaged or destroyed critical facilities, and hazardous material releases are all potential impacts following an earthquake event. Travel to any location can be extremely dangerous after an earthquake and should be avoided if possible due to road failures and fallen utility lines.

Aftershocks and secondary events often occur after the main quake and could trigger landslides, release of hazardous materials, and dam failure (which could lead to flooding). The greatest hazard potential for earthquakes exists in highly populated areas, because these areas tend to have a greater number of tall buildings that are more vulnerable to seismic impact. Buildings and infrastructure (roads, bridges, etc.) built before the 1960s are also generally more susceptible to seismic movement than newer construction.

Geology also strongly impacts the severity and geographic extent of earthquake damages. Although earthquakes in the central or eastern U.S. occur less frequently, they affect much larger areas than earthquakes of similar magnitude in the western U.S. For example, the San Francisco earthquake of 1906 (magnitude 7.8) was felt 350 miles away in the middle of Nevada, whereas the New Madrid earthquake of December 1811 (magnitude 8.0) rang church bells in Boston, Massachusetts, 1,000 miles away. Differences in geology east and west of the Rocky Mountains cause this strong contrast.

3.2.2.4 Likelihood of Occurrence

The goal of earthquake prediction is to give warning of potentially damaging earthquakes early enough to allow appropriate response to the disaster, enabling people to minimize loss of life and property. A primary goal of earthquake research is to increase the reliability of earthquake probability estimates. Ultimately, scientists would like to be able to specify a high probability for a specific earthquake, on a particular fault, within a particular year. Scientists estimate earthquake probabilities in two ways: by studying the history of large earthquakes in a specific area, and by the rate at which strain accumulates in the rock.

Scientists study the past frequency of large earthquakes in order to determine the future likelihood of similar large shocks. For example, if a region has experienced four magnitude 7 or larger earthquakes during 200 years of recorded history, and if these shocks occurred randomly in time, then scientists would assign a 50 percent probability to the occurrence of another magnitude 7 or larger quake in the region during the next 50 years.

But in many places, the assumption of random occurrence with time may not be true, because when strain is released along one part of the fault system, it may actually increase on another part. Four magnitude 6.8 or larger earthquakes and many magnitude 6 - 6.5 shocks occurred in the San Francisco Bay region during the 75 years between 1836 and 1911. For the next 68 years (until 1979), no earthquakes of magnitude 6 or larger occurred in the region. Beginning with a magnitude 6.0 shock in 1979, the earthquake activity in the region increased dramatically; between 1979 and 1989, there were four, magnitude 6 or greater earthquakes, including the magnitude 7.1 Loma Prieta earthquake.

3.2.3 Earthquake History

Illinois has had nearly 250 known earthquakes occur over the past two centuries (**Figure 8)**; though very few of them have caused damages or injuries. Approximately 80% of the recorded earthquakes occurred in southern Illinois, but there have been no recorded earthquakes centered in Calhoun County. However, the movement of earthquake vibrations through the bedrock of the central U.S. can affect significantly larger areas than earthquakes in the western U.S. Bedrock in the eastern U.S. is older, intact, and strong, compared to the weaker and more broken bedrock of the west. Because of this difference, earthquakes are felt and cause damage over an area 15 to 20 times larger than California earthquakes with similar magnitudes.

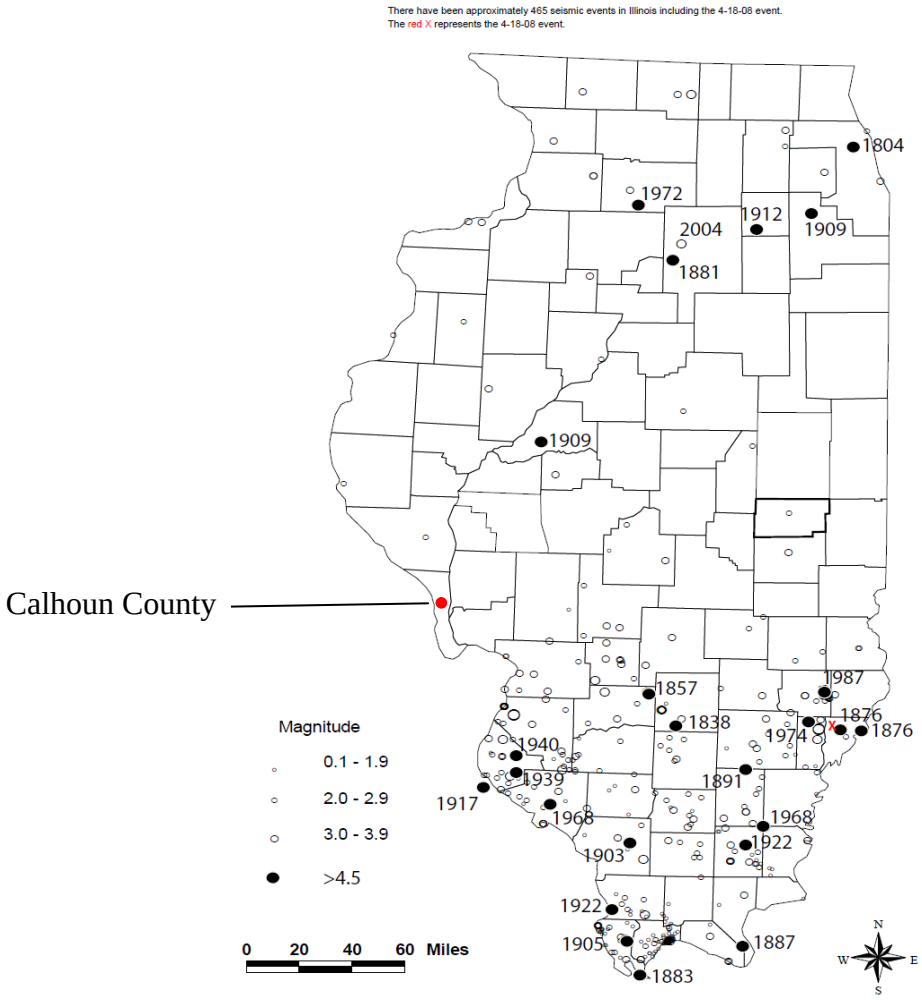


Figure 8. IEMA Earthquake Epicenter Map

An earthquake occurred on April 18, 2008 in southeastern Illinois (indicated by the red X) with a magnitude of 5.4. The quake was felt in Milwaukee, Atlanta, Nebraska, and Cincinnati. For the most part, the earthquake did no damage except to the immediate area around the epicenter and predominately caused cracked masonry and drywall.

Several smaller earthquakes have occurred in the region over the past century; however, most earthquakes cause minimal damage to the impacted area. There are no known occurrences of an earthquake in Calhoun County for 200 years and any earthquake impacting the County has caused only minor damages, such as cracked plaster or mortar. The results of the public survey indicated residents of the County were only somewhat concerned about earthquakes impacting the area.

Calhoun County has some unique challenges in regard to earthquakes because of the unique topography and geological setting of the county. Unconsolidated materials, such as

soils and sediments, amplify earthquake motion much more than bedrock. A study utilizing two of the United States Geological Survey seismograph stations in St. Louis indicated the ground motion was amplified ten times in the floodplain over the motion observed at an upland station. Consequently, a similar result would be expected in Calhoun County. The damages would be expected to be most severe in the floodplains of the county, where Hamburg, Hardin, and Kampsville are located.

3.2.3.1 Probable Future Occurrences

There is no jurisdictional dollar loss information associated with this hazard as losses are collated on a regional basis; therefore, impact cannot be determined for a particular jurisdiction within the county. Based on historical data, as collated by the NCDC, there have been no earthquakes which have caused damages in Calhoun County since 1950. Consequently, using the method utilized for the other hazards in this plan, there is a 0% chance of an earthquake impacting Calhoun County. However, there is always a possibility of an earthquake stemming from the faults in either northern or southern Illinois causing damages to the County. Thus, rather than indicating a 0% probability for earthquakes, planning efforts should utilize a minimal probability. Also, because of the proximity of the county to the New Madrid and Wabash Valley fault systems, it may be beneficial to raise the probability level to moderate.

Earthquakes do not have a specific area or size that is usually associated with them. Therefore, all areas located within Calhoun County have a probability of being affected by any seismic event. There have been 253 recorded earthquakes over the past two centuries, with approximately 220 occurring in Northern and Central Illinois. Thus, there is approximately a 100% probability of a recordable earthquake occurring each year with an epicenter in the State of Illinois; however, there have been approximately 30 earthquakes with a magnitude exceeding 4.5, which may cause some damages. Thus, there is approximately a 15% probability of an earthquake capable of causing at least minimal damages occurring somewhere in the state.

Table 7. Summary of Earthquake Risk Factors

Period of Occurrence	Year round
Number of Events to Date	0
Annual Chance Probability	Minimal
Location of Impacts	The most damaging impacts from an earthquake would be associated with bridges, concrete or masonry structures, and towers.

Table 7. Summary of Earthquake Risk Factors	
Potential Impacts	Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, fire, damaged or destroyed critical facilities, and hazardous material releases. Can cause severe transportation problems and make travel extremely dangerous. May trigger landslides, releases of hazardous materials, or dam and levee failure and flooding.
Injury or Death	None Reported

3.2.4 Extreme Heat

3.2.4.1 Description

Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. Our bodies dissipate heat by varying the rate and depth of blood circulation, by losing water through the skin and sweat glands, and as a last resort by panting, when blood is heated above 98.6°F. Sweating cools the body through evaporation. However, high relative humidity retards evaporation, robbing the body of its ability to cool itself.

Heat kills by taxing the human body beyond its abilities to cool itself. In a normal year, about 175 Americans succumb to the demands of summer heat. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the U.S. by the effects of heat and solar radiation. In the disastrous heat wave of 1980, more than 1,250 people died.

How our bodies respond to heat is impacted by a combination of the air temperature and the relative humidity. Hydration and cooling needs are different for a 90°F day with 30% humidity versus a 90°F day with 90% humidity. The NWS has devised a measurement system known as the heat index (HI) to estimate the temperature a person is exposed to over a common temperature and humidity range. The NWS will initiate alert procedures when the HI is expected to exceed 105°- 110°F for at least two consecutive days. The chart below shows the HI that corresponds to the actual air temperature and relative humidity.

Temperature (F) versus Relative Humidity (%)

°F	90%	80%	70%	60%	50%	40%
80	85	84	82	81	80	79
85	101	96	92	90	86	84
90	121	113	105	99	94	90
95		133	122	113	105	98
100			142	129	118	109
105				148	133	121
110						135

HI	Possible Heat Disorder:
80°F - 90°F	Fatigue possible with prolonged exposure and physical activity.
90°F - 105°F	Sunstroke, heat cramps and heat exhaustion possible.
105°F - 130°F	Sunstroke, heat cramps, and heat exhaustion likely, and heat stroke possible.
130°F or greater	**Heat stroke highly likely with continued exposure.**

Figure 9. Temperature versus Relative Humidity Scale

Source: http://www.crh.noaa.gov/pub/heat.htm

* Due to the nature of the heat index calculation, the values in the table have an error +/- 1.3 F.

3.2.4.2 Effects of Extreme Heat

When heat gain exceeds the heat the body can remove, body temperature begins to rise, and heat related illnesses and disorders might develop. Elderly persons, small children, chronic invalids, those on certain medications and persons with weight and alcohol problems are particularly susceptible to heat reactions, especially during heat waves in areas where a moderate climate usually prevails. Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating, or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise and heat-related illness may develop.

Ranging in severity, heat disorders share one common feature: the individual has overexposed or over-exercised for their age and physical condition in the existing thermal environment. Studies indicate that, other things being equal, the severity of heat disorders tend to increase with age. Heat cramps in a 17-year-old may be heat exhaustion in someone 40 and heat stroke in a person over 60.

Sunburn is the lowest level of over-exposure. Though sunburn is not an effect of exposure to heat, but rather to solar radiation, sunburn can significantly retard the skin's ability to shed excess heat. Heat cramps are painful spasms usually in the muscles of the legs and abdomen, generally accompanied by heavy sweating. Heat exhaustion is the next level of impact caused by excessive heat. Heat exhaustion causes heavy sweating, muscular weakness, and a weak pulse. The skin is also cold, pale and clammy. Heat stroke (or sunstroke) is the worst possible symptom of excess heat, prior to death. The victim's body temperature is 106° F. or higher, with hot dry skin. Sweating has stopped by this point due to lack of body moisture. **Table 8** summarizes the temperature ranges where heat-related illnesses are common and the impacts likely to occur with each.

Table 8. Heat Index/Heat Disorders Impacts

Heat Index	Heat Disorders Impacts
130° or Higher	Heatstroke/sunstroke highly likely with continued exposure
105°- 130°	Sunstroke, heat cramps or heat exhaustion likely, and heatstroke possible with prolonged exposure and/or physical activity
90°- 105°	Sunstroke, heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity
80° - 90°	Fatigue possible with prolonged exposure and/or physical activity

The most substantial heat-related impacts to the public include potential difficulties with electrical power and drinking water availability. Usage of utilities (electric and water) to combat the effects of the heat cause a strain on the system due to air conditioners, fans, and water usage. In extreme cases, roads, bridges, and railroad tracks have been known to suffer damage from extreme heat conditions.

3.2.4.3 Extreme Heat History

An unusually intense heat wave affected northern and central Illinois intermittently through July and August, 1995. Heat indices for the area were between 110° and 120° F for several days throughout the time period, resulting in several deaths and loss of crops. In addition, some roads in the metropolitan St. Louis area buckled due to the intense heat. Two other extreme heat events are described below.

October 2, 1922: Strong southerly winds brought very warm air from the Gulf region into Illinois. The heat wave across the region persisted through October 5.

July 30, 1930: "Three successive heat waves relieved by little precipitation in the area have led to an extremely bad situation for immature crops in the central states. With

each hot, dry day the amount of damage to the crops increases in the area with corn being the most affected. Most farmers are reporting a loss of 25 to 60 percent of their crop due to heat and drought." (Chicago Daily Tribune)

See **Appendix G** for NCDC events for Calhoun County and surrounding areas for past extreme heat events.

3.2.4.4 Future Probability

The calculation on the probability of future occurrences was based on the number of past events over a period of years. There have been three historic events reported to the National Climatic Data Center (NCDC) for extreme heat in Calhoun County over the past 59 years, resulting in a 5% chance of an extreme heat event occurring during any year. Extreme heat events do not have a specific area or size that is usually associated with them. Therefore, all areas located within Calhoun County have an equal probability of being affected by an extreme heat event.

Table 9. Summary of Extreme Heat Risk Factors	
Period of Occurrence	Summer
Number of Events to Date	3
Annual Chance Probability	5%
Location of Impacts	Extreme heat is not a geographically distinctive natural hazard, thus the entirety of Calhoun County is equally susceptible.
Potential Impacts	Public health and safety, especially the elderly. Heavy use of water and electrical facilities due to air conditioners, fans, etc.
Injury or Death	There are 7 recorded deaths and 232 reported injuries.

3.2.5 Flood

3.2.5.1 Description

A flood is a natural event for rivers and streams and is caused in a variety of ways. Floods can develop slowly or quickly, depending on several factors. Winter or spring rains, coupled with melting snows, can fill river basins too quickly. Torrential rains from decaying hurricanes or other tropical systems can also produce flooding. The excess water from snowmelt, rainfall, or storm surge accumulates and overflows onto the banks and adjacent floodplains.

A flood, as defined by the NFIP, is:

> 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;
> - A mudflow;
> - A 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.

Floods are generally the result of excessive precipitation, and can be classified under two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and general floods, caused by precipitation over a longer time period.

The severity of a flooding event is determined by a combination of stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions and the degree of vegetative clearing. Flood currents also possess tremendous destructive power as lateral forces can demolish buildings and erosion can undermine bridge foundations and footings, leading to the collapse of structures.

Flash flooding events usually occur within minutes or hours of heavy amounts of rainfall, from a dam or levee failure, or from a sudden release of water held by an ice jam. General floods are usually longer-term events and may last for several days.

Periodic flooding of lands adjacent to rivers, streams, and shorelines is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval. One way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1% chance of occurring in any given year, rather than being that level of flooding which only occurs once a century. In other words, it is possible to have two 100-year floods in a five year span or to not have a 25-year flood for 30 years.

Flooding is the most frequent and costly natural hazard in the U.S. Property damage from flooding totals over $1 billion each year in the U.S. During the 20th century, floods were the number one natural disaster in the U.S. in terms of number of lives lost (10,000) and property damage, and floods are the number one weather-related killer.

3.2.5.2 National Flood Insurance Program

The primary purpose of the NFIP is to provide flood insurance to properties located in floodplains, as delineated by FIRMs. The NFIP maintains records of the frequency and costs of insurance claims for each jurisdiction. The following table summarizes the number and value of policies and claims in Calhoun County and each of the incorporated jurisdictions.

Table 10. NFIP Policies and Claims in Calhoun County

Jurisdiction	Participating in NFIP	No. of Policies	Value of Policies	No. of Paid Losses	Value of Paid Losses
Total	**-**	**266**	**$23,044,600**	**1984**	**$15,406,203**
Batchtown	N	0	0	0	0
Brussels	Y	0	0	8	$48,703
Calhoun	Y	152	$11,183,800	1,199	$7,961,019
Hamburg	Y	26	$1,680,500	100	$1,018,424
Hardin	Y	56	$7,879,300	404	$4,070,572
Kampsville	Y	32	$2,301,000	273	$2,307,485

One of the primary concerns of the NFIP and FEMA are the repetitive loss structures and payments. FEMA defines repetitive loss structures as any structure which has had two or more claims exceeding $1,000 within a ten year period. Payments to repetitive loss structures strain the resources of the NFIP and put residents and emergency responders at risk repeatedly.

3.2.5.3 Common Flood-Related Terms

100-Year Floodplain: The area that has a 1% chance, on average, of flooding in any given year. (Also known as the Base Flood.)

500-Year Floodplain: The area that has a 0.2% chance, on average, of flooding in any given year.

Base Flood: Represents a compromise between minor floods and the greatest flood likely to occur in a given area. The elevation of water surface resulting from a flood that has a 1% chance of occurring in any given year. The base flood elevation is the basis for most flood related planning and mitigation activities.

Floodplain: The land area adjacent to a river, stream, lake, estuary, or other water body that is subject to flooding. This area, if left undisturbed, acts to store excess floodwater. The floodplain is made up of two sections: the floodway and the flood fringe.

Floodway: The NFIP floodway definition is "the channel of a river or other watercourse and adjacent land areas that must be reserved, in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot." The floodway carries the bulk of the floodwater downstream and is usually the area where water velocities and forces are the greatest. NFIP regulations require that the floodway be kept open and free from development or other structures that would obstruct or divert flood flows onto other properties.

Flood Fringe: The flood fringe refers to the outer portions of the floodplain, beginning at the edge of the floodway and continuing outward.

3.2.5.3.1 Types

Floods are the result of a multitude of naturally occurring and human-induced factors, but they all can be defined as the accumulation of too much water in too little time in a specific area. Types of floods include regional floods, river or riverine floods, flash floods, urban floods, ice-jam floods, storm-surge floods and debris, landslide, and mudflow floods.

Urban areas are especially susceptible to flash floods because a high percentage of the surface area is composed of impervious streets, roofs, and parking lots where runoff occurs very rapidly. Mountainous areas also are susceptible to flash floods, as steep topography may funnel runoff into a narrow canyon. Floodwaters accelerated by steep stream slopes can cause the flood-wave to move downstream too fast to allow escape, resulting in many deaths.

Factors determining the severity of floods include:

a. Rainfall intensity and duration

    1) A large amount of rain over a short time can result in flash flooding.
    2) Small amounts may cause flooding where the soil is saturated or if concentrated in an area of impermeable surfaces.

b. Topography and ground cover.

c. Water runoff is greater in areas with steep slopes and little vegetation.

3.2.5.4 Flood Impacts

Flooding impacts human life, health, and public safety. Community-wide, the potential for risks is severe for: utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, fire, damaged or destroyed critical facilities, and hazardous material releases. Flooding can also lead to economic losses such as unemployment, decreased land values, and agronomic losses. Flooding may cause damage to structures in the flooded area, resulting in especially significant damages if the buildings are commercial or institutional in nature, due to the necessity to close the business until damages are repaired. Residential damages also lead to larger impacts as the homeowners and/or residents are forced to leave their homes and, generally, are unable to work temporarily. In addition, some property owners may abandon their property, forcing the local community to handle the recovery and maintenance.

Figure 10. Home in Hamburg shows the high water mark from the 1997 flood.

Flood waters may also destroy or damage important infrastructure, such as roads, bridges, electrical/communication networks, and sewer systems. Flooding of sanitary sewer systems poses considerable cleanup problems and health hazards, although there is usually no structural damage. Considerable costs are incurred by delays in travel due to flooded roads. Flooded roadways may also impede emergency vehicles and emergency response teams along with other vehicles providing necessary goods and services. Schools are often closed due to lack of access or the need to focus on recovery and cleanup.

Long term costs associated with frequent flooding may also be significant to communities. Frequent flooding decreases property values and abandoned properties may become a vector for disease and pest infestations. Frequent flooding may also persuade residents to leave the community and create impedance for immigration to the community, causing a loss of tax revenue and an increased burden to remaining residents.

3.2.5.5 Background

Flooding is probably the most significant natural hazard in Illinois. Major flooding occurs within the state almost every year and it is not unusual for several floods to occur in a single year. Significant precipitation over most of Illinois or the Upper Mississippi watershed may cause flooding in Calhoun County because of the confluence of the two rivers. Even if the Illinois River does not directly flood, flooding on the Mississippi River may cause backwater flooding into the county. The streams originating in Calhoun County generally do not cause flooding because of the steepness of the slopes; however, they may cause backwater flooding when either of the Illinois or Mississippi Rivers is flooded.

3.2.5.6 Flood History

Illinois as a state has had 35 presidentially declared disasters between 1953 and 2009 and 15 of those have occurred in or affected Calhoun County and its jurisdictions. The following table shows the flood-related Presidentially Declared Disasters for Calhoun County.

Table 11. Calhoun County Declarations – Floods

Date	Declaration Number	Disaster Type	Funding Received*
1969	262	FLOODING	$3,866,660
1969	276	HEAVY RAINS & FLOODING	$13,151,133
1973	373	SEVERE STORMS & FLOODING	$80,338,210
1974	438	SEVERE STORMS & FLOODING	$32,904,477
1979	583	SEVERE STORMS & FLOODING	$34,840,105
1982	674	SEVERE STORMS, TORNADOES & FLOODING	$13,404,280
1983	684	SEVERE STORMS, TORNADOES & FLOODING	$8,705,529
1985	735	SEVERE STORMS & FLOODING	$8,086,211
1986	776	SEVERE STORMS & FLOODING	$21,274,952

Table 11. Calhoun County Declarations – Floods			
Date	**Declaration**	**Disaster Type**	**Funding**
1990	871	SEVERE STORMS, TORNADOES & FLOODING	$11,312,503
1993	997	SEVERE STORMS & FLOODING	$374,739,292
1994	1025	SEVERE STORMS AND FLOODING	$30,189,586
1995	1053	SEVERE STORMS AND FLOODING	$41,334,230
2001	1368	FLOODING	$10,948,134
2008	1771	SEVERE STORMS AND FLOODING	$93,136,904

*All funding amounts are in 2009 dollars.

Source: http://maggie6.cadsr.udel.edu/presdec/mainframe.htm

Figure 11. Home in Hamburg was raised above the base flood elevation using FEMA grant funding.

Figure 12. Flooding structurally damaged this building during the 1993 flood.

See **Appendix G** for a listing of Calhoun County area flooding events recorded by NCDC.

The NFIP tabulates data about properties receiving funding for flood-related disasters on a jurisdictional basis, including the amount of assistance provided, the number of properties with active flood insurance, the value of all insurance policies, and the number of repetitive loss properties (RL). FEMA defines RL properties as those which have received recovery assistance at least twice during the previous ten years. Due to the continued drain on disaster recovery efforts and funds, it is a FEMA goal to reduce or eliminate RL through hazard mitigation planning. In addition, RL properties tend to be those most exposed to severe damage or loss, indicating owners or users of the structure are at an increased risk of injury or loss of life due to a disaster. Within Calhoun County, there are 99 RL properties, with total losses exceeding $4 million. The average loss for these properties is approximately $8,000.

Table 12. Repetitive Loss Property Summary

Jurisdiction	Number of Repetitive Loss Properties	Number of Losses	Value of Losses ($)	Average Loss ($)
Batchtown, Village of	1	3	7,092	2,364
Brussels, Village of	102	361	3,013,989	782,004
Calhoun County	49	171	1,196,721	313,994
Hamburg, Village of	23	72	773,814	271,678
Hardin, Village of	55	251	2,177,533	447,452
Kampsville, Village of	44	148	1,956,354	397,889

A history of significant property damages impacts the quality of life in the County and the ability of the County and municipality to focus on other funding needs. As funds are required to build floodwalls, as in the picture below, or rebuild public facilities, funding for other budget priorities is also impacted.

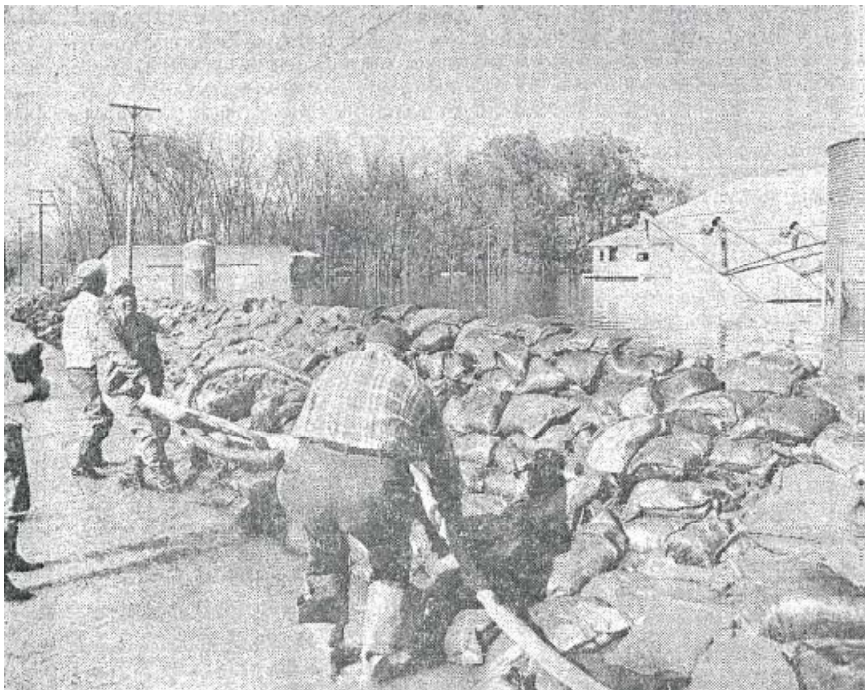


Figure 13. This sandbag wall prevented floodwaters from impacting Hardin during the 1973 flood. At the right is the Jersey County Grain Elevator.

3.2.5.7 Future Probability

For each river, engineers assign statistical probabilities for different sized floods. This is done to rate the size of the flood compared to other floods that have or may occur. Most planning and analysis utilizes the 100-year flood. FEMA describes the 100-year flood as "The flood elevation that has a one percent chance of being equaled or exceeded each year. Thus, the 100- year flood could occur more than once in a relatively short period of time. The 100-year flood is used by the NFIP as the standard for floodplain management and to determine the need for flood insurance." (Source: www.fema.gov/plan/prevent/fhm/fq_fld03.shtm). The 100-year flood is also known as the base flood. The NFIP and the Illinois Department of Natural Resources (IDNR) use this same baseline flooding probability.

Another level of risk that is used is the 500-year flood, or 0.2% chance of occurring in any given year. FEMA describes the 500-year flood as deeper than a 100-year flood and

covering a greater area, but less likely to occur than a 100-year event. Given that this level of flooding is less likely to occur, it is the standard used for critical facility protection.

Table 13 tabulates the probability of four different flood events occurring over a range of time periods. Notice that during the course of a 30-year mortgage, a homeowner in a 100-year floodplain has a 26% chance of experiencing a 100-year flood and a 96% chance of experiencing a 10-year flooding event. While a 10-year flood is not as extensive as other floods, the odds of experiencing a 10-year event are nearly guaranteed during a typical 30-year mortgage.

Table 13. Flood Probability

Time Period	Flood Size			
	10-year	**25-year**	**50-year**	**100-year**
1 Year	10%	4%	2%	1%
10 Years	65%	34%	18%	10%
20 Years	88%	56%	33%	18%
30 Years	96%	71%	45%	26%
50 Years	99%	87%	64%	39%

Table 14. Summary of Flood Risk Factors

Period of Occurrence	Anytime, but primarily during spring/summer rains.
Number of Events to Date	22
Annual Chance Probability	37%
Location of Impacts	Impacts are primarily confined to the areas adjacent to water bodies. For this plan, the location of impacts was defined as the FEMA 100-year floodplain.
Potential Impacts	Potential for loss of life. Floodwaters are a public safety issue due to contaminants and pollutants. Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, fire, damaged or destroyed critical facilities, and hazardous material releases. Can lead to economic losses such as unemployment, decreased land values, and agronomic losses.
Injury or Death	One reported injury.

3.2.6 Severe Storm (Thunderstorm, Lightning, and Hail)

3.2.6.1 Descriptions

A thunderstorm is formed from a combination of moisture, rapidly rising warm air, and a force capable of lifting air such as a warm and cold front, a sea breeze, or a mountain. All

thunderstorms contain lightning and may occur singularly, in clusters, or in lines. It is possible for several thunderstorms to affect one location in the course of a few hours. Some of the most severe weather occurs when a single thunderstorm affects one location for an extended period time. The NWS considers a thunderstorm as severe if it develops ¾-inch hail or 50-knot (58 mph) winds. In the last 25 years, severe storms have been involved in over 300 federal disasters.

Thunderstorms occur when clouds develop sufficient upward motion and are cold enough to provide the ingredients (ice and super cooled water) to generate and separate electrical charges within the cloud. The cumulonimbus cloud is the perfect lightning and thunder factory, thereby earning its nickname, "thunderhead". All thunderstorms are dangerous and capable of threatening life and property in localized areas.

While thunderstorms and lightning can be found throughout the U.S., they are most likely to occur in the central and southern states. The NWS estimates more than 100,000 thunderstorms occur in the U.S. each year. Thunderstorms are also capable of producing tornadoes and heavy rain that can lead to flash flooding. These hazards are addressed separately in the plan.

Thunderstorms affect relatively small areas, as the average storm is 15 miles in diameter and lasts 30 minutes. Nearly 1,800 thunderstorms are occurring at any moment around the world; however, of the estimated 100,000 thunderstorms that occur each year in the U.S., only about 10 percent are classified as severe.

While more localized than the winds and rain that accompany thunderstorms, lighting is a significant safety concern during storms. Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt". This flash of light occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches a temperature approaching 50,000 degrees Fahrenheit instantaneously. The rapid heating and cooling of air near the lightning causes thunder.

Lightning is the second most frequent cause of fatalities in the U.S. among natural phenomenon. Each year, lightning is responsible for an average of 93 deaths, 300 injuries, and several hundred million dollars in damage to property.

Hail is precipitation in the form of spherical or irregular pellets of ice larger than five millimeters (0.2 inches) in diameter (American Heritage Dictionary). Hail is a somewhat frequent occurrence associated with severe thunderstorms. Hailstones grow as ice pellets are lifted by updrafts, and collect super-cooled water droplets. As the pellets grow, hailstones become heavier and begin to fall. Sometimes, hailstones are caught by successively stronger updrafts and are re-circulated through the cloud growing larger each

time the cycle is repeated. Eventually, the updrafts can no longer support the weight of the hailstones. As hailstones fall to the ground, they produce a hail-streak (area where hail falls) that may be more than a mile wide and a few miles long.

Falling hail may reach speeds of 70-100 mph, explaining why it is capable of producing such extensive damage. Hailstorms occur more frequently during the late spring and early summer months. Most thunderstorms do not produce hail, and storms that do normally produce only small hailstones less than one-half inch in diameter. Hail is commonly described by its size and **Table 15** provides the conversion between the descriptions and the approximate size, in inches.

Table 15. Hail Conversion Chart

Diameter of Hailstones (inches)	Description
0.50	Marble
0.70	Dime
0.75	Penny
0.88	Nickel
1.00	Quarter
1.25	Half Dollar
1.50	Walnut
1.75	Golf Ball
2.00	Hen Egg
2.50	Tennis Ball
2.75	Baseball
3.00	Tea Cup
4.00	Grapefruit
4.50	Softball

3.2.6.2 Effects of Severe Storms

Severe storms may cause significant damage to the areas impacted through the combined impacts of wind, rain, lightning, and hail. Lightning is capable of damaging structures and infrastructure (especially the electrical grid) and starting fires. Lightning causes half the wildfires in the Western U.S. In addition, lightning regularly injures and kills people across the country. Approximately 25% of victims die and 70% of survivors suffer long-term effects.

Hail causes nearly $1 billion in damage to property and crops annually. Hail causes property damage by perforating holes in roofs and shingles, breaking windows, and denting house siding. Hail can also damage automobiles by denting car panels and breaking windows.

Hail rarely causes any deaths; however, approximately 20-25 people are injured by hailstones each year.

3.2.6.3 Background

The Midwest and Great Plains regions of the U.S. average between 40 and 60 days of thunderstorms per year. These two regions are prone to some of the most severe thunderstorms on Earth. Calhoun County is affected by severe thunderstorms more than any other natural hazard. Calhoun County typically experiences between 30 and 50 thunderstorm days per year. These storms are not bound to one particular geographic path; therefore, all jurisdictions located within the County are equally vulnerable to this hazard. **Appendix G** provides the NCDC information for Calhoun County and its jurisdictions for hail, lightning, and high wind events associated with severe storms.

In the United States, there are an estimated 25 million cloud-to-ground lightning strikes each year. The average deaths attributed to lightning strikes exceed those attributed to tornadoes. Lightning usually claims only one or two victims at a time and does not cause mass destruction of property, and because of this, it is underrated as a risk. Local data and the NCDC document three lightning events for Calhoun County. NCDC also documented 45 hail events from 1950 to 2008, with hailstones ranging in size from 0.75 inches to 3.00 inches in diameter.

3.2.6.4 Severe Storm History

Calhoun County has received thirteen (13) presidential declarations for severe storms, as shown in the following table.

Table 16. Calhoun County Declarations - Floods

Date	Declaration Number	Disaster Type	Funding Received*
1969	276	HEAVY RAINS & FLOODING	$13,151,133
1973	373	SEVERE STORMS & FLOODING	$80,338,210
1974	438	SEVERE STORMS & FLOODING	$32,904,477

Table 16. Calhoun County Declarations - Floods

Date	Declaration Number	Disaster Type	Funding Received*
1979	583	SEVERE STORMS & FLOODING	$34,840,105
1982	674	SEVERE STORMS, TORNADOES & FLOODING	$13,404,280
1983	684	SEVERE STORMS, TORNADOES & FLOODING	$8,705,529
1985	735	SEVERE STORMS & FLOODING	$8,086,211
1986	776	SEVERE STORMS & FLOODING	$21,274,952
1990	871	SEVERE STORMS, TORNADOES & FLOODING	$11,312,503
1993	997	SEVERE STORMS & FLOODING	$374,739,292
1994	1025	SEVERE STORMS AND FLOODING	$30,189,586
1995	1053	SEVERE STORMS AND FLOODING	$41,334,230
2008	1771	SEVERE STORMS AND FLOODING	$93,136,904

Source: http://maggie6.cadsr.udel.edu/presdec/mainframe.htm

In addition, each of the communities in Calhoun County has experienced many severe storms, which have not warranted a disaster declaration.

3.2.6.5 Future Probability

The probability of future occurrences calculation was based on the number of past events over a period of years. There have been 69 thunderstorm/high wind events, one lightning event, and 17 hail events reported to the NCDC in Calhoun County over the past 59 years. The calculated probability for each of these events is summarized in the table below, with an overall probability of 147%. In other words, in any given year, Calhoun County will be impacted by two severe storms.

