

2019

Hazard Mitigation Plan

Champaign County Emergency Management Agency

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EXECUTIVE SUMMARY

The 2019 Champaign County Hazard Mitigation Plan was developed using a whole community approach to assessing hazards, risks, and vulnerabilities; developing mitigation goals and strategies; and planning for implementation of mitigation efforts. Through a series of countywide and jurisdiction work sessions, communities and officials across the county assessed their current risks and identified sustainable solutions to reduce vulnerabilities. Throughout the process, they considered various regional, county, and local plans and documents that guide community and economic development.

The planning process aligns with the mitigation planning guidance established by the Federal Emergency Management Agency in March 2013 and involved stakeholders from across Champaign County. This broad participation was achieved by seeking input and participation from jurisdictions, county officials, community agencies, residents, and other partners and is evidenced by documentation of meetings and work sessions included in the plan.

The hazard mitigation plan provides a comprehensive review of communities and mitigation needs. It is one opportunity for Champaign County and its jurisdictions to increase their resilience to catastrophic incidents. The mitigation strategies are intended to help community leaders implement projects and develop policies that make the county more resistant to damage from disasters and facilitate rapid recovery when disasters do occur. The plan is also a tool for community development so that growth across the county can be implemented in ways that do not increase the county's vulnerability to hazards.

1.0 THE PLANNING PROCESS

To develop a multi-jurisdictional mitigation plan that reflects Champaign County's unique hazards, risks, and vulnerabilities, the Champaign County EMA engaged in a comprehensive, whole community planning process. This process included direct participation from stakeholders and community members representing municipalities, townships, county government, and community organizations. Neighboring jurisdictions, special interest organizations, and residents were invited to participate. This section describes the process utilized to develop the hazard mitigation plan and explains how stakeholders and the community were included throughout the process.

1.1 PLAN DEVELOPMENT

Because of the stakeholder feedback necessary to develop a comprehensive hazard mitigation plan, the EMA anticipated that the planning process would take six to twelve months. This timeframe was necessary to research the county's hazards and risks, meet with jurisdiction representatives and stakeholders, develop mitigation strategies and actions, and write the revised plan. Upon completion of the plan, the state and federal review process was anticipated to take three to four additional months. This section outlines each phase of the plan development process. Because the federal standards for mitigation plans have changed significantly since the county's last plan was adopted, the EMA decided a replacement plan was necessary rather than revising the county's previously approved plan.

1.1.1 Pre-Update Planning Process

Champaign County's most recent mitigation plan was given final FEMA approval on June 12, 2006. The plan was granted approval pending adoption on April 11, 2005, but adoptions by jurisdictions did not reach FEMA until much later. On April 11, 2006, FEMA contacted the Champaign County EMA to request adoptions by local jurisdictions be submitted by June 1, 2006. It was discovered that the following adoptions had been completed: Champaign County (09-13-2005), Village of St. Paris (10-17-2005), City of Urbana (10-25-2005), Village of Woodstock (12-19-2005), Village of Christiansburg (12-20-2005), Village of Mechanicsburg (no date specified), and the Village of North Lewisburg (01-03-2006). The Village of Mutual adopted the plan on May 31, 2006, completing adoption by all municipalities and the county. Those adoptions were forwarded to FEMA and final plan approval was issued effective June 12, 2006.

In June 2011, the EMA staff began to update the 2006 plan. They gathered input regarding hazards, incidents, vulnerabilities, and mitigation goals from the six municipalities, county officials, and one township over the course of six months. These internal planning efforts continued into 2012. On April 29, 2013 Champaign County received an unfavorable review from the State of Ohio Mitigation Branch. Some information was submitted in an attempt to answer questions from FEMA's planning evaluation crosswalk, but eventually the effort to update the plan was disbanded. The federal requirements for mitigation plans changed significantly in April

2013 and those changes proved too much to accomplish given staffing limitations and newly required mitigation planning expertise.

In 2017, Champaign County's new EMA director applied for funding to hire a consultant to update the plan. The grant was approved and in October 2018, Resource Solutions Associates LLC was hired to lead the mitigation planning process.

The Consultant and Champaign County entered into a contractual agreement and began planning the project. On December 10, 2018, they met to establish timelines, review planning requirements, identify local documents to be used in the plan development, and develop the schedule for primary activities. They began work to establish the Mitigation Planning Team that would include county appointed and elected officials, municipal and township officials and employees, community response and planning partners, businesses and industries, public and post-secondary education, agricultural representatives, and private citizens. They included economic development, natural resources conservation and advocacy, social organizations, and community volunteers. EMA directors and any key officials from adjacent counties were also identified.

The EMA and Consultant worked together to find all relevant local documentation, including past and present mitigation documents, other county plans like the Logan-Union-Champaign Economic Development plan, the Champaign County Community Health Assessment, Community Health Improvement Plan and Emergency Response Plan; soil surveys and watershed Discovery Reports; various GIS maps showing waterways, land use designations, utilities and infrastructure; flood maps and other risk identifiers; as well as hazard incident statistics and demographic data from the county.

A Mitigation Planning Team list was developed by the Consultant, including names, positions, contact information and alternate contacts. While this list would expand over the duration of the project, the initial list included individuals in all of the above-mentioned organizations and agencies to ensure that the whole community was represented in mitigation planning activities.

1.1.2 Planning Team Meetings

Project Kick Off and Hazard Identification

The initial countywide planning meeting was held at the Champaign County EMA on February 5, 2019. At this meeting, representatives of all jurisdictions, many local government employees and elected officials, and other community stakeholders and representatives heard about the project timeline, goals, and requirements. Attendees had the opportunity to ask questions, provide input, make requests for later meetings, and share their concerns in a countywide setting. Stakeholders were asked to complete worksheets that identified hazards and consequences affecting their jurisdiction. This process included a discussion of the hazards that impact each community, the type and severity of damages, and overall vulnerability. Stakeholders completed worksheets that characterized storms and other incidents by frequency, severity/magnitude, damages, and protective actions taken. They also provided feedback on the consequences of each hazard. This work followed discussion about the hazard

consequences, and the Consultant and EMA staff were available for questions throughout the session. While participants completed worksheets in jurisdictional groups, the discussions were county-wide, involving all present, and the effects of hazards countywide was considered and discussed.

On February 27, 2019 the EMA staff and the Consultant attended the Champaign County Township Trustee and Municipal Official's winter quarterly meeting to again discuss the project and collect information. Because this group included different individuals than the kick-off meeting, additional questions were asked about hazards, vulnerabilities, and damages. This meeting reached many county officials who did not attend the kick-off, most of the county's township trustees, and several township fiscal officers.

Risk and Vulnerability Assessment Work Sessions

The risk and vulnerability assessment phase focused on research and information gathering. Jurisdiction-specific work sessions were conducted to identify local vulnerability and analyze the impact of incidents on each jurisdiction.

On March 4 and 5, 2019, the Consultant and EMA staff met with individual jurisdictions to discuss hazard vulnerability and critical infrastructure protection needs. They also addressed the status of mitigation actions identified in the previous mitigation plan. Participants provided input regarding critical assets and infrastructure, areas with specific or heightened risk or vulnerability, and areas where mitigating actions would have a positive effect on future disaster loss in each jurisdiction. Discussions addressed vulnerabilities across the entire county as well as within the specific jurisdiction. Participants included mayors, administrators, city/village council members, trustees, fiscal officers, road/street department employees, law enforcement officials, fire service personnel, water and wastewater treatment facility staff, farmers, and other key jurisdiction employees.

Work sessions were also conducted with the county engineer to discuss waterway and roadway maintenance and damages; Soil and Water Conservation District staff to discuss agricultural conservation and preservation practices that protect land and soils; and economic development officials to discuss the integration of mitigation into development concerns and activities. These sessions focused on gathering risk and vulnerability information and discussing the impact of disasters relative to each group's specific area of expertise.

Mitigation Strategy Development Work Sessions

Mitigation strategy sessions focused on developing mitigation goals and strategies for each jurisdiction. The Consultant prepared a worksheet for strategy selection by jurisdiction officials that was customized to the risks and vulnerabilities of each jurisdiction. As participants selected, modified, and added strategies for their jurisdiction, they prioritized the hazards by severity of the damages typically incurred and by the impact on human lives and property. A hazard that is likely to cause death or injury ranked higher than one that does not result in loss of life. Property damage that prevented residents and businesses from utilizing their property ranked higher than less inhibiting damage. Incidents that damaged natural resources and key

assets that could not be restored to the original condition were more highly ranked than those that could be repaired. Strategies that apply to specific groups, such as agriculture, natural resources, county and township infrastructure, and specific activities such as community development were discussed in both jurisdictional meetings and special interest group sessions.

Because strategies would be assigned to jurisdictions, the attachment of each strategy to a key stakeholder within the jurisdiction was determined by jurisdiction officials. All assignments of strategies were done within the jurisdictional staff of elected and appointed officials; the stakeholders felt they had control only over their own employees and officials. No assignments were made to federal or state employees or agencies, and none were assigned to private entities or non-profit organizations outside the purview of the county or municipality.

Each strategy included a timeline for completion; for most, this began with adoption of the plan and continued for the duration of the five-year plan period. Because stakeholders do not have control over grant availability, cannot foresee the particular hazards that will impact the jurisdiction in the near future, and do not know what competing priorities may influence the ability to complete mitigation strategies, this was the most logical approach.

Final Plan Review

After completion of the hazard identification and risk assessment and developing mitigation strategies, the final draft plan was completed and the plan review process commenced. A final countywide review meeting was held on June 5. This meeting was attended by jurisdictions, special interest groups, agencies and organizations, and individuals across Champaign County. At this meeting, the Consultant explained the plan's structure and organization. They also discussed formal plan adoption, annual plan maintenance and updates, and encouraged jurisdictions to review strategies at any time, especially after significant incidents. The planning team was informed of the public review period scheduled for June 6 – 23, 2019, encouraged to review and comment on the plan, and share it with others in their jurisdiction.

Table 1-1 includes a complete list of planning team meetings and work sessions conducted throughout the planning process.

Table 1-1: Planning Team Meetings

Date	Location	Purpose	Participating Stakeholders
02/05/2019	Champaign County EMA	Project Kick Off/Initial Planning Meeting	Countywide Meeting
02/27/2019	Champaign County Trustees and Mayors Meeting	Hazard Identification and Risk Assessment	Countywide Meeting
03/04/2019	Champaign County Engineer's Office	Hazard Identification and Risk Assessment	Champaign County Engineer
03/04/2019	North Lewisburg Village Hall	Hazard Identification and Risk Assessment	Village of North Lewisburg Village of Woodstock
03/04/2019	Mechanicsburg Village Hall	Hazard Identification and Risk Assessment	Village of Mechanicsburg Village of Mutual
03/04/2019	Union Township Hall	Hazard Identification and Risk Assessment	Union Township
03/05/2019	St. Paris Village Hall	Hazard Identification and Risk Assessment	Village of St. Paris Village of Christiansburg
03/05/2019	Champaign County EMA	Hazard Identification and Risk Assessment	Champaign County Soil and Water Conservation District
03/05/2019	Urbana City Hall Fire Department	Hazard Identification and Risk Assessment	City of Urbana
03/05/2019	Champaign Economic Partnership Office	Hazard Identification and Strategy Development	Champaign Economic Partnership; Community Imp. Corp.; Urbana Zoning
05/13/2019	Champaign County Engineer's Office	Strategy Development and Implementation	Champaign County Engineer
05/13/2019	North Lewisburg Village Hall	Strategy Development and Implementation	Village of North Lewisburg Village of Woodstock
05/13/2019	Mechanicsburg Village Hall	Strategy Development and Implementation	Village of Mechanicsburg Village of Mutual
05/13/2019	Champaign County EMA	Strategy Development and Implementation; Review and Adoption Process	Champaign County EMA
05/13/2019	Champaign County EMA	Strategy Development and Implementation	Countywide Meeting
05/14/2019	St. Paris Village Hall	Strategy Development and Implementation	Village of St. Paris Village of Christiansburg
05/14/2019	Urbana City Hall	Strategy Development and Implementation	City of Urbana
05/15/2019	Champaign County EMA	Strategy Development and Implementation	Soil and Water Conservation District, OSU Extension; Nat. Resources Conservation; Ag.
05/15/2019	Champaign County EMA	Strategy Development and Implementation	Champaign County Public Health; Urbana Hospital; social agencies
06/05/2019	Champaign County EMA	Full Draft Plan Review	Countywide Meeting

1.2 STAKEHOLDER INVOLVEMENT

Because of Champaign County's population and number of jurisdictions, many people participated in the mitigation planning process. The EMA used a whole community approach to and reached out to a broad group of stakeholders to encourage participation in the mitigation planning team. An inclusive list of planning team members was developed with the intention of including all jurisdictions, organizations, and agencies with an interest or role in disaster mitigation.