Table 17. Summary of Severe Storms Risk Factor	
Period of Occurrence	Spring, Summer and Fall
Number of Events to Date	Total: 87
	Lightning: 1
	Hail: 17
	Rain: 2
	Wind: 67
Annual Chance Probability	Total: 147%
	Lightning: 2%
	Hail: 29%
	Rain: 3%
	Wind: 114%
Location of Impacts	Severe storms are not restricted by geographical features; however, tall structures, heavily forested areas, and low-lying areas are more prone to impact from severe storms.
Potential Impacts	Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, fire, damaged or destroyed critical facilities, and hazardous material releases. Impacts human life, health, and public safety.
Injury or Death	Ten deaths and 120 injuries reported.

3.2.7 Severe Winter Storms

3.2.7.1 Description

A winter storm can range from moderate snow over a few hours to blizzard conditions with blinding wind-driven snow, sleet and/or ice and extreme cold that lasts several days. A severe winter storm is defined as an event that drops four or more inches of snow during a 12-hour period or six or more inches during a 24-hour span. Severe winter storms are fueled by strong temperature gradients and an active upper-level cold jet stream. Some winter storms may be large enough to affect several states, while others may affect only a single community. Most winter storms are accompanied by low temperatures and blowing snow, which can severely reduce visibility.

Snow and ice are threats to most of the U.S. around the winter season. During the early and late months of the winter season, snow becomes warmer, giving it a greater tendency to melt on contact or stick to the surface. The beginning and end of the winter season also brings a greater chance of freezing rain and sleet, which contribute significantly to the hazard and impacts associated with severe winter storms.

Every state in the continental U.S. and Alaska has been impacted by severe winter storms. The super-storm of March 1993 caused over $2 billion in property damage in twenty states and Washington D.C. At least 79 deaths and 600 injuries were attributed to the storm.

The most important winter storms are blizzards and ice storms due to their capacity to cause interruptions in service and damage infrastructure. Blizzards are by far the most dangerous of all winter storms. They are characterized by temperatures below twenty degrees Fahrenheit and winds of at least 35 miles per hour. In addition to the temperatures and winds, a blizzard must have a sufficient amount of falling or blowing snow. The snow must reduce visibility to one-quarter mile or less for at least three hours. With high winds and heavy snow, these storms can punish residents throughout much of the U.S. during the winter months each year.

Ice storms occur when freezing rain falls from clouds and freezes immediately on impact. Ice storms occur when there is cold air at the surface and warm, moist air at higher altitudes. As the warm air advances and is lifted over the cold air, precipitation begins falling as rain at high altitudes then cools as it passes through the cold air mass below, and, in turn, freezes upon contact with chilled surfaces at temperatures of 32º F or below. In extreme cases, ice may accumulate several inches thick, though just a thin coating is often enough to do severe damage.

3.2.7.2 Possible Effects

Freezing rain can result in extensive damage to utility lines and buildings while making any type of travel extremely dangerous. The results are sometimes devastating: entire states can be almost entirely without electricity and communication for several weeks. Winter storms can paralyze a community by shutting down normal day-to-day operations. Heavy snow can also lead to the collapse of weak roofs or unstable structures. Storm effects can cause hazardous conditions and hidden problems, including power outages, mechanical problems, transportation hazards, and flooding.

Power outages result when snow and ice accumulate on trees causing branches and trunks to break and fall onto power lines. Blackouts vary in size from one street to an entire city. Loss of electric power means loss of heat for some residents, which poses a significant threat to human life, particularly the elderly. Extreme cold temperatures may also lead to frozen water mains and pipes, damaged car engines, and prolonged exposure to cold resulting in frostbite.

Flooding may occur after precipitation has accumulated and then temperatures rise once again, which melts snow and ice. In turn, as more snow and ice accumulate the threat of flooding increases.

Snow and ice accumulation on roadways can cause severe transportation problems in the form of extremely hazardous roadway conditions.

Illinois is typically continental, has the polar jet stream located near or over it during the winter months, bringing low pressure systems and therefore precipitation into the region, and averages 140 days at or below 32°F and 36 inches of snow. A combination of any of these conditions can lead to a severe winter storm.

3.2.7.3 Severe Winter Storm History

Areas where such weather is unusual are typically affected more severely than regions that routinely deal with winter weather events. No region can fully prepare for a severe winter storm so some degree of disruption is inevitable, regardless of how much experience a community or state may have. Calhoun County has had two Emergency Declarations in the past, resulting from severe winter storms.

Table 18. Calhoun County Emergency Declarations – Severe Winter Storms

Year	Disaster Type	Disaster Number	Funding Received
1999	Winter Storm	3134	$42,048,452
2007	Severe Winter Storm	1681	$28,399,250
		TOTAL	**$70,447,702**

Source: FEMA- Illinois States Disaster History, http://www.peripresdecusa.org/mainframe.htm

See **Appendix G** for past severe winter storm events recorded by the NCDC for Calhoun County and its jurisdictions.

Figure 14 The blizzard of 1978 caused drifts of several feet in height and shut down many communities across the Midwest for several days.

3.2.7.4 Future Probability

The probability of future occurrences calculation was based on the number of past events over a period of years. With 30 occurrences over the past 59 years, the likelihood of a severe winter storm hitting somewhere in the county is 51% in any given year.

Table 19. Severe Winter Storms Risk Factors	
Period of Occurrence	Winter
Number of Events to Date	Total: 30
	Extreme Cold/Wind Chill: 2
	Heavy Snow: 3
	Winter Storm: 25
Annual Chance Probability	Total: 51%
	Extreme Cold/Wind Chill: 3%
	Heavy Snow: 5%
	Winter Storm: 42%
Location of Impacts	All areas of Calhoun County are equally susceptible to damages from winter storms.

Table 19. Severe Winter Storms Risk Factors	
Potential Impacts	Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, and damaged or destroyed critical facilities. May cause severe transportation problems and make travel extremely dangerous. Power outages, which results in loss of electrical power and potentially loss of heat, and human life. Extreme cold temperatures may lead to frozen water mains and pipes, damaged car engines, and prolonged exposure to cold resulting in frostbite.
Injury or Death	Two deaths and six reported injuries.

3.2.8 Tornadoes

3.2.8.1 Description

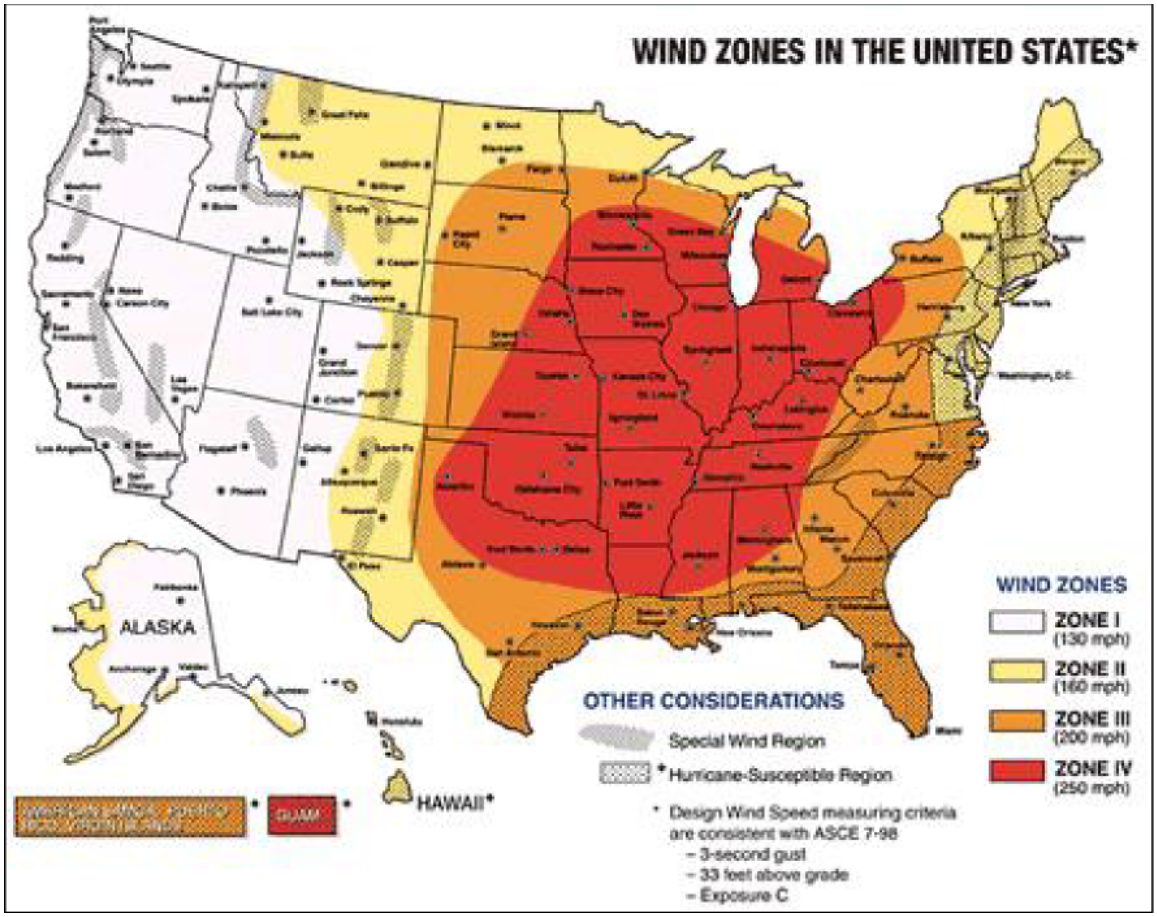
A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are spawned by a thunderstorm (or sometimes as a result of a hurricane) and produced when a cold air mass flows over a layer of warm air, forcing the warm air to rise rapidly through the cold air.

The damage from a tornado is a result of the high wind velocity and wind-blown debris with paths that can be in excess of one mile wide and fifty miles long. Tornado season is generally March through August, although tornadoes can occur at any time of year. They tend to occur in the afternoons and evenings, with over 80% of all tornadoes striking between noon and midnight.

Most tornadoes are just a few dozen yards wide and touch down only briefly, but highly destructive tornadoes may carve out a path over a mile wide and several miles long. The destruction caused by tornadoes may range from light to catastrophic depending on the intensity, size, and duration of the storm. Effects of tornadoes may include crop and property damage, power outages, environmental degradation, injury, and death. Tornadoes are known to blow off roofs, move cars and tractor-trailers, and demolish structures.

Typically, tornadoes are localized in impact and cause the greatest damages to structures of light construction, such as residential homes. A tornado can move as fast as 125 mph with internal wind speeds exceeding 300 mph.

The maps below illustrate the predictability of tornadic activity according to the National Oceanic and Atmospheric Administration (NOAA). Calhoun County and its jurisdictions are located within the wind Zone IV, where wind speeds can reach up to 250 mph. Zone IV also signifies that there is a high probability for tornadic activity in the County.



Source: http://www.fema.gov/plan/prevent/saferoom/tsfs02_wind_zones.shtm

Figure 15. Wind Zones in the United States

Over the past 25 years, more than 100 federal disaster declarations included damage associated with tornadoes. On April 3, 1974, 148 tornadoes in 13 states killed 315 people and is the largest recorded tornado event in history.

3.2.8.2 Tornado Intensity

The magnitude of a tornado is categorized by the damage pattern (i.e. path) and wind velocity, according to the Fujita-Pearson Tornado Measurement Scale. This scale is the only widely used rating method with the aim of validating classification by relating the degree of damage to the intensity of the wind. **Table 20** summarizes the Fujita scale with descriptions of typical damage caused by each storm magnitude.

Table 20. Fujita Scale for Tornadoes

Type	MPH	General Description
F1	73 - 112	Moderate Damage - Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113 - 157	Considerable Damage - Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light object missiles generated; cars lifted off ground.
F3	158 - 206	Severe Damage - Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207 - 260	Devastating Damage - Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261 - 318	Incredible Damage - Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

Source: FEMA State and Local Mitigation Planning How-To-Guide: Understanding Your Risks

3.2.8.3 Tornado Impacts

Due to the destructive nature of tornadoes and wind, these events impact human life, health, and public safety. Community-wide impacts include: utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, and damaged or destroyed critical facilities. Tornadoes can also cause severe transportation problems and make travel extremely dangerous. Although tornadoes strike at random, making all buildings vulnerable, three types of structures are likely to suffer damage: Mobile homes, homes on crawlspaces (more susceptible to lift), and buildings with large spans, such as airplane hangars, gymnasiums and factories.

Figure 16 Home in the County was partially destroyed and the trees in the background severely damaged due to a tornado.

3.2.8.4 Tornado History

Tornadoes track through Illinois at a rate of just over 29 per year. Illinois is in the heart of "Tornado Alley", an area of the U.S. known for its violent outbreaks of severe storms. All areas of the state are at risk of being struck by a tornado. The map below shows the recorded tornado touchdowns across the state between 1950 and 1998. In Calhoun County, there were nine tornadoes recorded between 1950 and 2009, with three tornado touchdowns recorded. See **Appendix G** for past tornado events recorded by the NCDC for Calhoun County and its jurisdictions.

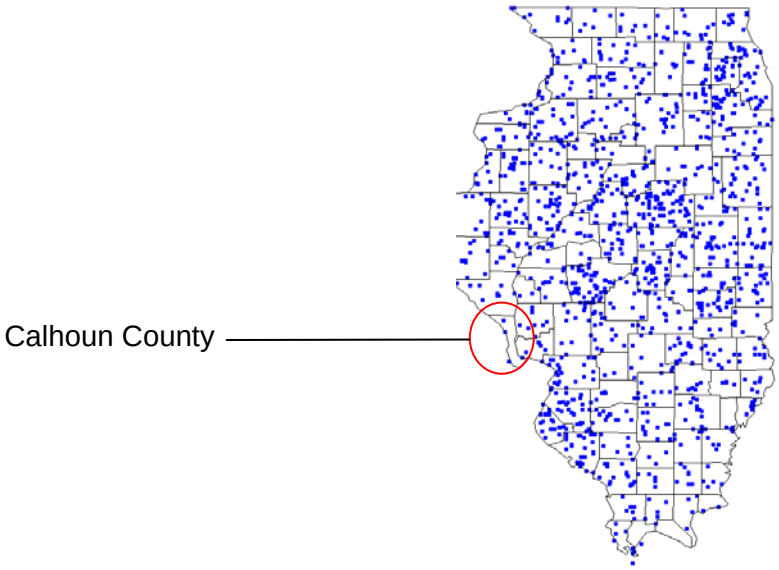


Figure 17. Illinois Tornado Touchdowns, 1950-1998

3.2.8.5 Future Probability

Tornadoes are extremely common throughout Illinois and have occurred in every month of the year. Conversely, the occurrence of a tornado is highly unpredictable as it is impossible to forecast the exact time and location that it will touch down and the path that it will take.

Most tornadoes occur between March and July, with the month of May normally experiencing the greatest number of tornadoes. The strongest tornadoes, which usually result in the highest number of deaths and greatest destruction of property, occur between April and June. Most deaths occur in April, which is considered the beginning of the tornado season.

Calhoun County was impacted by 9 of the 2,160 tornado events that occurred in Illinois between January 1950 and May 2009. With 9 occurrences over the past 59 years, the likelihood of a tornado hitting somewhere in the county is 15% in any given year. Tornadoes, like other climatological hazards, are not bound to a particular path or location; therefore all jurisdictions within Calhoun County have the same probability of being struck by a tornadic event. The table below summarizes the probability of a tornado striking the county with each of the magnitudes on the Fujita scale.

Table 21. Tornado Probability		
Type	**Number of Occurrences Since 1950**	**Annual Chance Probability Ratio**
F0	4	7%
F1	2	3%
F2	2	3%
F3	0	NA*
F4	0	NA*
F5	0	NA*
Total	8**	15%

*Note: Probability for tornadoes with a magnitude of F4-F5 cannot be calculated due to the lack of historical occurrences during the past 59 years. There have been tornadoes of these magnitudes in the past and they could occur again in the future.
**One recorded instance was a funnel cloud which never touched the ground and thus, did not receive a magnitude on the Fujita scale.

Table 22. Summary of Tornado Risk Factors	
Period of Occurrence	Year-round, primarily during March through August
Number of Events to Date	9
Annual Chance Probability	15%
Location of Impacts	All areas of Calhoun County are equally at risk to tornadoes.
Potential Impacts	Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, and damaged or destroyed critical facilities. Impacts human life, health, and public safety.
Injury or Death	Eleven injuries reported.

3.3 ASSESSING VULNERABILITY

This section documents the results and methodologies of the Calhoun County natural hazard vulnerability assessment.

3.3.1 Assessing Vulnerability – Overview

The methods used to assess vulnerability of natural hazards throughout Calhoun County incorporated the following:

- Number of past events and future probabilities for each hazard,
- Number and locations of at-risk structures, structure types, and estimated values,
- Number and locations of critical facilities at risk to each hazard, and

- Number of population at risk to each hazard.

Severity rankings were categorized using a similar convention to the Illinois' Natural Hazard Mitigation Plan. The tables below provide an overview of the vulnerability rankings and individual assessment results for each jurisdiction.

Each of the communities were ranked as low, medium, or high for each of the categories, which were translated into a numerical score of 1, 2, or 3, respectively. The scores were then totaled to develop an overall score for each community for each hazard, with totals ranging from 4-12, as shown in the table below.

Methodology and individual results were derived by geographically weighting risk as a function of event probability and event consequences.

The methodology utilized for this plan was based on the State of Illinois Natural Hazard Mitigation Plan methodology; however, there are some minor differences. The Calhoun Plan utilizes the same categories as the State plan, but does not weight the categories differently. In addition, the State plan combines two different measures of population to balance the differences between counties across the state (i.e. Cook County/Chicago and Calhoun County).

The population criteria utilized by the state was the actual population and the predicted growth rate over the next 10 years. Because localized growth data is not available for the jurisdictions of Calhoun County, the growth factor was omitted from the vulnerability assessment. Also, because the populations of the jurisdictions in Calhoun County are roughly similar, the actual population was omitted from the vulnerability assessment.

Another difference between the State and County plans is the probability of future event levels. The State plan uses 20%, 20-100%, and greater than 100% annual chance probability for the low, medium, and high scoring, respectively. However, the Calhoun County plan uses 10%, 10-50%, and greater than 50% annual probability for the scoring of the future probability. Due to the use of nationally averaged data for property values in the County plan, the threshold for high property damages was lowered from $15 million to $10 million. The final difference between the State and County hazard mitigation plans is the use of critical facilities. The State plan did not include the number of critical facilities impacted by an event in the vulnerability assessment. However, the Calhoun County planning team decided this could be an important factor in the severity and duration of the impact from a natural hazard event. Consequently, the actual number of critical facilities potentially impacted in a hazard event was included in the Calhoun County vulnerability assessment.

3.3.2 Multi-Jurisdictional Risk Assessment Methodology

The Planning Team worked together to develop a risk assessment model that analyzed event probability, infrastructure at-risk, and population exposure.

Hazard rankings were based upon numerical ranking concepts similar to the State's Hazard Mitigation criteria, modified to accommodate local interests and more detailed information.

Overall rankings were generated by totaling individual scores assessed for each community's risk to a given hazard. Specifically, hazard risk was estimated as a function of the number of past hazard events, estimated structure vulnerability, the number of critical facilities at risk, and the population exposed to the hazard.

Individual variable scores were then totaled for each community's vulnerability and categorized according to the table key below and as shown below in **Table 25**. Maps showing the locations of critical facilities in the villages and the unicorporated county are included in **Appendix F**.

<5 = Low
5 to 6 = Guarded
7 to 8 = Elevated
9 to 10 = High
11 to 12 = Severe

Table 23. Calhoun County Vulnerability Ranking

Community	Population	Hazard Risk Ranking						
		Drought	Earthquake	Extreme Heat	Flood	Severe Storms	Severe Winter Storms	Tornado
Batchtown, Village of*	218	7	7	6	4	9	9	7
Brussels, Village of	141	9	9	9	6	10	11	9
Calhoun County (Uninc.)	3,338	10	10	10	9	12	12	11
Hardin, City of	959	10	10	10	9	11	12	10
Hamburg, Village of	126	7	7	6	6	7	9	7
Kampsville, Village of	302	10	10	9	8	11	12	10

*Batchtown has no FEMA mapped flood hazards; however, the risks due to flooding still exist.

The following subsections detail individual results generated for each risk assessment variable.

3.3.2.1 Assessing Vulnerability - Historical Occurrences and Future Probability

Much like the Illinois Natural Hazard Mitigation Plan, the Calhoun County risk assessment model accounted for past occurrences of natural hazards. The following scores were given to each community based upon frequency of events recorded for their jurisdiction.

< 10% probability = 1
10-50% probability = 2
> 50% probability = 3

The number of historical occurrences of each event was based upon research performed at the local, state and federal levels. Ultimately, the Planning Team agreed to primarily use quantities and results recorded by NOAA's NCDC. The future probability of an event occurring is linked to the frequency of previous occurrences. The NCDC dataset spans almost 60 years of weather events, thus providing a suitable historic occurrence interval to estimate future probability. If there were fewer than seven recorded incidents in the NCDC dataset, the probability of future occurrences was deemed to be low (less than 10%). If there were between 7 and 27 events recorded by the NCDC, probability of future events was considered to be medium (11-50%). If more than 27 events of any given type were recorded in the dataset, the probability was high for future recurrence (greater than 50%).

Table 24. Historical Occurrences and Future Probability

	Hazard Risk Ranking						
Community	**Drought**	**Earthquake**	**Extreme Heat**	**Flood**	**Severe Storms**	**Severe Winter Storms**	**Tornado**
Batchtown, Village of*	1	1	1	1	2	3	1
Brussels, Village of	1	1	1	2	2	3	1
Calhoun County (Uninc.)	1	1	1	2	3	3	2
Hardin, City of	1	1	1	2	2	3	1
Hamburg, Village of	1	1	1	2	1	3	1
Kampsville, Village of	1	1	1	2	2	3	1

*Batchtown has no FEMA mapped flood hazards; however, the risks due to flooding still exist.
Note: Most historical event research produced countywide results that were not specific to individual jurisdictions.

3.3.2.2 Assessing Vulnerability – Incorporating Structural Risk

Structural risk is a function of the consequences of an event in relationship to the probability of the event occurring. Combined, both consequences and probability operate together to convey risk.

For purposes of the Plan, the probability of a future event occurring in any given year is calculated based upon the number of past events divided by the number of years of record. For example, there have been 9 tornadoes throughout the county over the last 59 years, yielding an annual occurrence ratio of 0.15 (probability). The results of the hazard profiling effort tell us that those 9 events have produced a combined $425,000 of documented damages, or roughly $47,222 per event (consequences). Another way of understanding this information is that there is a 15% probability of a tornado occurring in Calhoun County during any given calendar year that will cause damages worth approximately $47,222.

This pattern was used to estimate risk for all hazards except for flooding. Each of the other hazards is equally likely to impact the entire county, without regard to geographical location. However, flooding is much more likely to impact a property adjacent to a stream than a property several hundred feet away from a waterway. Flood risk is estimated by FEMA and established by FEMA's FIRM. The boundaries of flooding equate to the annual probability of flooding. Thus the 20% annual probability flood is also known as the 5 year flood and the 1% annual probability flood is more commonly known as the 100 year flood event.

The assessment was based on the 1% annual probability event and calculated at the Census block level. For the analysis, the value of each block was assumed to be geographically homogenous. In other words, if 43% of the block was within the floodplain boundary, it was assumed that 43% of the total value is exposed to flooding.

The property valuation records in Calhoun County are not yet digitized, making a large scale analysis of property values, such as that necessary for this plan, unfeasible. Consequently, the values were based on those established by FEMA for use in the HAZUS program. HAZUS values are based on national averages and thus may not accurately reflect the values of property in Calhoun County.

The following is an explanation of the vulnerability assessment calculation utilized in the Plan.

Structure Vulnerability (Risk) expressed as a formula:

$$Risk = P \times C \times D$$

Where:

P *= Annual Chance Probability Ratio (past events / years of record)*
C *= Average Annual Damages ($) from HAZUS model.*
D *= Geographic Weighted Distribution of Event by Jurisdictional Area*
Note: Geographic Distribution of flood plains is predetermined based upon FEMA's mapped flood areas and not subjected to an additional area distribution factor.

The following scores are given to each community based upon estimated annual weighted damages of infrastructure vulnerability for each jurisdiction.

Less than $5 million exposed = 1
Between $5 and $10 million exposed = 2
More than $10 million exposed = 3

Table 25. Fiscal Vulnerability

Community	Hazard Risk Ranking						
	Drought	Earthquake	Extreme Heat	Flood	Severe Storms	Severe Winter Storms	Tornado
Batchtown, Village of*	2	2	2	1	2	2	2
Brussels, Village of	3	3	3	1	3	3	3
Calhoun County (Uninc.)	3	3	3	3	3	3	3
Hardin, City of	3	3	3	2	3	3	3
Hamburg, Village of	2	2	2	2	2	2	2
Kampsville, Village of	3	3	3	2	3	3	3

*Batchtown has no FEMA mapped flood hazards; however, the risks due to flooding still exist.

3.3.2.3 Assessing Vulnerability – Incorporating Critical Facilities

Critical facilities provide vital services and resources to residents and hazard response personnel or would add substantially to the danger of a natural disaster (i.e. a natural gas leak). Should critical facilities fail during a natural hazard, short and long term impacts can be devastating to a community's safety and economy.

For each hazard profiled, the following scores are applied toward each community based upon the number of critical facilities exposed within their jurisdiction.

< 5 critical facilities exposed = 1
6-10 critical facilities exposed = 2
> 10 critical facilities exposed = 3

The number of critical facilities exposed to each hazard was based upon research performed at the local, state and federal levels, with additional locally identified critical infrastructure. The HAZUS dataset includes information about several different types of facilities, including public safety, such as police and fire stations, hospitals, and schools; utility infrastructure, including electrical substations, communication facilities, and water and wastewater treatment plants; and infrastructure which, if damaged, cause a high potential for damages, such as bridges and dams. Additional facilities identified by the local jurisdictions include public works department buildings, where trucks and equipment are stored; churches and community centers, which could serve as shelters; nursing homes; and businesses storing or utilizing large amounts of chemicals or fuels.

Table 26. Vulnerable Critical Facilities

Community	Hazard Risk Ranking						
	Drought	Earthquake	Extreme Heat	Flood	Severe Storms	Severe Winter Storms	Tornado
Batchtown, Village of*	1	1	1	1	1	1	1
Brussels, Village of	2	2	2	1	2	2	2
Calhoun County (Uninc.)	3	3	3	3	3	3	3
Hardin, City of	3	3	3	2	3	3	3
Hamburg, Village of	1	1	1	1	1	1	1
Kampsville, Village of	3	3	3	2	3	3	3

*Batchtown has no FEMA mapped flood hazards; however, the risks due to flooding still exist.

3.3.2.4 Assessing Vulnerability – Incorporating Population

One of the primary purposes of a Hazard Mitigation Plan is to protect life from the adverse impacts of natural hazards. Understanding where population densities are located and the demographics at risk to specific hazards is critical to mitigating risk. For example, individuals over the age of 65 are significantly more susceptible to extreme heat or cold.

For each hazard profiled, the following scores are given to each community based upon the percentage of each community's population exposed within their jurisdiction.

0% to 10% of community population exposed = 1
10% to 25% of community population exposed = 2
25% or more of community population exposed = 3

The population exposed to each hazard was based upon the 2000 U.S. Census data. Most hazards, aside from flooding, are subject to strike anywhere within the county, thus placing the entire county population at risk. Extreme heat, however, is unique in that citizens 65 or older tend to be more vulnerable to this hazard. As a result, Census data was further profiled to estimate associated population percentages at risk to this hazard. Populations exposed to

flooding were estimated based upon the 2000 U.S. Census values for Census blocks containing a portion of the 1% annual probability flood hazard. The area of the floodplain was calculated and the population was assumed to be spread homogeneously throughout the block. Thus, for a block with 100 residents and 28% of its total area within the 1% annual flood probability hazard, 28 people were assumed to be at risk. The population was summed for each jurisdiction and the percentage of the potentially impacted population was calculated and tabulated. To minimize the potential for distortion of the data caused by use of the actual population, the percentage of the total population was used for all jurisdictions.

Table 27. Vulnerable Population

Community	Hazard Risk Ranking						
	Drought	Earthquake	Extreme Heat	Flood	Severe Storms	Severe Winter Storms	Tornado
Batchtown, Village of*	3	3	2	1	3	3	3
Brussels, Village of	3	3	2	2	3	3	3
Calhoun County (Uninc.)	3	3	2	1	3	3	3
Hardin, City of	3	3	2	3	3	3	3
Hamburg, Village of	3	3	2	1	3	3	3
Kampsville, Village of	3	3	2	2	3	3	3

*Batchtown has no FEMA mapped flood hazards; however, the risks due to flooding still exist.

3.3.3 Identifying Structures and Estimating Losses

For purposes of the vulnerability assessment, 'structures' were determined to include countywide structures and critical facilities.

At-Risk Structures. These structures are defined as residential, commercial, industrial or agricultural structures residing within the respective hazard area. For all hazards except flooding, all structures are equally at risk of being impacted.

Structure Value. Structure values were estimated for each property using FEMA's HAZUS program. Generally, local property value data as assessed by the property tax office is the most accurate; however, Calhoun County data is not digitized. Consequently, the data is not available for a large scale analysis of property values. If funding is pursued for any projects, more detailed valuation data will be required for a FEMA approved cost-benefit analysis.

Critical Facilities. Critical facilities were developed by augmenting the FEMA standard HAZUS facilities with locally provided data. HAZUS facilities include:

- Emergency Service Facilities, including:
  - Police and fire stations,
  - Emergency and long-term health care facilities, and
  - Emergency operations centers.

- Transportation Facilities, including:
    - Highway bridges,
    - Railroad bridges,
    - Highway and railroad segments,
    - Airports and runways.
- Utility Facilities, including:
    - Communication centers,
    - Power plants, and
    - Water and wastewater treatment facilities.
- Miscellaneous other facilities, including:
    - Dams and levees,
    - Schools,
    - Facilities storing or using hazardous material, and
    - Sites related to the military.

Each jurisdiction was offered the opportunity to provide addresses of additional critical facilities to be geo-coded and incorporated into the master Critical Facilities mapping layer. Examples of facilities deemed important by the local jurisdictions include churches, government buildings, water wells and other key business or industrial infrastructure.

Severe storms, severe winter storms, drought, extreme heat, earthquakes and tornados can occur anywhere within Calhoun County. As a result, all structures and critical facilities throughout the County are at risk to these natural hazards. Flood risk, however, is unique in that this risk is primarily focused to areas near or adjacent to streams. Flood vulnerability is best estimated in areas mapped as FEMA recognized floodplains. Therefore, structures and critical facilities intersecting these flood boundaries assume a higher risk.

The two tables presented below identify the number, type and value of structures at risk to both countywide and flood related natural hazards.

Table 28. Structural Vulnerability by Type for the Entire County.

	Residential		Commercial		Industrial		Institutional		Agricultural	
Jurisdiction	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)
Batchtown, Village of	121	12,050,000	3	1,093,916	1	182,280	2	1,206,485	0	0
Brussels, Village of	78	7,733,000	4	1,863,925	0	0	3	1,613,534	1	98,735
Calhoun County (Uninc.)	2,149	195,176,330	24	17,580,742	9	2,634,482	8	2,830,855	13	8,051,460
Hamburg, Village of	128	9,770,430	3	2,457,646	0	0	2	1,922,055	0	0
Hardin, City of	500	56,742,340	31	18,662,236	8	3,266,867	10	17,113,931	2	1,486,987
Kampsville, Village of	185	14,627,360	3	1,717,489	0	0	3	1,719,872	0	0
TOTAL	**3,161**	**296,099,457**	**68**	**43,375,954**	**18**	**6,083,629**	**28**	**26,406,732**	**16**	**9,637,182**

Table 29. Structural Vulnerability by Type for the Floodplains Only.

	Residential		Commercial		Industrial		Institutional		Agricultural	
Jurisdiction	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)	Number	Value ($)
Batchtown, Village of	0	0	0	0	0	0	0	0	0	0
Brussels, Village of	8	785,736	0	0	0	0	0	0	1	3,767
Calhoun County (Uninc.)	296	28,738,839	11	7,778,049	1	580,022	1	845,730	1	1,146,951
Hamburg, Village of	54	4,115,045	1	11,354	0	0	2	1,797,956	0	0
Hardin, City of	59	6,223,437	3	1,951,121	1	90,710	1	100,124	1	11,363
Kampsville, Village of	44	3,522,460	3	1,648,739	0	0	3	1,527,495	0	0
TOTAL	**461**	**43,385,517**	**18**	**11,389,263**	**2**	**670,732**	**7**	**4,271,304**	**3**	**1,162,081**

Table 30. Critical Facilities - Countywide

Jurisdiction	Critical Facilities					Transportation			Utilities						Community Facilities	**TOTAL**
	Emergency Centers	Schools	Police Stations	Fire Stations	Hospital	Bridges	Ferry Facility	Port Facility	Dams	Electric Facility	Oil Facility	Water Treatment Plant	Wastewater Facility	Communication Center		
Batchtown, Village of	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
Brussels, Village of	0	3	0	1	0	1	0	0	0	0	0	0	0	0	1	**6**
Calhoun County (Uninc.)	0	2	0	0	0	51	3	2	0	0	0	1	0	0	8	**67**
Hamburg, Village of	0	0	0	1	0	2	0	0	0	0	0	0	0	0	2	**5**
Hardin, City of	1	1	2	1	1	2	0	1	0	0	0	1	1	1	8	**20**
Kampsville, Village of	1	1	0	1	0	2	1	1	0	0	0	1	1	1	2	**12**
TOTAL	**2**	**7**	**2**	**5**	**1**	**58**	**4**	**4**	**0**	**0**	**0**	**3**	**2**	**2**	**21**	**111**

Table 31. Critical Facilities – FEMA Mapped Flood Hazard Only

	Critical Facilities					Transportation			Utilities							
Jurisdiction	Emergency Centers	Schools	Police Stations	Fire Stations	Hospital	Bridges	Ferry Facility	Port Facility	Dams	Electric Facility	Oil Facility	Water Treatment Plant	Wastewater Facility	Communication Center	Community Facilities	**TOTAL**
Batchtown, Village of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Brussels, Village of	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
Calhoun County (Uninc.)	0	0	0	0	0	12	2	2	0	0	0	2	0	0	1	**19**
Hamburg, Village of	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	**3**
Hardin, City of	0	0	1	0	0	1	1	1	0	0	0	1	1	0	4	**10**
Kampsville, Village of	1	0	0	1	0	2	1	1	0	0	0	1	1	0	2	**10**
TOTAL	**1**	**0**	**1**	**1**	**0**	**18**	**4**	**4**	**0**	**0**	**0**	**4**	**2**	**0**	**8**	**43**

Tornados, earthquakes, severe storms, severe winter storms, extreme heat, and drought could potentially affect any or every location within each jurisdiction depending on the path or area the event encompasses. These hazards and their occurrences are not limited to a particular geographic area based on historical events and documentation provided in the hazard profile section for each hazard. These hazards can affect any jurisdiction at any time making every asset vulnerable. Flooding, however, is unique in that probability can be isolated to areas primarily in or adjacent to FEMA mapped floodplains.

FEMA recognized flood hazards are shown on the community maps in **Appendix F**.

3.3.4 Assessing Vulnerability – Population at Risk

Population is a major component to estimating risk and should be considered when assessing vulnerability to natural hazards. Repetitive loss properties are a significant focus of the NFIP and FEMA. RL properties cause strain on the resources of the NFIP and responding agencies, including federal, state, and local agencies. In addition, RL properties put residents and emergency responders at risk repeatedly. Removing or mitigating RL properties should be a primary goal of the participating villages and Calhoun County. Each of the villages have a significant number of RL properties, with substantial cumulative losses. The table below summarizes the number of RL properties and losses for each jurisdiction in Calhoun County.

Table 32. Repetitive Loss

Jurisdiction	Number of Repetitive Loss Properties	Number of Losses
Batchtown, Village of	1	3
Brussels, Village of	30	127
Calhoun County	17	71
Hamburg, Village of	13	38
Hardin, Village of	16	75
Kampsville, Village of	22	80

3.3.4.1 Existing Population at Risk

Severe storms, severe winter storms, drought, extreme heat, earthquakes and tornados can occur anywhere within Calhoun County. As a result, all population throughout the County is at risk to these natural hazards. Flood risk, however, is unique in that this risk is focused to areas near or adjacent to streams. Therefore, the populace residing within these flood boundaries assumes a higher risk.

The table below shows population demographics for the jurisdictions in Calhoun County for the population vulnerable to flooding.

Table 33. Flood Vulnerable Population

Jurisdiction	Total Population	At-Risk Population	Percent at Risk
Batchtown, Village of	218	0	0%
Brussels, Village of	141	15	10.6%
Calhoun County (Uninc.)	3,328	266	8.0%
Hamburg, Village of	126	45	35.7%
Hardin, City of	959	94	9.8%
Kampsville, Village of	302	53	17.5%

Population estimates for areas within a mapped flood hazard were based upon area weighted averages. The proportion of the Census block in the flood hazard was calculated and the population in the block was assumed to be spread homogenously through the block.

3.3.4.2 Population and Developmental Trends

The Calhoun County population is essentially static. The Illinois Department of Commerce has estimated populations for each of the counties in the state on five year increments through 2030, based on the 2000 U.S. Census. In the 2000 Census, Calhoun County had 5,084 residents. The Commerce Department estimates the county population will grow at an annual rate of approximately 0.3%, for a total change of 10% through 2030. The potential for new development in the County is predominately focused in the development of second homes or lots for temporary residents, such as recreational vehicles or travel trailers.

Consequently, few additions to the building stock in the County are expected in the foreseeable future. New development in the county is also subject to the requirements of the building ordinances, including the floodplain ordinance. The County has a defined plan for where development should be focused, which takes into account floodplains, the only geographically definable natural hazard discussed in this plan. Future development in the floodplain is unlikely based on the Floodplain Development Ordinance and other restrictions in place.

4.0 Mitigation Strategy

The Mitigation Strategy portion of this plan leverages the results of the hazard identification and vulnerability assessment to identify local risk reduction goals and actions. The process incorporated participation and coordination amongst the Planning Team to develop goals and actions that were specific, measurable, achievable, relevant and time or schedule dependent SMART).

The mitigation strategies developed within the Plan provide a blueprint for reducing the potential losses identified in the risk assessments and does not conflict with existing authorities, policies, programs and resources.

4.1 DEFINITION OF MITIGATION

FEMA defines mitigation as “sustained action that reduces or eliminates long-term risk to people and property from hazards and their effects.” Mitigation is the ongoing effort at the

federal, state, local and individual levels to decrease the impact of disasters upon families, homes, the jurisdiction and the economy. Mitigation also includes making existing and future development in hazard prone areas safer. A jurisdiction can steer growth to areas with fewer risks through non-structural measures such as regulations and land use plans. Preventing damages or loss to lives or property is the essence of mitigation. Incorporating mitigation into decisions relating to a jurisdiction's growth can result in a safer, more resilient jurisdiction, and one that is more attractive to families and businesses.

4.2 LOCAL HAZARD MITIGATION GOALS

The Mitigation Strategies were developed through work sessions, individual conversations, and meetings at the local level. The planning participants worked together to develop and complete a series of community mitigation worksheets. These worksheets encouraged communities to work with local resources to develop mitigation goals, activities, priorities, and capabilities. A copy of the worksheet each community completed is attached as **Figure 18**.

During the June 24, 2010 stakeholder meeting, attendees reviewed the hazard profiles and results of the vulnerability assessments. The concept of risk mitigation activities was introduced and examples were discussed together, and then each community separated to develop individualized plans. As a result of the process, the group ultimately developed several mitigation goals to reduce or avoid long-term vulnerabilities for hazards within each jurisdiction. These goals are provided in **Appendix H**. The group also identified specific locations for most of the goals provided. The maps showing the locations of the actions are collected in **Appendix F**.

4.3 IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIVITIES

The Planning Team worked together and individually throughout the planning process to identify, evaluate, and analyze a comprehensive range of specific mitigation actions. These actions were based on the evaluation of the risk assessment and in coordination with the mitigation goals that were formed by each jurisdiction.

Proposed activities include educational and preparatory tasks, such as supply stockpiling or response planning. Other activities targeted specific facilities, such as schools or maintenance buildings. Hardin has had substantial success in the past with purchasing properties to remove them from the flood-prone areas adjacent to the Illinois River, as shown in the picture below. Continuing the purchase and removal of the flood-prone properties, especially the repetitive loss properties is a high priority for the County. All of the mitigation activities for the County and the villages are included in **Appendix H**, with greater detail.

Figure 18. The buildings on these properties were removed and a park developed in their place to reduce flood exposure.

Community Name:_____ **Contact Name**_____ **Contact Phone No**.:_____

Mitigation Goals:

1. **Preventative Activities**. Reduce risks through regulations including building codes, development outside of hazardous areas, and local planning or capital improvement projects.
2. **Property Protection**. Reduce exposure to hazards through building or parcel specific activities such as flood proofing, structure acquisition, or retrofitting.
3. **Emergency Services.** Reduce impacts through response and recovery activities that are implemented during a disaster.
4. **Structural Projects.** Minimize impacts through projects, such as detention basins, tornado shelters, tornado sirens, etc.
5. **Public Information.** Assist residents to prepare for risks and protective measures to better protect themselves and their property.
6. **Other**. _____

Item Number	Goal Number	Mitigation Action	Responsible Agency & Contact Person	Funding Source	Implementation Timeline	Estimated Benefits†	Estimated Costs†
Example	*2*	*Purchase homes in the 100 year floodplain and convert the space to a park or greenspace.*	*County Planning Department - Bob Jones, Director*	*HMGP & General Funds*	*5 years*	*Medium*	*Medium*
1.							
2.							
3.							

† **Benefit and Cost estimates should be based on these categories:**

Less than $100,000 = Low
$100,000 - $500,000 = Medium
More than $500,000 = High

Figure 19 Mitigation Activity Development Worksheet

4.3.1 Mitigation Activities by Type

The group focused upon various types of activities that could be performed to reduce the risk of natural hazards throughout their communities. These activities were categorized as follows:

a. Prevention. (PA) Preventative activities are designed to keep current problems from getting worse and to eliminate the possibility of future problems. Preventative activities reduce a jurisdiction's vulnerability to hazard events. This type of activity is especially effective in hazard prone areas where development has not occurred. Preventative activity examples include the following:

    1) Planning and Zoning
    2) Floodplain regulations
    3) Local ordinances

b. Property Protection. (PP) Property protection activities are designed to adapt existing structures to withstand natural hazards or to remove structures away from hazard prone areas. Property protection activity examples include the following:

    1) Acquisition
    2) Relocation
    3) Foundation elevation
    4) Insurance – flood and homeowner's
    5) Retrofitting (includes activities such as wind proofing, flood proofing, and seismic design standards)

c. Emergency Services. (ES) Emergency services minimize the impact that a natural hazard has on the residents of a jurisdiction. Usually, actions are taken by emergency response services immediately before, during, or in response to a hazard event. Emergency service activity examples include the following:

    1) Warning systems
    2) Evacuation planning and management
    3) Sandbagging for flood protection

d. Structural Projects. (SP) Structural projects lessen the impact of a natural hazard by changing the natural progression of the hazard. These types of projects are usually designed by engineers. Structural projects include the following:

    1) Storm sewers
    2) Floodwalls
    3) Highway projects
    4) Tornado shelters

e. Public Information and Awareness. (PI) Public information and awareness activities are used to educate the residents of a jurisdiction about the potential hazards that affect their area, hazard prone areas, and mitigation strategies they can take part in to protect themselves and their property. Public information and awareness activity examples include the following:

1) Public speaking events
2) Outreach projects
3) Availability of hazard maps
4) School programs
5) Library materials

4.4 IMPLEMENTATION OF MITIGATION ACTIVITIES

Each jurisdiction's Plan Representative(s) worked with community resources to develop mitigation activities based upon local vulnerabilities and capabilities. These actions were identified and prioritized using a prioritization scheme, generalized benefit/cost approach, and funding identification strategy. For each action developed, an action administrator or authority was defined along with an estimated timeframe for completing the activity.

The hazard mitigation actions developed were prioritized based upon the capacity of an action to eliminate or reduce risk, the category of activity performed, the generalized benefit to cost of each activity, and it's potential for funding.

4.4.1 Activity Prioritization

The Planning Team prioritized each activity based upon its ability to eliminate or reduce risk associated with mitigation goal. The following table was used to categorize each activity's priority as listed within **Appendix I**.

Table 34. Activity Prioritization

Priority	Description
A-Very High	Priority A projects permanently eliminate damages or significantly reduce the probability of deaths and injuries in a specified area. Priority A is also given to other activities that have a high probability of systematically reducing damages or deaths and injuries across a wide area from one or more hazards.
B-High	Priority B projects permanently reduce damages in a specified area. Priority B is also given to other activities with the potential for reducing damages, deaths and injuries across a wide area from one or more hazards.
C-Medium	Priority C projects or activities permanently reduce damages or significantly reduce the probability of deaths and injuries in a specified area from one of my community's less significant hazards.
D-Low	Priority D projects or activities alert the public to the approach of a threat from a hazard or educate the public about the need for disaster preparedness and mitigation.

4.4.2 Activity Benefit-Cost Review

The Planning Team also considered the return on investment for each activity. Both the benefits and the costs were examined on a qualitative basis (i.e. High, Medium, and Low). The three categories were divided based on the estimated value of the benefits derived or the cost of developing the action or project. If the costs or benefits were expected to be less than $100,000, the category was low. If the costs or benefits were expected to surpass $100,000 but be less than $500,000, the category was medium. If the costs or benefits were expected to exceed $500,000, the category was high. The result produced a generalized approach for assessing relative benefits to cost. The Planning Team agreed that more detailed benefit cost analysis would be performed as necessary prior to the implementation of each activity. In cases of activities identified for funding through FEMA mitigation programs, the group recognized that FEMA approved benefit-cost analysis would be required.

4.4.3 Activity Funding and Implementation

The Planning Team considered and identified the funding resources that may be available for each activity. At this stage, no specific plans were developed to fund projects, but probable sources of funding were identified. In general, the identified source of funding corresponded to the implementing agency. As part of the activity development process, each activity defined by a given jurisdiction was recommended to identify a lead agency or personnel responsible for implementing the activity.

Most sources of public funding will require a detailed cost-benefit analysis of the proposed mitigation activities, as well as an analysis of potential alternatives. Development of mitigation actions should also include a STAPLEE analysis. STAPLEE is an acronym standing for Social, Technical, Administrative, Political, Legal, Environmental, and Economic. Each of these criteria should be reviewed to determine the usefulness and potential for implementation. Difficulties in any of the seven criteria could potentially derail a mitigation action because of unforeseen opposition or ramifications.

4.5 LOCAL MITIGATION STRATEGY AND CAPABILITIES ASSESSMENT

This plan includes specific actions for each jurisdiction in Calhoun County. These actions are based on goals developed to address the risks identified throughout the region. It is the intent of each jurisdiction to implement these actions using practices that are cost-effective, environmentally sound, and technically feasible.

Following the Plan's adoption, the Planning Committee will continue to work with the Calhoun County government, departments and other regional organizations to implement mitigation

strategies on a regional basis where feasible. While the commitment to implementing this strategy is strong, the potential for success is directly linked to each jurisdiction's capability.

The purpose of the capability assessment is to identify the potential hazard mitigation opportunities available to each jurisdiction that may already exist as part of each jurisdiction's daily operations (e.g. code enforcement, operations, maintenance, etc).

This assessment will highlight the positive measures already in place in the jurisdiction as well as identify weaknesses that could increase vulnerability in a jurisdiction. The capability assessment serves as the foundation for an effective hazard mitigation strategy. By establishing goals and objectives for jurisdictions to pursue under the Calhoun County Plan, it ensures that the goals and objectives that are decided upon are realistically attainable given local resources.

4.5.1 Local Mitigation Practices

The following defines local practices already in place throughout the county's jurisdictions that encourage or promote mitigation activities. These practices reside within existing polices, ordinances, programs, and other planning efforts.

Mitigation Management Policies. The Emergency Operations Plan (EOP) provides for an integrated countywide emergency preparedness and response plan, utilizing public, nonprofit, and private resources. The plan includes roles and responsibilities of persons/departments in charge of dispatching help during a natural hazard, rules that are followed, evacuation procedures dispersed by the transportation officer to be followed, etc.

Existing Plans. In general, the County's policies encourage cooperation and coordination within its jurisdictional agencies, as well as cooperation, including mutual aid compacts, between neighboring counties and municipalities within the region. The EOP provides for an integrated countywide emergency preparedness and response plan, utilizing public, nonprofit, and private resources.

Mitigation Programs. The main mitigation programs are the county's floodplain management regulations and participation in and administration of the NFIP. Additional programs include:

a. The County's Floodplain Regulations are aimed at restricting development in the floodplain. The County Zoning Ordinance restricts development to those uses which are unlikely to be severely impacted by floodwaters, such as agricultural fields, camps, parks, etc. In addition, the ordinance requires that any development in the floodplain not decrease the capacity of the floodplain to contain flood waters. The Subdivision Ordinance restricts most development in flood-prone areas.

b. Calhoun County severe weather warnings will be disseminated by broadcast radio and television stations. In addition, the emergency radio warning systems may be used to alert residents of the county.

4.5.2 Available Funding Resources

There are several sources of funding for both pre- and post-disaster hazard mitigation policies and projects. While all mitigation techniques will save money by avoiding different types of losses, the implementation of mitigation efforts can be costly and well beyond the local jurisdiction or county's capacity to fund the mitigation activity. There are existing federal and state funding programs that can be utilized for funding assistance. The following is a list of some sources of funding presently available. This list is not comprehensive, as new programs can be developed or existing programs can be eliminated or modified over time.

a. Federal Sources:

1) *Pre-disaster Mitigation Program: Federal Emergency Management Agency (FEMA)*: Through the Disaster Mitigation Act of 2000, Congress approved the creation of a national program to provide a funding mechanism that is not dependent on a Presidential disaster declaration. The Pre-Disaster Mitigation (PDM) Program provides funding to states and communities for cost-effective hazard mitigation activities that complement a comprehensive mitigation program, as well as reduce injuries, loss of life, and damage and destruction of property.

2) *Emergency Management Performance Grant*: *Federal Emergency Management Agency (FEMA):* The Emergency Management Performance Grant (EMPG) encourages the development of comprehensive emergency management at the State and local level in order to improve emergency management planning, preparedness, mitigation, response, and recovery capabilities. Funding is provided to the State, which can be used to educate people and protect lives and structures from natural and technological hazards.

3) *Public Assistance Grant Program: Federal Emergency Management Agency (FEMA):* The Public Assistance (PA) Grant Program provides supplemental assistance to states, local governments, and certain private non-profit organizations to alleviate sufferings and hardship resulting from major disasters or emergencies declared by the President. These grants allow state and local government to respond to disasters, recover from their impact, and mitigate impact from future disasters.

4) *Flood Mitigation Assistance Program*: *Federal Emergency Management Agency (FEMA):* FEMA's Flood Mitigation Assistance (FMA) Program provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to

buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP). FMA was created as part of the National Flood Insurance Reform Act of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the NFIP. FMA is a pre-disaster grant program, and is made available to states on an annual basis. This funding is exclusively available for mitigation planning and implementation of mitigation measures.

The community must be a participant in NFIP and the project must be cost-effective, beneficial to the NFIP fund, and technically feasible. The project must conform to the minimum standards of the NFIP Floodplain Management Regulations, the applicant's Flood Mitigation Plan, and all applicable laws and regulations.

5) *Hazard Mitigation Grant Program: Federal Emergency Management Agency (FEMA):* The Hazard Mitigation Grant Program (HMGP) was created in November 1988 through Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The HMGP assists states and local communities in implementing long-term mitigation measures following a Presidential disaster declaration.

   A project must conform to the State's Hazard Mitigation Plan, provide a beneficial impact on the disaster area, meet environmental requirements, solve a problem independently, and be cost-effective.

6) *Community Development Block Grants: US Department of Housing and Urban Development*: The Community Development Block Grant (CDBG) program provides grants to local governments for community and economic development projects that primarily benefit low- and moderate-income people. The CDBG program also provides grants for post-disaster hazard mitigation and recovery following a Presidential disaster declaration. To be eligible for a CDBG, a community must have a population less than 50,000 (200,000 for counties) and be located within a Presidential disaster declaration area.

7) *Sustainable Development Assistance: Department of Energy*: A Sustainable Development Assistance team works with communities to help them define and implement sustainable development strategies as part of their comprehensive community planning efforts. The team provides technical assistance to disaster-affected communities as they plan for long-term recovery by introducing a wide array of environmental technologies and sustainable redevelopment planning practices.

8) *Emergency Watershed Protection: Department of Agriculture*: Natural Resources Conservation Service *(NRCS)*: The Emergency Watershed Protection (EWP) Program provides financial assistance to sponsors and individuals in implementing emergency measures to relieve imminent hazards to life and property created by a disaster. Activities include providing financial and technical assistance to remove debris from streams, protect destabilized stream banks, and purchase floodplain easements. The program is designed for the implementation of recovery measures. It is not necessary for a national emergency to be declared to be eligible for assistance.

9) *Emergency Relief Program (Transportation Infrastructure): Department of Transportation, Federal Highway Administration*: The Emergency Relief (ER) Program provides assistance for repair of Federal-aid roads. This funding is allocated to rebuild transportation facilities that are damaged extensively, causing a "disastrous impact" on transportation services. States must request ER funding in order to initiate this assistance program.

10) *United States Army Corps of Engineers*: Congress delegates to the United States Army Corps of Engineers (USACE) the authority and appropriations for projects through the Water Resources and Development Act (WRDA). Projects eligible for funding include the following: disaster response, water supply, shore protection, navigation, facilities design & construction, installation support, hydropower, recreation, flood damage reduction, environmental infrastructure, ecosystem restoration, master planning, regulatory projects, and the rehabilitation of flood control structures

b. <u>State Funding:</u>

1) *Section 208 Snagging and Clearing for Flood Control: United States Corps of Engineers*: USACE designs and constructs the project. Each project must be engineering feasible, complete within itself, and economically justified. The nonfederal sponsor must provide all lands, easements, and rights of way. Non-Federal sponsor pays all project costs in excess of the Federal limit of $500,000. Sponsor agrees to maintain the project.

2) *Volunteer Labor Force (G): Illinois Department of Corrections*: Prisoners can be used to sandbag, construct levees and flood fight. Prisoners are also occasionally used to clean streams of brush and debris or clean up following a flood disaster.

3) *Community Development Assistance Program (Community Development Block Grant: Illinois Department of Commerce and Community Affairs:* Eligible projects must include activities that improve community welfare,

specifically in moderate or low-income areas. Conservation related projects can possibly include the acquisition of real property (e.g., flood-prone areas), construction of water or sewer facilities, and initiatives for energy conservation. Funding competition is intense. Application deadlines vary; no match required.

4) *Hazard Mitigation Assistance Program: IEMA Agency:* Governments must be enrolled and in good standing with the NFIP. Eligible initiatives are eligible for projects that include acquisition of insured structures and underlying real property for open space use. Provides up to 75% of project costs, 25% match required.

5) *Greenways and Trails Planning Assistance Program: Illinois Department of Natural Resources*: IDNR provides community-wide or individual assistance and training to communities trying to regulate floodplain development activities and reduce existing flood problems. Can provide communities with training manuals, model floodplain and storm water ordinances, technical assistance, risk assessment, and floodplain mapping.

6) *Open Space Lands Acquisition and Development (OSLAD) Program and Open Lands Trust Program: Illinois Department of Natural Resources*: Eligible products include money for acquisition and development of public parks for passive recreation/open spaces. Application deadlines vary. Conservation easement required with both programs. Funding is reimbursable up to 50% of project costs, reimbursable up to $2 million for the Trust Grant.

There are several sources of available funding for hazard mitigation projects. Those identified here, while they are significant, do not comprise all potential sources of funding. It should be noted that new programs can become available while existing programs can be modified or dropped. Many funds available are leveraged with “local” matching funds at various contribution percentages. Should any of the above funding sources be utilized, a detailed cost-benefit analysis should be completed prior to application. Diligence in keeping abreast of changes in funding opportunities will be necessary to institute hazard mitigation projects that take advantage of non-local funds.

Calhoun County and its jurisdictions are well positioned to perform successful implementation of the activities identified within the Plan. As a result, the communities are better prepared to achieve their identified goals for mitigating local risk to natural hazards throughout the region.

5.0 Plan Maintenance

Plan Maintenance is the process in which the Calhoun County Plan will be monitored, evaluated, and updated within a five-year cycle. When updated, the plan will be reviewed, revised, and resubmitted to the State/IEMA within five years of the plan for approval by FEMA Region V. As appropriate, the plan will also be evaluated after a disaster, or after unexpected changes in land use or demographics in or near hazard areas. The Planning Committee also will be kept apprised of a change in federal regulations, programs and policies, such as a change in the allocation of FEMA's funding for mitigation grant programs. These evaluations will be addressed in the annual progress report for the plan and may affect the Action Plan for Mitigation goals and activities.

5.1 MONITORING, EVALUATING, AND UPDATING THE PLAN

5.1.1 Monitoring

The Community Representatives will continue to monitor the status and track the progress of the plan elements on an annual basis. The Community Representatives will oversee the progress made on the implementation of the identified actions and update the plan as needed to reflect changing conditions. Representatives will also meet annually to evaluate plan progress and recommend updates.

5.1.2 Evaluating

Evaluation of the plan will not only include checking the implementation status of mitigation actions, but also assessing their degree of effectiveness and assessing whether other natural hazards need to be addressed and added to the plan (man-made hazards). This will be accomplished by reviewing the benefits (or avoided losses) of the mitigation activities that were in place within each jurisdiction and county. These will be compared to the goals the Plan has set to achieve. The team will also evaluate whether mitigation actions need to be discontinued or modified in light of new developments or changes within the community. Public comment on the plan and achievement of goals and objectives will also be solicited annually during the evaluation by the committee. The process will be documented by the Community Representatives and submitted to the County Emergency Services and Disaster Agency and the County Board of Commissioners for review. Any updates will be included in the plan at the next update.

5.1.3 Updating

As required by part 201.6(c)(4)(i) of the Local Hazard Mitigation Plan Review Crosswalk, this plan will be updated within five years of the date of the Federal Emergency Management

Agency's (FEMA) approval of the plan. The plan may be updated earlier, at the discretion of the Planning Committee and its jurisdictions. Also, the Committee's ability to update the mitigation process by adding new data and incorporating it into the mitigation plan, will allow for the efficient use of available resources, staff, and programs. Any changes in the Plan will be documented and appended in a section titled "Amendments". The Action Plan will be maintained as an Appendix so it can remain a living document.

5.2 IMPLEMENTATION THROUGH EXISTING PROGRAMS

The identified action projects address reducing the effects of hazards on new buildings and infrastructure as well as existing buildings and infrastructure. Activities also incorporate mitigation activities into other planning mechanisms and recommends mitigation projects that can be integrated into Master Plans, Flood Mitigation Plans, Capital Improvement Plans, Land Use Plans, Emergency Management Plans, Zoning Ordinances, Building Codes, and Post-Disaster Mitigation Policies and Procedures where appropriate. In addition, projects will be implemented through existing or ongoing programs.

5.3 CONTINUED PUBLIC PARTICIPATION

In order to have continued public support of the mitigation process, it is important that the public be involved not only in the preparation of the initial plan, but also in any modifications or updates to the plan. To ensure that public support is maintained, the following actions may be taken by the Community Representatives or Project Administrator:

- Develop informational mailings to be distributed to the public about mitigation efforts in the County and updates made to the Plan.
- Develop mitigation flyers or mailings that contain mitigation activities and actions that promote reducing damages and risks of natural hazards.
- Develop a survey following a Presidential, Emergency, or State Declaration to solicit public input about current or possible future mitigation activities, and place it on the County website.
- Hold a public meeting prior to plan updates.

6.0 Additional State Requirements

Illinois has additional requirements for local plans, as identified within the Illinois Natural Hazards Mitigation Plan. The state plan requests that local plans include the following tables and worksheets for each jurisdiction represented by the plan:

a. Worksheet 3A. Critical Facilities, Structures, and Population Information.

b. Potential Structure Losses for Floods.

c. Potential Structure Losses for Earthquakes.

The tables provided in **Appendix J** satisfy Illinois requirements and may be used to augment future natural hazard planning practices and risk mitigation approaches.

7.0 Conclusion

Calhoun County is very vulnerable to most natural hazards, especially flooding. The large number of repetitive loss properties in the County can be easily mitigated with the assistance of federal grants. In addition, the planning participants developed a list of several actions that will mitigate the risks to the citizens and municipalities in the County, if they are enacted. By adopting the Calhoun Countywide Multi-Hazard Mitigation Plan and incorporating the results into other planning and regulatory mechanisms, the communities and Calhoun County can become a safer place to live and work.

Appendix A

Adoption Resolutions and Executive Orders

Appendix B

Documentation of Meetings

NOTICE OF PUBLIC MEETING

Calhoun County and the villages of Batchtown, Brussels, Hardin, Kampsville, and Hamburg will hold a special public involvement meeting on Thursday June 24, 2010 at 7:00 pm Thursday, at Calhoun High School, North Highway 100, Calhoun, Illinois 62047 for the stakeholders and the public regarding the Calhoun County Natural Hazard Mitigation Plan. The purpose of the meeting is to (1) inform the public of the Natural Hazard Mitigation Plan and (2) to receive input from the public regarding natural hazards in the community including droughts, earthquakes, extreme heat, floods, hail, winter storms, severe storms, and tornadoes. After this plan has been approved by FEMA and adopted by the participating jurisdictions, these jurisdictions will be eligible for FEMA Mitigation Grant Programs which can fund up to 75% of cost effective mitigation projects.

For Additional Information, please contact:
Gene Breden
Calhoun County Emergency Services Disaster Agency Coordinator
gbreden@frontiernet.net
(618) 576-2351
PO Box 187
Hardin, IL 62047

Calhoun County Multi-Jurisdictional Multi-Hazard Mitigation Plan
First Stakeholder and Public Meeting
March 4, 2010 – 7:00 pm
Calhoun County High School Auditorium

Attendees:

Name	Agency/Department
Janet Droege	Planning Commission
David Droege	
Chuck Squier	Insurance Agent
Mel Heffington	Restaurant Owner
Richard Greenleif	Judge
Tony Friedel	Hardin Village Trustee
Robert Lee	Hardin Village Trustee
Linda K Watt	Court Reporter
Doug Smith	Hamburg Homeowner
Jessica Smith	Hamburg Homeowner
Richard Hitchcock	Hamburg Renter
Bob Lonsbach	Hardin FPD, Town Board
Ted Schumann	Kampsville Mayor
Phil Robeen	Hardin FPD, Village Trustee
Steve Shireman	Calhoun Co. Health Dept.
Rich Schnettgoecke	
Gary Rose	Calhoun Co. Rural Water
Dick Stelbrink	Planning Board
Pat Droege	
Veca Droege	LCFS
Wanda Tepen	Calhoun Co. Board Chairman
Phil Gress	Hardin Mayor
Maralyn Dilport	Hamburg resident
Roger Proctor, Sr.	Hamburg Mayor
Aaron Tucker	North Calhoun FD, Ambulance Service
Gene Breeden	Calhoun Co. ESDA Director
Kristen Dunaway	Stantec
Jared Edwards	Stantec

Jurisdictions represented:

Jurisdiction	Representative Present
Batchtown	No
Brussels	No
Calhoun County	Yes
Hamburg	Yes
Hardin	Yes
Kampsville	Yes

The meeting was called to order by Gene Breeden and the purpose and history of the Mitigation Plan was explained to the attendees. Kristen Dunaway and Jared Edwards were introduced as the consultants who would be helping the County conduct the research, analyze the results, and write the Plan.

Kristen Dunaway and Jared Edwards then discussed the attached presentation with the group. The following is a brief summary of the presentation.

- A hazard mitigation plan is intended to:
    - Help governments and residents become more prepared for when a disaster strikes;
    - Identify critical and vulnerable facilities in the jurisdiction;
    - Assist the jurisdiction in prioritizing and implementing impact minimization strategies; and,
    - Maintain the economic viability and quality of life of a community, especially following the occurrence of a natural hazard.
- The mitigation plan development process consists of public involvement, an assessment of the risk of being impacted, development of hazard specific mitigation strategies, and final review and adoption of the plan.
- The hazards identified in a plan will vary depending on region. The Illinois State Natural Hazard Mitigation Plan focuses on droughts, earthquakes, extreme heat, flooding, severe storms, severe winter storms, and tornadoes. The Calhoun County plan will focus on these hazards as well.
- There are several tables describing the historic occurrences of natural hazards as recorded in the National Climatic Data Center database and Presidential Disaster Declarations.
- Two sources for disaster preparedness information were included in the presentation; the website of the Illinois Emergency Management Agency (IEMA) and a website from the American Red Cross and IEMA.

The primary goal of this meeting was to identify critical facilities within the various jurisdictions. This was an exercise for each jurisdiction to define the facilities which would cause safety issues or a hardship on the community if they were to be shut down as the result of a natural disaster. The participants were asked to mark the location on the maps provided, describe the facility, the types of hazards the facility is vulnerable to, and the value of the facility, if it is known.

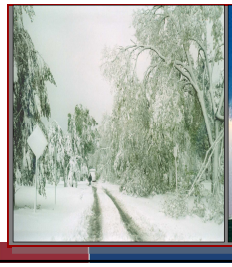
Surveys were also distributed to the meeting attendees to understand their awareness of the vulnerability of their jurisdictions and their homes and their feelings of preparedness. Blank surveys were also provided to Gene Breeden and others to distribute among the residents of their jurisdiction. The survey is also available online at http://gis01.stantec.com/calhouncounty/.

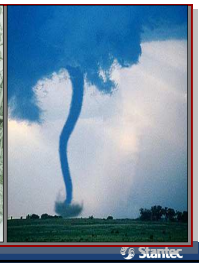
The next meeting to discuss the results of the risk assessment and to identify potential mitigation actions will be around June, 2010.

Stantec

FEMA

Calhoun County Multi-Hazard Mitigation Plan Kick-off Meeting Thursday, March 4, 2010





Stantec

FLOODING MITIGATION

PROJECT APPLICATIONS

PROJECT IMPLEMENTATION

Stantec

Stantec

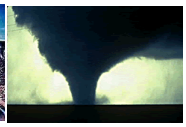
DEVELOP HAZ-PLAN

Stantec

Project Goal?

Create a Local Multi-Hazard Mitigation Plan to:

- Protect lives, property, economic viability and quality of life,
- Become more disaster-resistant,
- Compliment existing efforts,
- Organize future mitigation efforts.



Stantec

DEVELOP HAZ-PLAN

Stantec

Why Are You Here?

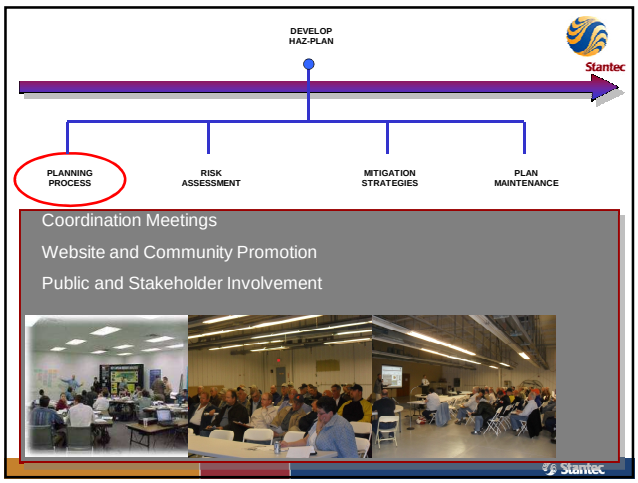
You are the Core Group (Planning Team)

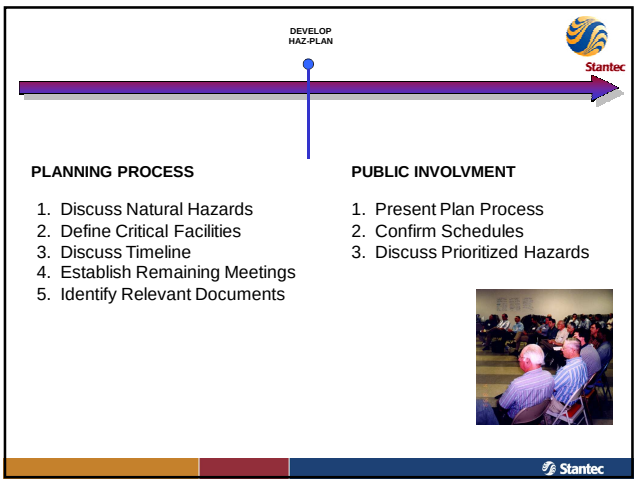
- Awareness of the process,
- Information gathering,
- Utilize your expertise,
- Provide documents and data,
- Perform draft plan reviews, and
- Offer feedback.