Invitations to participate in the Hazard Mitigation Planning Team were extended to the following officials, leaders, and stakeholders from Champaign County:

- Incorporated jurisdictions (county, city, and village officials)
- Township representatives (trustees, fiscal officers)
- Specialized disciplines, including fire service, law enforcement, engineering, utilities, public health, healthcare, hospitals, business and industry, education and academia, nonprofits, social agencies, and the general public
- Elected officials, including the county auditor, treasurer, engineer, and commissioners
- Appointed officials, including the county floodplain manager, GIS mapping specialist, conservation specialists, development officials, fire chiefs, police chiefs, public health commissioners, extension agents
- Economic development organizations, chambers of commerce, and tourism bureaus
- Emergency management officials from adjacent counties
- Non-government agencies and community action groups
- Special interest groups such as watershed coalitions, conservancy districts, federal partners, and state agencies with facilities in the county
- Residents, businesses, and the general public

Stakeholders were advised that all planning activities were open to the public and any constituent or resident was welcome and encouraged to participate.

1.2.1 Jurisdiction Participation

All incorporated jurisdictions in Champaign County elected to participate in the countywide hazard mitigation plan. Champaign County has no border communities that are located in more than one county and have selected the alternate county for mitigation purposes.

For the purposes of plan adoption and potential grant administration, Champaign County is authorized to act on behalf of the townships. Most townships elected to participate in the planning work sessions and contributed significantly to the process. This broad participation ensured that all interests across the county, including rural and suburban areas, were represented. Because so many individuals fill more than one leadership role in the county, there was significant multi-jurisdictional consideration throughout the planning process, emphasizing the countywide focus of mitigation planning and implementation.

The officials identified in Table 1-2 served as the primary representative and point of contact for each jurisdiction. The EMA coordinated with these individuals to schedule work sessions.

Table 1-2: Participating Jurisdictions and Primary Representatives

Jurisdiction	Position/Title	Representative
COUNTY		
Champaign County	EMA Director	James Freeman
Champaign County	EMA Deputy Director	David Torsell
Champaign County	Commissioner	Steve Hess
Champaign County	Commissioner	David Faulkner
Champaign County	Commissioner	Bob Corbett
Champaign County	Engineer	Steve McCall
MUNICIPALITIES		
Christiansburg	Village Mayor	Chuck Lyons
Christiansburg	Council Member	Charles Fey
Christiansburg	Fiscal Officer	Theresa Lewis
North Lewisburg	Village Administrator	Andy Yoder
Mechanicsburg	Village Administrator	April Huggins-Davis
Mechanicsburg	Village Mayor	Greg Kimbell
Mutual	Mayor	William Brown
Mutual	Fiscal Officer	Judy Russell
St. Paris	Mayor	Brenda Cook
Woodstock	Village Administrator	Brad Herron
Urbana	City Administrator	Kerry Brugger
Urbana	City Engineer	Tyler Bumbalough

1.2.2 Hazard Mitigation Planning Team

To encourage broad countywide participation in the planning process, a large group of stakeholders were included in the planning process. Using multiple information sources, including but not limited to EMA contact lists, jurisdiction and agency websites, and the Board of Elections, a master planning team of more than 65 people was developed. The master list identified the name, position, agency or jurisdiction, and contact information for each individual; it included representation from business and industry, community services, economic and community development, education, government, infrastructure and engineering, natural resources, and public safety.

Throughout the planning process, more than 70 people representing contributed to the planning process. The complete list of participating stakeholders is provided in Appendix A: Mitigation Planning Team.

The planning team's participation occurred over four phases of plan development: kick-off meeting, hazard identification and risk assessment, mitigation strategy development, and final plan review. The plan development schedule included several rounds of work sessions with additional small group meetings scheduled throughout, as described in section 1.1.2 above. The

EMA provided multiple opportunities for stakeholder participation that considered a wide variety of schedule conflicts, work situations, and other issues. Most meeting invitations were sent via e-mail as this was the quickest and most efficient communication method. When necessary, EMA staff reached out to stakeholders by phone, regular mail, or other communication mechanisms to ensure delivery of the information. The EMA and Consultant worked diligently to maintain a list of participants so those who had not yet been involved could be identified. The EMA then reached out to non-respondents individually to encourage them to participate.

1.3 PUBLIC PARTICIPATION

Throughout the planning process, the EMA identified comprehensive community participation as a priority. Utilizing FEMA's whole community planning concept, the EMA reached out to partners, jurisdiction officials, community organizations, and stakeholders across the community and invited them to participate and provide input through all phases of the planning process. Initially, the EMA and Consultant dedicated significant time to identifying contacts across all jurisdictions, subject-areas, and segments of the county and creating an accurate contact list of those individuals. Collectively, this list was referred to as the mitigation planning team, and they were invited to all work sessions throughout the process. Meetings and work sessions were also open to the public and participants were encouraged to attend all meetings that fit their schedule. Stakeholders were encouraged to invite others from their jurisdiction or agency, or the general public.

Each jurisdiction was asked to provide input about recent incidents, damage and casualties from storms and other hazards, prioritize the hazards in their jurisdiction, and assess how hazards impacting other jurisdictions might affect them. They were asked to identify the mitigation needs of the jurisdiction, including any action or project that might help reduce damages and decrease impact of any hazard. Special populations, critical infrastructure, and high-risk facilities were discussed in this context, and potential vulnerabilities were assessed. This information was compiled to develop the draft HIRA and strategies sections.

As the vulnerability statements and potential strategies were developed for each jurisdiction, draft documents were shared with the planning team. Jurisdictions were asked to share these documents with other officials, employees, and residents for feedback. Revisions were made as jurisdictions responded, including clarifications and expansion of some information.

Upon completion of the plan, a countywide plan review forum was conducted on June 5, 2019. This forum was open to the public and provided all stakeholders the opportunity to view and comment on the plan. It also provided an opportunity to discuss multi-jurisdictional implementation, ongoing countywide participation, and annual review by all jurisdictions in the coming five years. This meeting was followed by a formal public review period from June 6 – 23, 2019. The plan was posted on the Consultant's website through the entire review period. A printed copy was also available in the Champaign County EMA for anyone who preferred to view a printed copy of the plan.

The public was notified of the plan review forum and review period through notifications sent to planning team participants, letters to jurisdictions, a paid legal notice placed in the Urbana Daily Citizen, and a news release to local media outlets. All notifications included a link to view the plan online, the timeline for public review, and instructions for submitting comments and questions. Jurisdictions were encouraged to share plan review information on their websites and social media accounts.

The EMA Director and Consultant reviewed all comments and questions received through the review process and made appropriate revisions. Upon final revision, the plan was submitted to the Ohio EMA for state review before submission to FEMA for federal approval. Following federal approval, the formal adoption process began. This process is explained in section 4.0 Plan Adoption.

1.4 RESEARCH METHODOLOGIES

Extensive research was conducted during the planning process. This included reviews of existing data, plans, and reports and detailed discussions with stakeholders and subject-matter experts.

To develop the county profile, various county and jurisdiction documents and plans were utilized. This research included information about community development, business and industry, land use regulations, and community life. Demographic and statistical information came from the U.S. Census Bureau and other government sources. Jurisdiction websites provided additional local information. Champaign County's comprehensive land use plan was consulted for information about individual communities, development goals, building and development restrictions and regulations, and countywide goals and objectives for community growth. The floodplain manager provided information about community participation in NFIP and CRS and communities provided jurisdictional documents and websites that confirmed and explained collaboration between jurisdictions and the county. Watershed plans and watershed discovery reports were consulted for information about local rivers, creeks, and streams.

The plan incorporates local disaster history and hazard occurrences through early 2019. This information was researched through the National Oceanic and Atmospheric Administration (NOAA) Storm Events Database, Ohio EMA, FEMA, Tornado History Project, Stanford University Dam Program, Ohio Department of Natural Resources, and other federal, state, and private sources. This information was shared with stakeholders during planning team work sessions so that local knowledge of the impact, consequences, and recovery efforts of incidents was incorporated into the county's hazard history. Appendix B: Hazard and Vulnerability Data includes a complete list of all recorded occurrences of each hazard, organized by type.

The vulnerability assessment and risk analysis are based on multiple data sources. HAZUS projections helped establish potential losses in flood and earthquake incidents. FEMA records contained loss data based on federal disaster assistance provided in the county and the Ohio Enhanced Multi-Hazard Mitigation Plan Draft (2019) provided additional data and explanation.

Multiple sources provided information on Champaign County’s agriculture industry and natural resources, including watershed reports published by ODNR, US EPA documents, reports developed by local government agencies and watershed coalitions, and others as identified in Table 1-4. This information was combined with discussions with stakeholders and subject-matter experts to develop the mitigation plan. Local Soil and Water Conservation District, Ohio State University Extension Service, and the Natural Resource Conservation District office provided information. The USDA agricultural census supplied data regarding agriculture and production.

The EMA Director provided documents, including GIS maps, building and zoning regulations, dam safety plans, contact lists for local officials, and an array of other specific pieces of information. The county engineer provided maps of ditches on county maintenance, lists and maps of roads and bridges in the county and information regarding the local watershed.

Table 1-4 identifies the references, reports, and studies utilized in plan development.

Table 1-4: Studies, Reports, and References

Document	Author/Agency	Date
2010 United States Census	US Census Bureau	2010
Federal Disaster Declaration Statistics	FEMA	2018
HAZUS Earthquake and Flood data	Ohio EMA	2012
Champaign County Engineer’s Annual Report	Champaign County Engineer	2017
Champaign County Public Transit Human Services Transportation Coordination Plan	Catholic Social Services of Miami Valley	2018
Champaign County Building Regulations	Champaign County	2011
North Lewisburg Comprehensive Plan	LUC Regional Planning	2002
Champaign County Comprehensive Land Use Plan	LUC Regional Planning	2004
Champaign County Profile	Ohio Department of Development, Office of Research	2017
North Central Ohio Solid Waste Management Plan Draft	GT Environmental, Inc.	2014
Ohio Enhanced Hazard Mitigation Plan	Ohio EMA	2014
Soil Survey of Champaign County, Ohio	US Department of Agriculture, Soil Conservation Service	1994
Storm Events Database	National Oceanic and Atmospheric Administration	2018
Urbana Comprehensive Plan	LUC Regional Planning	2009
Champaign County Hazard Mitigation Plan	Champaign County EMA	2006
Champaign County Hazard Mitigation Update – unapproved	Champaign County EMA	2012
State of Ohio Hazard Mitigation Plan Draft	Ohio EMA	2019

1.5 PLAN MAINTENANCE

Plan maintenance is a critical element of the hazard mitigation plan. Regular plan maintenance establishes hazard mitigation as part of regular community development activities, provides a mechanism for the EMA to continually engage stakeholders in issues related to disaster risk reduction, and establishes a solid groundwork for the required five-year plan update. By reviewing disaster occurrences annually and assessing progress on mitigation activities, a five-year mitigation plan update can be a quick and efficient process. Champaign County intends to follow a regular plan maintenance schedule. The EMA will lead this effort and involve stakeholders, jurisdictions, and the community, laying a solid foundation for the next plan update.

1.5.1 Plan Maintenance Methodology

The most significant challenge in plan maintenance is stakeholder participation. Plan review meetings are not always well attended, leading to limited discussion of ongoing mitigation issues. Many stakeholders have competing demands on their time as they fill multiple roles in their communities and participation in plan review meetings is often a lower priority than other responsibilities. In an effort to address this challenge, Champaign County will adopt a plan maintenance methodology that utilizes multiple engagement and communication methods to meet the needs of community leaders. Specific activities will be selected based on what will elicit the most robust participation from stakeholders and can include, but will not be limited to, the following activities:

- Jurisdiction-based meetings in cities, villages and townships
- Countywide meetings at central locations
- Written or electronic surveys/questionnaires
- Webinars/conference calls
- Post-incident review following a significant incident

As with any planning activity, the EMA will maintain documentation of participation, copies of surveys, and other communication surrounding these events.

1.5.2 Annual Plan Review

The Mitigation Planning Team will be called upon to review, evaluate, and discuss the plan annually, beginning approximately one year after the final approval of the plan and annually until the formal plan update process begins. These annual plan maintenance discussions may be conducted through traditional in-person meetings or webinars, surveys, questionnaires, or other forms of communication. The specific methodology will be determined by the EMA based on what best meets the needs of stakeholders and is appropriate at that specific time. If the community has been impacted by multiple incidents during any year, a face-to-face session should be held after post-incident response critiques are held. A comprehensive review may involve different methods for different organizations. For example, county employees may be gathered to discuss the incident, while municipalities and townships may be sent written materials and asked to submit completed documents after review at their local meetings.