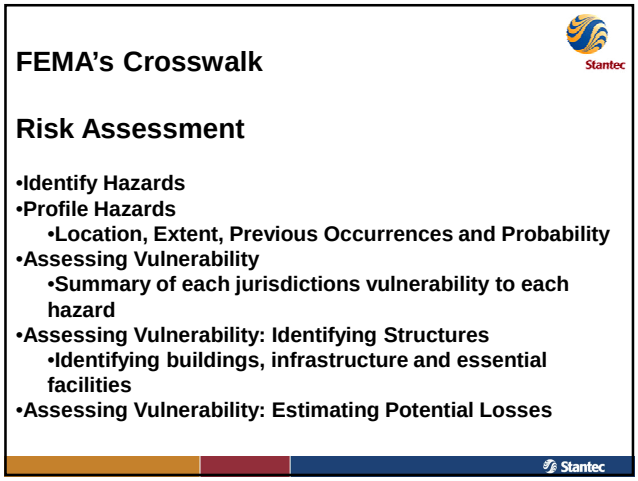
Primary Points of Contact

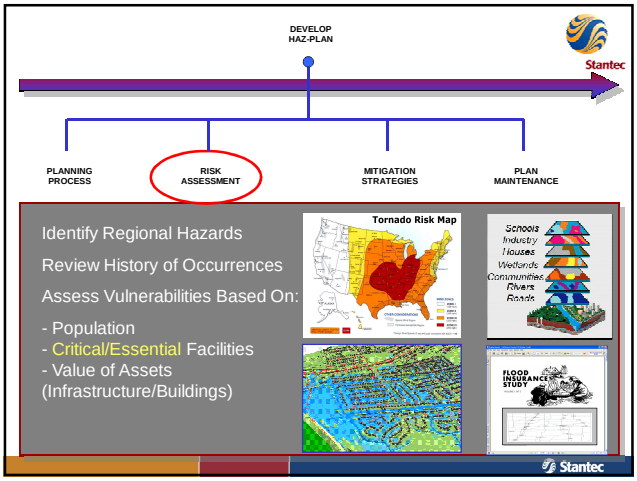
- Key representatives,
- Coordination roles, etc.
- IEMA
- FEMA Region V

Stantec


DEVELOP HAZ-PLAN
Stantec
PLANNING PROCESS
RISK ASSESSMENT
MITIGATION STRATEGIES
PLAN MAINTENANCE
Coordination Meetings
Website and Community Promotion
Public and Stakeholder Involvement
Stantec


DEVELOP HAZ-PLAN
Stantec
PLANNING PROCESS
1. Discuss Natural Hazards
2. Define Critical Facilities
3. Discuss Timeline
4. Establish Remaining Meetings
5. Identify Relevant Documents
PUBLIC INVOLVMENT
1. Present Plan Process
2. Confirm Schedules
3. Discuss Prioritized Hazards
Stantec


FEMA's Crosswalk
Risk Assessment
•Identify Hazards
•Profile Hazards
•Location, Extent, Previous Occurrences and Probability
•Assessing Vulnerability
•Summary of each jurisdictions vulnerability to each hazard
•Assessing Vulnerability: Identifying Structures
•Identifying buildings, infrastructure and essential facilities
•Assessing Vulnerability: Estimating Potential Losses
Stantec


DEVELOP HAZ-PLAN
Stantec
PLANNING PROCESS
RISK ASSESSMENT
MITIGATION STRATEGIES
PLAN MAINTENANCE
Identify Regional Hazards
Review History of Occurrences
Assess Vulnerabilities Based On:
- Population
- Critical/Essential Facilities
- Value of Assets (Infrastructure/Buildings)
Tornado Risk Map
Schools
Industry
Houses
Wetlands
Communities
Rivers
Roads
FLOOD INSURANCE STUDY
Stantec

Types of Hazards

Stantec

State of Illinois Identified Hazards:

Severe Storms	Drought	Tornados
Floods	Extreme Heat	
Severe Winter Storms	Earthquake	

Stantec

DEVELOP HAZ-PLAN

Stantec

RISK ASSESSMENT

1. Data Gathering
2. Existing Plan Check-List
3. Existing Regulations
4. Local Mapping – GIS Base Data
5. Critical Facilities
6. Property Value Information
7. GAP Analysis and Data Augmentation
8. Discuss Assessment Techniques
9. Determine Vulnerability
10. Coordination

PUBLIC INVOLVEMENT

1. Awareness

Stantec

Stantec

National Floodplain Insurance Program Information for Calhoun County

Community	Flood Policies	Past Claims Number / Total	Repetitive Loss Buildings
Village of Batchtown	0	0 / $0	0
Village of Brussels	0	8 / $48,703.07	0
Calhoun County	119	1,185/ $7,852,027	51
Village of Hamburg	18	100 / $1,060,423.51	6
Village of Hardin	41	403 / $4,057,366.34	5
Village of Kampsville	31	270/ $2,267,027.40	9

Stantec

Stantec

Presidential Disasters Declared for Calhoun County (2008 Dollars)

Event Type	Years	Damages
Flooding	1969, 2001	$15,037,194
Severe Storms and Flooding	1969, 1973, 1974, 1979, 1985, 1986, 1993, 1994, 1995	$642,071,386
Severe Storms, Tornados	1982, 1983	$22,312,475
Severe Winter Storms	2007	$25,809,632

Stantec

Reported Storm Events
NCDC (1950-2009)

Event Type	Number of Events	Deaths	Injuries	Damages
Droughts	3	0	0	0
Floods	21	0	0	$27,000,000
Hail	21	0	0	0
Snow/Ice	27	0	0	$305,000
Thunderstorms	67	1	1	$429,000
Tornados	8	0	4	$429,000
Totals	147	1	5	$28,163,000

Vulnerability Assessment (concept)

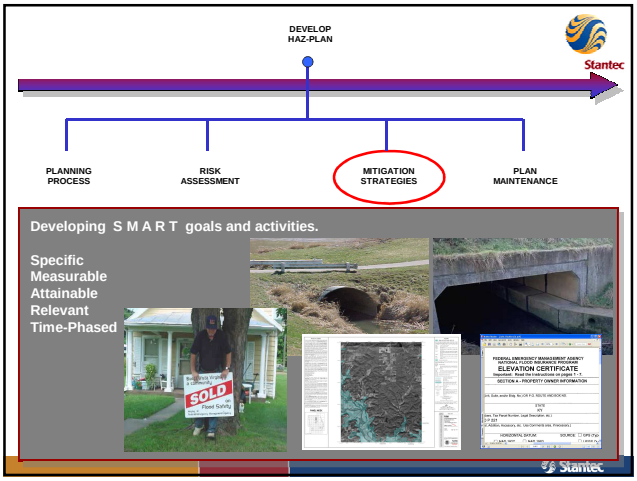
Risk = Probability x Consequences.

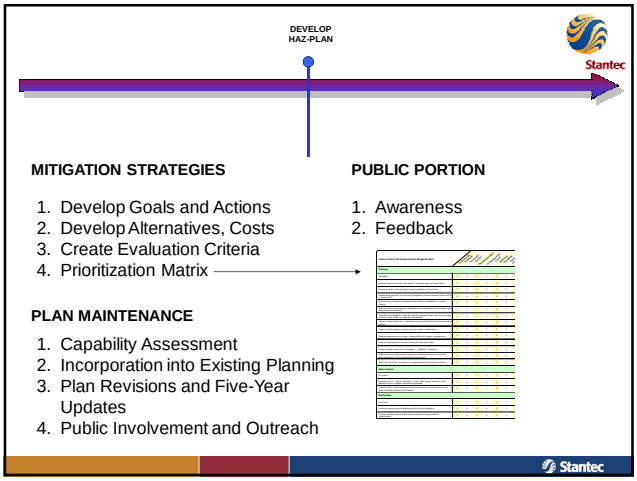
Probability

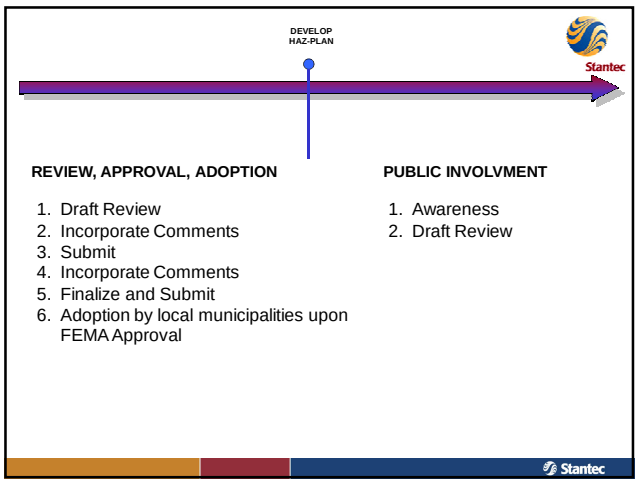
- Past Occurrences
- Geographic Considerations

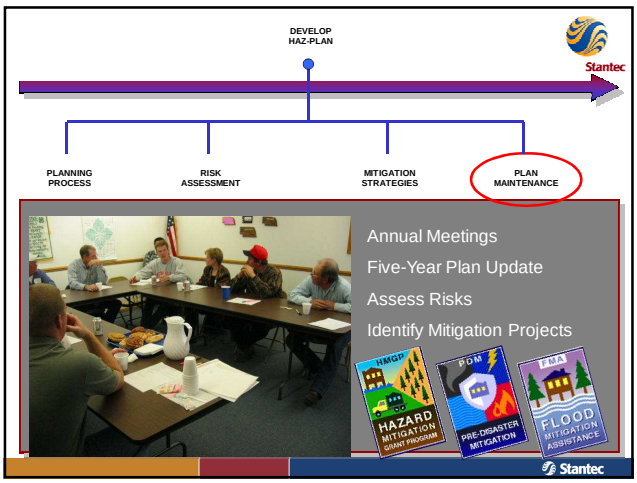
Consequences

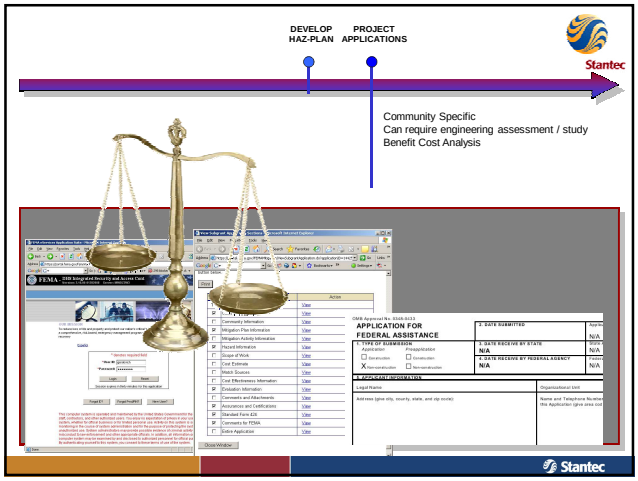
- Structure Value
- Population
- Critical Facilities

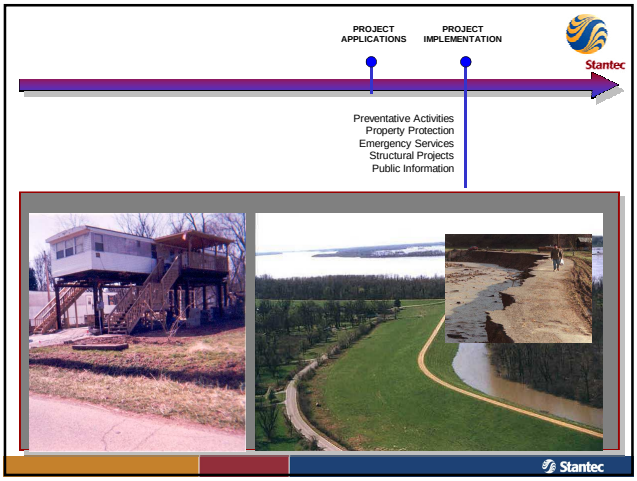





DEVELOP
HAZ-PLAN
Stantec
REVIEW, APPROVAL, ADOPTION
1. Draft Review
2. Incorporate Comments
3. Submit
4. Incorporate Comments
5. Finalize and Submit
6. Adoption by local municipalities upon FEMA Approval
PUBLIC INVOLVMENT
1. Awareness
2. Draft Review
Stantec


DEVELOP
HAZ-PLAN
Stantec
PLANNING PROCESS
RISK ASSESSMENT
MITIGATION STRATEGIES
PLAN MAINTENANCE
Annual Meetings
Five-Year Plan Update
Assess Risks
Identify Mitigation Projects
HMGP
HAZARD MITIGATION GRANT PROGRAM
PDM
PRE-DISASTER MITIGATION
FMA
FLOOD MITIGATION ASSISTANCE
Stantec


DEVELOP
HAZ-PLAN
PROJECT
APPLICATIONS
Stantec
Community Specific
Can require engineering assessment / study
Benefit Cost Analysis
APPLICATION FOR
FEDERAL ASSISTANCE
Stantec


PROJECT
APPLICATIONS
PROJECT
IMPLEMENTATION
Stantec
Preventative Activities
Property Protection
Emergency Services
Structural Projects
Public Information
Stantec

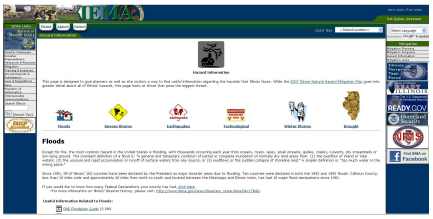
Each Jurisdiction must participate in the Planning Process through…

- Representation during planning meetings
- Submit inventory of plans, data, and reports relevant to hazard mitigation planning
  - *GIS datasets*
  - *Capitol Improvement Plans*
  - *Growth Management Plans*
  - *Floodplain Management Plans*
  - *Zoning Ordinances*
  - *Elevation Certificates*
- Update website by adding Mitigation Plan link
- Identify critical/essential 'at risk' structures and facilities
- Submit a targeted list of mitigation actions
- Review and comment on draft plan
- Incorporate plan in existing planning efforts
- Formally adopt final plan
- Participate in plan maintenance

Stantec

Resources

IEMA Website



www.state.il.us/iema/planning/HazardInfo.asp

Stantec

Resources

http://www.safehomeillinois.org/public.php

Stantec

Stantec

Hazard Identification Exercise

Hazard Identification Exercise

Jurisdiction:_____

Number on Map	Hazard Type	Description of losses	Date	Contact information

Stantec

Record of Review

Record of review and incorporation of existing programs, policies, and technical for a single local jurisdiction

(Name of Jurisdiction) _____

Existing Program/ Policy/ Techincal Document	Does the jurisdiction have this program/ policy/ technical document? (Y/N)	Reviewed by Plan Authors? (Y/N)	Method of incorporation into the hazard mitigation plan
Comprehensive Plan			
Growth Management Plan			
Capitol Improvement Plan			
Flood Damage Prevention Ordinance			
Floodplain Management Plan			
Flood Insurance/Engineering Studies			
Hazard Vulnerability Analysis			
Emergency Management Plan			
Zoning Ordinance			
Building Code			
Drainage Ordinance			
Critical Facilities Maps			
Existing Land Use Maps			
Elevation Certificates			
State Plan			
HAZUS			

Prepared by:
Name:
Title:
Telephone
E-mail:

June, 2010

Subject: Second Planning Meeting for the Calhoun County, Illinois Hazard Mitigation Plan

For Immediate Release:

Calhoun County, Illinois will host the second meeting for the Calhoun County, Natural Hazard Mitigation Plan on Thursday, June 24, 2010 at Calhoun High School, North Highway 100, Hardin, Illinois 62047 at 7:00 p.m. Residents from Calhoun County and surrounding counties and communities are invited to attend. The purpose of the meeting is to (1) inform the public of the Natural Hazard Mitigation Plan and (2) to receive input from the public regarding natural hazards in the community including droughts, earthquakes, extreme heat, floods, hail, winter storms, severe storms, and tornadoes. Topics that will be discussed at this meeting include the following: a discussion of the results of the risk assessment, grant opportunities, the public will be asked to identify mitigation activities to reduce the risks of natural hazards. After this plan has been approved by FEMA and adopted by the participating jurisdictions, these jurisdictions will be eligible for FEMA Mitigation Grant Programs which can fund up to 75% of cost effective mitigation projects.

For Additional Information, Please Contact:

Gene Breden
Calhoun County Emergency Services Disaster Agency Coordinator
gbreden@frontiernet.net
(618) 576-2351
PO Box 187
Hardin, IL 62047

Calhoun County Multi-Jurisdictional Multi-Hazard Mitigation Plan
Second Stakeholder and Public Meeting
June 24, 2010 – 7:00 pm
Calhoun County High School Auditorium

Attendees:

Name	Agency/Department
Tony Friedel	Hardin Village Trustee
Robert Lee	Hardin Village Trustee
Ted Schumann	Kampsville Mayor
Steve Shireman	Calhoun Co. Health Dept.
Barry Webster	County Highway Dept.
Wanda Tepen	Calhoun Co. Board Chairman
Gene Breeden	Calhoun Co. ESDA
Kristen Dunaway	Stantec
Jared Edwards	Stantec

Jurisdictions represented:

Jurisdiction	Representative Present
Batchtown	No
Brussels	No
Calhoun County	Yes
Hamburg	Yes
Hardin	Yes
Kampsville	Yes

The meeting was called to order by Gene Breeden. Kristen Dunaway and Jared Edwards reviewed the current status of the plan. In addition, they shared the results of the research of the history of the community and the results of the hazard analysis. Comments from meeting participants were addressed.

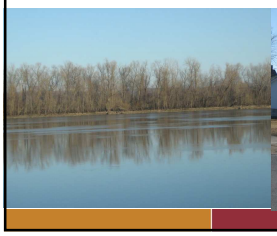
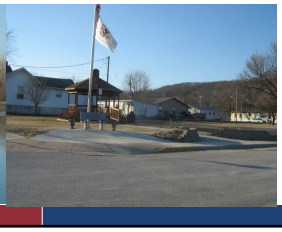
The primary purpose of the meeting was to identify specific mitigation activities for each of the communities and the county. Stantec provided maps and worksheets to facilitate the development of specific actions for each jurisdiction and Ms. Dunaway and Mr. Edwards worked with each of the groups to develop workable activities.

The next meeting to discuss the draft plan will be around September, 2010.

Calhoun County Countywide Multi- Hazard Mitigation Plan
Meeting #2, Thursday, June 24, 2010 7:00 p.m.

Mission Statement

To protect life, property and the environment through coordination and cooperation among stakeholders, which will reduce risk and loss, and enhance the quality of life for the people of Calhoun County

Stantec

Tonight's Discussion:

1. Survey Results
2. Hazard Profile Results
3. Risk Assessment Results
4. Identify Mitigation Activities
5. Provide Data for Past Hazard Events
6. Next Steps

Stantec

Project Overview

1. Planning Process,
   - Meetings, stakeholder input, data gathering
2. Risk Assessment (Hazard Identification and Vulnerability),
   - Analyze past occurrences, probabilities, document and map.
3. Multiple Hazard Mitigation Strategy,
   - Determine strategies to reduce risk (preventative, protection, projects, education, etc)
4. Hazard Mitigation Plan Maintenance Process
   - Periodic plan monitoring, evaluating and update. Annual reviews. 5-yr updates.
5. Hazard Mitigation Plan Review, Approval and Adoption
   - Committee, advisory group, public review and council adoption.

Stantec

Share Survey Results

•63.2% feel somewhat prepared for the impacts of a natural hazard
•80% receive information from television regarding hazards
•100% experienced flooding in the past 10 years
•23.5% experienced severe weather in the past 10 years
•42.9% consider themselves prepare for a natural disaster
•95% of respondents are concerned to extremely concerned about flooding
•47.6% have property in the floodplain
•45% have flood insurance
•57.1% have earthquake insurance

Stantec

Hazard Profile Results

DROUGHT
EARTHQUAKE
EXTREME HEAT
FLOODING
SEVERE STORMS
SEVERE WINTER STORMS
TORNADOS

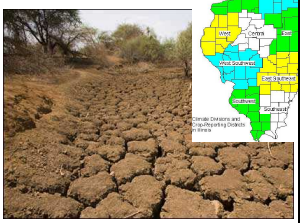
Researched:

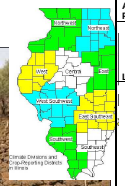
National Climatic Data Center
National Weather Service
FEMA Map Service Center
Illinois State Water Survey
Illinois State Climatology Center
Illinois State Hazard Mitigation Plan
Local and Regional Newspapers

Data Submitted by Residents

Hazard Profile Results

DROUGHT





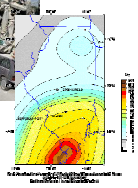
Summary of Drought Risk Factors

Period of Occurrence	Generally during summer months or extended periods of no precipitation.
Number of Events to Date	1
Annual Chance Probability	2%
Location of Impacts	The most severe impacts are associated with agricultural land uses; however, water-related tourism industries may be impacted as well.
Potential Impacts	Activities that rely heavily on high water usage may be impacted significantly, including agriculture, tourism, wildlife protection, municipal water usage, commerce, recreation, and electric power generation. Droughts can lead to economic losses such as unemployment, decreased land values, and agronomic losses. Minimal risk of damage or cracking to structural foundations, due to soils.
Injury or Death	None Reported

Extreme Drought — Near Normal — Extremely Moist
-4 -3 -2 -1 0 +1 +2 +3 +4

Hazard Profile Results

EARTHQUAKE



Summary of Earthquake Risk Factors

Period of Occurrence	Year round
Number of Events to Date	0
Annual Chance Probability	Minimal
Location of Impacts	The most damaging impacts from an earthquake would be associated with bridges, concrete or masonry structures, and towers.
Potential Impacts	Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, fire, damaged or destroyed critical facilities, and hazardous material releases. Can cause severe transportation problems and make travel extremely dangerous. May trigger landslides, releases of hazardous materials, and/or dam and levee failure and flooding.
Injury or Death	None Reported

Hazard Profile Results

EXTREME HEAT

Summary of Extreme Heat Risk Factors

Period of Occurrence	Summer
Number of Events to Date	3
Annual Chance Probability	5%
Location of Impacts	Extreme heat is not a geographically distinctive natural hazard, thus the entirety of Calhoun County is equally susceptible.
Potential Impacts	Public health and safety, especially the elderly. Heavy use of water and electrical facilities due to air conditioners, fans, etc.
Injury or Death	There are 7 recorded deaths and 232 reported injuries.

Hazard Profile Results

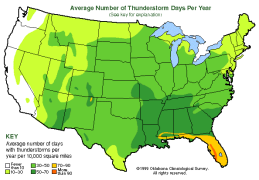
FLOODING

Summary of Flood Risk Factors

Period of Occurrence	Anytime, but primarily during spring/summer rains.
Number of Events to Date	22
Annual Chance Probability	37%
Location of Impacts	Impacts are restricted to the FEMA 100 Year Floodplain
Potential Impacts	Potential for loss of life. Floodwaters are a public safety issue due to contaminants and pollutants. Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, fire, damaged or destroyed critical facilities, and hazardous material releases. Can lead to economic losses such as unemployment, decreased land values, and agronomic losses.
Injury or Death	One reported injury.

Hazard Profile Results

SEVERE STORMS



Summary of Severe Storms Risk Factor

Period of Occurrence	Spring, Summer and Fall
Number of Events to Date	Total: 87
	Lightning: 1
	Hail: 17
	Rain: 2
	Wind: 67
Annual Chance Probability	147%
Location of Impacts	Severe storms are not restricted by geographical features; however, tall structures, heavily forested areas, and low-lying areas are more prone to impact from severe storms.
Potential Impacts	Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, fire, damaged or destroyed critical facilities, and hazardous material releases. Impacts human life, health, and public safety.
Injury or Death	Ten deaths and 120 injuries reported.

Hazard Profile Results

SEVERE WINTER STORMS

Severe Winter Storms Risk Factors

Period of Occurrence	Winter
Number of Events to Date	Total: 30
	Extreme Cold/Wind Chill: 2
	Heavy Snow: 3
	Winter Storm: 25
Annual Chance Probability	51%
Location of Impacts	All areas of Calhoun County are equally susceptible to damages from winter storms.
Potential Impacts	Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, and damaged or destroyed critical facilities. May cause severe transportation problems and make travel extremely dangerous. Power outages, which results in loss of electrical power and potentially loss of heat, and human life. Extreme cold temperatures may lead to frozen water mains and pipes, damaged car engines, and prolonged exposure to cold resulting in frostbite.
Injury or Death	Two deaths and six reported injuries.

Hazard Profile Results

TORNADOS

Summary of Tornado Risk Factors

Period of Occurrence	Year-round, primarily during March through August
Number of Events to Date	9
Annual Chance Probability	15%
Location of Impacts	All areas of Calhoun County are equally at risk to tornadoes.
Potential Impacts	Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, and damaged or destroyed critical facilities. Impacts human life, health, and public safety.
Injury or Death	Eleven injuries reported.

Vulnerability Assessment (concept)

Risk = Probability x Consequences.

Probability

- Past Occurrences
- Geographic Considerations

Consequences

- Structure Value
- Population
- Critical Facilities

Vulnerability Assessment

Historical Consequences and Future Probability

- Less than 10% probability = 1
- Between 10 and 50% probability = 2
- More than 50% probability = 3

Exposed Assets

- Less than $5 million exposed = 1
- Between $5 and $10 million exposed = 2
- More than $10 million exposed = 3

Critical Facilities

- Less than 5 critical facilities exposed = 1
- Between 6 and 10 critical facilities exposed = 2
- More than 10 critical facilities exposed = 3

Population

- Less than 10% of community population exposed = 1
- Between 10% and 25% of community population exposed = 2
- More than 25% of community population exposed = 3

Rating

- **<5 = Low**
- **5 to 6 = Guarded**
- **7 to 8 = Elevated**
- **9 to 10 = High**
- **11 to 12 = Severe**

Historical Occurrences

Historical Occurrences and Future Probability

Community	Drought	Earthquake	Extreme Heat	Flood	Severe Storms	Severe Winter Storms	Tornado
Batchtown, Village of	1	1	1	1	2	3	1
Brussels, Village of	1	1	1	2	2	3	1
Calhoun County (Uninc.)	1	1	1	2	3	3	2
Hamburg, Village of	1	1	1	2	1	3	1
Hardin, City of	1	1	1	2	2	3	1
Kampsville, Village of	1	1	1	2	2	3	1

Historical Occurrences and Future Probability

Community	Drought	Earthquake	Extreme Heat	Flood	Severe Storms	Severe Winter Storms	Tornado
Batchtown, Village of	1	0	4	0	16	30	0
Brussels, Village of	1	0	4	23	9	30	0
Calhoun County (Uninc.)	1	0	4	23	54	30	7
Hamburg, Village of	1	0	4	23	1	30	0
Hardin, City of	1	0	4	24	15	30	0
Kampsville, Village of	1	0	4	23	10	30	1

Structure Value

Jurisdictional Structure Value by Hazard

Jurisdiction	Drought	Earthquake	Extreme Heat	Flood	Severe Storms	Severe Winter Storm	Tornado
Batchtown, Village of	2	2	2	1	2	2	2
Brussels, Village of	3	3	3	1	3	3	3
Calhoun County (Uninc.)	3	3	3	3	3	3	3
Hamburg, Village of	2	2	2	2	2	2	2
Hardin, City of	3	3	3	2	3	3	3
Kampsville, Village of	3	3	3	2	3	3	3

Jurisdictional Structure Value by Hazard (Thousand $)

Jurisdiction	Drought	Earthquake	Extreme Heat	Flood	Severe Storms	Severe Winter Storm	Tornado
Batchtown, Village of	14,532.68	14,532.68	14,532.68	0.00	14,532.68	14,532.68	14,532.68
Brussels, Village of	11,309.19	11,309.19	11,309.19	789.50	11,309.19	11,309.19	11,309.19
Calhoun County (Uninc.)	226,273.87	226,273.87	226,273.87	39,089.59	226,273.87	226,273.87	226,273.87
Hamburg, Village of	14,150.13	14,150.13	14,150.13	5,924.36	14,150.13	14,150.13	14,150.13
Hardin, City of	97,272.36	97,272.36	97,272.36	8,376.76	97,272.36	97,272.36	97,272.36
Kampsville, Village of	18,064.72	18,064.72	18,064.72	6,698.69	18,064.72	18,064.72	18,064.72

Critical Facilities

Vulnerable Critical Facilities

Community	Drought	Earthquake	Extreme Heat	Flood	Severe Storms	Severe Winter Storms	Tornado
Batchtown, Village of	1	1	1	1	1	1	1
Brussels, Village of	2	2	2	1	2	2	2
Calhoun County (Uninc.)	3	3	3	3	3	3	3
Hamburg, Village of	1	1	1	1	1	1	1
Hardin, City of	3	3	3	2	3	3	3
Kampsville, Village of	3	3	3	2	3	3	3

Vulnerable Critical Facilities

Community	Drought	Earthquake	Extreme Heat	Flood	Severe Storms	Severe Winter Storms	Tornado
Batchtown, Village of	1	1	1	0	1	1	1
Brussels, Village of	6	6	6	1	6	6	6
Calhoun County (Uninc.)	63	63	63	24	63	63	63
Hamburg, Village of	4	4	4	2	4	4	4
Hardin, City of	17	17	17	7	17	17	17
Kampsville, Village of	11	11	11	7	11	11	11

Stantec

Population Exposure

Population Exposure by Hazard and Jurisdiction

Jurisdiction	Drought	Earthquake	Extreme Heat	Flood	Severe Storm	Severe Winter Storm	Tornado
Batchtown, Village of	3	3	2	1	3	3	3
Brussels, Village of	3	3	2	2	3	3	3
Calhoun County (Uninc.)	3	3	2	1	3	3	3
Hamburg, Village of	3	3	2	3	3	3	3
Hardin, City of	3	3	2	1	3	3	3
Kampsville, Village of	3	3	2	2	3	3	3

Population Exposure by Hazard and Jurisdiction

Jurisdiction	Drought	Earthquake	Extreme Heat	Flood	Severe Storm	Severe Winter Storm	Tornado
Batchtown, Village of	100%	100%	16.5%	0.0%	100%	100%	100%
Brussels, Village of	100%	100%	18.4%	10.6%	100%	100%	100%
Calhoun County (Uninc.)	100%	100%	18.2%	8.0%	100%	100%	100%
Hamburg, Village of	100%	100%	15.9%	35.7%	100%	100%	100%
Hardin, City of	100%	100%	21.5%	9.8%	100%	100%	100%
Kampsville, Village of	100%	100%	18.9%	17.5%	100%	100%	100%

Stantec

Hazard Vulnerability

Jurisdiction	Drought	Earthquake	Extreme Heat	Flood	Severe Storm	Severe Winter Storm	Tornado
Batchtown, Village of	7	7	6	4	8	10	7
Brussels, Village of	9	9	8	6	10	11	9
Calhoun County (Uninc.)	10	10	9	9	12	12	11
Hamburg, Village of	7	7	6	8	7	9	7
Hardin, City of	10	10	9	7	11	12	10
Kampsville, Village of	10	10	9	8	11	12	10

Stantec

Develop Mitigation Actions

Specific actions that are measurable and promote goals.

Consider existing actions previously developed. Site plan or ordinance.

Consider new proposed actions.

Mitigation Goals:

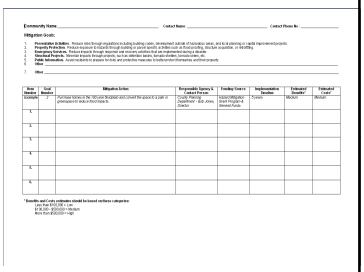
1.**Preventative Activities**. Reduce risks through regulations including building codes, development outside of hazardous areas, and local planning or capital improvement projects.

2.**Property Protection**. Reduce exposure to hazards through building or parcel specific activities such as flood proofing, structure acquisition, or retrofitting.

3.**Emergency Services.** Reduce impacts through response and recovery activities that are implemented during a disaster.

4.**Structural Projects.** Minimize impacts through projects, such as detention basins, tornado shelters, tornado sirens, etc.

5.**Public Information.** Assist residents to prepare for risks and protective measures to better protect themselves and their property.


Community Name _____ Contact Name: _____ Contact Phone #: _____

Mitigation Goals:

1. **Preventative Activities.** Reduce risks through regulations including building codes, development outside of hazardous areas, and local planning or capital improvement projects.
2. **Property Protection.** Reduce exposure to hazards through building or parcel specific activities such as flood proofing, structure acquisition, or retrofitting.
3. **Emergency Services.** Reduce impacts through response and recovery activities that are implemented during a disaster.
4. **Structural Projects.** Minimize impacts through projects, such as detention basins, tornado shelters, tornado sirens, etc.
5. **Public Information.** Assist residents to prepare for risks and protective measures to better protect themselves and their property.

Other: _____

Item Number	Goal Number	Mitigation Action	Responsible Agency & Contact Person	Funding Source	Implementation Timeline	Estimated Benefits*	Estimated Cost*
1.		Purchase Kankakee Pier Wright Hospital and convert the ground to a park or greenspace to reduce flood impacts.	City of Kankakee Parks Department - Bob Jones, Director	Hazard Mitigation Grant Program & General Funds	Tornado	Medium	Medium
2.							
3.							
4.							
5.							
6.							

* Benefits and Costs estimates should be based on these categories:
Low: Under $10,000 = low
$10,000 - $100,000 = Medium
More than $100,000 = High

Stantec

Worksheet

1. **Preventative Activities**. Reduce risks through regulations including building codes, development outside of hazardous areas, and local planning or capital improvement projects.
2. **Property Protection**. Reduce exposure to hazards through building or parcel specific activities such as flood proofing, structure acquisition, or retrofitting.
3. **Emergency Services.** Reduce impacts through response and recovery activities that are implemented during a disaster.
4. **Structural Projects.** Minimize impacts through projects, such as detention basins, tornado shelters, tornado sirens, etc.
5. **Public Information.** Assist residents to prepare for risks and protective measures to better protect themselves and their property.

Item Number	Goal Number	Mitigation Action	Responsible Agency & Contact Person	Funding Source	Implementation Timeline	Estimated Benefits†	Estimated Costs†
Example	*2*	*Purchase homes in the 100 year floodplain and convert the space to a park or greenspace to reduce flood impacts.*	*County Planning Department Director*	*HMGP& General Funds*	*5 years*	*Medium*	*Medium*
1.							

Stantec

FEMA Mitigation Activity Funding Programs

Eligible Activities	HMGP	PDM	FMA	RFC	SRL
1. Mitigation Projects	√	√	√	√	√
Property Acquisition and Structure Demolition	√	√	√	√	√
Property Acquisition and Structure Relocation	√	√	√	√	√
Structure Elevation	√	√	√	√	√
Mitigation Reconstruction					√
Dry Floodproofing of Historic Residential Structures	√	√	√	√	√
Dry Floodproofing of Non-residential Structures	√	√	√	√	
Minor Localized Flood Reduction Projects	√	√	√	√	√
Structural Retrofitting of Existing Buildings	√	√			
Non-structural Retrofitting of Existing Buildings and Facilities	√	√			
Safe Room Construction	√	√			
Infrastructure Retrofit	√	√			
Soil Stabilization	√	√			
Wildfire Mitigation	√	√			
Post-Disaster Code Enforcement	√				
5% Initiative Projects	√				
2. Hazard Mitigation Planning	√	√	√		
3. Management Costs	√	√	√	√	√

Stantec

CALHOUN NEWS-HERALD

75¢ PER COPY | HARDIN, ILLINOIS 62047 | MARCH 23, 2011 | VOLUME 139 - ISSUE 12

Hazard mitigation planning meeting set for Thursday

The third public planning meeting for the county's Natural Hazard Mitigation Plan will be held Thursday, March 24 at the Calhoun High School at 7 p.m.

Calhoun County Emergency Services Disaster Agency Coordinator Gene Breden said residents from Calhoun and other surrounding counties are invited to attend.

"The purpose of the meeting is to discuss the current status of the Natural Hazard Mitigation Plan and to receive input from the public regarding the draft plan," Breden said. "During this meeting we will also discuss the nearly completed plan, grant funding opportunities, and to seek input and comments on the draft plan."

Breden added that copies of the plan will be available at the meeting.

"After this plan has been approved by FEMA (Federal Emergency Management Agency) and adopted by the participating jurisdictions, these jurisdictions will be eligible for FEMA Mitigation Grant Programs which can fund up to 75 percent of cost effective mitigation projects," Breden said.

For further information, contact Breden at (618) 576-2733 or via e-mail at gbreden@frontiernet.net

Calhoun County Hazard Mitigation Plan

Stakeholder and Public Meeting
Calhoun High School Auditorium
March 24, 2011
7:00 p.m.

Gene Breeden, Director
Calhoun County Emergency Services
Disaster Agency

Jared Edwards
Environmental Scientist
Stantec Consulting Services Inc.