Regardless of the specific method, annual plan maintenance discussions will include an assessment of disaster incidents in the previous year and a summary of the resulting damages, costs, and recovery efforts. It will define any shortages, gaps in capabilities, ineffective loss prevention actions, and any mitigation projects that would have reduced losses or eliminated costs. Status reports on mitigation projects in progress and updates on each jurisdiction's mitigation strategies and actions will also be included. The EMA will maintain records of these discussions and develop an ongoing list of strategy modifications to be considered in the plan update. The report will identify any reduction in losses due to a successful mitigation strategy, action, or project implementation.

As part of the review process, jurisdictions will be asked to conduct an internal analysis of mitigation strategies and actions underway in their jurisdiction or identify strategies that should be added, modified, or deferred and provide the EMA with a report of these findings. The report will include an assessment of disaster incidents that occurred during the year, a summary of damages and recovery efforts and a status report on the adopted mitigation strategies. If a strategy has been completed, the jurisdiction will evaluate its effectiveness in reducing loss. This information will be shared with the mitigation planning team during the annual review process. The EMA will maintain a summary of these reports.

Along with these review activities, the EMA will complete an annual review of the Hazard Identification and Risk Assessment and note any necessary changes. Loss estimates will be evaluated for ongoing accuracy and any progress in development, changes in regulation, or other significant differences will be noted. The EMA will also identify any significant changes in the community. This could include, but is not limited to, property valuations, businesses or industries, agricultural practices, conservation practices, community development, or regulations. The EMA will also review the inclusion of mitigation in community development and make recommendations for changes to the county process that ensure mitigation strategies are included in the implementation of growth in the countywide community. The EMA Director may add other information at his/her discretion.

1.5.3 Community Participation

While the EMA is responsible for leading plan maintenance efforts, that process is only effective if stakeholders are engaged. Ongoing consideration of hazard mitigation critical to creating a resilient and sustainable community. It is the EMA's intention that the same stakeholders involved in plan development continue to participate in ongoing plan maintenance. Without their involvement, ongoing input will not be comprehensive or accurate. Therefore, all parties involved in developing this plan must perceive the annual review process as critical to the pre- and post-disaster welfare of the county. This was stressed to stakeholders throughout the plan development process.

Public involvement is an important component of ongoing mitigation efforts. Annual update meetings will be open to the public and community input will be encouraged. Public notices will be published through local media and appropriate websites and social media accounts of participating jurisdictions and agencies. Meeting announcements will include the date, time,

and location of the session and adequate notice so that people have reasonable time to plan their attendance. If surveys and other electronic tools are utilized to collect feedback from stakeholders, these documents will be made available to the community and instructions provided on how to utilize these tools. Any feedback received from the public will be reviewed by the EMA, which will also maintain documentation of public participation. The public should have open access to findings in annual reports as well as recommendations for future mitigation actions.

1.5.4 Integration with Community Planning Mechanisms

Community and economic development in Champaign County are handled by several cooperating entities with a broad reach into the various disciplines, businesses, and agencies in the county.

LUC Regional Planning Commission is a joint venture between Logan, Union, and Champaign Counties to engage in collaborative regional planning. LUC is a Regional Transportation Planning Organization (RTPO) designated by Ohio Governor Kasich several years ago. The organization is involved in subdivision regulation development and enforcement, economic development, transportation development, zoning development and enforcement, and financial management of state and federal programs such as Community Development Block Grants. LUC works closely with all other local development agencies to, in part, prevent unwise development, and manage development in disaster prone high-risk areas. LUC is a membership organization. Urbana, Mechanicsburg, North Lewisburg, and St. Paris are members. Mutual, Woodstock, and Christiansburg are not. Adams, Goshen, Jackson, Johnson, Mad River, Rush, Salem, Union, Urbana and Wayne townships are members; Harrison and Concord are not.

Champaign County is zoned. Zoning is intended to guide appropriate location of commercial, agricultural, and residential entities across the county. A significant consideration in zoning approval is the impact of the potential business on local infrastructure, such as utilities, resources and roads. LUC encourages, by policy, consistency in zoning regulations between municipalities and townships, especially adjacent jurisdictions. They also advocate for consistency in all other regulation such as building codes, fire codes, and permit process.

The Champaign County Economic Development Corporation is part of the Champaign Economic Partnership, a public/private non-profit organization that serves the whole county. The Champaign Economic Partnership is doing business as the Champaign County Economic Development Corporation. Their strategic priorities include supporting industry, advocating for businesses, developing a strong workforce, collaborating with partners across the region, and connecting the business community with resources. They establish goals that take into account the strengths and weaknesses of the county's economic culture, needs of county residents, and wise use of the county's resources. They work collaboratively with the public schools, Urbana University, and the career-technical education system to positively influence workforce development as businesses and industries are recruited and retained in Champaign County.

With an office in Urbana, the Champaign Economic Partnership is a public/private non-profit that serves the whole county. As the Community Improvement Corporation for all of Champaign County, they work very closely with the various zoning and building officials in the county as well as the fire officials who assist with building plans and fire code enforcement. As a team, they work to ensure new developers that they are not building within flood plains or high-risk areas, and that business are positioned with easy access to services and infrastructure. They work with jurisdictions to develop housing, retail and support services that will provide for the employees and vendors of the business community.

The Champaign County EMA supports these development activities through participation in committees and workgroups. The EMA Director provides input in developing policies and procedures; creating and revising land use plans, economic development strategies, code enforcement policies and methods; and recruiting and retaining business across the county. Jurisdictions support the consideration of hazards and hazard mitigation as community development is planned, executed, and evaluated.

Champaign County community development officials attempt to appropriately locate entities in areas that serve their business needs, do not contribute to escalating casualty and loss due to storms and other disasters, and emphasize principles of wise land use. They concentrate on the preservation of agricultural land, protection of natural habitat, and proper use of resources and infrastructure.

Commercial development and electrical code compliance are fully regulated as part of Ohio law and floodplain regulations are strictly enforced. The State of Ohio issues plumbing permits. Local zoning officials review, approve, and inspect all other commercial construction and improvements. The county's current Land Use Plan identifies consideration of providing these inspection and enforcement services locally as a priority.

The Champaign County Land Use Plan recognizes that poorly drained soils may impact development and that mitigation measures are necessary to facilitate development in some areas. The plan encourages ditch maintenance programs to help with drainage and for agricultural use of field tile, conservation practices, and buffer zones along riparian corridors. The plan paints a strong advocacy for wise-use agricultural practices, and is supported by the Soil and Water Conservation District and individual farmers.

Champaign County's community growth is a widespread and shared responsibility. While the LUC Regional Planning, Community Improvement Corporation, Economic Development Partnership, and others take the lead in recruiting and developing new businesses, all county departments, jurisdictions, and businesses play a role in guiding that development. The county is large enough to have ample resources and expertise to succeed, but small enough that people and departments know one another, work together, and share both challenges and success.

The EMA Director monitors development through the agency's role in the development councils and through continual communication with jurisdiction officials, businesses and industries, and county officials. The Director works with fire departments that provide fire inspections, building officials who inspect construction, and business owners who execute growth initiatives. The Director has, for many years, been the primary voice of mitigation in county leadership roles, supported and enhanced by the Champaign County Commissioners and other elected officials.

The wide array of individuals involved in community development allows for a broad perspective in the development community in Champaign County. It facilitates wise development, measured growth, and true improvement without the addition of unanticipated hazard vulnerability.

1.5.5 Documentation of Plan Maintenance

The EMA will be responsible for maintaining documentation of all plan maintenance activities. This documentation should include attendance records for annual review meetings and events, contact lists of stakeholders invited to complete digital surveys, meeting notes and summaries, and recommendations from stakeholders for changes, additions, or deletions to the plan. Results from surveys and questionnaires, annual jurisdiction reports, and comments submitted by the public should also be maintained. All reports, documents, and files can be saved digitally. These records should be part of the data shared with the author of the next formal plan update.

1.5.6 Plan Update Cycle

The newly approved Champaign County Hazard Mitigation Plan will expire in 2024. With ongoing plan maintenance activities, the county should be positioned to submit an updated plan before the identified expiration date. To ensure the appropriate timeline is met, formal efforts to update the plan will begin in mid-2022. The EMA Director will ensure that the appropriate and necessary steps are taken to complete this process.

2.0 HAZARD IDENTIFICATION AND RISK ASSESSMENT

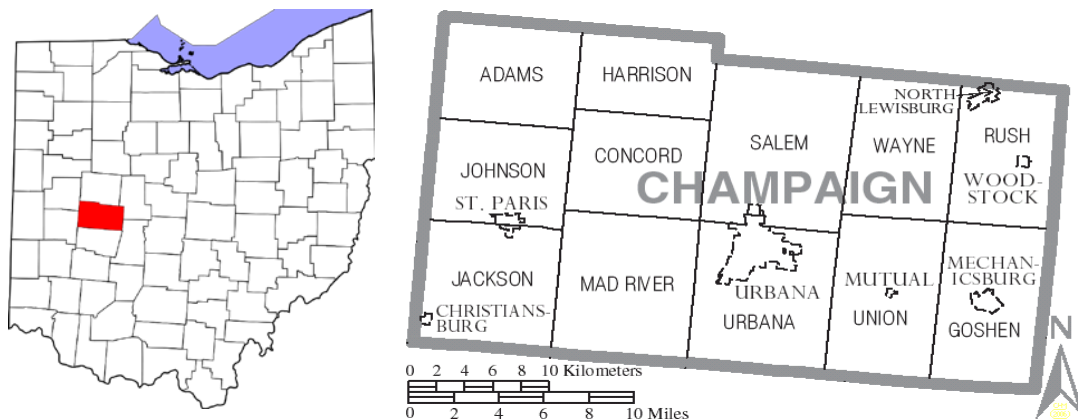
The Hazard Identification and Risk Assessment (HIRA) identifies the type and frequency of disasters that affect Champaign County and the risk to people and property created by those hazards. The HIRA is addressed in four sections:

- **County Profile:** provides general information on Champaign County and its jurisdictions.
- **Hazard Identification:** describes hazards that threaten Champaign County and provides a brief history of significant past occurrences of each identified hazard.
- **Vulnerability Assessment:** discusses each jurisdiction's vulnerability to specific hazards.
- **Risk Analysis:** evaluates and ranks the hazards Champaign County must address through mitigation efforts.

2.1 COUNTY PROFILE

Champaign County is located in west central Ohio. This rural county has a land area of 430.0 square miles (of which 428.6 square miles is land and 1.2 square miles is water) and an estimated population of 38,840. The county is bordered by Logan, Union, Madison, Clark, Miami, and Shelby counties. The closest major city, Columbus, is approximately 45 miles to the east.

Map 2-1: Champaign County Map



2.1.1 Demographics

According to US Census QuickFacts data, the 2018 population estimate for Champaign County is 38,840. The population base in 2010 was 40,097 so the county is experiencing a slight loss in population, a trend that is expected to continue for the next several decades. This slight decrease is common in Ohio's rural communities and represents an elderly population decrease through death and a challenging job environment for younger workers. 12.7% of the population under 65 years old has some sort of disability. 1% of the population is foreign-born and 9.2% are military veterans.

Table 2-1: County Population Statistics

Statistic	Figure
Population Density	93.5/sq. mile
Female Population	50.2%
Male Population	49.8%
Number of Households	15,274
Population under 18	22.5%
Population over 65	17.8%
Median Age	41.6 years
White	94.6%
Black or African American	2.2%
Hispanic or Latino	1.6%
Other	1.6%
Average Household Size	2.50 persons
Median Household Income	\$54,495
Persons in Poverty	11.0%

Champaign County has 16,809 housing units; owner-occupied housing rate is 72.7%. The median value of owner-occupied units is \$126,700. Multi-unit housing structures such as apartment buildings account for 12% of all housing units. There are 13 manufactured and mobile home parks in Champaign County that hold at least 850 of the county's 1,005 mobile or manufactured homes. There is a sporadic presence of mobile homes outside mobile home parks, but this constitutes a very small number of structures. The median gross rent for all types of rental properties is \$720 per month while the median cost for homes with mortgages is \$1,145 per month.

Roughly 87.5% of households have a computer. Broadband Internet subscriptions are in place for approximately 79.9% of the households.

Several special residential housing facilities, such as nursing homes and assisted living facilities, exist across the county. As of 2016, the types of facilities and statistics for each type are as follows:

Table 2-2: Special Residential Facilities

Facility	Facilities	Beds
Nursing Home Facilities	4	266
Residential Care Facilities	3	125
Jails and confinement	1	206
Residential college students	1	990

2.1.3 Incorporated Jurisdictions

Champaign County has one city and six villages. All municipalities participated in the county's 2019 mitigation planning efforts.

Cities

The City of Urbana, the only city in the county, is the county seat and largest municipality. It is home to Urbana University and Mercy Health Urbana Hospital.

Table 2-3: City Population and Demographics

City	Population	Households	Median Income	Persons Below Poverty
Urbana	11,793	4,940	\$39,259	20.5%

Villages

Champaign County has six incorporated villages, all of them small and rural. By definition, a village in Ohio has fewer than 5,000 residents.

Table 2-4: Village Population and Demographics

Village	Population	Housing Units	Median Income	Persons Below Poverty
Christiansburg	526	228	\$47,500	16.0%
Mechanicsburg	1,644	679	\$52,232	12.4%
Mutual	104	55	\$67,917	0%
North Lewisburg	1,490	674	\$54,063	6.1%
St. Paris	2,089	896	\$49,856	13.2%
Woodstock	305	99	\$59,375	11.7%

2.1.4 Unincorporated Areas

The unincorporated areas of Champaign County are divided into townships. In Ohio, townships are governed by an elected board of trustees. They meet monthly, at a minimum, and are responsible for the health, safety, and welfare of the township residents. Townships also have elected Fiscal Officers who manage the township's finances. Because townships are unincorporated, they are considered part of the county for the purpose of hazard mitigation planning and activities. Champaign County has twelve townships.

Table 2-5: Township Population Statistics

Township	Population
Adams	1,110
Concord	1,408
Goshen	3,696
Harrison	932
Jackson	2,644
Johnson	3,506
Mad River	2,821
Rush	2,613
Salem	2,539
Union	2,210
Urbana	14,795
Wayne	1,809

Township trustees and fiscal officers manage the business affairs of the township, which consist mostly of maintaining the roads, cemeteries, and critical facilities, and clearing debris from township ditches. Some townships have their own fire department while others are part of a fire district or shared service agreement with another department in the area. For law enforcement purposes, rural townships are covered by the Champaign County Sheriff's Office.

Unincorporated Communities and Neighborhoods

Champaign County has 19 unincorporated communities and one census-designated place. These small, informal neighborhoods are not organized municipalities nor do they have an official form of government. Instead, they function as part of the township in which they are located. In many instances, the locations have historical significance or were formerly incorporated but have ceased to have enough population to be considered a jurisdiction. Local residents generally still recognize the neighborhoods by their previous names. Cable, Mingo, and Westville have post offices and unique zip codes, but they are unincorporated and have no form of government.

2.1.5 Institutions and Special Facilities

Residents in Champaign County have access to abundant educational and healthcare resources. These services contribute to the quality of life for residents and the successful development of Champaign County's economy.

Education

Families in Champaign County have access to multiple educational opportunities. Students are served by five public school districts and one private school. Vocational education is provided by Ohio Hi-Point Career Center, located in Bellefontaine slightly north of Champaign County. Urbana University is located in Urbana with undergraduate enrollment of approximately 700 students.

Table 2-6: Champaign County Schools

Public School Districts	Private/Parochial Schools
Graham Local School District	Victory Christian School
West Liberty Salem Local School District	Operation Rebirth (boarding school)
Triad Local School District	
Urbana City School District	
Mechanicsburg Exempted Village School District	

Healthcare

Throughout Champaign County, residents have access to healthcare services. Within Champaign County, residents have access to comprehensive medical care at Mercy Health Urbana Hospital in Urbana. Memorial Urgent Care has a new facility in Urbana that provides urgent care and specialty services. Mercy also provides sports medicine and rehabilitation services as well as diagnostic services. There is one urgent care center in Urbana. Mary Rutan Hospital from Bellefontaine provides various specialty services in Urbana. There are approximately 266 nursing home beds across the county, the majority of those in Urbana. There are approximately 149 assisted living occupants in the county. There are various facilities that provide special services like rehabilitation, dialysis, physical therapy, and diagnostic services, and there are primary care physicians in multiple communities in Champaign County.

2.1.6 Infrastructure

Infrastructure and related systems provide residents, workers, and visitors with access to critical services. This section describes the county's road and rail infrastructure, airports, and utility systems.

Transportation Systems

Champaign County has a strong highway system connecting the county to cities and regions across Ohio. This includes more than 407 miles of U.S. and state highways and 104 bridges. Ohio Department of Transportation District 7 covers Champaign County; a district facility houses 15 vehicles and additional maintenance equipment in Urbana. There are outposts in both Mechanicsburg and St. Paris.

The Champaign County Engineer is responsible for maintaining and repairing 239 miles of county roads, 213 bridges, and hundreds of culverts. There are 340 miles of township roads maintained by the various townships in the county. Urbana has 62.6 miles of city streets.

Table 2-7: Champaign County Highways

Interstates	U.S. Highways	State Highways		
None	36	4	161	507
	68	29	187	559
		54	235	560
		55	245	814
		56	296	

Rail

Rail is another transportation system in Champaign County. The WESTCO Line operates rail that crosses north to south from Bellefontaine in Logan County to the south, running through Urbana into the west side of Springfield in Clark County. Another WESTCO line runs northeast out of Springfield to its end in Mechanicsburg. There are 21 active WESTCO railroad crossings in Champaign County. The Indiana and Ohio Railway operates a line that comes into Champaign County in Mad River Township, runs northwest through St. Paris and through Johnson and Adams Township.

Airports

Champaign County has five airports, including the Champaign County Airport in Urbana, commonly known as Grimes Field Airport. Mercy Memorial Hospital maintains a heliport at its hospital in Urbana. Weller Airport (Urbana), Dad Field Airport (Christiansburg) and Reeds Airport (St. Paris) round out the air traffic facilities in the county.

Utilities

The majority of homes in Champaign County, approximately 38.4%, are heated with natural gas. An additional 23.8% utilize electric heat. These utilities are provided by multiple private providers; there are no municipal electric providers in the county. The Public Utilities Commission of Ohio regulates private companies that provide public utility services. These companies, along with municipal electric utilities, are identified in the table below.

Table 2-8: Champaign County Utility Providers

Electric Service	Natural Gas Service
Dayton Power and Light Inc.	Columbia Gas of Ohio
Pioneer Rural Electric	Vectren Energy Delivery of Ohio

The remaining properties in the county are heated by other sources, including:

- Bottled, tank, or LP gas 21.8%
- Fuel oil, kerosene 7.7%
- Coal, coke or wood 5.9%
- Solar energy or other fuel 2.1%
- No fuel used 0.3%

Champaign County is home to two approved and potential windfarm projects, Buckeye I and Buckeye II. Combined, the two projects are approved for 110 wind turbines.

While not for distribution, there are two major hazardous liquid pipelines that cross the western third of the county. One runs from east of Christiansburg about five miles, to the north through St. Paris, to the northwest through the unincorporated area referred to as Rosewood, and into Logan County near Quincy. A second line enters Champaign County in mid-Mad River Township and goes northwest into St. Paris; it then follows the other line up through Rosewood and into Logan County. A gas transmission line runs from the southern border in Mad River Township just west of SR 68 to the north into Urbana.

Water and wastewater services are provided by municipal services. Mechanicsburg provides water and sewer services. Their water system includes three wells, one tower, 8 miles of distribution lines and 67 hydrants. The wastewater system includes one treatment facility, eight miles of lines, and two lift stations.

North Lewisburg provides water and wastewater facilities. The water system is fed by three wells and includes two towers, 9.8 miles of distribution lines, and 74 hydrants. The wastewater facility treatment plant serves 8.6 miles of lines and treats 140,000 gallons per day.

St. Paris provides wastewater treatment and sanitary sewers. They operate a sewage treatment facility and maintain over 65,000 feet of lines. The water treatment system consists of one pump house, three wells, two towers, 66,000 feet of water lines, and distribution lines.

The City of Urbana provides water, wastewater and sanitary sewer services for residents. They maintain 87 miles of water mains, four water towers and 5 wells. They have one treatment facility. The city's water and sewer systems serve both residents and businesses, including several major industrial customers. The sanitary sewer system has two pump stations with the recent addition of a new station on Three Mile Road near the former Robert Rothschild Farm. The other pump station is located near Vancrest Nursing Home. The city also has a wastewater treatment facility. They maintain 77 miles of sanitary sewer lines, 1,200 manholes, and one pump station. They accept septic system waste from professional haulers on a contractual basis for homes with septic systems. Their stormwater management program provides storm sewer lines and containment with 34 miles of storm sewer lines. The city provides a compost facility for yard waste and tree debris.

Christiansburg operates a sanitary sewer system with a treatment facility, and they have a municipal water system. Mutual and Woodstock do not provide utility services for the village residents. North Lewisburg provides sanitary sewer services for Woodstock.

According to census figures, 79.9% of the households in the county have broadband service and 87.5% have a computer.

2.1.7 Topography and Climate

The terrain in Champaign County is flat to slightly rolling, with steeper terrain in a few limited areas. Between the highest and lowest points, there is approximately 741 feet of difference. The county's highest point is approximately 1,437 feet above sea level, and is in Johnson Township. The lowest elevation is 696 feet above sea level.

Soil Types

There are eight soil associations in Champaign County. Most soils are deep to very deep. There is also a glacial boulder belt which is an area where the melting glaciers left boulders and stone on the surfaces, as well as depositing stone pieces in the soils. The soil associates are as follows, as taken from the Soil Survey of Champaign County by K.L. Powell and VL Siegenthaler in 1966:

- Brookston-Crosby: nearly level and undulating, very poorly drained, moderately fine texture
- Crosby-Brookston-Celina: nearly level and undulating, moderately well drained to very poorly drained, medium textured and moderately fine textured
- Miami-Celina-Brookston: undulating to steep, well drained and moderately well drained, medium-textured and nearly level or depress, very poorly drained, and moderately fine textured on uplands;
- Miami: nearly level to undulating, well-drained, medium textured on uplands
- Miami (Steep): sloping to steep, well-drained, medium textured on uplands
- Fox-Lippincott: nearly level to sloping, well-drained, medium textured on stream terraces, and nearly level or depressed, moderately fine textured on stream terraces
- Miami-Fox-Casco: gently sloping to steep, well-drained, medium textured on moraines and kames
- Patton: level or depressed, very poorly drained, moderately fine textured on old glacial lakebeds

Climate

Like most of Ohio, Champaign County experiences cold winters and hot summers. The mean annual temperature is 53° F. July has an average high temperature of 85° F, making it the warmest month. January is generally the coldest month with an average low temperature of 22° F. Average rainfall is approximately 36.92 inches per year. July is typically the wettest month with average precipitation of 2.76 inches of rain.

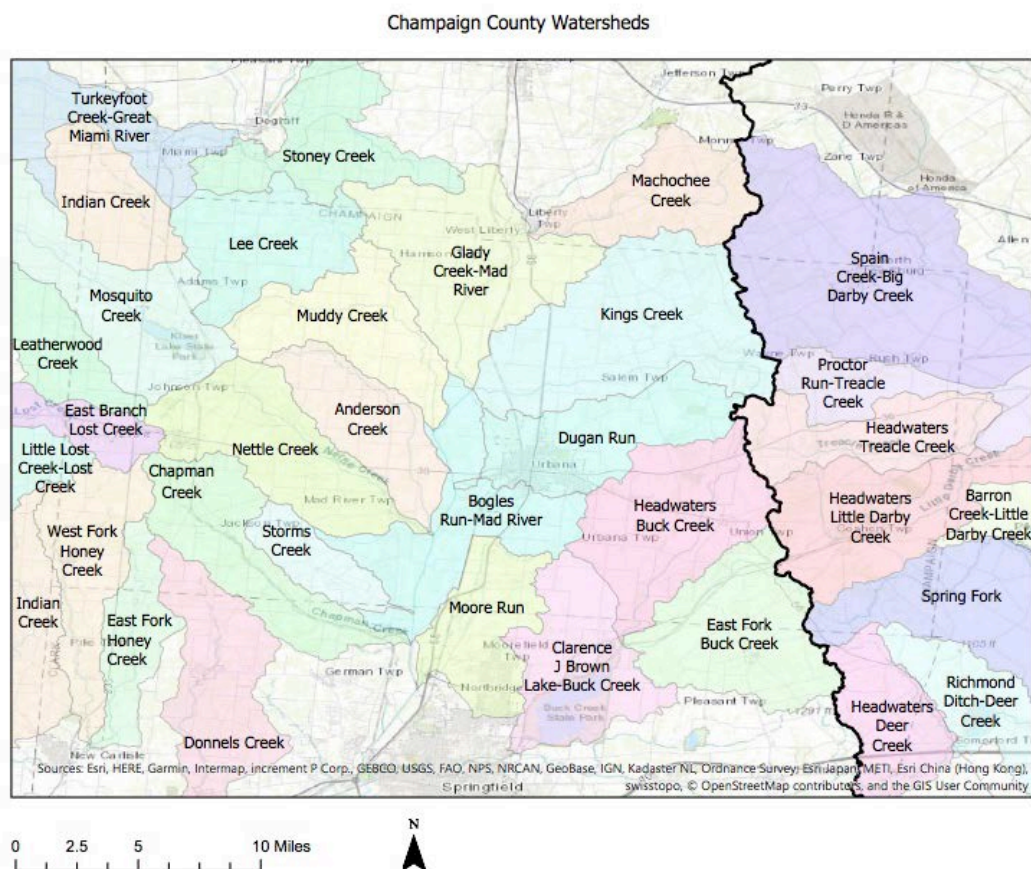
2.1.8 Waterways and Watershed

Champaign County is part of two distinct watersheds as the county's water drains south towards the Ohio River. The majority of the county falls in the Great Miami Watershed. This large watershed includes portions of fifteen Ohio counties and drains 3,802 square miles of land. This watershed is broken down into several sub-watersheds, two of which include Champaign County. The Mad River sub-watershed includes 657 square miles of Champaign, Logan, Clarke, Miami, Greene, and Montgomery counties. It flows southwest until it joins the Great Miami River in Dayton. This sub-watershed encompasses the majority of Champaign County, including most of the western two-thirds of the county. A small section in the northwest corner of Champaign County is located in the Great Miami River (Upper) sub-watershed. This large sub-section drains 748 square miles at the top of Great Miami watershed and flows into the Ohio River west of Cincinnati.