FEMA

IEMA
ILLINOIS EMERGENCY MANAGEMENT AGENCY

Stantec

Agenda

- Introductions
- Purpose of an HMP
- Planning Process
- Results
- Next Steps
  - Approval
  - Adoption
  - Maintenance

Stantec

HMP Purpose & Goals

- NFIP compliance
- Become eligible for FEMA funding
- Locate susceptible areas
- Define mitigation ideas

Stantec

HMP Benefits

1. Identify and assess risk.
2. Develop strategies for reducing risk.
3. Improve communication between agencies.
4. Enhance existing programs.
5. **Development of Data to include in future FEMA grant applications.**

FMA FLOOD MITIGATION ASSISTANCE

RMI SEVERE REPETITIVE LOSS

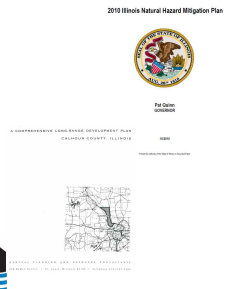
HMGP HAZARD MITIGATION GRANT PROGRAM

PDM PRE-DISASTER MITIGATION

Stantec

Risk Assessment

- Stantec reviewed:
  - NFIP data
  - Historic flood losses
  - Zoning, subdivision, floodplain ordinances
  - Flood Insurance Rate Maps (FIRMs)
  - Illinois State Hazard Mitigation Plan
  - Newspaper accounts



NATIONAL FLOOD INSURANCE PROGRAM

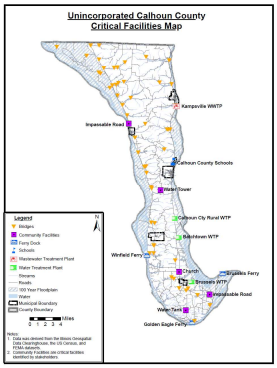
Risk Assessment

	Drought	Earthquake	Extreme Heat	Flood	Severe Storm	Severe Winter Storm	Tornado
Number of Events to-date: 1950-2010 (National Climatic Data Center)	1	0	3	22	87	30	9
Annual Chance Probability Ratio	2%	Minimal	5%	37%	147%	51%	15%
Injuries and Deaths (NCDC)	None Reported	None Reported	Seven deaths; 232 injuries	No deaths; one injuries	Ten deaths; 120 injuries	Two deaths; six injuries	No deaths; 11 injuries
Property and Crop Damages (NCDC)	None Reported	None Reported	$465,000	$27 million	$430,000	$5,000	$425,000

Flood Insurance Policies	264
Value of Policies	$22.8 million
Number of Paid Losses	1,982
Value of Paid Losses	$15.4 million

Repetitive Loss (RL) Properties	68
Value of RL Property Claims	$3.4 million
Number of RL Property Claims	1,006

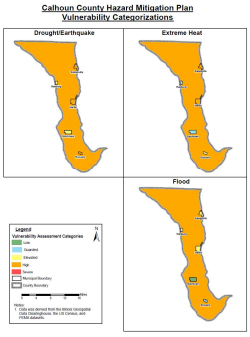
Risk Assessment

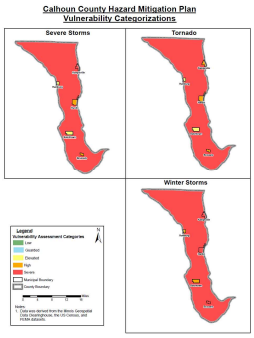


Repetitive Losses

- Repetitive Losses are:
  - Properties with 2 or more losses exceeding $1,000 in a ten year period
- Calhoun County has 68 repetitive loss Properties
- Repetitive Loss claims comprise 30% of NFIP claims, but only 1% of total insurance policies

Risk Assessment





Mitigation Strategies

Table I-5. Village of Hamburg Action Plan

ITEM NUMBER	HAZARD	TYPE OF ACTIVITY OR PROJECT	RESPONSIBLE AGENCY	IMPLEMENTATION TIMELINE	FUNDING SOURCE	PRIORITY	ACTIVITY CATEGORIZATION	BENEFIT/ COST
1	Flooding	Purchase houses on the west side of Washington Street and on Water Street and remove the buildings.	ESDA and Village Board	2 Years	HMGP and General Funds	A	PP	High/Medium
2	Flooding	Raise the intersection of High and State Streets to minimize flooding.	ESDA and Village Board	5 Years	HMGP and General Funds	B	SP	Medium/Medium
3	Flooding	Raise Mississippi River Road at the low spot north of Hamburg, as indicated on the critical facilities map.	ESDA and County Highway Dept.	10 Years	HMGP and General Funds	B	SP	Medium/Medium

Table I-6. City of Hardin Action Plan

ITEM NUMBER	HAZARD	TYPE OF ACTIVITY OR PROJECT	RESPONSIBLE AGENCY	IMPLEMENTATION TIMELINE	FUNDING SOURCE	PRIORITY	ACTIVITY CATEGORIZATION	BENEFIT/ COST
1	All Hazards	Purchase and install backup power generators for St. Norbert's School as an emergency shelter, the Medical Center and Nursing Home, and the gas station.	City Mayor, ESDA, Medical Board	2 Years	Grant Programs	B	PP	Medium/Low
2	Flooding	Raise Illinois River Road on the north and south sides of Hardin, as indicated on the critical facilities map.	City Mayor and ESDA	5 Years	Grant Programs and General Funds	B	SP	High/High
3	Flooding	Move the fire station away from the Illinois River to minimize exposure to flooding.	City Mayor	1 Year	Grant Programs and General Funds	A	PP	Medium/Medium
4	Flooding	Raise or purchase and remove the Illini Medical Associates office on Water Street and the City Police and Maintenance Buildings.	City Mayor	1 Year	Grant Programs	A	PP	Medium/Medium
5	Flooding	Rebuild the water treatment plant.	City Mayor	1 Year	Grant Program and General Funds	B	PP/SP	High/High
6	All Hazards	Improve Rocky Hill Road to enhance access to Hardin during flood events.	City Mayor	2 Years	Grant Programs and General Funds	B	SP	High/High
7	Earthquake	Rebuild the water tower to update to modern earthquake codes.	City Mayor	1 Year	Grant Program	B	SP/PP	High/High

Mitigation Strategies

- Examples:
  - **Brussels:** Purchase and install backup power generators for the high school and water treatment plant.
  - **County:** Construct salt sheds at the north and south Highway Dept. facilities.
  - **County:** Prepare a community shelter.
  - **Hamburg:** Purchase and remove houses on Washington and Water Streets.
  - **Hardin:** Improve Rocky Hill Road to improve access to Hardin during floods.
  - **Kampsville**: Relocate the fire station and ambulance building away from the flood zone.

Next Steps

- Draft Review
- Changes and updates
- Illinois EMA review
- FEMA review
- Adoption

Project Funding

Eligible Activities	HMGP	PDM	FMA	RFC	SRL
1. Mitigation Projects	√	√	√	√	√
Property Acquisition and Structure Demolition	√	√	√	√	√
Property Acquisition and Structure Relocation	√	√	√	√	√
Structure Elevation	√	√	√	√	√
Mitigation Reconstruction					√
Dry Floodproofing of Historic Residential Structures	√	√	√	√	√
Dry Floodproofing of Non-residential Structures	√	√	√	√	
Minor Localized Flood Reduction Projects	√	√	√	√	√
Structural Retrofitting of Existing Buildings	√	√			
Non-structural Retrofitting of Existing Buildings and Facilities	√	√			
Safe Room Construction	√	√			
Infrastructure Retrofit	√	√			
Soil Stabilization	√	√			
Wildfire Mitigation	√	√			
Post-Disaster Code Enforcement	√				
5% Initiative Projects	√				
2. Hazard Mitigation Planning	√	√	√		
3. Management Costs	√	√	√	√	√

Stantec

Hazard Mitigation Grant Program

- **Purpose:**
  - Cost effective and long-term mitigation measures following a major disaster declaration
- **Requirements:**
  - Must be in good standing with NFIP.
  - Projects must be environmentally sound, cost-effective, solve a problem and prevent future disaster damages.
  - Community must have an all-hazards mitigation plan in place.
- Cost share program: 75% Federal, 25% Local Match
- The amount of funding is based on a percentage of the total disaster costs and varies from disaster to disaster.
- A project does not have to be in a declared county to be eligible for HMGP funding.
- Projects can protect public or private property.

Stantec

Flood Mitigation Assistance Program

- **Purpose:**
  - Implementation of Flood Mitigation Projects
- **Requirements:**
  - Must belong to the National Flood Insurance Program (NFIP)
- Cost share program: 75% Federal, 25% Local Match
- Typically these grants are used for acquisition and demolition of repetitively flooded structures.
- A repetitive loss property is any insured structure that has two or more flood insurance claims of at least $1,000 each.

Stantec

Pre-disaster Mitigation Program

- **Purpose:**
  - Implement mitigation activities that complement a comprehensive mitigation plan
- **Requirements:**
  - Must have an approved all-hazards plan
  - Must participate in NFIP and have Special Flood Hazard Area (Flood Hazard Boundary Map (FHBM) or Flood Insurance Rate Map (FIRM)
  - Must not be suspended or on probation from the NFIP
- Funding can be awarded for the development of all-hazards mitigation plan or for cost effective hazard mitigation project.
- Cost share program: 75% Federal, 25% Local Match

Stantec

Repetitive Flood Claims Program

- **Purpose:**
  - Implement mitigation activities that reduce flood damages to insured properties with one or more flood claims.
- **Requirements:**
  - Properties must be enrolled in the NFIP
  - Properties must have had at least one prior flood damage claim
- Cost share program: 75% Federal, 25% Local Match

Stantec

Severe Repetitive Loss Program

- **Purpose:**
  - Reduce or eliminate the long-term risk of flooding damage to severe repetitive loss (SRL) structures insured under the NFIP.
- **Requirements:**
  - Must be included on the SRL property list
  - Must be enrolled in the NFIP
- Primarily intended for removal and/or relocation of the buildings.
- An SRP property is a residential property that is covered under the NFIP and:
  - Has at least four NFIP claim payments over $5,000 each; or
  - Two or more separate claims payments (building payments only), with the cumulative amount exceeding the market value of the building.

Stantec

Resources

http://www.ready.illinois.gov/

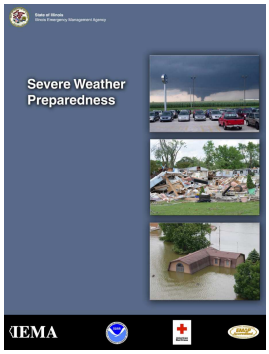
Stantec

Resources

http://www.iema.illinois.gov/iema/planning/planning.htm

Stantec

Resources



Hazard Mitigation Assistance Unified Guidance

Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, Flood Mitigation Assistance Program, Repetitive Flood Claims Program, Severe Repetitive Loss Program

June 1, 2009

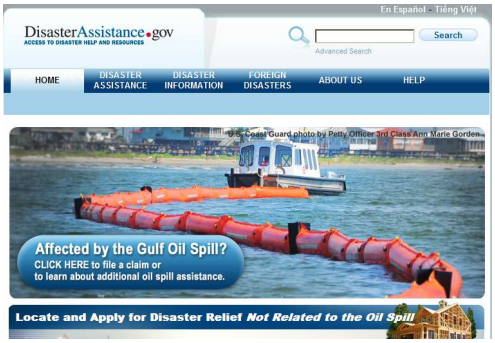
FEMA

Federal Emergency Management Agency
Department of Homeland Security
500 C Street, S.W.
Washington, DC 20472

Stantec

Resources

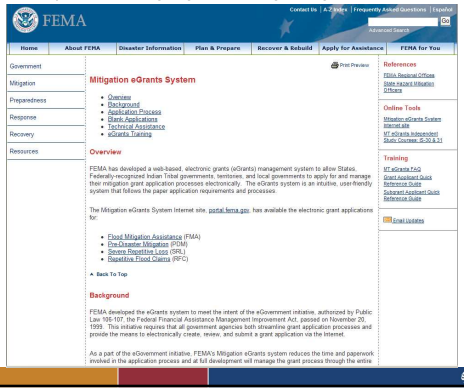
http://www.disasterassistance.gov



Stantec

Resources

http://www.fema.gov/government/grant/egrants.shtm



Stantec

Summary

- The Plan is almost done!
- We still need your comments
- The City needs to incorporate mitigation into other planning mechanisms
- Maintenance and updates!

Stantec

Questions?

Stantec

Calhoun County Multi-Jurisdictional Multi-Hazard Mitigation Plan
Third Stakeholder and Public Meeting
March 24, 2011 – 7:00 pm
Calhoun County High School Auditorium

Attendees:

Name	Agency/Department	Representing Jurisdiction
Charlie Robertson	Homeowner	Hamburg
David Cary	Homeowner	Hamburg
Barbara Kelly	Homeowner	Hamburg
John Kelly	Hamburg Board Member	Hamburg
Steve Shireman	Calhoun Co. Health Dept.	Calhoun Co.
James E. Ewen	Farmer	Calhoun Co.
Robert B. Lousboch	Hardin Board Member/HFPD Chief	Hardin
Lisa R. Roth	County Treasurer	Calhoun Co.
Rick Schnettgoecke	Homeowner	Hamburg
Kenneth Kronadle		Calhoun Co.
Debbie Hall	Hamburg Board Member	Hamburg
Christina Behrens	Homeowner	Kampsville
Randy Behrens	Homeowner	Kampsville
Chuck Miner	Flood Insurance Agent	Hardin
Doug Wilschet	County Commissioner	Calhoun Co.
Karla Schnettgoecke	Homeowner	Hamburg
Marlene Smith	Hamburg Trustee	Hamburg
Christine C. Payne	Hamburg Trustee	Hamburg
Tony Friedel	Hardin Trustee	Hardin
Robert E. Lee	Hardin Trustee	Hardin
Joan Senko	Homeowner	Hamburg
Jean Bennest	Homeowner	Hamburg
Melvin Follis		Hamburg
Maralyn Dilport	Homeowner	Hamburg
Terry Dilport	Homeowner	Hamburg
Phil Green	Hardin Mayor	Hardin
Betty Wendt		
Ronald Wendt		
Sue Grimes	Planning Committee Member	Kampsville
Terry Grimes	Homeowner	Kampsville
Joe Swan	County Board Member	Hardin
John Johnson	Kampsville Village Trustee	Kampsville
Rosemary Johnson	Kampsville Village Trustee	Kampsville
Gene Breden	Calhoun Co. ESDA	Calhoun Co.

Jurisdictions represented:

Jurisdiction	Representative Present
Batchtown	No
Brussels	No

Calhoun County	Yes
Hamburg	Yes
Hardin	Yes
Kampsville	Yes

The meeting was called to order by Gene Breden. Jared Edwards from Stantec, the planning consultant hired by the County to assist in the development of the plan, reviewed the history and the current status of the plan. In addition, he shared the results of the research of the history of the community and the results of the hazard analysis. Comments from meeting participants were addressed.

The primary purpose of the meeting was to discuss the results of the planning effort and the implementation of the plan recommendations. In addition, Mr. Edwards discussed the potential funding paths for mitigation activities, including several of the FEMA and IEMA programs currently available. Several meeting attendees asked questions about the requirements and procedures for obtaining funding, the impacts of adopting the plan, and other similar questions. Mr. Edwards and Mr. Breden addressed these questions and comments and concluded the meeting by requesting attendees review the plan and provide comments prior to submitting the plan for review by IEMA and FEMA. A deadline of April 15 was suggested for submitting comments to Mr. Breden.

The plan will be finalized once comments are received and submitted for review. Following a successful review, the plan will be forwarded to the communities for adoption.

First Meeting - March 4, 2010

Name	Agency/Department	Phone	Email
Janet Droege	Planning Commission	618-883-2253	
David Droege		618-883-2253	
Chuck Squier	Insurance Agent	618-576-2207	
Mel Heffington	Restaurant Owner	618-576-2362	
Richard Greenleif	Judge	618-576-9061	Greenleif@hotmail.com
Tony Friedel	Hardin Village Trustee	618-576-2640	
Robert Lee	Hardin Village Trustee	618-576-8026	
Linda K Watt	Court Reporter	618-576-2432	
Doug Smith	Hamburg Homeowner	618-232-1495	dbentonsmith@gmail.com
Jessica Smith	Hamburg Homeowner	618-232-1495	
Richard Hitchcock	Hamburg Renter		
Bob Lonsbach	Hardin FPD, Town Board	618-576-2830	bobten2003@yahoo.com
Ted Schumann	Kampsville Mayor	618-653-4421	schumann@618.com
Phil Robeen	Hardin FPD, Village Trustee	618-576-2465	phil.robeen@frontiernet.net
Steve Shireman	Calhoun Co. Health Dept.	618-576-2428	sshireman@ezl.com
Rich Schnettgoecke		636-795-8581	
Gary Rose	Calhoun Co. Rural Water	618-576-8022	
Dick Stelbrink	Planning Board	618-653-4642	
Pat Droege		618-883-2798	
Veca Droege	LCFS	618-883-2798	
Wanda Tepen	Calhoun Co. Board Chairman	618-576-2666	vwtepen@frontiernet.net
Phil Gress	Hardin Mayor	618-576-8081	
Maralyn Dilport	Hamburg resident	618-232-9717	
Roger Proctor, Sr.	Hamburg Mayor	618-232-0054	hamburgmayor@frontier.com
Aaron Tucker	North Calhoun FD, Ambulance Service	618-535-2533	ff280ems103@yahoo.com
Gene Breden	Calhoun Co. ESDA	618-576-2733	gbreden@frontiernet.net

Second Meeting - June 24, 2010

Name	Agency/Department	Phone	Email
Tony Friedel	Hardin Village Trustee	618-576-2640	
Robert Lee	Hardin Village Trustee	618-576-8026	
Ted Schumann	Kampsville Mayor	618-653-4421	schumann@618connect.com
Steve Shireman	Calhoun Co. Health Dept.	618-576-2253	sshireman@ezl.com
Barry Webster	County Highway Dept.	618-576-2600	barry.w50@hotmail.com
Wanda Tepen	Calhoun Co. Board Chairman	618-576-2666	vwtepen@frontiernet.net
Gene Breden	Calhoun Co. ESDA	618-576-2733	gbreden@frontiernet.net

Third Meeting - March 24, 2011

Name	Agency/Department	Representing Jurisdiction
Charlie Robertson	Homeowner	Hamburg
David Cary	Homeowner	Hamburg
Barbara kelly	Homeowner	Hamburg
John Kelly	Hamburg Board Member	Hamburg
Steve Shireman	Calhoun Co. Health Dept.	Calhoun Co.
James E. Ewen	Farmer	Calhoun Co.
Robert B. Lousboch	Hardin Board Member/HFPD Chief	Hardin
Lisa R. Roth	County Treasurer	Calhoun Co.
Rick Schnettgoecke	Homeowner	Hamburg
Kenneth Kronadle		Calhoun Co.
Debbie Hall	Hamburg Board Member	Hamburg
Christina Behrens	Homeowner	Kampsville
Randy Behrens	Homeowner	Kampsville
Chuck Miner	Flood Insurance Agent	Hardin
Doug Wilschet	County Commissioner	Calhoun Co.
Karla Schnettgoecke	Homeowner	Hamburg
Marlene Smith	Hamburg Trustee	Hamburg
Christine C. Payne	Hamburg Trustee	Hamburg
Tony Friedel	Hardin Trustee	Hardin
Robert E. Lee	Hardin Trustee	Hardin
Joan Senko	Homeowner	Hamburg
Jean Bennest	Homeowner	Hamburg
Melvin Follis		Hamburg
Maralyn Dilport	Homeowner	Hamburg
Terry Dilport	Homeowner	Hamburg
Phil Green	Hardin Mayor	Hardin
Betty Wendt		
Ronald Wendt		
Sue Grimes	Planning Committee Member	Kampsville
Terry Grimes	Homeowner	Kampsville
Joe Swan	County Board Member	Hardin
John Johnson	Kampsville Village Trustee	Kampsville
Rosemary Johnson	Kampsville Village Trustee	Kampsville
Gene Breden	Calhoun Co. ESDA	Calhoun Co.

Appendix C

Hazard Mitigation Questionnaire

Calhoun County Multi-Hazard Mitigation Plan Survey

MULTI HAZARD MITIGATION INFORMATION

1. Please indicate where you live:
Batchtown
Brussels
Hamburg
Hardin
Kampsville

2. In the past 10 years, have you or has someone in your household experienced a natural disaster *within Calhoun County* such as: severe storms, floods, winter storms, extreme heat, tornadoes, drought, earthquakes, or other natural disaster?

- ☐ Yes
- ☐ No

2a. If yes to question #2, which of the following types of natural hazard events have you or someone in your household experienced? (Please check all that apply) *If you answered no to question #2, please move on to question #3.*

- ☐ Severe Weather damage in excess of $500
- ☐ Floods
- ☐ Winter Storms
- ☐ Extreme Heat
- ☐ Tornadoes
- ☐ Drought
- ☐ Earthquakes
- ☐ Other (Please specify)_____

3. Do you consider yourself prepared for the probable impacts from natural hazard events that may occur within your community and/or the greater Calhoun County?

- ☐ Yes
- ☐ No

3a. If yes to question #3, where did you learn about being prepared for a disaster? (Please check all that apply) * *If you answered no to question #3, please move on to question #4*

- ☐ Emergency preparedness information from a government source (i.e. Federal, State, or Local emergency management)
- ☐ Personal experience. Have experienced one or more natural hazard events
- ☐ Locally provided news or other media information
- ☐ Schools and other educational institutions
- ☐ Meetings or trainings offered by volunteer organizations (Red Cross, etc)
- ☐ Other (please specify) _____

3b. Please rank how prepared you feel and your household are for the probable impacts of natural hazard events likely to occur within Calhoun County. Rank on a scale of 1 to 5, with 5 representing the most prepared.

- ☐ 1 Not at all prepared
- ☐ 2 Somewhat prepared
- ☐ 3 Adequately prepared
- ☐ 4 Well prepared
- ☐ 5 Very well prepared

3c. What steps, if any, have you or someone in your household taken to prepare for a natural disaster? (Check all that apply)
Have stored or stocked up on:

- ☐ Food
- ☐ Water
- ☐ Flashlight (s)
- ☐ Batteries
- ☐ Battery-powered radio
- ☐ Medical supplies (First Aid Kit)
- ☐ Fire extinguisher
- ☐ Smoke detector on each level of the house
- ☐ Prepared a disaster supply kit
- ☐ Received First Aid/ CPR training
- ☐ Made a fire escape plan
- ☐ Discussed utility shutoffs
- ☐ Other (please specify) _____

4. How concerned are you about the following natural hazards impacting your community and or/ the greater Calhoun County area (*Please check the corresponding number for each hazard)*

Natural Hazard	Not Concerned	Somewhat Concerned	Concerned	Very Concerned	Extremely Concerned
Severe Storm (wind, lightening)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Flood	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Winter Storms	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Extreme Heat	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Tornados	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Drought	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Earthquakes	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Other Please specify: _____	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

5. What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (*Please check all that apply*)

Newspapers:
- ☐ Newspaper stories
- ☐ Newspaper ads

Television:
- ☐ Television news
- ☐ Television ads

Radio:
- ☐ Radio news
- ☐ Radio ads

Other Methods:
- ☐ Schools
- ☐ Books
- ☐ Mail
- ☐

- ☐ Fire Department/Rescue
- ☐ Internet
- ☐ Fact sheet/Brochure
- ☐ Chamber of Commerce
- ☐ Public workshops/Meetings
- ☐ Magazine
- ☐ University or research institution
- ☐ Other (*please explain*):

_____

6. To the best of your knowledge, is your property located in a designated floodplain?
- ☐ Yes
- ☐ No
- ☐ Not sure

6a. To the best of your knowledge, is your property located in close proximity (<1 mile) to an earthquake fault line?
- ☐ Yes
- ☐ No
- ☐ Not sure

7. Do you have flood insurance?
- ☐ Yes
- ☐ No

8. Do you have earthquake insurance?
- ☐ Yes
- ☐ No

9. How vulnerable to damage is your infrastructure to:

Natural Hazard	Severely Vulnerable	Moderately Vulnerable	Minimally Vulnerable	Don't Know
Severe Storm (wind, lightening)	☐ 3	☐ 2	☐ 1	☐ 0
Flood	☐ 3	☐ 2	☐ 1	☐ 0
Winter Storms	☐ 3	☐ 2	☐ 1	☐ 0
Extreme Heat	☐ 3	☐ 2	☐ 1	☐ 0
Tornados	☐ 3	☐ 2	☐ 1	☐ 0
Drought	☐ 3	☐ 2	☐ 1	☐ 0
Earthquakes	☐ 3	☐ 2	☐ 1	☐ 0
Other *Please specify*: _____	☐ 3	☐ 2	☐ 1	☐ 0

9a.) How vulnerable to damage are the critical facilities (i.e. police stations, fire stations, emergency operation centers, etc) within your jurisdiction to:

Natural Hazard	Severely Vulnerable	Moderately Vulnerable	Minimally Vulnerable	Don't Know
Severe Storm (wind, lightening)	☐ 3	☐ 2	☐ 1	☐ 0
Flood	☐ 3	☐ 2	☐ 1	☐ 0
Winter Storms	☐ 3	☐ 2	☐ 1	☐ 0
Extreme Heat	☐ 3	☐ 2	☐ 1	☐ 0
Tornados	☐ 3	☐ 2	☐ 1	☐ 0
Drought	☐ 3	☐ 2	☐ 1	☐ 0
Earthquakes	☐ 3	☐ 2	☐ 1	☐ 0
Other *Please specify*: _____	☐ 3	☐ 2	☐ 1	☐ 0

NATURAL HAZARD MITIGATION

10. Did you consider the impact that the possible occurrence of a natural disaster would have on your home before you purchased/moved in to your home?

☐ Yes
☐ No

11. Was the presence of a natural hazard risk zone (i.e. flood zone, fault zone, etc) disclosed to you by a Real Estate agent, Seller, or Landlord before you purchased/moved into your home?

☐ Yes
☐ No

12. Would the disclosure of this type of information influence your decision to purchase/move into a home?

- ☐ Yes
- ☐ No

13. Would you be willing to spend money on your current home to modify/retrofit it from the impacts of future possible natural disasters within Calhoun County? (Examples of retrofitting are: Elevating a flood prone home, bolting a foundation for seismic impacts, or improving home exteriors to withstand higher winds)

- ☐ Yes
- ☐ No
- ☐ Maybe

(*If you answered No, please skip to question #15)*

14. How much money would you be willing to spend to better protect your home from the impacts of natural disasters?

- ☐ $5,000 and above
- ☐ $2,500 to $4,999
- ☐ $1,000 to $2,499
- ☐ $500 to $999
- ☐ $100 to $499
- ☐ Less than $100
- ☐ Nothing
- ☐ Don't know
- ☐ Other (please specify) _____

15. Which of the following **incentives** would help to encourage you to spend money to retrofit your home from the possible impacts of natural disasters (*Please check all that apply)*

- ☐ Low interest rate loan
- ☐ Insurance premium discount
- ☐ Mortgage discount
- ☐ Property tax break or incentive
- ☐ Grant funding that requires a "Cost-Share"
- ☐ None
- ☐ Other (please specify)_____

16. If your property were located in a designated high hazard area, or had received repetitive damages from a natural event, would you consider a buyout or relocation offered by a public agency?

- ☐ Yes
- ☐ No

GENERAL HOUSEHOLD INFORMATION

17. Please indicate your age range:
    - ☐ 18 to 29
    - ☐ 30 to 39
    - ☐ 40 to 49
    - ☐ 50 to 59
    - ☐ 60 or over

18. Gender:
    - ☐ Male
    - ☐ Female

19. Please indicate your highest level of education:
    - ☐ Grade school/no schooling
    - ☐ Some high school
    - ☐ High school graduate/GED
    - ☐ Some College/Trade school
    - ☐ College Degree
    - ☐ Post Graduate degree
    - ☐ Other _____

20. How long have you lived in Calhoun County?
    - ☐ Less than 1 year
    - ☐ 1 to 4 years
    - ☐ 5 to 9 years
    - ☐ 10 to 19 years
    - ☐ 20 or more years

21. Do you have access to the Internet?
    - ☐ Yes
    - ☐ No

22. Do you own or rent your home?
    - ☐ Own
    - ☐ Rent

23. Do you own/rent a:
    - ☐ Single-family home
    - ☐ Duplex
    - ☐ Apartment (3-4 units in structure)
    - ☐ Apartment (5 or more units in structure)
    - ☐ Condominium/townhouse
    - ☐ Manufactured home
    - ☐ Other _____

24. **Other Comments:**

Appendix D

Questionnaire Results

Calhoun County Multi-Hazard Questionnaire

1. Please indicate where you live in Calhoun County:

Answer Options	Response Percent	Response Count
Batchtown	5.0%	1
Brussels	0.0%	0
Hamburg	30.0%	6
Hardin	35.0%	7
Kampsville	15.0%	3
Other (please specify)	15.0%	3
answered question		20
skipped question		1

2. In the past 10 years, have you or someone in your household experienced a natural disaster within Calhoun County such as: severe storms, floods, winter storms, extreme heat, tornadoes, drought, earthquakes, or other natural disaster?

Answer Options	Response Percent	Response Count
Yes	76.2%	16
No	23.8%	5
answered question		21
skipped question		0

2a. If yes to question #2, Which of the following types of natural hazard events have you or someone in your household experienced? (Please check all that apply) If you answered no to question #2, please move on to question #3.

Answer Options	Response Percent	Response Count
Severe Weather damage in excess of $500	23.5%	4
Floods	100.0%	17
Winter Storms	11.8%	2
Extreme Heat	11.8%	2
Tornadoes	0.0%	0
Drought	0.0%	0
Earthquakes	5.9%	1
Other (please specify)	0.0%	0
answered question		17
skipped question		4

3. Do you consider yourself prepared for the probable impacts from natural hazard events that may occur within your community and/or the greater Calhoun County?

Answer Options	Response Percent	Response Count
Yes	42.9%	9
No	57.1%	12
answered question		21
skipped question		0

3a. If yes to question #3, Where did you learn about being prepared for a disaster? (Please check all that apply) * If you answered no to question #3, please move on to question #4

Answer Options	Response Percent	Response Count
Emergency preparedness information from a government source (i.e. Federal, State, or Local emergency management)	50.0%	4
Personal experience. Have experienced one or more natural hazard events	100.0%	8
Locally provided news or other media information	12.5%	1
Schools and other educational institutions	12.5%	1
Meetings or trainings offered by volunteer organizations (Red Cross, etc)	25.0%	2
Other (please specify)	12.5%	1
answered question		8
skipped question		13

3b. Please check, on a scale of 1 to 5, how prepared you feel and your household are for the probable impacts of natural hazard events likely to occur within Calhoun County.

Answer Options	Response Percent	Response Count
1 Not at all prepared	5.3%	1
2 Somewhat prepared	63.2%	12
3 Adequately prepared	31.6%	6
4 Well prepared	0.0%	0
5 Very well prepared	0.0%	0
answered question		19
skipped question		2

3c. What steps, if any, have you or someone in your household taken to prepare for a natural disaster? (Check all that apply)

Answer Options	Response Percent	Response Count
Food	75.0%	12
Water	56.3%	9
Flashlight(s)	81.3%	13
Batteries	81.3%	13
Battery-powered radio	62.5%	10
Medical supplies (First Aid Kit)	62.5%	10
Fire extinguisher	75.0%	12
Smoke detector on each level of the house	87.5%	14
Prepared a disaster supply kit	0.0%	0
Received First Aid/ CPR training	43.8%	7
Made a fire escape plan	37.5%	6
Discussed utility shutoffs	37.5%	6
Other (please specify)	6.3%	1
answered question		16
skipped question		5

4. How concerned are you about the following natural hazards impacting your community and or/ the greater Calhoun County area?

Answer Options	Not Concerned	Somewhat Concerned	Concerned	Very Concerned	Extremely Concerned	Response Count
Severe Storm (wind, lightning)	1	6	12	1	1	21
Flood	1	0	3	7	10	21
Winter Storms	1	6	10	2	0	19
Extreme Heat	3	9	5	2	0	19
Tornadoes	1	6	9	3	1	20
Drought	5	6	7	1	0	19
Earthquakes	1	8	6	4	0	19
Comments						0
					answered question	21
					skipped question	0

5. What are the most effective ways for you to receive information about how to make your household and home safer from natural disasters? (Please check all that apply)

Answer Options	Response Percent	Response Count
Newspapers	65.0%	13
Television	80.0%	16
Radio	75.0%	15
Schools	20.0%	4
Books	0.0%	0
Mail	25.0%	5
Fire Department/Rescue	25.0%	5
Internet	45.0%	9
Fact sheet/Brochure	20.0%	4
Chamber of Commerce	5.0%	1
Public workshops/Meetings	25.0%	5
Magazine	10.0%	2
University or research institution	0.0%	0
Other (please specify)	15.0%	3
answered question		20
skipped question		1

6. To the best of your knowledge, is your property located in a designated floodplain?

Answer Options	Response Percent	Response Count
Yes	47.6%	10
No	52.4%	11
Not Sure	0.0%	0
answered question		21
skipped question		0

6a. To the best of your knowledge, is your property located in close proximity (<1 mile) to an earthquake fault line?

Answer Options	Response Percent	Response Count
Yes	19.0%	4
No	38.1%	8
Not Sure	42.9%	9
answered question		21
skipped question		0

7. Do you have flood insurance?

Answer Options	Response Percent	Response Count
Yes	45.0%	9
No	55.0%	11
answered question		20
skipped question		1

8. Do you have earthquake insurance?

Answer Options	Response Percent	Response Count
Yes	57.1%	12
No	42.9%	9
answered question		21
skipped question		0

9. How vulnerable to damage is your infrastructure to:

Answer Options	Severely Vulnerable	Moderately Vulnerable	Minimally Vulnerable	Don't Know	Response Count
Severe Storm(wind/lightning)	500.0%	9	5	2	21
Flood	700.0%	5	6	2	20
Winter Storms	300.0%	9	8	1	21
Extreme Heat	0.0%	7	9	2	18
Tornadoes	200.0%	11	5	0	18
Drought	100.0%	5	11	1	18
Earthquakes	200.0%	8	7	1	18
Comments					0
answered question					21
skipped question					0

9a.) How vulnerable to damage are the critical facilities (i.e. police stations, fire stations, emergency operation centers, etc) within your jurisdiction to:

Answer Options	Severely Vulnerable	Moderately Vulnerable	Minimally Vulnerable	Don't Know	Response Count
Severe Storm(wind/lightning)	200.0%	11	4	1	18
Flood	800.0%	8	3	1	20
Winter Storms	300.0%	11	3	1	18
Extreme Heat	100.0%	9	7	1	18
Tornadoes	200.0%	11	2	2	17
Drought	100.0%	6	9	2	18
Earthquakes	300.0%	6	3	5	17
Comments					0
answered question					20
skipped question					1

10. Did you consider the impact that the possible occurrence of a natural disaster would have on your home before you purchased or moved in?

Answer Options	Response Percent	Response Count
Yes	52.6%	10
No	47.4%	9
answered question		19
skipped question		2

11. Was the presence of a natural hazard risk zone (i.e. flood zone, fault zone, etc) disclosed to you by a Real Estate agent, Seller, or Landlord before you purchased/moved into your home?

Answer Options	Response Percent	Response Count
Yes	37.5%	6
No	62.5%	10
answered question		16
skipped question		5

12. Would the disclosure of this type of information influence your decision to purchase/move into a home?

Answer Options	Response Percent	Response Count
Yes	73.7%	14
No	26.3%	5
answered question		19
skipped question		2

13. Would you be willing to spend money to modify/retrofit your current home from the impacts of future natural disasters within Calhoun County? (Examples of retrofitting are: Elevating a flood prone home, bolting a foundation for seismic impacts, or improving home exteriors to withstand higher winds) (If you answered No, please skip to #15)

Answer Options	Response Percent	Response Count
Yes	33.3%	7
No	28.6%	6
Maybe	38.1%	8
answered question		21
skipped question		0

14. How much money would you be willing to spend to better protect your home from the impacts of natural disasters?

Answer Options	Response Percent	Response Count
$5,000 and above	11.8%	2
$2,500 to $4,999	23.5%	4
$1,000 to $2,499	5.9%	1
$500 to $999	11.8%	2
$100 to $499	0.0%	0
Less than $100	0.0%	0
Nothing	5.9%	1
Don’t know	35.3%	6
Other (please specify)	5.9%	1
answered question		17
skipped question		4

15. Which of the following incentives would help to encourage you to spend money to retrofit your home from the possible impacts of natural disasters (Please check all that apply)

Answer Options	Response Percent	Response Count
Low interest rate loan	35.0%	7
Insurance premium discount	25.0%	5
Mortgage discount	10.0%	2
Property tax break or incentive	65.0%	13
Grant funding that requires a "Cost-Share"	30.0%	6
None	15.0%	3
Other (please specify)	5.0%	1
answered question		20
skipped question		1

16. If your property were located in a designated high hazard area or had received repetitive damages from a natural event, would you consider a buyout or relocation offered by a public agency?