The remainder of Champaign County is located in the Scioto River watershed, which includes all or part of 31 counties in central and southern Ohio and drains 6,513 square miles. The eastern third of Champaign County falls in the Big Darby Creek sub-watershed. This basin also includes portions of Logan, Union, Clark, Madison, Franklin, and Pickaway Counties. A small section in the far southeast corner of Champaign County falls in the Deer Creek sub-watershed.

Map 2-2 identifies the watershed sub-basins on Champaign County. The heavy black line that runs through the county depicts the border between the Great Miami and Scioto watersheds.

Map 2-2: Champaign County Watersheds



2.1.9 Land Use

With 190,060 acres of farmland, agriculture is the predominant land use in Champaign County. Cultivated crops account for 72% of all land use in the county. Countywide, there are 873 farms with an average size of 218 acres. Individuals and families operate 91.6% of the farms. Farmers cultivate approximately 69,450 acres of corn, 82,913 acres of soybeans, and 5,602 acres of wheat. Orchards make up just 81 acres of the county. Farmers also raise poultry, cattle, and dairy cows.

The forested areas, grassland, and wetlands in Champaign County include 2,082 acres of state parks, forests, nature preserves and wildlife areas. This includes the Cedar Bog Dedicated Nature Preserve (Urbana Township), Urbana Wildlife Area (Salem Township), Davey Woods Dedicated Nature Preserve (Concord Township), Seigenthaler-Kaesther Esker Dedicated Nature Preserve (Harrison Township), Kiser Lake State Park and Kiser Lake Wetlands (Johnson Township).

Table 2-9: Champaign County Land Use

Use Category	Percentage
Cultivated Crops	72.45%
Forest	9.99%
Pasture/Hay	8.32%
Developed, Lower Intensity	6.78%
Shrub/Scrub and Grasslands	1.43%
Open Water	0.45%
Developed, Higher Intensity	0.44%
Wetlands	0.11%
Barren (strip mines, gravel pits, etc.)	0.03%

2.1.10 Regulation

Building regulations are enforced by several entities across Champaign County. LUC Regional Planning Commission is a three-county entity that provides regional planning for the contiguous counties of Champaign, Logan, and Union. The Commission is responsible for approving subdivisions in unincorporated areas and reviewing and recommending zoning amendments for township zoning commissions.

Zoning regulations are in place in most municipalities and all townships in Champaign County. Each municipality or township is responsible for adopting and enforcing these regulations through their local zoning inspector and zoning board or commission. Rules are adopted and enforced by each individual municipality or township. The zoning status for all jurisdictions in the county is listed in table 2-10 below.

The Champaign County Building Regulations department conducts inspections, issues building permits, and enforces commercial and residential building codes. The County Engineer serves as the county's floodplain manager and is in charge of regulating development in special flood hazard areas. The City of Urbana Zoning official enforces floodplain regulations within the city.

Table 2-10: Champaign County Zoning Status

Zoned Municipalities	Zoned Townships	Not Zoned
Mechanicsburg	Adams	Christiansburg (village)
North Lewisburg	Concord	Mutual (village)
St. Paris	Goshen	Woodstock (village)
Urbana	Harrison	
	Jackson	
	Johnson	
	Mad River	
	Rush	
	Salem	
	Union	
	Urbana	
	Wayne	

2.1.11 Economy and Development

Champaign County is part of the Dayton-Springfield Metropolitan Statistical Area. Its proximity to Columbus also allows for an easy exchange of business with the state's capitol, providing a wide array of resources, products and services for county residents and businesses.

Community development is accomplished through the collaborative efforts of multiple entities and organizations. Township trustees, municipal officials and employees, and county workers work together to recruit new business, retain current ones, and make changes to regulations that result in wise development that protects the built community and natural resources. In various documents, these professionals are referred to as "plan partners".

Regional planning is conducted by LUC Regional Planning, a three-county office that represents Logan, Union, and Champaign counties. It is funded in part by Champaign County. Other key development organizations include the Champaign Economic Partnership and the Champaign County Chamber of Commerce. Township trustees, village councils, city councils and county officials belong to these three organizations. Businesses also participate, creating an effective and active public-private land use and community development consortium.

The plan partners have established several categories of land use: agricultural preservation areas, existing residential areas, preferred rural residential areas, commercial areas, industrial areas, public and semi-public areas, conservation areas, rural centers, urban service areas, aquifer protection areas, and incorporated areas. Each category is classified into prime, suitable, and marginal areas.

Champaign County development goals, objectives, and policies address a wide array of concerns and express the county's intent to protect the health, safety and welfare of residents, protect agricultural land, and preserve streams, wooded areas, groundwater aquifers and environmentally sensitive land. A few specific items are of particular relevance to hazard mitigation. These include the effort to maintain zoning regulations and construction standards and avoid variances and exceptions that could lead to unwise use of land or development contrary to the overall well-being and intention of the land use planning partners. Several places in the plans outline and confirm the intent to preserve natural resources, including the soils, waterways, and natural habitat in the county.

The plan partners' intent to protect and preserve agriculture, which is the leading industry in Champaign County, is clear. The documents refer to support for the Clean Ohio Fund Agricultural Easement Purchase Program, avoidance of urban sprawl into productive land, and minimizing the use of any land that results in compromise to farming purposes in either crop or livestock production.

Commercial growth is focused on areas in proximity to transportation routes, infrastructure that supports growth, and where necessary services and utilities can be provided. The plan partners speak frequently about preservation of recreational areas, parks and other scenic areas, selecting alternate locations for the addition of new business and industry in an effort to

preserve natural resources. They recognize the effects of commercial development on drainage patterns, and advocate and require the use of structurally engineered components of construction to avoid flooding, flash flooding or other modifications of the natural drainage process.

Plan partners intend to conserve, maintain, and restore the natural environment through protection of soils, waterways, water sources, minerals, and other environmental components. They collaborate with the Champaign County Soil and Water Conservation District, Champaign County Engineer, Urbana floodplain administrator, waterway conservation groups, and others to achieve these goals. They recognize that they play an important role in flood prevention and protection, and that they share responsibility for protection of the quality of water in the county.

An updated countywide comprehensive plan is in process with completion in late 2019 or early 2020.

Major Industries and Employment

Key industries in Champaign County include aerospace leaders Honeywell Aerospace (aviation lighting), Hughey and Phillips, LLC (obstruction lighting) and Sarica Manufacturing (LED lighting board assembly). In addition to many corporate and family farms, the agribusiness community includes Freshwater Farms (indoor fish hatchery), Heritage Cooperative (farm cooperative sales and services), Michael Farms (vegetable production), and Old Souls Farm (hydroponic produce). Automotive industries include Johnson Welded Products (brake components), KTH Parts Industries (frame components), and Parker Trutec Industries (industrial coatings). Logistics and warehousing leaders include Dingledine Trucking Co. (distribution services), Navistar (packaging), and WCA Logistics, LLC (freight brokerage). Advances materials and advanced manufacturing includes Bundy Baking Solutions (commercial baking equipment), ColePak (packaging partition manufacture), Desmond Stephan (grinding wheel dressers), Eisenworks (machining), The Hall Company (human machine interfacing), Hughey & Phillips LLC (obstruction lighting technology), Rittal Corporation (industrial control and electrical enclosures), Rosewood Machining and Tool (tractor part machining), Ultra-Met Company (custom-molded tungsten carbide products), and WEIDMANN Electrical Technology (transformer board production). Polymer industry includes ORBIS, a manufacturer of plastic returnable and reusable packaging systems. Table 2-11 lists the county's major employers. Table 2-12 includes employment statistics by industry

Table 2-11: Major Employers

Employer	Sector
Honeywell Aerospace	Manufacturing
Hughey & Phillips, LLC	Manufacturing
Sarica Manufacturing	Manufacturing
Freshwater Farms	Agriculture
Heritage Cooperative	Agriculture
Michael Farms	Agriculture
Old Souls Farm	Agriculture
Johnson Welded Products	Manufacturing
KTH Parts Industries	Manufacturing
Parker Trutec Industries	Manufacturing
Dingledine Trucking	Transportation/Logistics
Damewood Enterprises	Warehousing
Navistar	Technology
WCA Logistics, LLC	Transportation/Logistics
Weidmann Electrical Technology	Manufacturing
Orbis	Manufacturing

Table 2-12: Employment by Industry

Employment Sector	Average Employment
Manufacturing	28.6%
Healthcare and Social Assistance	12.8%
Educational Services	8.4%
Retail trade	9.6%
Accommodation and Food Service	6.7%
Professional, Scientific, Technical	3.4%
Administrative Support, Waste Mgt.	2.5%
Transportation and Warehousing	4.2%
Utilities	1.3%
Other services, not public admin	5.1%
Construction	4.5%
Finance and Insurance	3.4%
Agriculture, Forestry, Fishing, Hunting	2.2%
Public Administration	2.6%
Wholesale Trade	1.8%
Information	1.0%
Other	1.9%

Champaign County's unemployment figures have dropped steadily since 2013, as described in Table 2-13. As of May 2018, the rate had dropped to 4.3%.

Table 2-13: Employment Statistics

	2013	2014	2015	2016	2017
Total Labor Force	20,000	19,900	19,900	19,800	19,900
Employed	18,700	18,900	19,000	19,000	19,000
Unemployed	1,400	1,000	900	900	800
Unemployment Rate	6.9%	5.1%	4.4%	4.5%	4.2%

2.1.12 Development Trends

Champaign County is primarily an agricultural community and many families who live in the county have been residents for multiple generations. Some families have a history of skilled and unskilled labor work and are employed by businesses like Honda, and Navistar. Development professionals reported that there are 4,200 “bread and butter” industries in the county. Some historic century homes are found in Urbana and other villages. In the rural areas, many farm families reside in long-standing farm homes or in newer homes built on the family farm.

The county has experienced well-planned and managed residential development due to business growth and job availability in the county and surrounding communities. Over the past twenty years, there have been efforts to develop multi-family housing in municipalities, and to create frontage lots with private wells and septic system in rural areas on rural roadways.

Industrial growth has focused on recruitment or expansion of mid-sized companies with fewer than 500 employees, use of vacant locations within existing industrial park areas, and new facilities in areas where other manufacturing is located. Developers have concentrated on filling empty buildings when possible and adapting vacant locations to meet the needs of new tenants. They have worked to save jobs, add high paying skilled labor jobs, and increase the viability of professional and technical support and service businesses.

The county airport has been upgraded to provide improved access and support of local industry. Grants and other funding sources have been used to make improvements that help the airport serve potential industries and to provide transportation for existing ones. Similarly, the county has worked to expand healthcare options to support new employees and families, and they’ve worked to establish the infrastructure necessary to serve an expanded population.

Development activities in Champaign County have followed specific goals and objectives, and locations where various kinds of development have taken place were planned and executed according to plan. The municipalities and townships are active in the creation of development plans, as are county departments and private partners. They have determined specific details of development prior to implementing a plan.

Housing needs have been met based upon industrial and manufacturing growth, and the types of housing created (single family, multi-family, single lots vs. subdivisions and cost factors based upon income statistics) have been established based upon data. Developers and community professionals have established housing areas to avoid flood plains and other areas that incur damage from storms or have exceptional risk from identified hazards.

Industrial and manufacturing growth has been located in zones with access to highways and necessary transportation routes in an effort to keep the roadways as safe yet accessible as possible. They have considered transportation needs for raw materials and finished product and how those commodities might impact highway safety.

Champaign County has worked hard to protect its agricultural industry. They have considered the use of land as it affects farm production and have approached productive farmland as a currently used resource and have not attempted to remove land from production to satisfy industrial development needs. They have considered watershed factors, agricultural product management and transportation, and the need for access to farm supplies and markets as they have added agribusinesses to their county commercial community.

Building regulations, land use planning, and existing rules and regulations have been strictly enforced. The county has concentrated development away from areas that are vulnerable to flooding. Development officials have utilized Urbana University assistance to determine areas appropriate for housing and to determine the infrastructure necessary to support this growth and worked with municipalities and the county to establish infrastructure studies and improvements that will support growth in a sustainable manner than avoids building in floodplains or other areas prone to water problems. The use of green materials in development or maintenance, the employment of smart development concepts, and the use of damage resistant materials as they develop the community has been important to all parties involved.

In the process of development, floodplain regulations and NFIP participation has been enforced and maintained. Consideration has been given to waterway maintenance and infrastructure support in light of developing areas, projects, and structures. This has enabled the county to add homes, business, and industry without increasing the damages from disaster incidents.

In the coming years, Champaign County mitigation planning participants expressed an interest in maintaining the regulations in place, and even of improving regulation to be more supportive of wise and sustainable development. They expressed a desire to utilize regulation, as they have in the past, to prevent the addition of properties or structures that stand in the way of nature and encourage development that avoids high-risk and high-impact areas.

2.2 HAZARD IDENTIFICATION

Champaign County has experienced many disasters in its history, ranging from floods and tornadoes to blizzards and windstorms. In this section, the hazards that can impact Champaign County are defined and county's risk for each hazard is considered.

In developing this assessment, the Hazard Mitigation Planning Team analyzed the hazards and risks present throughout the county. The thirteen hazards identified as relevant to Champaign County are:

- Dam failure
- Drought/extreme heat
- Earthquake
- Flood
- Hazardous materials incident
- Invasive species
- Land subsidence
- Power outage
- Severe thunderstorm
- Tornado
- Water quality emergency
- Windstorm
- Winter Storm

Some hazards were excluded from this plan because they pose no risk to Champaign County. The excluded hazards and the justification for the exclusion are identified in table 2-14.

Table 2-14: Excluded Hazards

Excluded Hazard	Justification
Coastal Erosion	The county has no open coastline.
Tsunami	Geographically impossible
Volcano	Geographically impossible
Wildfire	Insufficient forested area

Champaign County does not have a long history of federal disaster declarations or assistance. The county has been included in eight federal declarations. The most recent federal disaster declaration for the county occurred in June 2012 after a severe thunderstorm and wind event. A comprehensive list of federal disaster declarations for Champaign County is provided in table 2-15.

Table 2-15: Federal Disaster Declaration History

DR/EM Number	Incident Date	Incident Type(s)
DR-90-OH	January 23, 1959	Flood
EM-3055-OH	January 26, 1978	Winter Storm
DR-1065-OH	August 7, 1995	Severe Storm, Flood
DR-1580-OH	December 22, 2004	Flood, Winter Storm, Mudslide
EM-3198-OH	December 22, 2004	Winter Storm
EM-3250-OH	September 14, 2005	Hurricane Katrina Evacuation
DR-1805-OH	September 14, 2008	Wind
DR-4077-OH	June 29, 2012	Severe Storm, Wind

To understand the risk posed by these hazards in Champaign County, it is important to examine the characteristics of each hazard and evaluate the local history of occurrences. Historical information was obtained from the National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC) and supplemented with information from local officials. This section defines each hazard and describes Champaign County's history with each.

2.2.1 Dam Failure

A dam is an artificial barrier built across flowing water. This barrier directs or slows the flow of water and often creates a lake or reservoir. A dam is considered hydrologically significant if it has a height of at least 25 feet from the natural streambed and a storage capacity of at least fifteen acre-feet or an impounding capacity of at least 50 acre-feet and is six feet or more above the natural streambed. Dams are constructed for different purposes, such as flood control or to water storage for irrigation, water supply, or energy generation. They can be composed of earth, rock, concrete, masonry, timber, or a combination of materials.

Levees are embankments constructed to prevent the overflow of a river and subsequent flooding of the surrounding land. They can be built using earth, rock, or other materials. Levees constructed from concrete or masonry materials are referred to as floodwalls.

Many of the structures classified as dams or levees in Ohio are part of municipal water or wastewater treatment systems. These structures are often referred to as upground reservoirs or lagoons. According to ODNR, an upground reservoir is defined as a reservoir formed by artificial barriers on two or more sides and which impounds water or liquefied material pumped or otherwise imported from an exterior source. Lagoons are considered upground reservoirs.

Dam failure is defined as the uncontrolled release of the water held back by the structure. Depending on the storage volume of the dam and the types of structures surrounding it, a breach or failure can have a significant or limited impact on the surrounding community. In the most significant dam failure incidents, there can be substantial flooding downstream, damage to property, and loss of life. Potential causes of dam failure include, but are not limited to, sub-

standard construction, geological instability, spillway design error, poor maintenance, internal erosion, and/or extreme inflow.

The Ohio Department of Natural Resources (ODNR) is responsible for determining the hazard potential for dams through their Dam Safety Program. ODNR classifies dams based on this scale:

Classification	Description
Class I	High hazard dam; Probable loss of life, serious hazard to health, structural damage to high value property (i.e. homes, industries, major public utilities)
Class II	Significant hazard dam; Flood water damage to homes, businesses, industrial structures (no loss of life envisioned), damage to state and interstate highways, railroads, only access to residential areas
Class III	Low hazard dam; Damage to low value non-residential structures, local roads, agricultural crops, and livestock
Class IV	Losses restricted mainly to the dam

Dam/Levee Failure Risk Assessment

There are 26 dams in Champaign County and zero levees or upground reservoirs. No dams are considered Class I but there are 7 Class II, 2 Class III, and 17 Class IV dams. These structures function as water retention structures on waterways intended to hold back a recreational water supply, and are privately-owned structures that affect the flow of runoff waters. Dams and classifications for the county, according to the Ohio Department of Natural Resources, are identified in table 2-16. The only exception is Kiser Lake Dam, which is owned and operated by the Ohio Department of Natural Resources as a part of Kiser Lake recreational area.

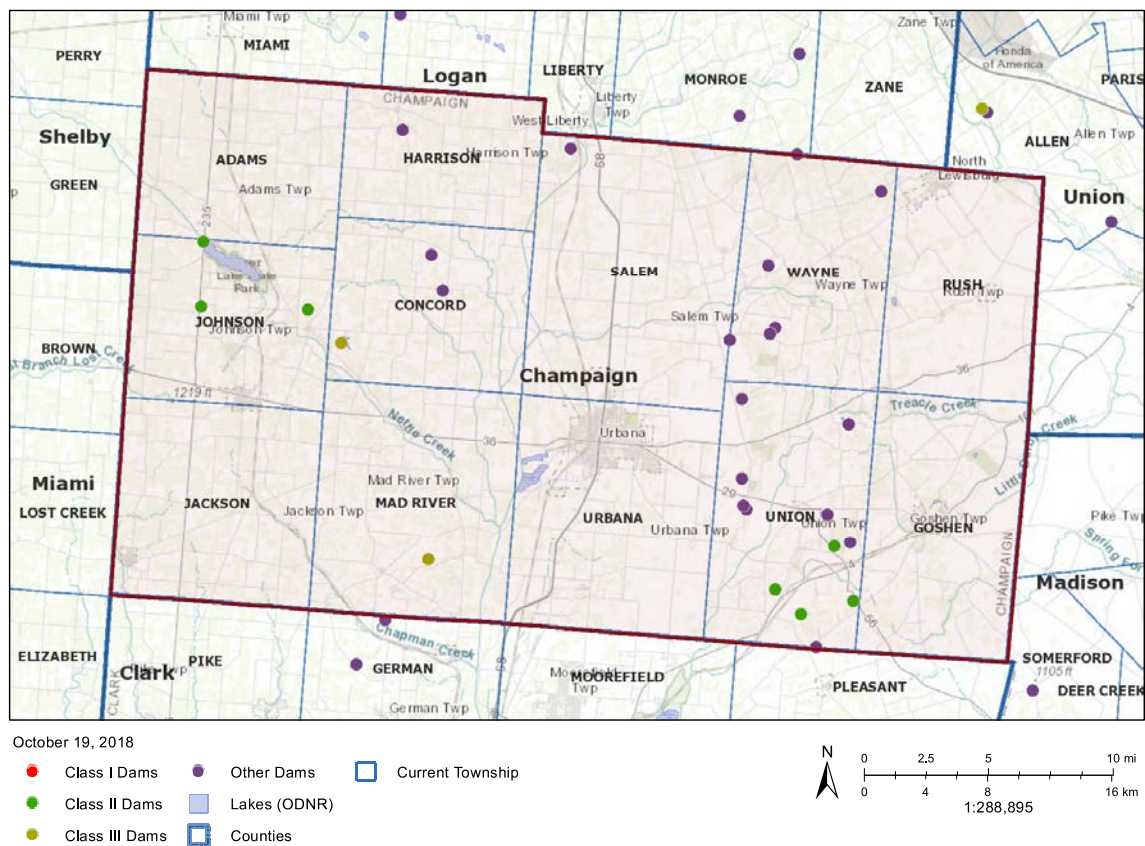
Table 2-16: Champaign County Dams

Dam	Class	Location	Owner	EAP Status
Kiser Lake Dam	II	Johnson Township	ODNR	Not Approved
Runkle Farm Pond Dam	II	Johnson Township	Mark Runkle	Approved
Shore Lake Dam	II	Johnson Township	Estel Ray Shore	Not Approved
East Fork Buck Creek Structure III-A	II	Union Township	East Fork Buck Creek Conservation District	Not Approved
East Fork Buck Creek Structure IV-A	II	Union Township	East Fork Buck Creek Conservation District	Not Approved
East Fork Buck Creek Structure I-B	II	Union Township	East Fork Buck Creek Conservation District	Not Approved
East Fork Buck Creek Structure II-B	II	Union Township	East Fork Buck Creek Conservation District	Not Approved
Stroman Lake Dam	III	Concord Township	Jacob & Terrie Conley	Approved
Williams Lake Dam	III	Mad River Township	Robert Neff	Not Approved
Unknown	IV	Harrison Township	Unknown	N/A
Wilson Pond Dam	IV	Concord Township	Otto Wilson	N/A
Meadow Lake Dam	IV	Concord Township	Denton Calland	N/A
Cole Pond Dam	IV	Salem Township	Rick Cole	N/A
Bitzos-Bancroft Lake Dam	IV	Salem/Wayne Township	Frank Bitzos & Robert Bancroft	N/A
Bahan Pond Dam	IV	Wayne Township	Nelson Bahan	N/A
Unknown	IV	Wayne Township	Unknown	N/A
White's Pond Dam	IV	Wayne Township	Noel White	N/A
Schaffer's Pond Dam	IV	Wayne Township	Lorin Schaffer or RE Walter	N/A
Dowds Pond Dam	IV	Union Township	D.D. Dowds	N/A
Muirhead Pond Dam	IV	Union Township	Stan Muirhead	N/A
Denkewalter's Lake Dam	IV	Union Township	Dr. Fred Denkewalter	N/A
Eckert's Pond No. 2 Dam	IV	Union Township	Larry Eckert	N/A
Eckert's Pond No. 1 Dan	IV	Union Township	Larry Eckert	N/A
Whittaker Pond Dam	IV	Union Township	Mary Whittaker	N/A
East Fork Buck Creek Structure II-A	IV	Union Township	East Fork Buck Creek Conservation District	N/A
Grimes Point Dam	IV	Union Township	Burelson Grimes	N/A

Maps identifying the locations of all dams in table 2-16 are included in map 2-3. The map is provided by ODNR.

Map 2-3: Champaign County Dam Locations

Ohio Dam Locator



Kiser Lake Dam is located at the north end of Kiser Lake and holds the water in this recreational area at a level conducive to boating and fishing. Kiser Lake is, by far, the largest recreational body of water in the county; all other private lakes are considered ponds, and are small and privately used. Kiser Lake is an open recreational area used by the local and non-local recreational community. The dam inundation zone is drained by Mosquito Creek, and most of the inundation zone is some distance from any structures. State Route 235 crosses the dam via a bridge and the road is vulnerable to flooding should the dam fail under extremely high precipitation and flooding conditions. Under the most extreme and unusual of circumstances, the roadway could be damaged or destroyed as water inundated the bridge and causeway area. A major failure would result in farm crops in adjacent fields being flooded and destroyed. There are no permanent homes in the area of the dam.