Answer Options	Response Percent	Response Count
Yes	73.7%	14
No	26.3%	5
answered question		19
skipped question		2

17. Please indicate your age range:

Answer Options	Response Percent	Response Count
18 to 29	0.0%	0
30 to 39	15.0%	3
40 to 49	0.0%	0
50 to 59	40.0%	8
60 or over	45.0%	9
answered question		20
skipped question		1

18. Gender:

Answer Options	Response Percent	Response Count
Male	75.0%	15
Female	25.0%	5
answered question		20
skipped question		1

19. Please indicate your highest level of education:

Answer Options	Response Percent	Response Count
Grade school/no schooling	0.0%	0
Some high school	5.0%	1
High school graduate/GED	20.0%	4
Some College/Trade school	35.0%	7
College Degree	30.0%	6
Post Graduate degree	5.0%	1
Other (please specify)	5.0%	1
answered question		20
skipped question		1

20. How long have you lived in Calhoun County?

Answer Options	Response Percent	Response Count
Less than 1 year	0.0%	0
1 to 4 years	15.0%	3
5 to 9 years	15.0%	3
10 to 19 years	10.0%	2
20 or more years	60.0%	12
answered question		20
skipped question		1

21. Do you have access to the Internet?

Answer Options	Response Percent	Response Count
Yes	90.0%	18
No	10.0%	2
answered question		20
skipped question		1

22. Do you own or rent your home?

Answer Options	Response Percent	Response Count
Own	90.0%	18
Rent	10.0%	2
answered question		20
skipped question		1

23. Do you own/rent a:

Answer Options	Response Percent	Response Count
Single-family home	94.7%	18
Duplex	0.0%	0
Apartment (3-4 units in structure)	0.0%	0
Apartment (5 or more units in structure)	0.0%	0
Condominium/townhouse	0.0%	0
Manufactured home	5.3%	1
Other (please specify)	0.0%	0
answered question		19
skipped question		2

24. Other Comments:

Answer Options	Response Count
answered question	1
skipped question	20

Appendix E

Profiling Hazard Event Tables

Hazard Risk Factor Table Key

Period of Occurrence	The normal time of year when a hazard occurs.
Number of Events to Date	The number of past events reported to the National Climatic Data Center (NCDC) between 1950 and 2010.
Annual Chance Probability	The number of past events divided by time of record.
Location of Impacts	The area most commonly impacted by a natural hazard.
Potential Impacts	Impacts typically associated with a particular natural hazard.
Injury or Death	The number of Injuries or deaths reported to the NCDC.

Summary of Drought Risk Factors

Period of Occurrence	Generally during summer months or extended periods of no precipitation.
Number of Events to Date	1
Annual Chance Probability	2%
Location of Impacts	The most severe impacts are associated with agricultural land uses; however, water-related tourism industries may be impacted as well.
Potential Impacts	Activities that rely heavily on high water usage may be impacted significantly, including agriculture, tourism, wildlife protection, municipal water usage, commerce, recreation, and electric power generation. Droughts can lead to economic losses such as unemployment, decreased land values, and agronomic losses. Minimal risk of damage or cracking to structural foundations, due to soils.
Injury or Death	None Reported

Summary of Earthquake Risk Factors

Period of Occurrence	Year round
Number of Events to Date	0
Annual Chance Probability	Minimal
Location of Impacts	The most damaging impacts from an earthquake would be associated with bridges, concrete or masonry structures, and towers.
Potential Impacts	Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, fire, damaged or destroyed critical facilities, and hazardous material releases. Can cause severe transportation problems and make travel extremely dangerous. May trigger landslides, releases of hazardous materials, or dam and levee failure and flooding.
Injury or Death	None Reported

Summary of Extreme Heat Risk Factors

Period of Occurrence	Summer
Number of Events to Date	3
Annual Chance Probability	5%
Location of Impacts	Extreme heat is not a geographically distinctive natural hazard, thus the entirety of Calhoun County is equally susceptible.
Potential Impacts	Public health and safety, especially the elderly. Heavy use of water and electrical facilities due to air conditioners, fans, etc.
Injury or Death	There are 7 recorded deaths and 232 reported injuries.

Summary of Flood Risk Factors

Period of Occurrence	Anytime, but primarily during spring/summer rains.
Number of Events to Date	22
Annual Chance Probability	37%
Location of Impacts	Impacts are primarily confined to the areas adjacent to water bodies. For this plan, the location of impacts was defined as the FEMA 100 year floodplain.
Potential Impacts	Potential for loss of life. Floodwaters are a public safety issue due to contaminants and pollutants. Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, fire, damaged or destroyed critical facilities, and hazardous material releases. Can lead to economic losses such as unemployment, decreased land values, and agronomic losses.
Injury or Death	One reported injury.

Summary of Severe Storms Risk Factor

Period of Occurrence	Spring, Summer and Fall
Number of Events to Date	Total: 87
	Lightning: 1
	Hail: 17
	Rain: 2
	Wind: 67
Annual Chance Probability	Total: 147%
	Lightning: 2%
	Hail: 29%
	Rain: 3%
	Wind: 114%
Location of Impacts	Severe storms are not restricted by geographical features; however, tall structures, heavily forested areas, and low-lying areas are more prone to impact from severe storms.
Potential Impacts	Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, fire, damaged or destroyed critical facilities, and hazardous material releases. Impacts human life, health, and public safety.
Injury or Death	Ten deaths and 120 injuries reported.

Severe Winter Storms Risk Factors

Period of Occurrence	Winter
Number of Events to Date	Total: 30
	Extreme Cold/Wind Chill: 2
	Heavy Snow: 3
	Winter Storm: 25
Annual Chance Probability	Total: 51%
	Extreme Cold/Wind Chill: 3%
	Heavy Snow: 5%
	Winter Storm: 42%
Location of Impacts	All areas of Calhoun County are equally susceptible to damages from winter storms.
Potential Impacts	Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, and damaged or destroyed critical facilities. May cause severe transportation problems and make travel extremely dangerous. Power outages, which results in loss of electrical power and potentially loss of heat, and human life. Extreme cold temperatures may lead to frozen water mains and pipes, damaged car engines, and prolonged exposure to cold resulting in frostbite.
Injury or Death	Two deaths and six reported injuries.

Summary of Tornado Risk Factors

Period of Occurrence	Year-round, primarily during March through August
Number of Events to Date	9
Annual Chance Probability	15%
Location of Impacts	All areas of Calhoun County are equally at risk to tornadoes.
Potential Impacts	Utility damage and outages, infrastructure damage (transportation and communication systems), structural damage, and damaged or destroyed critical facilities. Impacts human life, health, and public safety.
Injury or Death	Eleven injuries reported.

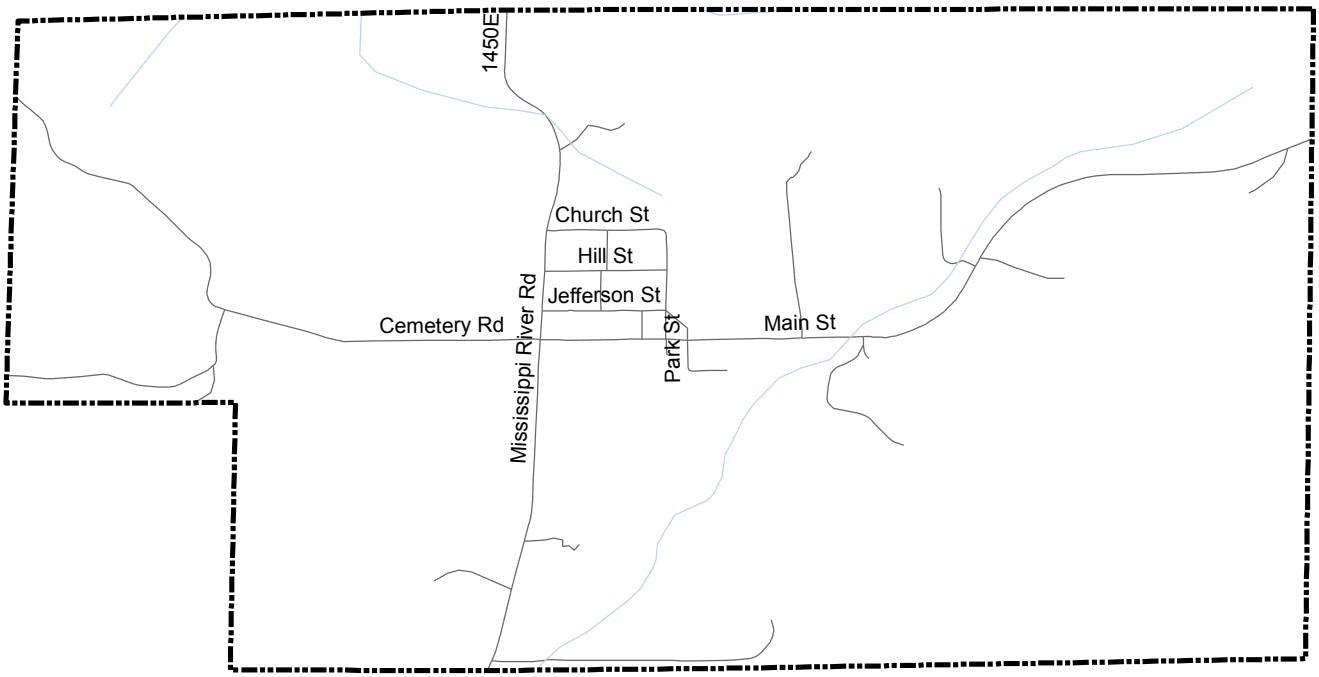
Appendix F

Community Maps

Calhoun County, Illinois

Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.
2. Community Facilities are critical facilities identified by stakeholders.

Village of Batchtown
100 Year Floodplain Map



Legend

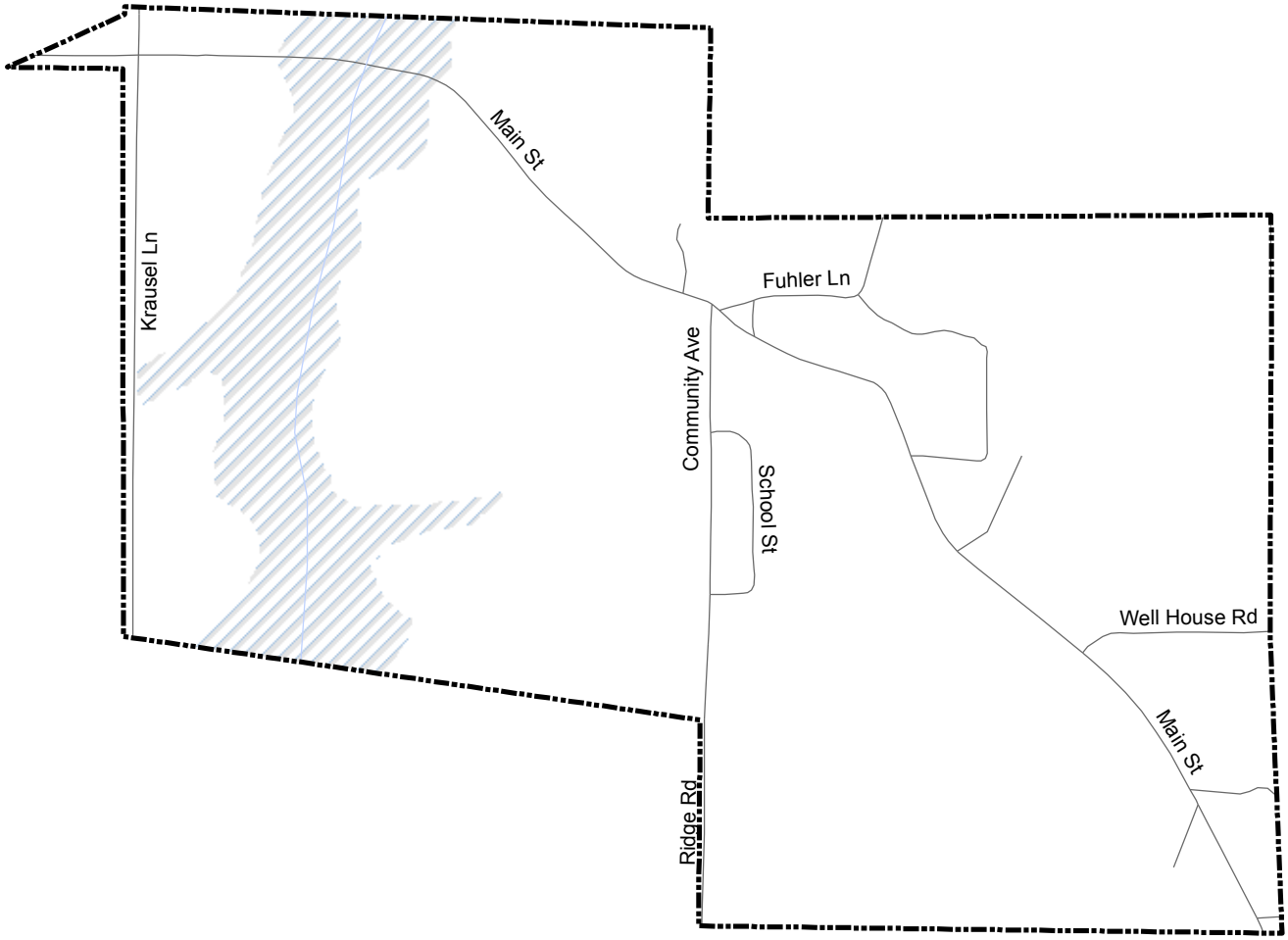
- Streams
- Roads
- 100 Year Floodplain
- Water
- Municipal Boundary
- County Boundary

N

Feet
0 1,100 2,200

Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.
2. Community Facilities are critical facilities identified by stakeholders.

Village of Brussels
100 Year Floodplain Map



Legend

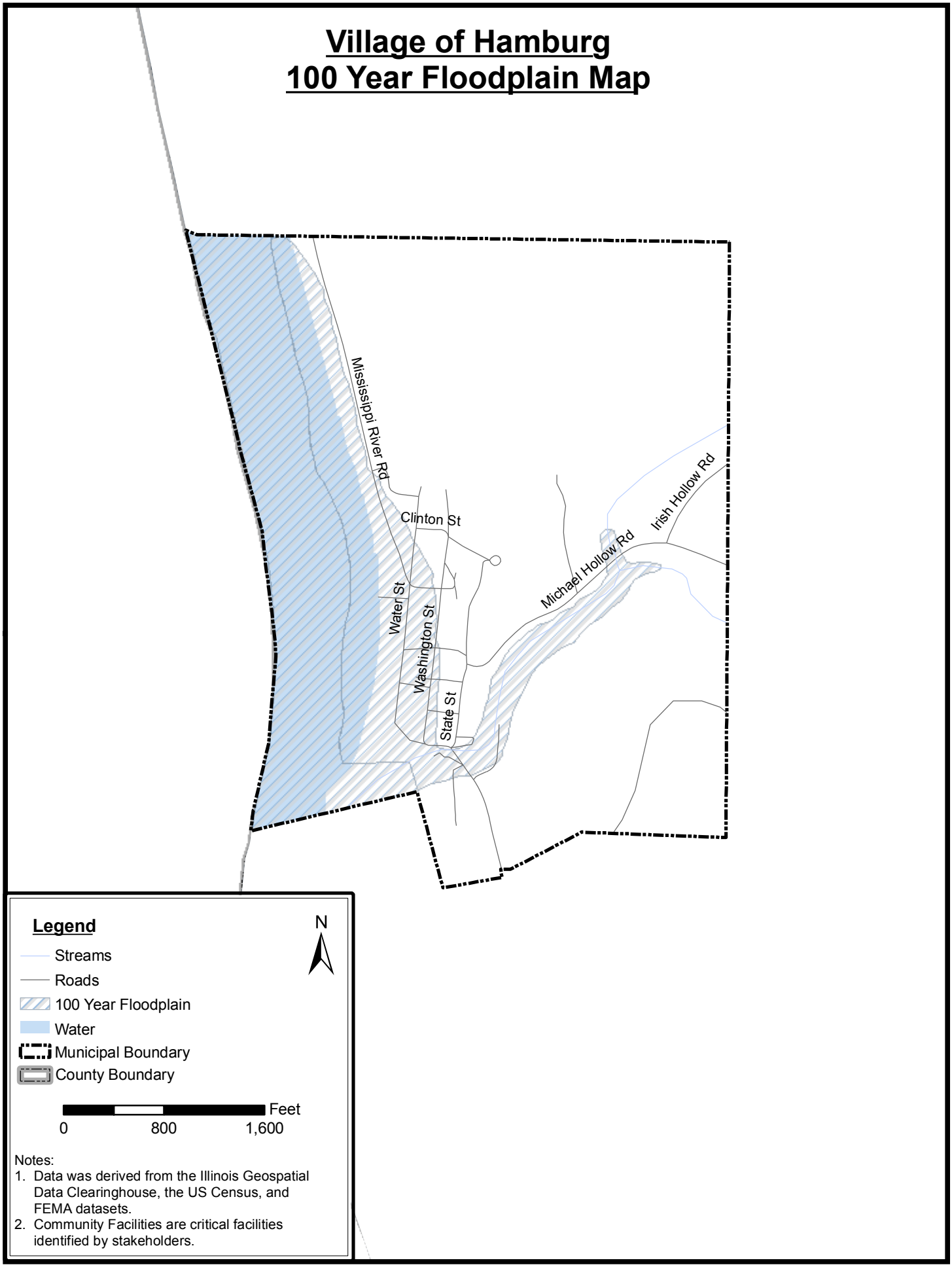
- Streams
- Roads
- 100 Year Floodplain
- Water
- Municipal Boundary
- County Boundary

N

Feet
0 700 1,400

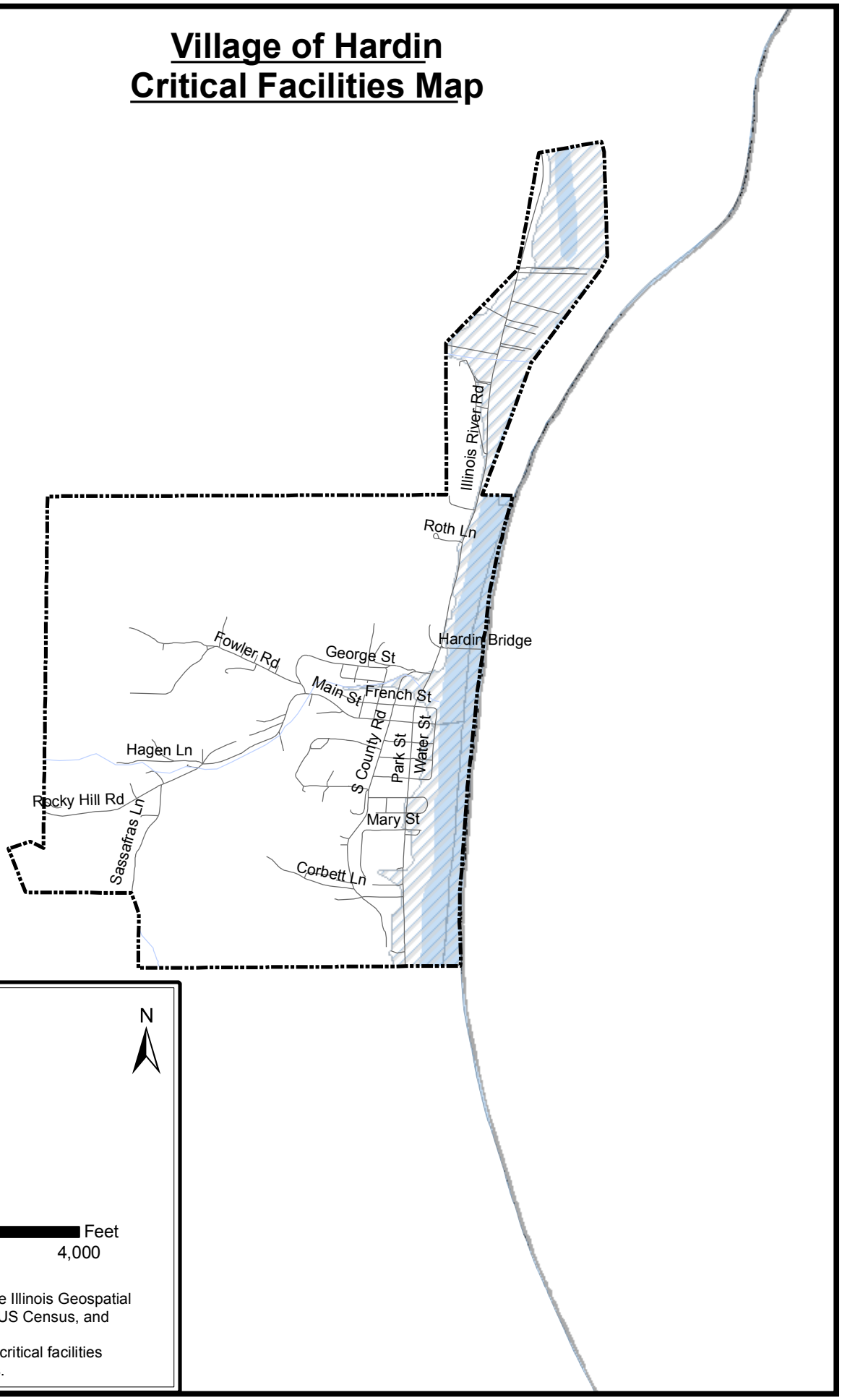
Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.
2. Community Facilities are critical facilities identified by stakeholders.

Village of Hamburg
100 Year Floodplain Map



Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.
2. Community Facilities are critical facilities identified by stakeholders.

Village of Hardin
Critical Facilities Map



Legend

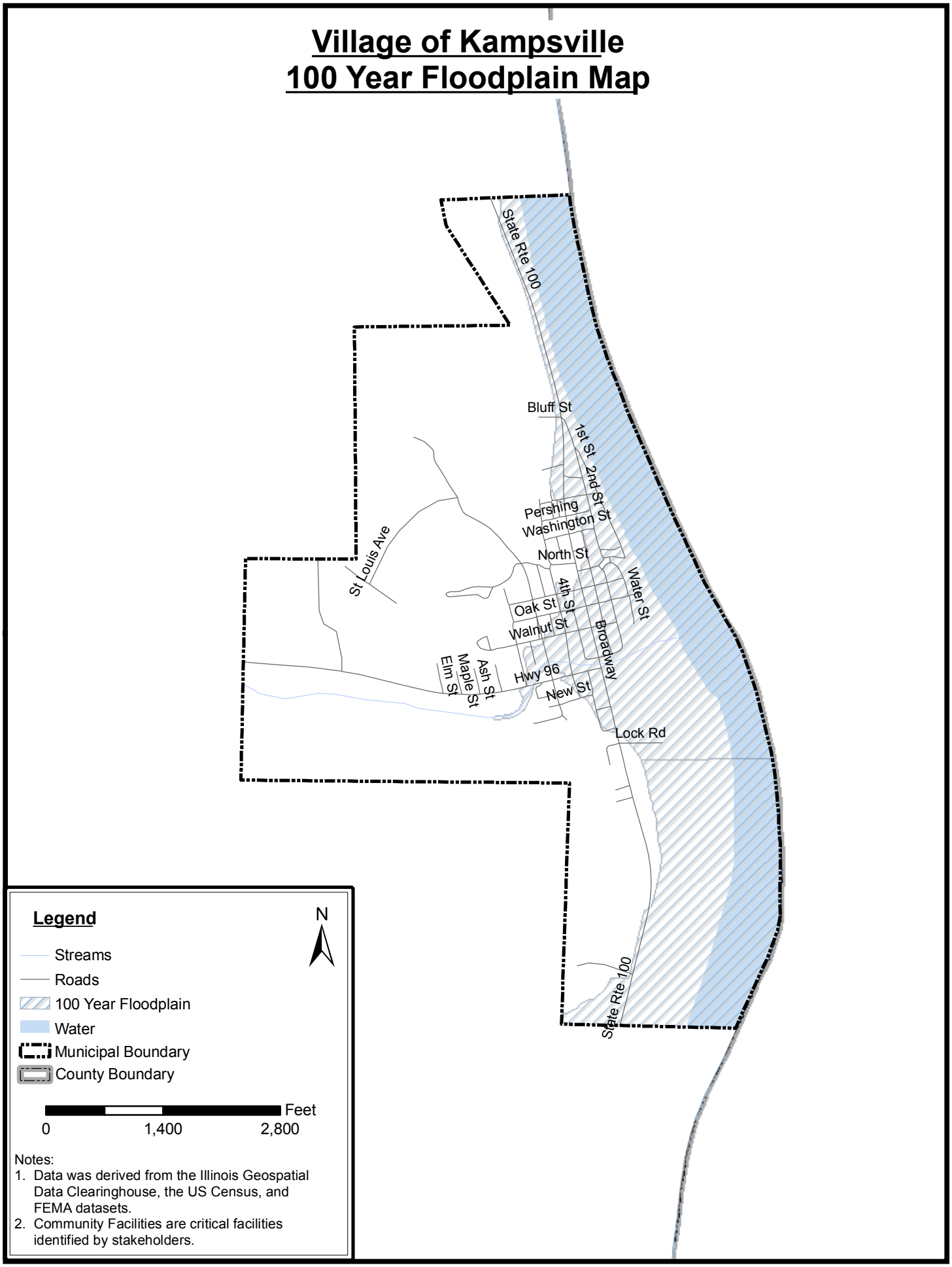
- Streams
- Roads
- 100 Year Floodplain
- Water
- Municipal Boundary
- County Boundary

N

0 2,000 4,000 Feet

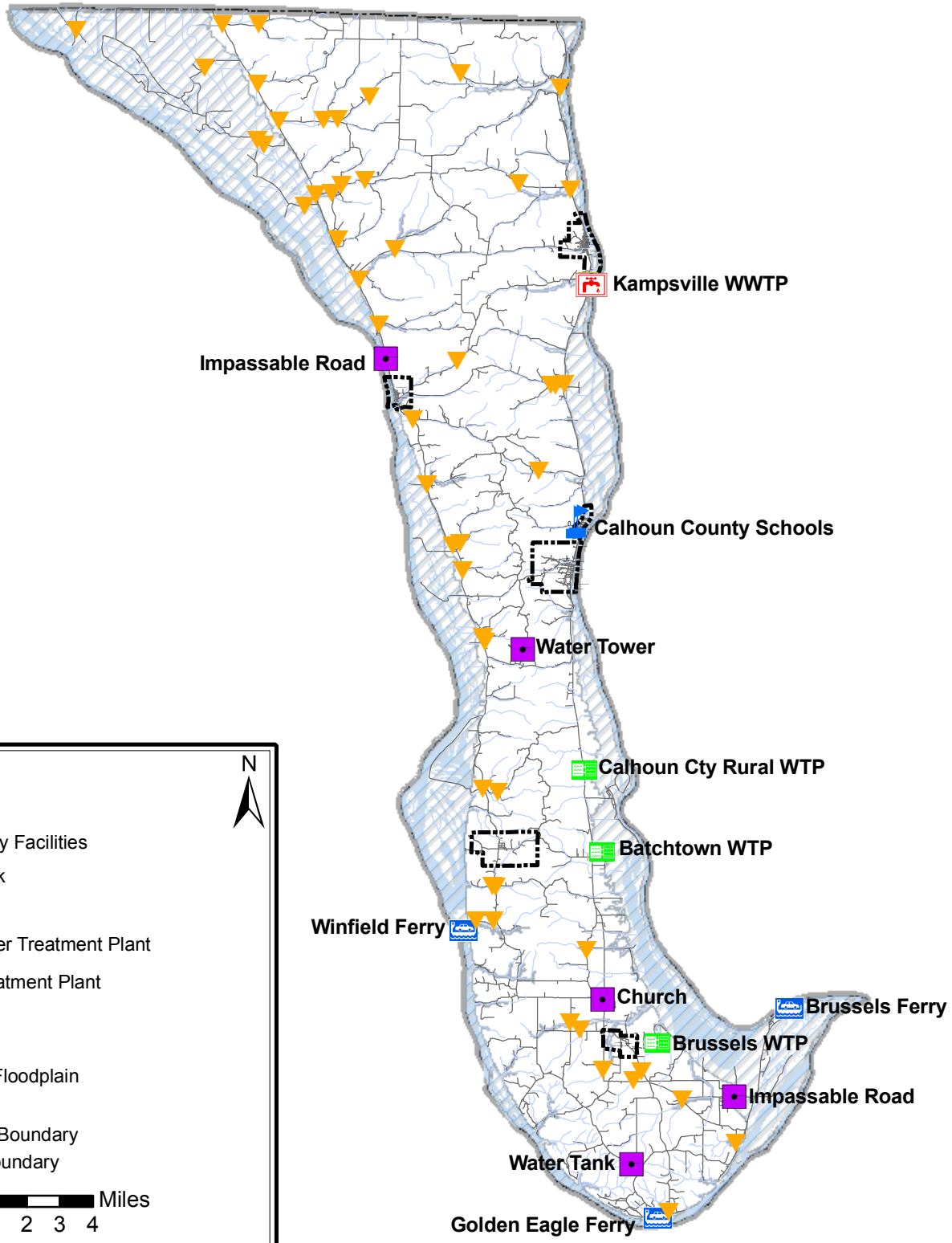
Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.
2. Community Facilities are critical facilities identified by stakeholders.

Village of Kampsville
100 Year Floodplain Map



Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.
2. Community Facilities are critical facilities identified by stakeholders.

Unincorporated Calhoun County
Critical Facilities Map



Legend

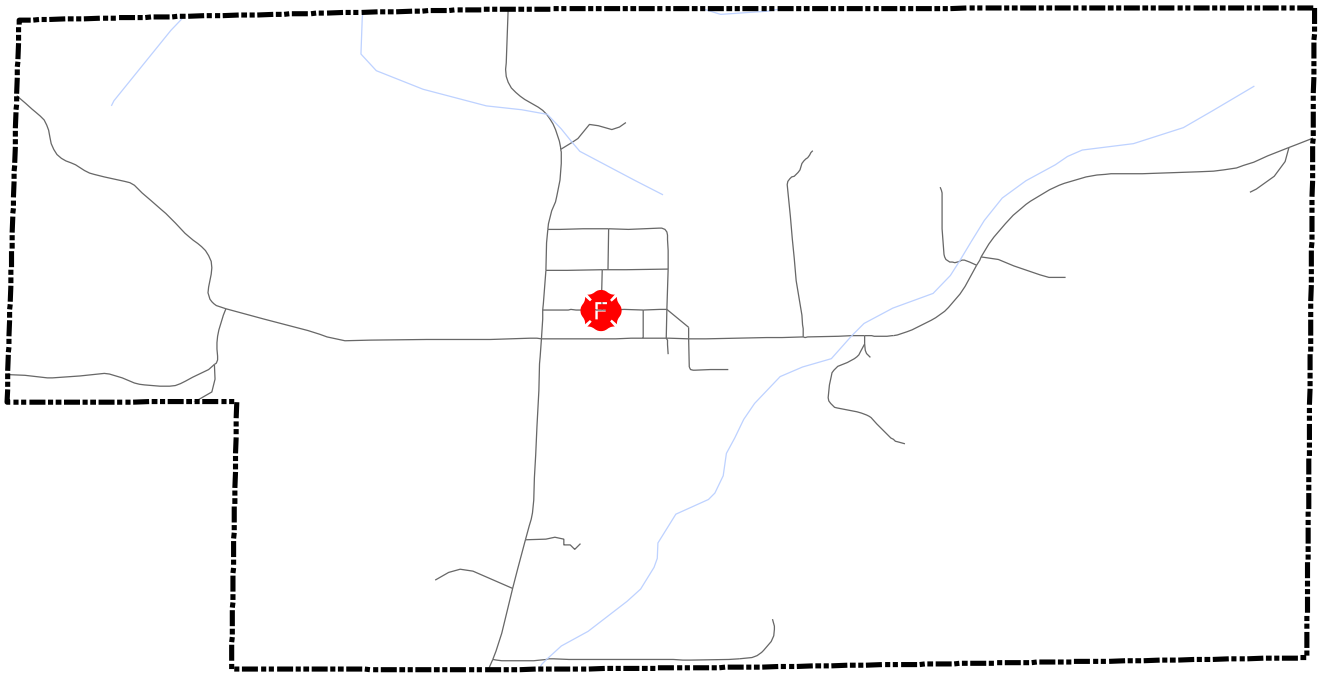
- Bridges
- Community Facilities
- Ferry Dock
- Schools
- Wastewater Treatment Plant
- Water Treatment Plant
- Streams
- Roads
- 100 Year Floodplain
- Water
- Municipal Boundary
- County Boundary

N

Miles
0 1 2 3 4

Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.
2. Community Facilities are critical facilities identified by stakeholders.

Village of Batchtown
Critical Facilities Map



Legend

N

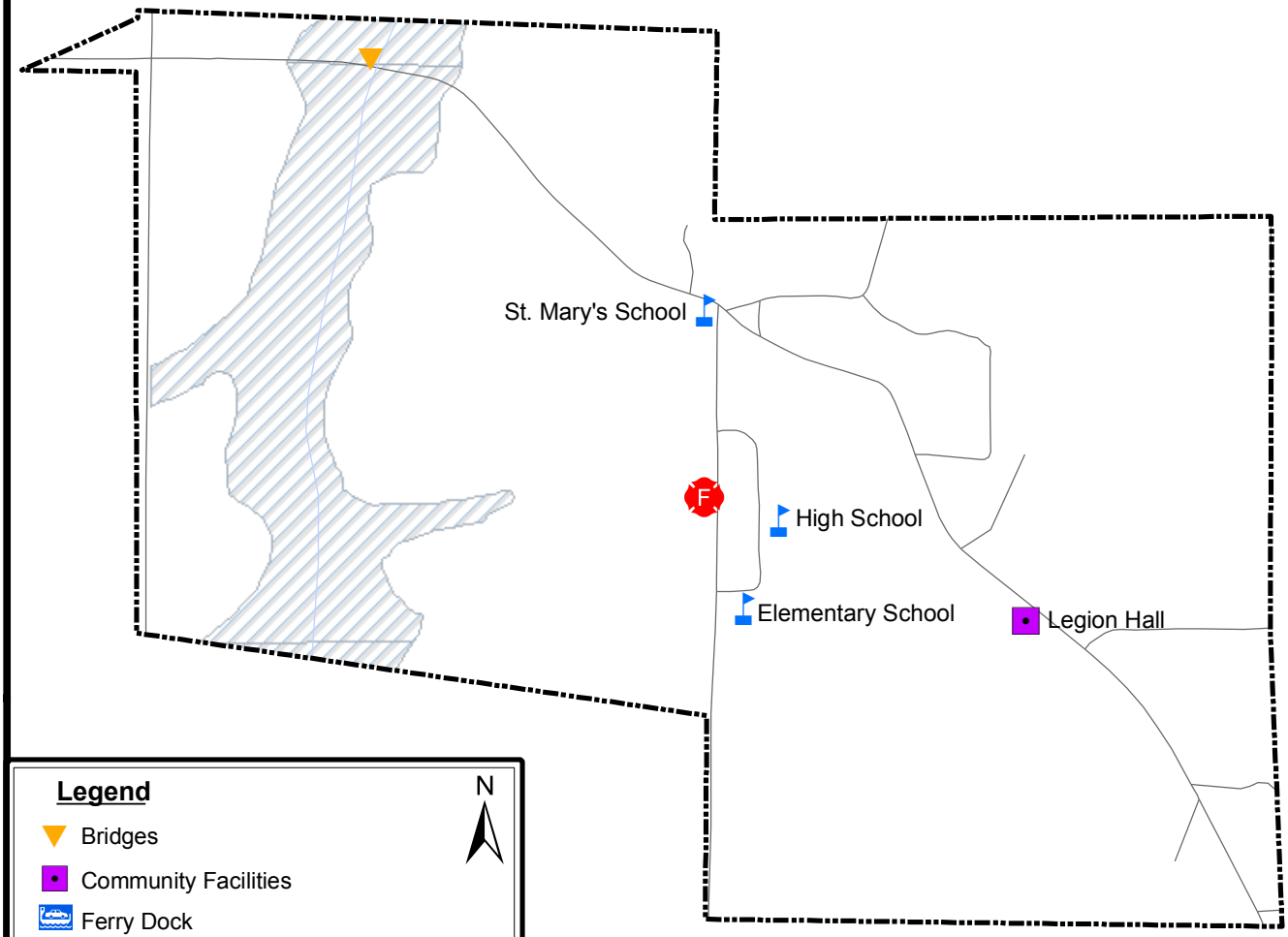
- Bridges
- Community Facilities
- Ferry Dock
- Fire Stations
- Police Stations
- Schools
- Wastewater Treatment Plant
- Water Treatment Plant
- Streams
- Roads
- 100 Year Floodplain
- Water
- Municipal Boundary
- County Boundary

Feet

0 1,000 2,000

Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.
2. Community Facilities are critical facilities identified by stakeholders.