The other Class II dams are privately owned, much smaller than Kiser Lake, and used privately. They are near county roadways that could experience some flooding but would likely be temporary and quickly resolved. Most of the Class II dams are surrounded by farmland and away from highly populated areas. Crop loss would be a reasonable expectation if a breach occurred, especially, during times of high precipitation and ground saturation.

The Class III and IV dams are all on private property and serve as private recreational areas on creeks and streams that flow through private property. They pose little risk to any structures and roadways have minimal vulnerability to flooding. The structures are located in rural areas of very low-density population. Most damage would be to farm crops, and likely crops owned by the same owner as the dam.

Local Dam Failure History

There is no known local dam failure history.

2.2.2 Drought and Extreme Heat

A drought is a deficiency of moisture that adversely impacts people, animals, and vegetation over an area of significant size. Because drought is a creeping phenomenon characterized by the absence of water, there is no defined beginning or end, nor is there a specific amount of time required for an extended dry period to be considered a drought. An event is considered a drought when the dry period lasts long enough to impact the environment and economy of a region, typically several months or years.

Drought severity is measured using the Palmer Drought Severity Index (PDSI). The PDSI measures dryness based on recent precipitation and temperature statistics. Drought classifications are identified in the chart below:

Measurement	Description
-4 or less	Extreme Drought
-4 to -3	Severe Drought
-3 to -2	Moderate Drought
-2 to -1	Mild Drought
-1 to -0.5	Incipient Dry Spell
-0.5 to 0.5	Near Normal
0.5 to 1	Incipient Wet Spell
1 to 2	Slightly Wet
2 to 3	Moderately Wet
3 to 4	Very Wet
4 or more	Extremely Wet

A heat wave is a period of abnormally hot and unusually humid weather, typically lasting for two or more days. This can be an extended period of time with higher than normal temperatures or a shorter period of time with abnormally high temperatures. Regardless of the duration or exact temperatures, heat waves are a safety hazard to anyone exposed to the high heat. People are at risk for heat exhaustion and heat stroke, which can be fatal in the most serious cases. When heat waves are accompanied by drought conditions, the potential for a serious natural disaster increases. Between injuries, fatalities, and crop/property damage, these disasters can significantly impact the economy of a region.

Heat waves can occur anywhere in Ohio, including Champaign County, but are typically brief, lasting only a few days. Extreme temperatures are considered anything above 90 degrees Fahrenheit. In the humid climate of the Midwest, these temperatures are often accompanied by high humidity. Temperatures rarely exceed the mid-90s, although the region does occasionally experience temperatures in the upper 90s or slightly higher. These brief heat waves are not uncommon, but rarely last more than a few days. A heat wave lasting longer than a week is extremely rare.

Table 2-17: Average Temperatures and Rainfall

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. High	33°	36°	46°	59°	69°	79°	82°	81°	75°	63°	50°	37°
Avg. Low	19°	20°	28°	38°	49°	59°	63°	61°	54°	42°	34°	24°
Avg. Precip.	2.32"	2.01"	2.56"	3.54"	3.82"	4.21"	3.9"	3.62"	2.35"	2.76"	3.07"	2.76"

Drought/Extreme Heat Risk Assessment

Drought and extreme heat are uncommon in Champaign County but are countywide hazards and can affect all areas and jurisdictions. Brief spells of abnormally dry conditions can last for several weeks but most months have sufficient rainfall to support crop growth. Drought conditions, when they do occur, have a significant impact on the county's significant agriculture industry.

During the primary growing season, Champaign County can experience short periods of unusually dry conditions. Champaign County does not have a history of extended drought that would cause casualties or property damage. The most common drought-related loss is a reduction in crop yields for a single growing season and endangerment of any livestock that could not get water for survival.

Based on the 2012 Census of Agriculture published by the U.S. Department of Agriculture, Champaign County's agriculture industry has a total market value of \$130,414,000. In a drought, the significant crop and livestock operations across the county would be exposed to loss. Table 2-18 identifies the quantities of the primary agricultural commodities in the county that could be impacted by drought-related loss. While many farmers insure their crops, it is not possible to determine how extensive crop insurance coverage is across the county. Insurance would only partially replace the economic loss caused by severe drought.

Table 2-18: Drought Vulnerability Assessment

Top Commodities	Crop Acres	Livestock Inventory
Soybeans	82,913	
Corn	69,450	
Wheat	5,602	
Hogs/Pigs		24,030
Cattle		7,830
Poultry		3,705

Local Drought/Extreme Heat History

Drought is not common in Champaign County. Per official NDCD records, the county has experienced two official droughts as indicated in table 2-19 below. The United States Department of Agriculture issues drought declarations and provides farmers and ranchers with disaster relief funding. According to USDA records, Champaign County has been included in several significant drought incidents.

Table 2-19: Champaign County Drought/Extreme Heat History

Hazard	Incidents	Property Loss	Crop Loss	Deaths	Injuries
Drought	2	0	0	0	0
Extreme Heat	0	0	0	0	0

One of Ohio's more significant droughts was the 1988-1989 North American Drought. This event was preceded by droughts in the Southeastern United States and California the year before. The 1988 was widespread and intense. It included heat waves that killed thousands of people and substantial livestock nationwide. One of the underlying causes of the drought was the nationwide use of marginally arable land for agriculture production and continued pumping of groundwater near the depletion mark. This major drought was catastrophic for the agriculture industry, destroying crops across the country. Water use restrictions were put in place across many jurisdictions. The drought continued to impact the Midwest and Northern Plains states during 1989 and was not declared over until 1990.

In the summer of 2012, Ohio was impacted by another severe drought, the 2012 North American Drought. This incident was an expansion of the 2010-2012 United States drought that began in the spring of 2012. Lack of snowfall in the United States caused very little melt water to absorb into the soil. The drought included most of the United States and all of Ohio. Champaign County, along with 84 other counties in the state, was designated with moderate drought conditions by mid-June of 2012. This drought has been compared to similar droughts in the 1930s and 1950s but did not last as long. The drought caused catastrophic economic ramifications. According to most measures, this drought exceeded the 1988-1989 North American Drought, which is the most recent comparable drought. On September 5, 2012, the USDA issued a disaster declaration for all counties in Ohio affected by the drought; Champaign County was included as a primary county.

The most recent drought to affect Ohio occurred in 2016. On January 6, 2017, the USDA issued a disaster declaration for drought conditions experienced from May through October 2016. The primary declaration was issued for five Ohio counties; ten contiguous counties were also included in the declaration. While Champaign County was not identified as a primary or contiguous county and did not experience complete drought conditions, the greater west central Ohio region was impacted by abnormally dry conditions.

2.2.3 Earthquake

An earthquake occurs when two of earth's plates move past one another beneath earth's surface. The location where the plates meet is called a fault. The shifting of the plates causes movement along the fault line. This movement can often be felt in areas surrounding the earthquake's epicenter and can cause damage ranging from insignificant to devastating. Damage caused by an earthquake can include rattling foundations, falling debris, and, in the most severe cases, toppling buildings, bridges, and culverts. The severity of earthquake movement is measured using the Modified Mercalli Index scale as defined in this chart:

Intensity	Shaking	Description/Damage
I	Not Felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest, especially on building upper floors.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motorcars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very Strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, and walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Earthquake Risk Assessment

Ohio has experienced more than 120 earthquakes since 1776. While only a few of these events have caused structural damage, Ohio does have some earthquake risk, more than many people realize. West central Ohio is the region of the state with the highest earthquake risk. Because Champaign County is located in the west central Ohio, there is some earthquake risk in the county.

Earthquakes are geologically possible but extremely rare in Champaign County. Earthquake is a countywide hazard and can affect all areas and jurisdictions. The county has experienced two very minor earthquakes in the past, as detailed in table 2-21 below. Neither of these incidents caused property damage. Therefore, there is little data to support committing extensive resources to earthquake-proofing buildings and other structures.

Because of the low risk and high cost of implementing earthquake mitigation strategies, the planning team did not identify any such actions. As they arrived at this decision, they considered historical earthquake damage data and HAZUS loss projections for a 5.0 magnitude earthquake with an epicenter in Urbana. Table 2-20 is the vulnerability analysis made available to the committee.

Table 2-20: Earthquake Scenario Vulnerability Analysis

Building Type	Number of Buildings	Exposure
Residential	2,047	\$520,057,881
Non-Residential	1,246	\$221,326,139
Critical Facilities	58	\$10,302,500
<i>Totals</i>	<i>3,351</i>	<i>\$751,686,521</i>

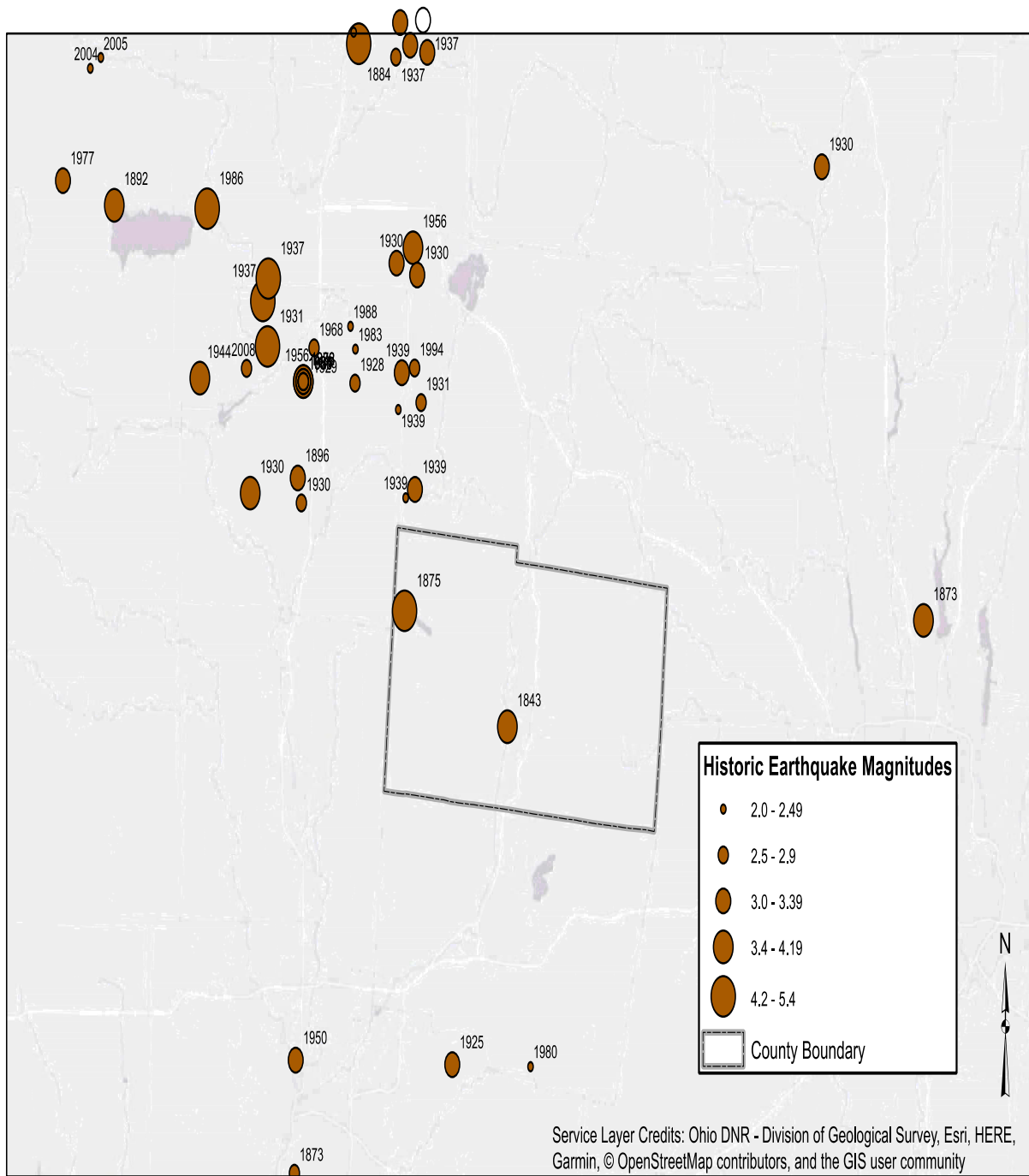
Local Earthquake History

Records from the Ohio Department of Natural Resources indicate that Champaign County has experienced two earthquakes with epicenters in the county. These earthquakes were moderate in magnitude, ranging between 3.5 and 4.7 on the Richter scale. Both occurred in the late 1800s. There is no documented evidence of structural damage in the county. Shelby County to the northwest and Logan County to the north have both experienced several minor earthquakes, ranging in time from the late 1800s to the mid-1900s. Like the Champaign County incidents, these occurrences have been low in magnitude and caused no structural damage. Union, Madison, Clark and Miami Counties, the other adjacent counties, have no earthquake history.