Village of Brussels
Critical Facilities Map



Legend

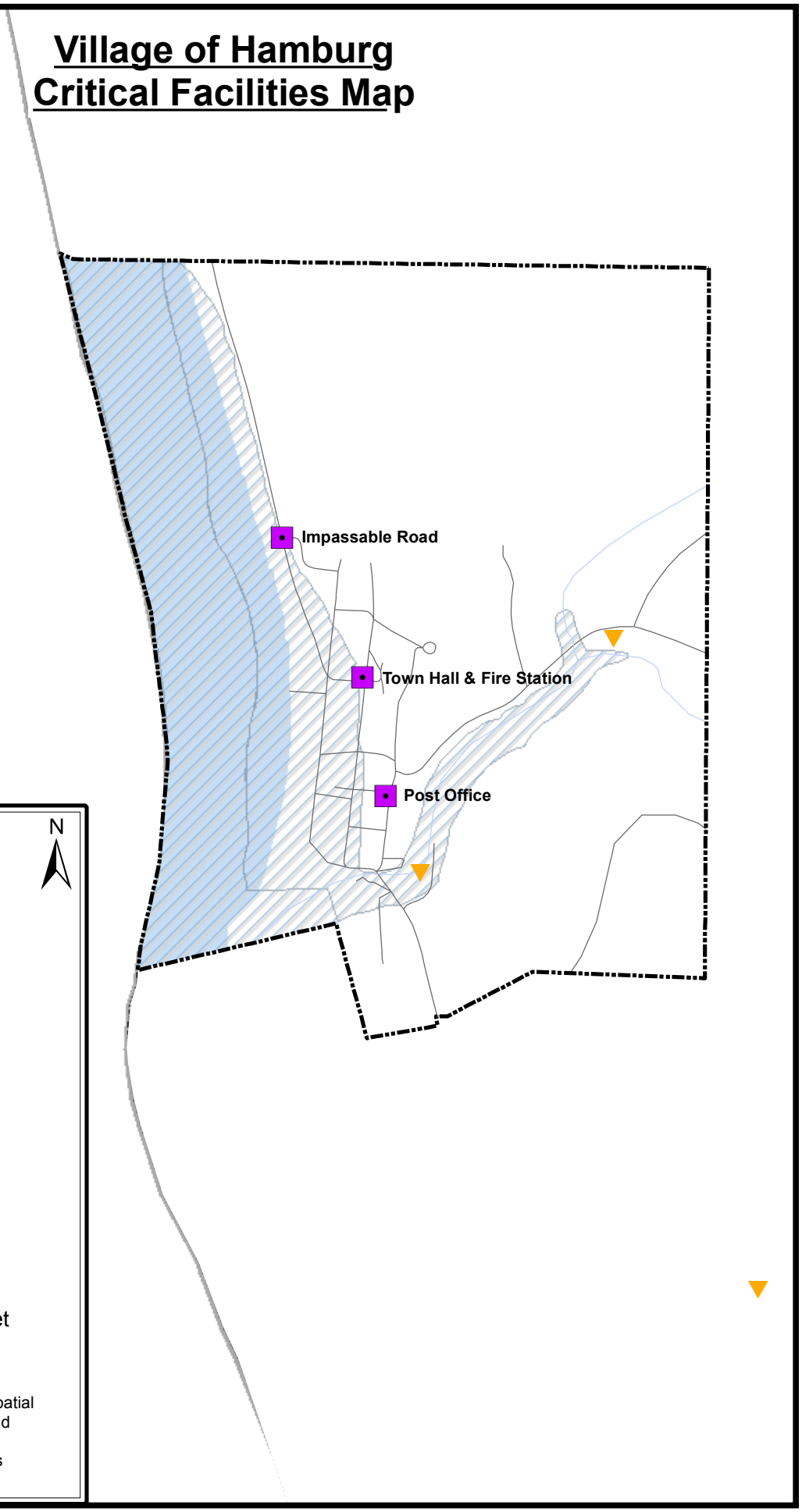
- Bridges
- Community Facilities
- Ferry Dock
- Fire Stations
- Police Stations
- Schools
- Wastewater Treatment Plant
- Water Treatment Plant
- Streams
- Roads
- 100 Year Floodplain
- Water
- Municipal Boundary
- County Boundary

N

Feet
0 600 1,200

Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.
2. Community Facilities are critical facilities identified by stakeholders.

Village of Hamburg
Critical Facilities Map



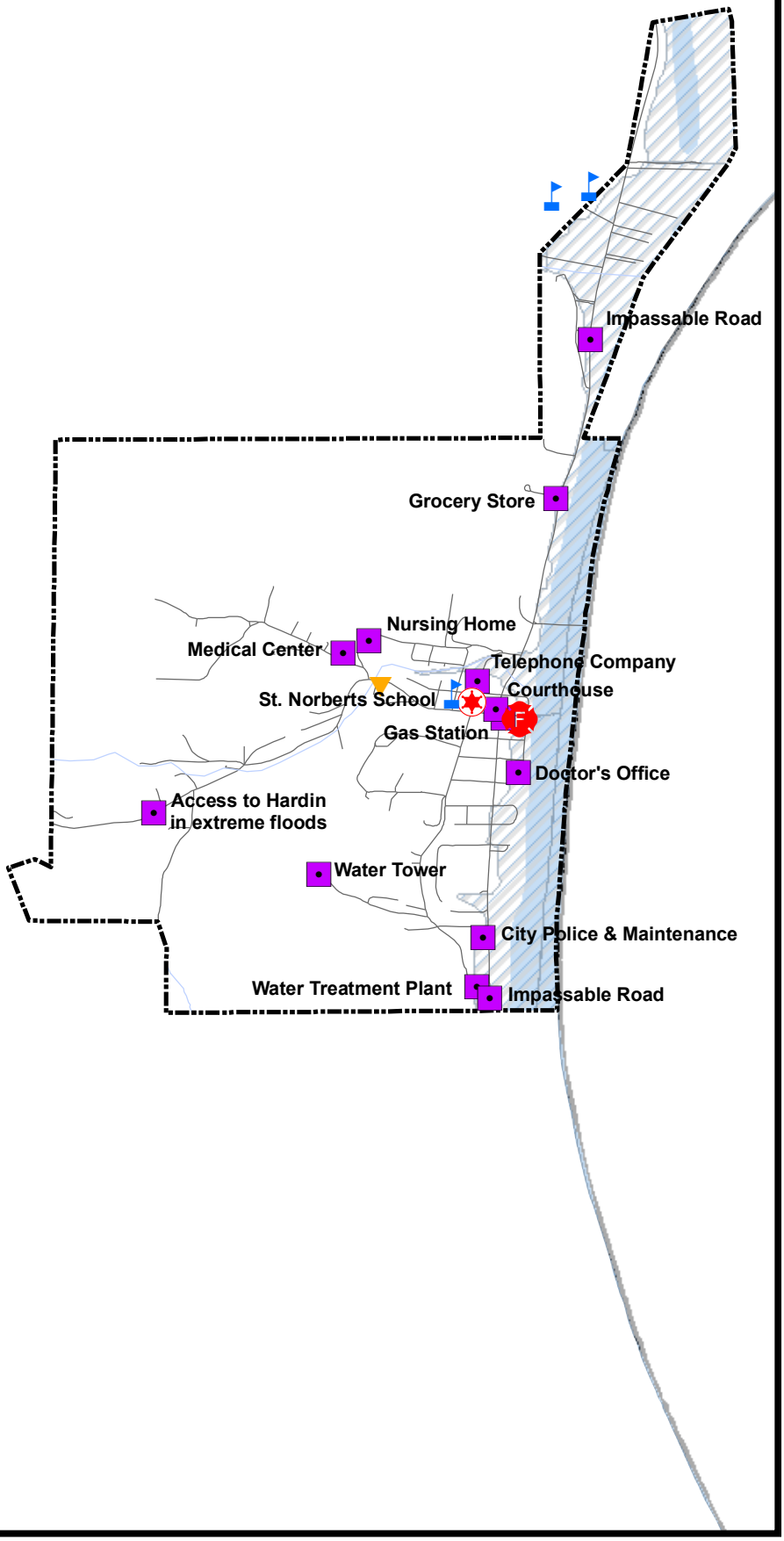
Legend

- Bridges
- Community Facilities
- Ferry Dock
- Fire Stations
- Police Stations
- Schools
- Wastewater Treatment Plant
- Water Treatment Plant
- Streams
- Roads
- 100 Year Floodplain
- Water
- Municipal Boundary
- County Boundary

Feet
0 730 1,460

Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.
2. Community Facilities are critical facilities identified by stakeholders.

Village of Hardin
Critical Facilities Map



Legend

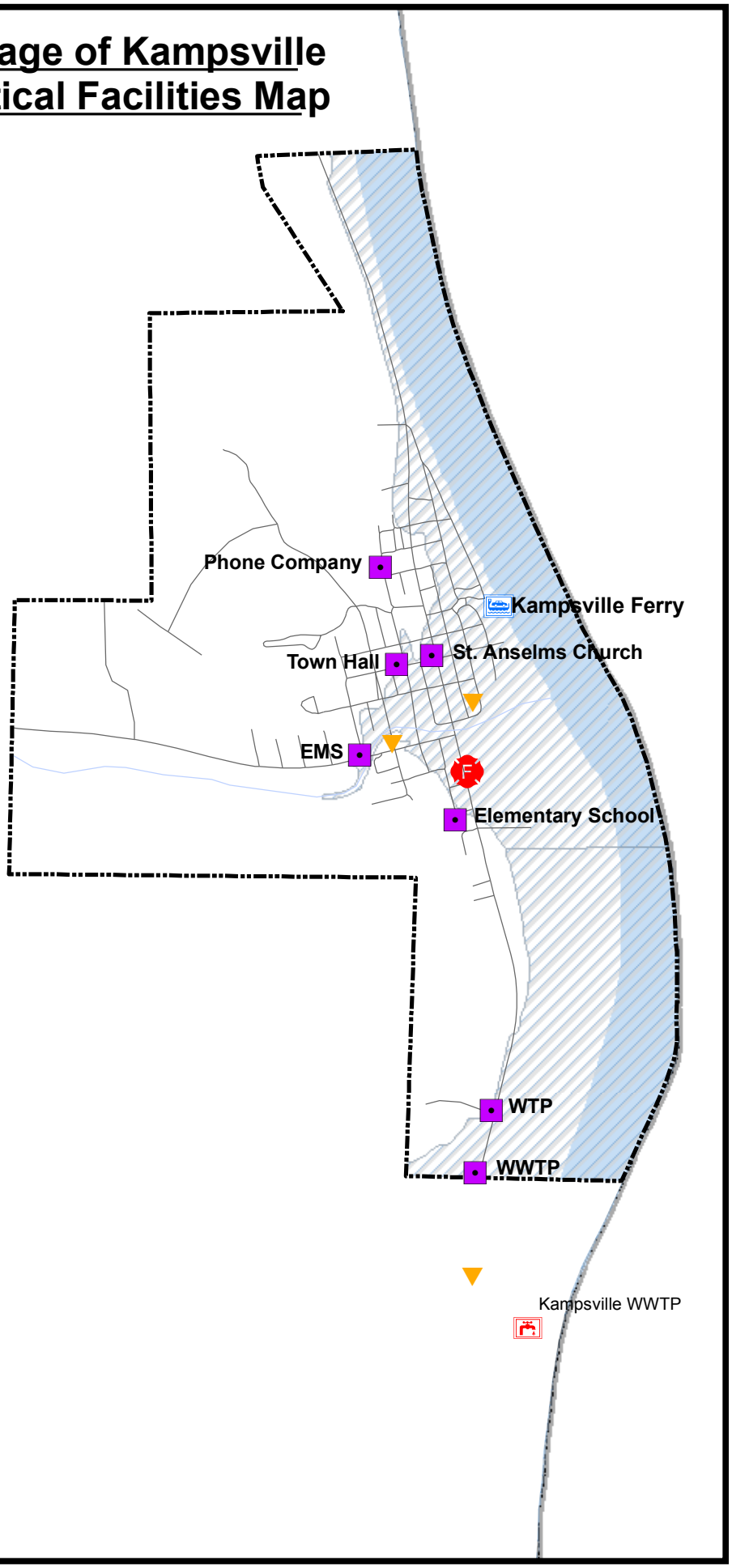
- Bridges
- Community Facilities
- Ferry Dock
- Fire Stations
- Police Stations
- Schools
- Wastewater Treatment Plant
- Water Treatment Plant
- Streams
- Roads
- 100 Year Floodplain
- Water
- Municipal Boundary
- County Boundary

N

0 2,000 4,000 Feet

Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.
2. Community Facilities are critical facilities identified by stakeholders.

Village of Kampsville
Critical Facilities Map



Legend

- Bridges
- Community Facilities
- Ferry Dock
- Fire Stations
- Police Stations
- Schools
- Wastewater Treatment Plant
- Water Treatment Plant
- Streams
- Roads
- 100 Year Floodplain
- Water
- Municipal Boundary
- County Boundary

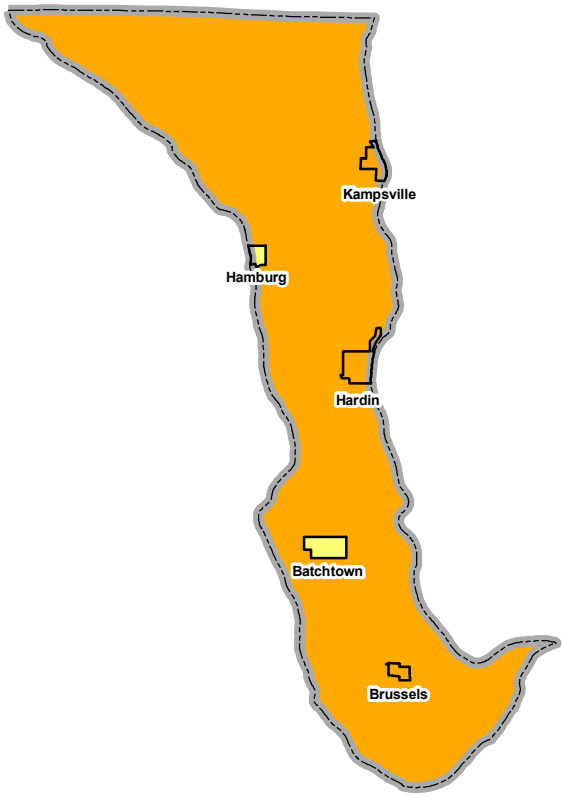
N

0 1,400 2,800 Feet

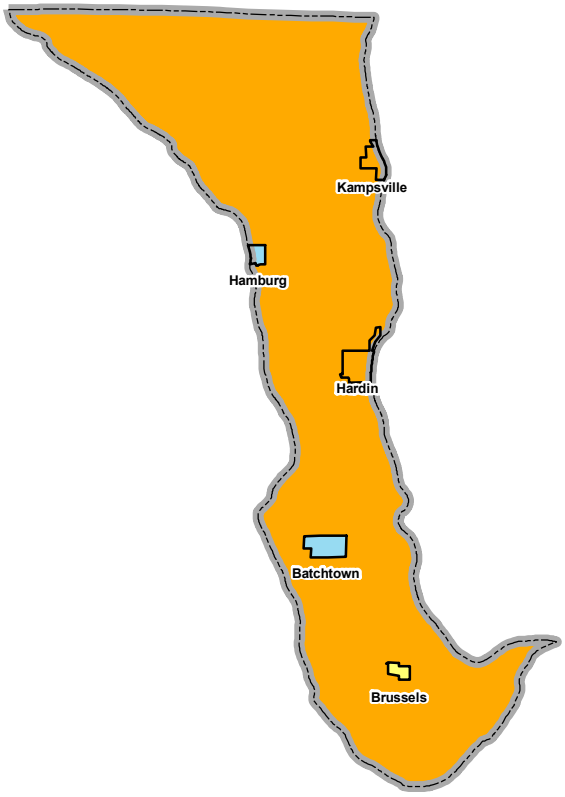
Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.
2. Community Facilities are critical facilities identified by stakeholders.

Calhoun County Hazard Mitigation Plan
Vulnerability Categorizations

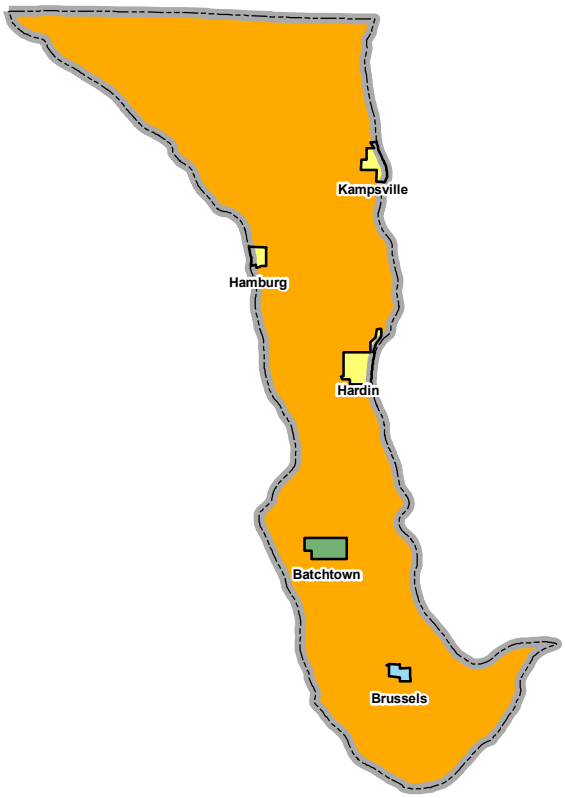
Drought/Earthquake



Extreme Heat



Flood



Legend

N

Vulnerability Assessment Categories

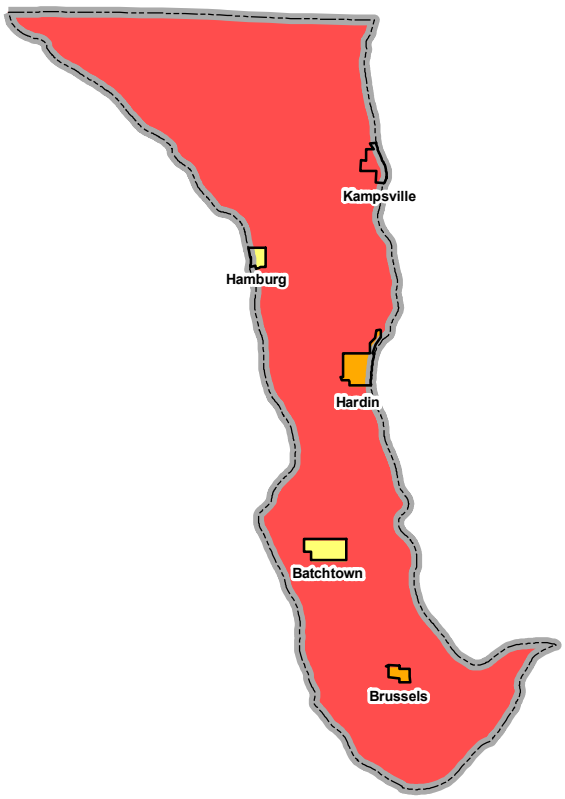
- Low
- Guarded
- Elevated
- High
- Severe
- Municipal Boundary
- County Boundary

0 4 8 12 16 Miles

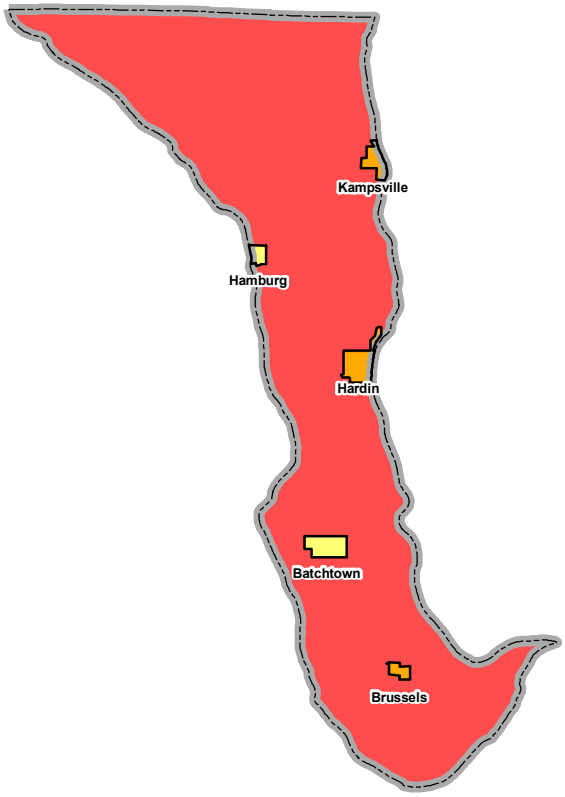
Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.

Calhoun County Hazard Mitigation Plan
Vulnerability Categorizations

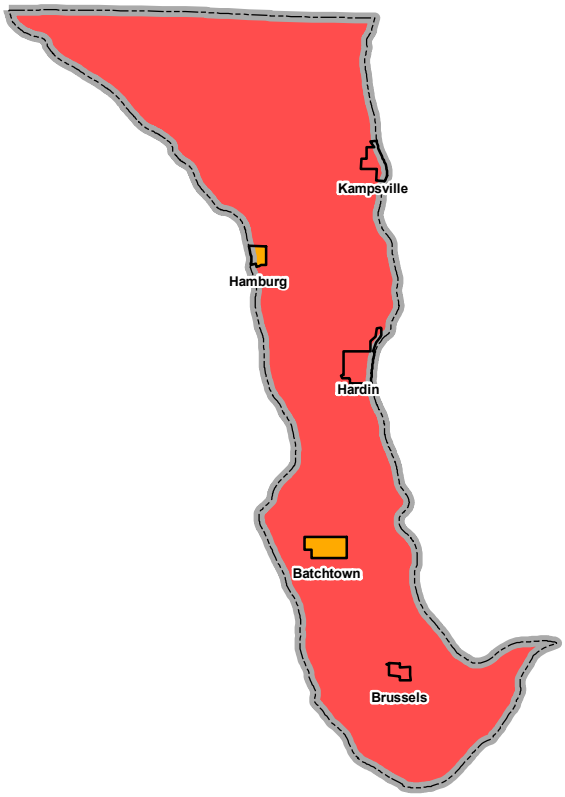
Severe Storms



Tornado



Winter Storms



Legend

Vulnerability Assessment Categories

- Low
- Guarded
- Elevated
- High
- Severe
- Municipal Boundary
- County Boundary

N

0 4 8 12 16 Miles

Notes:
1. Data was derived from the Illinois Geospatial Data Clearinghouse, the US Census, and FEMA datasets.

Appendix G

National Climatic Data Center Event Records

Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage ($)	Crop Damage ($)
ILZ058>060 - 064>065 - 069>070 - 074 - 0	8/1/2005	Drought	N/A	0	0	0	0
ILZ058>060 - 064>065 - 095>099	9/1/2005	Drought	N/A	0	0	0	0
ILZ058>060 - 095>099	10/1/2005	Drought	N/A	0	0	0	0
ILZ064>066 - 069 - 070 - 074 - 075 - 079	6/12/1994	Heat	N/A	0	10	0	0
West Central And	7/11/1995	Heat	N/A	5	95	50,000	200,000
West Central And	7/28/1995	Heat	N/A	0	30	5,000	10,000
Southwest And	8/9/1995	Heat	N/A	2	97	0	200,000
Hardin	4/11/1994	Flood/flash Flood	N/A	0	0	5,000	0
West Central And	5/9/1995	River Flood	N/A	0	0	15,000,000	12,000,000
CALHOUN	5/16/1995	Flash Flood	N/A	0	0	1,000	0
CALHOUN	8/10/1995	Flash Flood	N/A	0	0	0	0
ILZ065 - 079 - 095>102	5/1/1996	Flood	N/A	0	0	0	0
Countywide	5/7/1996	Flash Flood	N/A	0	0	0	0
South Portion	6/24/2000	Flash Flood	N/A	0	0	0	0
ILZ095 - 097>099	4/13/2001	Flood	N/A	0	0	0	0
ILZ095 - 097>100	5/1/2001	Flood	N/A	0	0	0	0
ILZ058 - 098>099	5/20/2001	Flood	N/A	0	0	0	0
ILZ058 - 096>099	4/27/2002	Flood	N/A	0	0	0	0
ILZ097>099	4/27/2002	Flood	N/A	0	0	0	0
ILZ079 - 095 - 097>102	5/1/2002	Flood	N/A	0	0	0	0
Countywide	5/7/2002	Flash Flood	N/A	0	0	0	0
Countywide	5/12/2002	Flash Flood	N/A	0	0	0	0
Countywide	5/12/2002	Flash Flood	N/A	0	0	0	0
North Portion	5/10/2003	Flash Flood	N/A	0	0	0	0
Countywide	6/25/2003	Flash Flood	N/A	0	0	0	0
Countywide	5/27/2004	Flash Flood	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	8/24/2003	Flash Flood	N/A	1	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	8/5/2007	Flash Flood	N/A	0	0	0	0
ILZ058>060 - 065 - 069>070 - 074 - 079 -	6/21/2009	Flash Flood	N/A	0	0	0	0
Golden Eagle	8/26/2007	Flood	N/A	0	0	0	0
Belleview	6/3/2008	Flood	N/A	0	0	0	0
CALHOUN	9/6/1983	Hail	0.75 in.	0	0	0	0
CALHOUN	5/16/1986	Hail	1.00 in.	0	0	0	0
Kampsville	4/19/1996	Hail	0.75 in.	0	0	0	0
Brussels	5/3/1996	Hail	1.75 in.	0	0	0	0
Batchtown	5/3/1996	Hail	1.75 in.	0	0	0	0
Hamburg	12/23/1996	Hail	1.00 in.	0	0	0	0
Hardin	6/12/1998	Hail	1.75 in.	0	0	0	0
Batchtown	6/12/1998	Hail	1.00 in.	0	0	0	0
Brussels	6/12/1998	Hail	1.75 in.	0	0	0	0
Golden Eagle	5/1/2002	Hail	1.75 in.	0	0	0	0
Hardin	5/1/2002	Hail	1.75 in.	0	0	0	0
Deer Plain	4/4/2003	Hail	0.88 in.	0	0	0	0
Belleview	5/9/2003	Hail	0.75 in.	0	0	0	0
Mozier	5/27/2004	Hail	0.75 in.	0	0	0	0
Kampsville	5/27/2004	Hail	0.75 in.	0	0	0	0
Brussels	11/5/2005	Hail	0.75 in.	0	0	0	0
Batchtown	1/2/2006	Hail	0.75 in.	0	0	0	0
Kampsville	3/13/2006	Hail	1.00 in.	0	0	0	0
Hardin	6/22/2006	Hail	2.75 in.	0	0	0	0
Kampsville	7/11/2008	Hail	1.50 in.	0	0	0	0
ILZ058>060 - 065 - 069>070 - 074 - 079 -	7/20/2004	Hail	N/A	0	0	0	0
Batchtown	8/5/2008	Hail	0.88 in.	0	0	0	0

Source: National Climatic Data Center
Accessed 2/12/10

Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage ($)	Crop Damage ($)
CALHOUN	9/28/1974	Tstm Wind	0 kts.	0	0	0	0
CALHOUN	4/29/1984	Tstm Wind	0 kts.	0	0	0	0
ILZ058>059 - 064 - 097>102	3/9/2002	High Wind	43 kts.	0	0	0	0
Brussels	5/7/2002	Tstm Wind	53 kts.	0	0	0	0
Brussels	5/7/2002	Tstm Wind	53 kts.	0	0	0	0
CALHOUN	4/29/1984	Tstm Wind	0 kts.	0	0	0	0
Deer Plain	5/7/2002	Tstm Wind	53 kts.	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	7/8/2002	Thunderstorm wind	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	7/20/2002	Thunderstorm wind	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	7/26/2002	Thunderstorm wind	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	8/1/2002	Thunderstorm wind	N/A	0	0	0	0
Batchtown	12/18/2002	Tstm Wind	55 kts.	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	8/15/2003	Thunderstorm wind	N/A	0	0	0	0
Countywide	11/17/2003	Heavy Rain	N/A	0	0	0	0
CALHOUN	5/8/1988	Tstm Wind	0 kts.	0	0	0	0
Hardin	5/24/2004	Tstm Wind	55 kts.	0	0	0	0
Hardin	10/29/2004	Tstm Wind	60 kts.	0	0	0	0
Hardin	10/29/2004	Tstm Wind	60 kts.	0	0	0	0
Countywide	1/5/2005	Heavy Rain	N/A	0	0	0	0
CALHOUN	11/15/1988	Tstm Wind	0 kts.	0	1	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	7/20/2005	Thunderstorm wind	N/A	1	0	0	0
Batchtown	9/13/2005	Tstm Wind	55 kts.	0	0	0	0
Brussels	9/19/2005	Tstm Wind	55 kts.	0	0	0	0
CALHOUN	4/26/1989	Tstm Wind	0 kts.	0	0	0	0
Belleview	3/12/2006	Tstm Wind	52 kts.	0	0	0	0
Batchtown	4/2/2006	Tstm Wind	55 kts.	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	7/17/2006	Thunderstorm wind	N/A	0	0	0	0
Batchtown	7/21/2006	Tstm Wind	60 kts.	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	7/30/2006	Thunderstorm wind	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	8/1/2006	Lightning	N/A	1	0	0	0
Kampsville	8/18/2006	Tstm Wind	52 kts.	0	0	0	0
ALHOUN	4/27/1990	Tstm Wind	52 kts.	0	0	0	0
Batchtown	7/9/2007	Thunderstorm Wind	52 kts.	0	0	0	0
Batchtown	7/9/2007	Thunderstorm Wind	56 kts.	0	0	20,000	0
Hardin	8/12/2007	Thunderstorm Wind	52 kts.	0	0	0	0
Batchtown	9/25/2007	Thunderstorm Wind	52 kts.	0	0	0	0
CALHOUN	5/12/1990	Tstm Wind	0 kts.	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	5/11/2008	Strong Wind	43 kts.	0	0	0	2,000
Batchtown	3/8/2009	Thunderstorm Wind	52 kts.	0	0	0	0
CALHOUN	10/4/1991	Tstm Wind	52 kts.	0	0	0	0
CALHOUN	4/15/1992	Tstm Wind	0 kts.	0	0	0	0
CALHOUN	6/17/1992	Tstm Wind	0 kts.	0	0	0	0
CALHOUN	7/2/1992	Tstm Wind	0 kts.	0	0	0	0
CALHOUN	7/11/1992	Tstm Wind	0 kts.	0	0	0	0
CALHOUN	9/9/1992	Tstm Wind	0 kts.	0	0	0	0

Source: National Climatic Data Center
Accessed 2/12/10

Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage ($)	Crop Damage ($)
Batchtown	4/26/1994	Thunderstorm Winds	0 kts.	0	0	1,000	0
Brussels	4/26/1994	Thunderstorm Winds	0 kts.	0	0	1,000	0
ILZ049 - 058>060 - 064 - 065 - 069 - 074	4/18/1995	High Winds	0 kts.	0	0	400,000	0
Belleview	6/8/1995	Thunderstorm Winds	0 kts.	0	0	1,000	0
Hardin	6/8/1995	Thunderstorm Winds	0 kts.	0	0	0	0
CALHOUN	2/23/1977	Tstm Wind	0 kts.	0	0	0	0
Kampsville	5/25/1996	Tstm Wind	52 kts.	0	0	5,000	0
Beechville	7/19/1996	Tstm Wind	55 kts.	0	0	0	0
ALHOUN	3/12/1982	Tstm Wind	0 kts.	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	4/30/1997	High Wind	45 kts.	0	0	0	0
Hardin	3/27/1998	Tstm Wind	50 kts.	0	0	0	0
CALHOUN	6/7/1982	Tstm Wind	0 kts.	0	0	0	0
Hardin	10/29/1998	Tstm Wind	52 kts.	0	0	0	0
Brussels	11/10/1998	Tstm Wind	56 kts.	0	0	0	0
Hardin	11/10/1998	Tstm Wind	56 kts.	0	0	0	0
Kampsville	11/10/1998	Tstm Wind	56 kts.	0	0	0	0
Kampsville	6/4/1999	Tstm Wind	55 kts.	0	0	0	0
CALHOUN	4/27/1983	Tstm Wind	0 kts.	0	0	0	0
Batchtown	6/11/1999	Tstm Wind	52 kts.	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	7/18/1999	Thunderstorm winds	N/A	8	119	0	0
Brussels	4/20/2000	Tstm Wind	60 kts.	0	0	0	0
Kampsville	4/20/2000	Tstm Wind	60 kts.	0	0	0	0
Batchtown	6/23/2000	Tstm Wind	56 kts.	0	0	0	0
Kampsville	8/7/2000	Tstm Wind	55 kts.	0	0	0	0
Hardin	8/7/2000	Tstm Wind	55 kts.	0	0	0	0
Batchtown	8/7/2000	Tstm Wind	55 kts.	0	0	0	0
Hardin	8/23/2000	Tstm Wind	51 kts.	0	0	0	0
ILZ058>059 - 079 - 095>102	2/25/2001	High Wind	40 kts.	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	3/13/2001	High Wind	45 kts.	0	0	0	0
CALHOUN	4/29/1984	Tstm Wind	52 kts.	0	0	0	0
Hardin	6/19/2001	Tstm Wind	50 kts.	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	7/7/2001	Thunderstorm wind	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	7/17/2001	Thunderstorm wind	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	7/29/2001	Thunderstorm wind	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	8/1/2001	Thunderstorm wind	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	8/7/2001	Thunderstorm wind	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069 - 074 - 079 -	8/21/2001	Thunderstorm wind	N/A	0	0	0	0
Batchtown	8/30/2001	Tstm Wind	55 kts.	0	0	0	0
Hardin	8/30/2001	Tstm Wind	55 kts.	0	0	0	0
West-central And	1/3/1995	Cold	N/A	1	6	0	0
Southwest Illinois	1/6/1995	Glaze Ice	N/A	0	0	5,000	0
West Central And Sout	12/19/1995	Winter Storm	N/A	0	0	0	0
ILZ097>102	1/2/1996	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	1/8/1997	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	1/15/1997	Winter Storm	N/A	0	0	0	0

Source: National Climatic Data Center
Accessed 2/12/10

Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage ($)	Crop Damage ($)
ILZ058>060 - 064>065 - 095>102	4/10/1997	Winter Storm	N/A	0	0	0	0
ILZ058 - 095>099	1/8/1998	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	1/12/1998	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	12/21/1998	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 064>065 - 098>102	1/1/1999	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	1/13/1999	Ice Storm	N/A	0	0	0	0
ILZ058>059 - 079 - 098>102	1/28/2000	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	3/11/2000	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	12/13/2000	Heavy Snow	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	12/16/2000	Extreme Windchill	N/A	1	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	1/26/2001	Winter Storm	N/A	0	0	0	0
ILZ058>059 - 064 - 097>102	2/25/2002	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 098>100	3/25/2002	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 064>065 - 098>100	12/24/2002	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	2/23/2003	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 064>065 - 098>102	12/13/2003	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	1/25/2004	Winter Storm	N/A	0	0	0	0
ILZ058 - 098>099	11/24/2004	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 065 - 069>070 - 074 - 079 -	12/8/2005	Winter Storm	N/A	0	0	0	0
ILZ058>060 - 065 - 095>096 - 098	12/6/2007	Winter Weather	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	1/31/2008	Heavy Snow	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	2/1/2008	Heavy Snow	N/A	0	0	0	0
ILZ060 - 064 - 069>070 - 074 - 098	2/11/2008	Winter Weather	N/A	0	0	0	0
ILZ058>060 - 064>065 - 069>070 - 074 - 0	2/21/2008	Sleet	N/A	0	0	0	0

Source: National Climatic Data Center
Accessed 2/12/10

Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage ($)	Crop Damage ($)
CALHOUN	5/31/1958	Tornado	F0	0	0	0	0
CALHOUN	10/10/1969	Tornado	F2	0	4	25,000	0
Belleview	6/14/1998	Tornado	F1	0	0	0	0
Mozier	2/11/1999	Tornado	F2	0	0	300,000	0
Mozier	2/11/1999	Tornado	F1	0	0	100,000	0
Centerville	5/7/2002	Tornado	F0	0	0	0	0
Belleview	5/9/2003	Funnel Cloud	N/A	0	0	0	0
Kampsville	3/12/2006	Tornado	F0	0	0	0	0
Mozier	3/13/2006	Tornado	F0	0	0	0	0
TOTALS:				**17**	**362**	**15,919,000**	**12,412,000**

Source: National Climatic Data Center
Accessed 2/12/10

Appendix H

Mitigation Action Items

1.1 JURISDICTIONAL MITIGATION ACTIVITIES

Mitigation goals and actions for each community are summarized in the following tables. Actions identified by each community will be reviewed annually for purposes of tracking progress and or revising implementation approaches.

The following table lists mitigation actions for each jurisdiction. These actions would mitigate the associated hazard and support the corresponding goals of the community. Below are descriptions and definitions of each category within the following tables.

- **Item Number:** Most of the actions identified correspond to a specific area, thus this number corresponds to the numbers on each jurisdiction's map.
- **Hazard:** The primary hazard(s) addressed by each mitigation activity.
- **Type of Activity or Project:** This category is a description of the identified project.
- **Responsible Agency:** The lead implementer or contact is the person, department, or agency responsible for each action listed.
- **Implementation Timeline:** The proposed schedule or time frame for completion of each action or project.
- **Funding Source:** Potential funding source of the identified action item.
- **Priority:** The priority rankings for each activity.
- **Activity Categorization:** The type of goal which the project was designed to achieve. These activities are defined above in Section 4.3.1.
- **Benefit-Cost:** A qualitative description of the expected benefits and costs of implementation of the project. The benefits and costs were defined as described in Section 4.4.

Table H-1. Countywide Action Plan

ITEM NUMBER	HAZARD	TYPE OF ACTIVITY OR PROJECT	RESPONSIBLE AGENCY	IMPLEMENTATION TIMELINE	FUNDING SOURCE	PRIORITY	ACTIVITY CATEGORIZATION	BENEFIT/ COST
1	Tornado & Severe Storms	Educate citizens on how to prepare for and respond to severe weather.	ESDA	2 Years	Grant Program & Local Funds	D	PI	Low/Low
2	Severe Winter Storms	Educate citizens on how to prepare for winter weather through fairs, pamphlets ,etc.	ESDA	2 Years	Local Funds	D	PI	Low/Low
3	Earthquake	Develop a model earthquake response plan for schools, public buildings, and other critical facilities.	ESDA	5 Years	Grant Program & Local Funds	C	ES/PI	Low/Medium
4	All Hazards	Purchase and implement a countywide emergency notification information system to advise citizens of potential risks and available resources.	County Board, ESDA	1 Year	Grant Program	B	PI/ES	Medium/Low
5	Flooding	Purchase and remove repetitive loss properties.	ESDA	5 Years	Grant Programs & Local Funds	A	PP	High/High

Table H-2. Village of Batchtown Action Plan

ITEM NUMBER	HAZARD	TYPE OF ACTIVITY OR PROJECT	RESPONSIBLE AGENCY	IMPLEMENTATION TIMELINE	FUNDING SOURCE	PRIORITY	ACTIVITY CATEGORIZATION	BENEFIT/ COST
1	Tornado & Severe Storms	Educate citizens on how to prepare for and respond to severe weather.	ESDA	2 Years	Grant Program & Local Funds	D	PI	Low/Low

Table H-3. Village of Brussels Action Plan

ITEM NUMBER	HAZARD	TYPE OF ACTIVITY OR PROJECT	RESPONSIBLE AGENCY	IMPLEMENTATION TIMELINE	FUNDING SOURCE	PRIORITY	ACTIVITY CATEGORIZATION	BENEFIT/ COST
1	All Hazards	Purchase and install backup power generator for the high school.	School Board	2 Years	Grant Program	B	PP/PA	Medium/Low
2	All Hazards	Purchase and install backup power generator for the water treatment plant.	Village Board	2 Years	Grant Program	B	PP/PA	Medium/Low

Table H-4. Calhoun County (Unincorporated) Action Plan

ITEM NUMBER	HAZARD	TYPE OF ACTIVITY OR PROJECT	RESPONSIBLE AGENCY	IMPLEMENTATION TIMELINE	FUNDING SOURCE	PRIORITY	ACTIVITY CATEGORIZATION	BENEFIT/ COST
1	All Hazards	Prepare equipment and resources necessary to respond during the first 72 hours following a natural disaster (i.e. water, food, blankets)	County Health Dept.	5 years	Hazard Mitigation Grant	B	PA	Medium/Low
2	All Hazards	Assist residents to prepare equipment and resources necessary to respond during the first 72 hours following a natural disaster (i.e. water, food, blankets)	County Health Dept.	5 years	Hazard Mitigation Grant	B	PI	Medium/Low
3	All Hazards	Purchase community facilities for temporary housing, extreme heat and cold relief, and resource distribution. Prepare a community shelter.	County Board/ESDA	5 Years	Hazard Mitigation Grant	C	ES/PA	Medium/Medium
4	Winter Storms	Construct salt sheds at the north and south Highway Dept. facilities to stockpile road salt.	County Engineer	2 Years	Grant Program	C	SP	High/Low
5	Flooding	Improve ridgeline roads to increase usefulness and safety in the event of flooding. The ridgeline roads provide the only access to the County in the event of an extreme flood.	County Engineer	5 Years	Grant Program	B	SP	High/High
6	Flooding	Stockpile sands and sandbags at several locations around the County for easy access when needed.	County Engineer	1 Year	Grant Program	C	PA/ES	High/Low
7	Winter Storms & Flooding	Purchase loader for handling sand and clearing roads.	County Engineer	2 Years	Grant Program	C	PA	High/Low
8	All Hazards	Purchase and install backup power generators for the Court House.	County Board	3 Years	Grant Program	C	PP	Medium/Low
9	All Hazards	Develop an emergency operations center.	County Board and ESDA	2Years	ITTF Grant	A	SP/ES	High/Medium

Table H-5. Village of Hamburg Action Plan

ITEM NUMBER	HAZARD	TYPE OF ACTIVITY OR PROJECT	RESPONSIBLE AGENCY	IMPLEMENTATION TIMELINE	FUNDING SOURCE	PRIORITY	ACTIVITY CATEGORIZATION	BENEFIT/ COST
1	Flooding	Purchase houses on the west side of Washington Street and on Water Street and remove the buildings.	ESDA and Village Board	2 Years	HMGP and General Funds	A	PP	High/Medium
2	Flooding	Raise the intersection of Pleasant and State Streets to minimize flooding.	ESDA and Village Board	5 Years	HMGP and General Funds	B	SP	Medium/Medium
3	Flooding	Raise Mississippi River Road at the low spot north of Hamburg, as indicated on the critical facilities map.	ESDA and County Highway Dept.	10 Years	HMGP and General Funds	B	SP	Medium/Medium

Table H-6. City of Hardin Action Plan

ITEM NUMBER	HAZARD	TYPE OF ACTIVITY OR PROJECT	RESPONSIBLE AGENCY	IMPLEMENTATION TIMELINE	FUNDING SOURCE	PRIORITY	ACTIVITY CATEGORIZATION	BENEFIT/ COST
1	All Hazards	Purchase and install backup power generators for St. Norberts School as an emergency shelter, the Medical Center and Nursing Home, and the gas station.	City Mayor, ESDA, Medical Board	2 Years	Grant Programs	B	PP	Medium/Low
2	Flooding	Raise Illinois River Road on the north and south sides of Hardin, as indicated on the critical facilities map.	City Mayor and ESDA	5 Years	Grant Programs and General Funds	B	SP	High/High
3	Flooding	Move the fire station away from the Illinois River to minimize exposure to flooding.	City Mayor	1 Year	Grant Programs and General Funds	A	PP	Medium/Medium
4	Flooding	Raise or purchase and remove the Illini Medical Associates office on Water Street and the City Police and Maintenance Buildings.	City Mayor	1 Year	Grant Programs	A	PP	Medium/Medium
5	Flooding	Rebuild the water treatment plant.	City Mayor	1 Year	Grant Program and General Funds	B	PP/SP	High/High
6	All Hazards	Improve Rocky Hill Road to enhance access to Hardin during flood events.	City Mayor	2 Years	Grant Programs and General Funds	B	SP	High/High
7	Earthquake	Rebuild the water tower to update to modern earthquake codes.	City Mayor	1 Year	Grant Program	B	SP/PP	High/High

Table H-7. Village of Kampsville Action Plan

ITEM NUMBER	HAZARD	TYPE OF ACTIVITY OR PROJECT	RESPONSIBLE AGENCY	IMPLEMENTATION TIMELINE	FUNDING SOURCE	PRIORITY	ACTIVITY CATEGORIZATION	BENEFIT/ COST
1	Flooding	Relocate the fire station and ambulance building away from the flood-prone area.	Mayor	6 Years	Grant Programs	A	PP	Medium/Medium

Appendix I

Illinois Emergency Management Agency Worksheet 3a

Illinois Emergency Management Agency Worksheet 3a – Community building type and value assessments.

All building types and value information is based on data derived from FEMA's HAZUS-MH program. This data is derived from national averages, thus the property values may not accurately reflect local data. Local property value data is not readily accessible for large scale planning efforts as it is currently not digitized.

Worksheet 3a. Calhoun County

ALL HAZARDS

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	$ in Community (thousands)	$ in Hazard Area (thousands)	% in Hazard Area	# in Community	# in Hazard Area	% in Hazard Area
Residential	2,149	2,149	100	195,176.33	195,176.33	100	3,338	3,338	100
Commercial	24	24	100	17,580.74	17,580.74	100	NA	NA	
Industrial	9	9	100	2,634.48	2,634.48	100	NA	NA	
Religious	2	2	100	1,206.95	1,206.95	100	NA	NA	
Education	3	3	100	922.48	922.48	100	NA	NA	
Government	3	3	100	701.43	701.43	100	NA	NA	
Utilities							NA	NA	
Agricultural	13	13	100	8,051.46	8,051.46	100	NA	NA	
TOTAL:	**2,203**	**2,203**	**100**	**226,273.87**	**226,273.87**	**100**	**3,338**	**3,338**	**100**

FLOOD ONLY

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	$ in Community	$ in Hazard Area	% in Hazard Area	# in Community	# in Hazard Area	% in Hazard Area
Residential	2,149	296	13.8	195,176.33	28,738.84	14.7	5,084	266	8.0
Commercial	24	12	50	17,580.74	7,778.05	44.2	NA	NA	
Industrial	9	1	11.1	2,634.48	580.02	22.0	NA	NA	
Religious	2	1	50	1,206.95	426.83	35.4	NA	NA	
Education	3	0	0	922.48	0	0	NA	NA	
Government	3	0	0	701.43	0	0	NA	NA	
Utilities							NA	NA	
Agricultural	13	1	7.7	8,051.46	1,146.95	14.2	NA	NA	
TOTAL:	**2,203**	**311**	**14.1**	**226,273.87**	**38,670.09**	**17.1**	**3,338**	**266**	**8.0**

1.	Do you know where your greatest damages may occur in your hazard areas?	YES
2.	Do you know whether your critical facilities will be operational after a hazard event?	NO
3.	Is there enough data to determine which assets are subject to the greatest potential damages?	NO
4.	Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	YES
5.	Is there enough data to determine whether certain areas of historic, environmental, political or cultural significance are vulnerable to potential hazards?	YES
6.	Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	YES
7.	Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?	YES

Worksheet 3a. Village of Batchtown

ALL HAZARDS

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	$ in Community	$ in Hazard Area	% in Hazard Area	# in Community	# in Hazard Area	% in Hazard Area
Residential	121	121	100	12,050.00	12,050.00	100	218	218	100
Commercial	3	3	100	1,093.92	1,093.92	100	NA	NA	
Industrial	1	1	100	182.28	182.28	100	NA	NA	
Religious	0	0	-	0	0	-	NA	NA	
Education	0	0	-	0	0	-	NA	NA	
Government	2	2	100	1,.206.49	1,.206.49	100	NA	NA	
Utilities							NA	NA	
Agricultural	0	0	-	0	0	-	NA	NA	
TOTAL:	**127**	**127**	**100**	**14,532.68**	**14,532.68**	**100**	**218**	**218**	**100**

FLOOD ONLY

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	$ in Community	$ in Hazard Area	% in Hazard Area	# in Community	# in Hazard Area	% in Hazard Area
Residential	121	0	0	12,050.00	0	0	218	0	0
Commercial	3	0	0	1,093.92	0	0	NA	NA	
Industrial	1	0	0	182.28	0	0	NA	NA	
Religious	0	0	-	0	0	-	NA	NA	
Education	0	0	-	0	0	-	NA	NA	
Government	2	0	0	1,.206.49	0	0	NA	NA	
Utilities							NA	NA	
Agricultural	0	0	-	0	0	-	NA	NA	
TOTAL:	**127**	**0**	**0**	**14,532.68**	**0**	**0**	**218**	**0**	**0**

1.	Do you know where your greatest damages may occur in your hazard areas?	YES
2.	Do you know whether your critical facilities will be operational after a hazard event?	NO
3.	Is there enough data to determine which assets are subject to the greatest potential damages?	NO
4.	Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	YES
5.	Is there enough data to determine whether certain areas of historic, environmental, political or cultural significance are vulnerable to potential hazards?	YES
6.	Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	YES
7.	Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?	YES

Worksheet 3a. Village of Brussels

ALL HAZARDS

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	$ in Community	$ in Hazard Area	% in Hazard Area	# in Community	# in Hazard Area	% in Hazard Area
Residential	78	78	100	7,733.00	7,733.00	100	141	141	100
Commercial	4	4	100	1,863.93	1,863.93	100	NA	NA	
Industrial	0	0	-	0	0	-	NA	NA	
Religious	1	1	100	942.27	942.27	100	NA	NA	
Education	1	1	100	588.08	588.08	100	NA	NA	
Government	1	1	100	83.18	83.18	100	NA	NA	
Utilities							NA	NA	
Agricultural	1	1	100	98.74	98.74	100	NA	NA	
TOTAL:	**86**	**86**	**100**	**11,309.19**	**11,309.19**	**100**	**141**	**141**	**100**

FLOOD ONLY

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	$ in Community	$ in Hazard Area	% in Hazard Area	# in Community	# in Hazard Area	% in Hazard Area
Residential	78	8	10.3	7,733.00	785.74	10.2	141	15	10.6
Commercial	4	0	0	1,863.93	0	0	NA	NA	
Industrial	0	0	-	0	0	-	NA	NA	
Religious	1	0	0	942.27	0	0	NA	NA	
Education	1	0	0	588.08	0	0	NA	NA	
Government	1	0	0	83.18	0	0	NA	NA	
Utilities							NA	NA	
Agricultural	1	0	0	98.74	0	0	NA	NA	
TOTAL:	**86**	**8**	**10.3**	**11,309.19**	**785.74**	**10.2**	**141**	**15**	**10.6**

1.	Do you know where your greatest damages may occur in your hazard areas?	YES
2.	Do you know whether your critical facilities will be operational after a hazard event?	NO
3.	Is there enough data to determine which assets are subject to the greatest potential damages?	NO
4.	Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	YES
5.	Is there enough data to determine whether certain areas of historic, environmental, political or cultural significance are vulnerable to potential hazards?	YES
6.	Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	YES
7.	Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?	YES

Worksheet 3a. Village of Hamburg

ALL HAZARDS

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	$ in Community	$ in Hazard Area	% in Hazard Area	# in Community	# in Hazard Area	% in Hazard Area
Residential	128	128	100	9,770.43	9,770.43	100	126	126	100
Commercial	3	3	100	2,457.65	2,457.65	100	NA	NA	
Industrial	0	0	-	0	0	-	NA	NA	
Religious	0	0	-	0	0	-	NA	NA	
Education	0	0	-	0	0	-	NA	NA	
Government	2	2	100	1,922.06	1,922.06	100	NA	NA	
Utilities							NA	NA	
Agricultural	0	0	-	0	0	-	NA	NA	
TOTAL:	**133**	**133**	**100**	**14,150.13**	**14,150.13**	**100**	**126**	**126**	**100**

FLOOD ONLY

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	$ in Community	$ in Hazard Area	% in Hazard Area	# in Community	# in Hazard Area	% in Hazard Area
Residential	128	54	42.2	9,770.43	4,115.05	42.1	126	45	35.7
Commercial	3	0	0	2,457.65	0	0	NA	NA	
Industrial	0	0	-	0	0	-	NA	NA	
Religious	0	0	-	0	0	-	NA	NA	
Education	0	0	-	0	0	-	NA	NA	
Government	2	2	100	1,922.06	1,922.06	100	NA	NA	
Utilities							NA	NA	
Agricultural	0	0	-	0	0	-	NA	NA	
TOTAL:	**133**	**56**	**42.1**	**14,150.13**	**6037.11**	**42.7**	**126**	**45**	**35.7**

1.	Do you know where your greatest damages may occur in your hazard areas?	YES
2.	Do you know whether your critical facilities will be operational after a hazard event?	NO
3.	Is there enough data to determine which assets are subject to the greatest potential damages?	NO
4.	Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	YES
5.	Is there enough data to determine whether certain areas of historic, environmental, political or cultural significance are vulnerable to potential hazards?	YES
6.	Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	YES
7.	Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?	YES

Worksheet 3a. Village of Hardin

ALL HAZARDS

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	$ in Community	$ in Hazard Area	% in Hazard Area	# in Community	# in Hazard Area	% in Hazard Area
Residential	500	500	100	56,742.34	56,742.34	100	959	959	100
Commercial	31	31	100	18,662.24	18,662.24	100	NA	NA	
Industrial	8	8	100	3,266.87	3,266.87	100	NA	NA	
Religious	3	3	100	1,053.13	1,053.13	100	NA	NA	
Education	2	2	100	13,364.43	13,364.43	100	NA	NA	
Government	5	5	100	2,294.52	2,294.52	100	NA	NA	
Utilities							NA	NA	
Agricultural	2	2	100	1,486.99	1,486.99	100	NA	NA	
TOTAL:	**551**	**551**	**100**	**96,870.50**	**96,870.50**	**100**	**959**	**959**	**100**

FLOOD ONLY

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	$ in Community	$ in Hazard Area	% in Hazard Area	# in Community	# in Hazard Area	% in Hazard Area
Residential	500	59	11.8	56,742.34	6,223.44	11.0	959	94	9.8
Commercial	31	3	9.7	18,662.24	1,951.12	10.5	NA	NA	
Industrial	8	0	0	3,266.87	0	0	NA	NA	
Religious	3	0	0	1,053.13	0	0	NA	NA	
Education	2	0	0	13,364.43	0	0	NA	NA	
Government	5	0	0	2,294.52	0	0	NA	NA	
Utilities							NA	NA	
Agricultural	2	0	0	1,486.99	0	0	NA	NA	
TOTAL:	**551**	**62**	**11.3**	**96,870.50**	**8,174.56**	**8.4**	**959**	**94**	**9.8**

1.	Do you know where your greatest damages may occur in your hazard areas?	YES
2.	Do you know whether your critical facilities will be operational after a hazard event?	NO
3.	Is there enough data to determine which assets are subject to the greatest potential damages?	NO
4.	Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	YES
5.	Is there enough data to determine whether certain areas of historic, environmental, political or cultural significance are vulnerable to potential hazards?	YES
6.	Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	YES
7.	Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?	YES

Worksheet 3a. Village of Kampsville

ALL HAZARDS

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	$ in Community	$ in Hazard Area	% in Hazard Area	# in Community	# in Hazard Area	% in Hazard Area
Residential	185	185	100	14,627.36	14,627.36	100	302	302	100
Commercial	3	3	100	1,717.49	1,717.49	100	NA	NA	
Industrial	0	0	-	0	0	-	NA	NA	
Religious	1	1	100	457.28	457.28	100	NA	NA	
Education	1	1	100	962.21	962.21	100	NA	NA	
Government	1	1	100	300.38	300.38	100	NA	NA	
Utilities							NA	NA	
Agricultural	0	0	-	0	0	-	NA	NA	
TOTAL:	**191**	**191**	**100**	**18,064.72**	**18,064.72**	**100**	**302**	**302**	**100**

FLOOD ONLY

Type of Structure (Occupancy Class)	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	$ in Community	$ in Hazard Area	% in Hazard Area	# in Community	# in Hazard Area	% in Hazard Area
Residential	185	44	23.8	14,627.36	3,522.46	24.1	302	53	17.5
Commercial	3	3	100	1,717.49	1,717.49	100	NA	NA	
Industrial	0	0	-	0	0	-	NA	NA	
Religious	1	0	0	457.28	0	0	NA	NA	
Education	1	1	100	962.21	962.21	100	NA	NA	
Government	1	1	100	300.38	300.38	100	NA	NA	
Utilities							NA	NA	
Agricultural	0	0	-	0	0	-	NA	NA	
TOTAL:	**191**	**49**	**25.7**	**18,064.72**	**6,502.54**	**36.0**	**302**	**53**	**17.5**

1.	Do you know where your greatest damages may occur in your hazard areas?	YES
2.	Do you know whether your critical facilities will be operational after a hazard event?	NO
3.	Is there enough data to determine which assets are subject to the greatest potential damages?	NO
4.	Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?	YES
5.	Is there enough data to determine whether certain areas of historic, environmental, political or cultural significance are vulnerable to potential hazards?	YES
6.	Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?	YES
7.	Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?	YES

Appendix J

Countywide Multi-Hazard Plan Crosswalk

LOCAL MITIGATION PLAN REVIEW SUMMARY

The plan cannot be approved if the plan has not been formally adopted. Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a **"Needs Improvement"** score.

Prerequisite(s) (Check Applicable Box)	**NOT MET**	**MET**
1. Adoption by the Local Governing Body: §201.6(c)(5) OR		
2. Multi-Jurisdictional Plan Adoption: §201.6(c)(5) **AND**		
3. Multi-Jurisdictional Planning Participation: §201.6(a)(3)		

Planning Process	**N**	**S**
4. Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)		

Risk Assessment	**N**	**S**
5. Identifying Hazards: §201.6(c)(2)(i)		
6. Profiling Hazards: §201.6(c)(2)(i)		
7. Assessing Vulnerability: Overview: §201.6(c)(2)(ii)		
8. Assessing Vulnerability: Addressing Repetitive Loss Properties. §201.6(c)(2)(ii)		
9. Assessing Vulnerability: Identifying Structures, Infrastructure, and Critical Facilities: §201.6(c)(2)(ii)(B)		
10. Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)		
11. Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)		
12. Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)		

*States that have additional requirements can add them in the appropriate sections of the *Local Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.

SCORING SYSTEM

Please check one of the following for each requirement.

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Mitigation Strategy	**N**	**S**
13. Local Hazard Mitigation Goals: §201.6(c)(3)(i)		
14. Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)		
15. Identification and Analysis of Mitigation Actions: NFIP Compliance. §201.6(c)(3)(ii)		
16. Implementation of Mitigation Actions: §201.6(c)(3)(iii)		
17. Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)		

Plan Maintenance Process	**N**	**S**
18. Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(ii)		
19. Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)		
20. Continued Public Involvement: §201.6(c)(4)(iii)		

Additional State Requirements*	**N**	**S**
Insert State Requirement		
Insert State Requirement		
Insert State Requirement		

LOCAL MITIGATION PLAN APPROVAL STATUS

PLAN NOT APPROVED	
See Reviewer's Comments	
PLAN APPROVED	

LOCAL MITIGATION PLAN REVIEW CROSSWALK: Calhoun County Multi-Hazard Mitigation Plan

Local Mitigation Plan Review and Approval Status

Jurisdiction: Calhoun County, Illinois	**Title of Plan:** Calhoun County Multi-Hazard Mitigation Plan	**Date of Plan:** **April 25, 2011**
Local Point of Contact: Gene Breden	**Address:** Calhoun County Emergency Services Disaster Agency P.O. Box 187 Hardin, Illinois 62047	
Title: Director		
Agency: Calhoun County Emergency Services Disaster Agency		
Phone Number: 618-576-2351	**E-Mail:** gbreden@frontiernet.net	

State Reviewer:	**Title:**	**Date:**

FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region V		
Plan Not Approved		
Plan Approved		
Date Approved		

Jurisdiction:	**DFIRM**		**NFIP Status***			
	In Plan	**NOT in Plan**	**Y**	**N**	**N/A**	**CRS Class**
1. Calhoun County		X	X			
2. Batchtown, Village of		X		X		
3. Brussels, Village of		X	X			
4. Hamburg, Village of		X	X			
5. Hardin, Village of		X	X			
6. Kampsville, Village of		X	X			

PREREQUISITE(S)

1. Adoption by the Local Governing Body

***Requirement §201.6(c)(5)*:** *[The local hazard mitigation plan **shall** include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Has the local governing body adopted the **new or updated** plan?	Section 1.3; Appendix A			
B. Is supporting documentation, such as a resolution, included?	Appendix A			
		SUMMARY SCORE		

2. 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.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new or updated** plan indicate the specific jurisdictions represented in the plan?	Section 1.3			
B. For each jurisdiction, has the local governing body adopted the **new or updated** plan?	Section 1.3, Table 2			
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?	Appendix A			
		SUMMARY SCORE		

3. 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.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new or updated** plan describe **how** each jurisdiction participated in the plan's development?	Section 1.4			
B. Does the **updated** plan identify all participating jurisdictions, including new, continuing, and the jurisdictions that no longer participate in the plan?	N/A – First Plan			
		SUMMARY SCORE		

PLANNING PROCESS: *§201.6(b): An open public involvement process is essential to the development of an effective plan.*

4. 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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan provide a narrative description of the process followed to prepare the **new or updated** plan?	Section 2			
B. Does the **new or updated** plan indicate who was involved in the **current** planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, *etc*.?)	Section 2.2			
C. Does the **new or updated** plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)	Section 2.3			
D. Does the **new or updated** plan discuss the opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?	Section 2.3			
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?	Section 2.4			
F. Does the **updated** plan document how the planning team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process?	N/A – First Plan			
		SUMMARY SCORE		

RISK ASSESSMENT: *§201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.*

5. 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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan include **a description** of the types of **all natural hazards** that affect the jurisdiction?	Section 3			
		SUMMARY SCORE		

6. 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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the risk assessment identify the **location** (*i.e.*, geographic area affected) of each natural hazard addressed in the **new or updated** plan?	Section 3.2			
B. Does the risk assessment identify the **extent** (*i.e.*, magnitude or severity) of each hazard addressed in the **new or updated** plan?	Sections 3.2.1.2; 3.2.2.3; 3.2.3.2; 3.2.4.4; 3.2.5.2; 3.2.6.2; 3.2.7.3			
C. Does the plan provide information on **previous occurrences** of each hazard addressed in the **new or updated** plan?	Section 3.2.1.3; 3.2.2.5; 3.2.3.3; 3.2.4.6; 3.2.5.4; 3.2.6.3; 3.2.7.4			
D. Does the plan include the **probability of future events** (*i.e.*, chance of occurrence) for each hazard addressed in the **new or updated** plan?	Section 3.2.1.4; 3.2.3.6; 3.2.3.4; 3.2.4.7; 3.2.5.5; 3.2.6.4; 3.2.7.5			
		SUMMARY SCORE		

7. 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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?	Section 3.3			
B. Does the **new or updated** plan address the **impact** of each hazard on the jurisdiction?	Sections 3.2.1.2; 3.2.2.3; 3.2.3.2; 3.2.4.4; 3.2.5.2; 3.2.6.2; 3.2.7.3			
		SUMMARY SCORE		

8. 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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe vulnerability in terms of the types and numbers of *repetitive loss properties* located in the identified hazard areas?	Section 3.5.3			
		SUMMARY SCORE		

9. 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 … .*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe vulnerability in terms of the **types and numbers** of **existing** buildings, infrastructure, and critical facilities located in the identified hazard areas?	Section 3.3.3	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
B. Does the **new or updated** plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?	Section 3.3.4.2	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

10. 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 … .*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan estimate **potential dollar losses** to vulnerable structures?	Section 3.3.3	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
B. Does the **new or updated** plan describe the **methodology** used to prepare the estimate?	Section 3.3.3	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

11. 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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe land uses and development trends?	Section 1.0	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

12. Multi-Jurisdictional Risk Assessment

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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?	Section 3.3.2			
		SUMMARY SCORE		

MITIGATION STRATEGY: *§201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.*

13. 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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the **new or updated** plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards?	Section 4.2			
		SUMMARY SCORE		

14. 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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard?	Section 3.8.3 & Appendix F			
B Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?	Section 4.3 & Appendix H			
C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?	Section 4.3 & Appendix H			
		SUMMARY SCORE		

15. 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.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or **updated** plan describe the jurisdiction (s) participation in the NFIP?	Section 2.4			
B. Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?	Section 4.4			
		SUMMARY SCORE		

16. 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.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** mitigation strategy include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?)	Section 4.4.1			
B. Does the **new or updated** mitigation strategy address how the actions will be implemented and administered, including the responsible department , existing and potential resources and the timeframe to complete each action?	Section 4.4 & Appendix H			
C. Does the **new or updated** prioritization process include an emphasis on the use of a **cost-benefit review** to maximize benefits?	Section 4.4.2			
D. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?	N/A – First Plan			
		SUMMARY SCORE		

17. 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.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the **new or updated** plan include identifiable **action items** for each jurisdiction requesting FEMA approval of the plan?	Appendix F			
B. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?	N/A – First Plan			
		SUMMARY SCORE		

PLAN MAINTENANCE PROCESS

18. 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.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe the method and schedule for **monitoring** the plan, including the responsible department?	Section 5.1.1			
B. Does the **new or updated** plan describe the method and schedule for **evaluating** the plan, including how, when and by whom (*i.e.* the responsible department)?	Section 5.1.2			
C. Does the **new or updated** plan describe the method and schedule for **updating** the plan within the five-year cycle?	Section 5.1.3			
		SUMMARY SCORE		

19. 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.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan identify other local planning mechanisms available for incorporating the mitigation requirements of the mitigation plan?	Section 5.2			
B. Does the **new or updated** plan include a process by which the local government will incorporate the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?	Section 5.2			
C. Does the **updated** plan explain how the local government incorporated the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?	N/A – First Plan			
		SUMMARY SCORE		

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.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)	Section 5.3			
		SUMMARY SCORE		

MATRIX A: PROFILING HAZARDS

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that their plan addresses each natural hazard that can affect the jurisdiction. **Completing the matrix is not required**.

Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each** applicable **hazard. An "N" for any element of any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Location		B. Extent		C. Previous Occurrences		D. Probability of Future Events	
	Yes	N	S	N	S	N	S	N	S
Avalanche	☐	☐	☐	☐	☐	☐	☐	☐	☐
Coastal Erosion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Coastal Storm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Dam Failure	☐	☐	☐	☐	☐	☐	☐	☐	☐
Drought	☐	☐	☐	☐	☐	☐	☐	☐	☐
Earthquake	☐	☐	☐	☐	☐	☐	☐	☐	☐
Expansive Soils	☐	☐	☐	☐	☐	☐	☐	☐	☐
Levee Failure	☐	☐	☐	☐	☐	☐	☐	☐	☐
Flood	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hailstorm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hurricane	☐	☐	☐	☐	☐	☐	☐	☐	☐
Land Subsidence	☐	☐	☐	☐	☐	☐	☐	☐	☐
Landslide	☐	☐	☐	☐	☐	☐	☐	☐	☐
Severe Winter Storm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tornado	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tsunami	☐	☐	☐	☐	☐	☐	☐	☐	☐
Volcano	☐	☐	☐	☐	☐	☐	☐	☐	☐
Wildfire	☐	☐	☐	☐	☐	☐	☐	☐	☐
Windstorm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐	☐	☐

To check boxes, double click on the box and change the default value to "checked."

Legend:

§201.6(c)(2)(i) Profiling Hazards
A. Does the risk assessment identify the location (*i.e.*, geographic area affected) of each hazard addressed in the **new or updated** plan?
B. Does the risk assessment identify the extent (*i.e.*, magnitude or severity) of each hazard addressed in the **new or updated** plan?
C. Does the plan provide information on previous occurrences of each natural hazard addressed in the **new or updated** plan?
D. Does the plan include the probability of future events (*i.e.*, chance of occurrence) for each hazard addressed in the plan?

MATRIX B: ASSESSING VULNERABILITY

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that the new or updated plan addresses each requirement. **Completing the matrix is not required**.

Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each ***applicable*** *hazard. An "N" for any element of any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk. Note: Receiving an N in the shaded columns will not preclude the plan from passing.*

To check boxes, double click on the box and change the default value to "checked."

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	§201.6(c)(2)(ii) Assessing Vulnerability: Overview					§201.6(c)(2)(ii) Assessing Vulnerability: Identifying Structures				§201.6(c)(2)(ii) Assessing Vulnerability: Estimating Potential Losses				
		A. Overall Summary Description of Vulnerability		B. Hazard Impact			A. Types and Number of Existing Structures in Hazard Area (Estimate)		B. Types and Number of Future Structures in Hazard Area (Estimate)		A. Loss Estimate		B. Methodology		
	Yes	N	S	N	S		N	S	N	S	N	S	N	S	
Avalanche	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Coastal Erosion	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Coastal Storm	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Dam Failure	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Drought	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Earthquake	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Expansive Soils	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Levee Failure	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Flood	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Hailstorm	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Hurricane	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Land Subsidence	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Landslide	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Severe Winter Storm	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Tornado	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Tsunami	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Volcano	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Wildfire	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Windstorm	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Other _____	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Other _____	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	
Other _____	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	

Legend:

§201.6(c)(2)(ii) Assessing Vulnerability: Overview

A. Does the **new or updated** plan include an overall summary description of the jurisdiction's vulnerability to each hazard?

B. Does the **new or updated** plan address the impact of each hazard on the jurisdiction?

§201.6(c)(2)(ii)(A) Assessing Vulnerability: Identifying Structures

A. Does the **new or updated** plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?

B. Does the **new or updated** plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

§201.6(c)(2)(ii)(B) Assessing Vulnerability: Estimating Potential Losses

A. Does the **new or updated** plan estimate potential dollar losses to vulnerable structures?

B. Does the **new or updated** plan describe the methodology used to prepare the estimate?

MATRIX C: IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIONS

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure consideration of a range of actions for each hazard. **Completing the matrix is not required.**

Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each ***applicable*** *hazard. An "N" for any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Comprehensive Range of Actions and Projects	
	Yes	N	S
Avalanche	☐	☐	☐
Coastal Erosion	☐	☐	☐
Coastal Storm	☐	☐	☐
Dam Failure	☐	☐	☐
Drought	☐	☐	☐
Earthquake	☐	☐	☐
Expansive Soils	☐	☐	☐
Levee Failure	☐	☐	☐
Flood	☐	☐	☐
Hailstorm	☐	☐	☐
Hurricane	☐	☐	☐
Land Subsidence	☐	☐	☐
Landslide	☐	☐	☐
Severe Winter Storm	☐	☐	☐
Tornado	☐	☐	☐
Tsunami	☐	☐	☐
Volcano	☐	☐	☐
Wildfire	☐	☐	☐
Windstorm	☐	☐	☐
Other _____	☐	☐	☐
Other _____	☐	☐	☐
Other _____	☐	☐	☐

To check boxes, double click on the box and change the default value to "checked."

Legend:
§201.6(c)(3)(ii) Identification and Analysis of Mitigation Actions
A. Does the **new or updated** plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?