Table 2-21: Champaign County Earthquake History

Date	Location	Magnitude	Modified Mercalli
6/18/1875	Adams Township	4.7	VII
6/19/1843	Urbana Township	3.5	IV

The following map provides locations for the incidents in table 2-21 and the surrounding region.

Map 2-4: Champaign County Earthquake Epicenters

The strongest earthquake recorded in Ohio occurred in Shelby County, adjacent to Champaign County's northwest border, in 1937 and was estimated to have a magnitude of 5.5 on the Richter Scale. This incident caused some damage in Anna and surrounding west central Ohio communities. The same area in Ohio also reported earthquake activity in 1875 and 1884. Residents in Anna also reported minor quakes in 1930 and 1931.

The Pomeroy area, southeast of Columbus, experienced an earthquake in 1926. All of these earthquakes caused only minor damage, primarily shaking buildings, crumbling mortar with limited or no property damage. Impacts were only felt locally; no statewide damages were reported.

2.2.4 Flood

According to the National Weather Service, a flood is defined as an overflow of water onto typically dry land. The inundation of a normally dry area is caused by rising water from a nearby waterway, such as a river, stream, or drainage ditch. Flooding generally occurs subsequent to a meteorological event such as substantial precipitation, rapid snowmelt, or extreme wind events along coastal waterways. This type of flooding, also known as riverine flooding can last days or weeks.

A flash flood is caused by heavy or excessive rainfall over a short period of time, typically less than six hours. These events are often characterized by raging torrents after heavy rains impact river beds, streets, or low-lying areas and can occur within minutes or hours of excessive rainfall. Flash flooding can also occur when the ground is too saturated, impervious, or flat to drain rainfall into waterways through storm sewers, ditches, creeks, and streams at the same rate as the precipitation falls.

Floods are the most common and costly disaster worldwide, resulting in significant loss of life and property. They have a substantial impact on infrastructure, including roadway breaches, bridge washouts, roadway wash away, and water-covered roadways. Fast-moving floodwater can wash away the surface and sub-surface of roads, creating holes, ruts, and other problems for vehicles. Floodwater that is one foot deep is strong enough to carry vehicles away, often with occupants inside. Rescuers are powerless against rapid, rising water because they are unable to exert enough strength to counteract the physics of moving water.

Floodwaters seek the path of least resistance as they travel to lower ground and will seep into and occupy any structure in their path. Basements and lower levels of buildings can become inundated with floodwater. Installing sandbags along the exterior of a building can be a temporary stopgap measure but, if floodwaters do not recede quickly, the force of the water will move through the sandbags and enter the structure.

The aftereffects of flooding can be just as damaging as the flood itself. Cleanup is often a long, protracted activity with its own set of hazards. Standing flood water can become contaminated with household and industrial chemicals, fuel, and other materials that have leaked into the

water. All floodwater is considered contaminated, either from germs and disease or hazardous materials. This creates a hazard for responders and residents throughout the cleanup phase.

Flood Risk Assessment

Flooding is considered a significant risk in Champaign County. This risk includes riverine flooding and flash flooding. The county's combination of flat and rolling terrain and the number of rivers, streams, creeks, and ditches contribute to the local flood risk. The county is located in two different watersheds: Great Miami River and Scioto River. The Great Miami watershed includes the central and western sections of the county. The east section falls in the Scioto River watershed. Flooding is a countywide hazard and can affect nearly all jurisdictions. Champaign County experiences a combination of riverine and flash flooding.

The soil types in Champaign County are mostly poorly drained soils that retain water for a period of time, and that are prone to surface drainage in the absence of engineered tiling systems. With heavy or hard rain, the soils can become hardened and water runs across the surface into swales and ditches. In the flatter areas, some swales and French drains have been installed to guide and direct wastewater to the creeks and ditches. Some roadways have ditches alongside the pavement to contain runoff from the roads. Some production land areas are tiled; these areas are the flatter and more productive soils that produce grain. The county has facilitated drainage in some areas by installing what is referred to as a "county tile" which is a drainage main that is maintained by the county engineer. Other more rolling areas that make up ditch-bottoms and waste land along waterways are grazing land for cattle and other livestock, and natural habitat due to the frequent flooding and standing water.

Flash flooding occurs in much the same way. There are many roads that are closed after heavy rain due to a low-lying bridge, or a winding turn in the road that is flooded over in one section or another. The water collects quickly in these areas as it runs across clay soils that harden and drain poorly. If ground is frozen or already saturated, this occurs very quickly. This can last for several days, impeding transportation and movement of goods and services within the county for an inconvenient length of time.

Flood damage in Champaign County could include damage and destruction of physical buildings, infrastructure, crops, and livestock. Residential structural damages could include single and multi-family homes, group living facilities, and multi-family housing complexes. Commercial and industrial structural damages could include buildings used for manufacturing, product handling, transportation, warehousing, retail, business, and industrial, and the capital equipment associated with those uses. Agricultural structures would include barns used for livestock, storage buildings, equipment, and machinery. Grain bins and elevator systems could be damaged very easily by the force of water. Government, nonprofit, and educational institutions include critical structures like fire stations, police stations, hospitals, offices, schools, and special facilities like garages and maintenance buildings, and the capital contents of those structures. This damage would result in large amounts of debris to manage, including finish, structural, and foundation materials. It is unlikely that loss of life would be attributed to

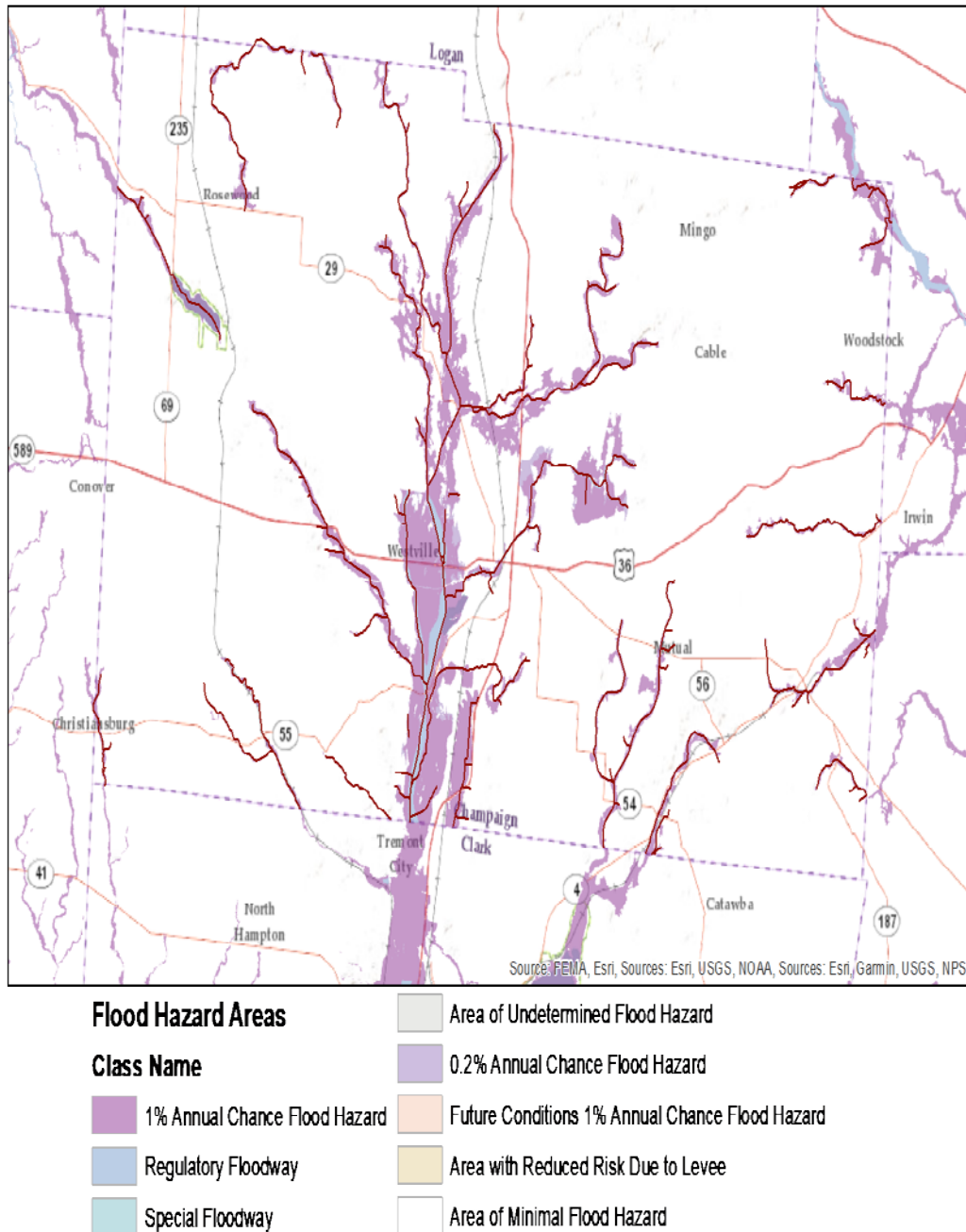
flooding. If a death were to occur, it would likely be the result of two or more combined threats, such as lightning, tornado, or driving into standing water.

Table 2-22: 100-Year Flood Scenario Vulnerability Analysis

Building Type	Number of Buildings	Exposure
Residential	3,024	\$796,846,000
Non-Residential	661	\$174,826,000
Critical Facilities	85	\$22,234,000
<i>Totals</i>	<i>3,769</i>	<i>\$993,906,000</i>

Floodplain Mapping and National Flood Insurance Program

Champaign County's floodplain maps were updated in 2009 as part of FEMA's Map Modernization Program. The current floodplain maps became effective 11/18/2009. Map 2-5 below identifies floodplain areas in the county.

Map 2-5: Champaign County Floodplain

The table below provides information on participation in the National Flood Insurance Program for communities in Champaign County. The information is from FEMA's Community Status Book for Ohio. The communities listed participate in NFIP and are considered to be in good standing with the program. All communities except Woodstock participate in NFIP. Woodstock does not currently participate because it does not have any identified floodplain areas.

Table 2-23: NFIP Participating Communities

Community	Initial FHBM Identified	Initial FIRM Identified	Current Map Effective Date	Reg-Emer Date
Champaign County	12/23/77	04/03/85	11/18/09	04/03/85
Christiansburg	01/25/74	11/02/84	11/18/09 (M)	11/02/84 (M)
Mechanicsburg	02/01/74	09/01/86	11/18/09 (M)	09/01/86
Mutual	Unknown	11/18/09	(NSFHA)	05/13/83
North Lewisburg	04/05/74	12/07/84	11/18/09 (M)	12/07/84
St. Paris	06/07/74	11/18/09	(NSFHA)	05/29/79
Urbana	06/07/74	04/03/84	11/18/09	04/03/84

Repetitive and Severe Repetitive Loss Structures

Throughout Champaign County, there is only one known repetitive loss structure as of June 30, 2018. This structure is identified as a business-nonresidential building that has incurred three separate incidents. There are no severe repetitive loss properties that have been identified in Champaign County.

Table 2-24: Repetitive Loss Properties

Community	Properties	Losses	Building Payments	Contents Payments	Total Payments
Urbana	1	3	\$56,204.61	0	\$56,204.61

Local Flood History

Champaign County has experienced 23 floods and 9 flash floods since 1950., per NCDC records. Property damage from these incidents has been relatively low, limited to approximately \$164,000.

Table 2-25: Champaign County Flood History

Hazard	Incidents	Property Loss	Crop Loss	Deaths	Injuries
Flood	23	\$54K	0	0	0
Flash Flood	9	\$108K	0	1	0

Champaign County has experienced multiple flooding events but the majority have caused little to no property damage. Of the 32 document incidents, 26 have caused less than \$5,000 in property damage. One of the more damaging and costly floods occurred on June 1, 1997 when a system of thunderstorms moved across southern and central Ohio. These storms brought heavy precipitation onto ground that was already saturated, causing streams and creeks to overflow. The eastern part of Champaign County was the hardest hit. An apartment complex was evacuated in North Lewisburg and several roads were washed out. Flooded roadways were a problem across the county. In total, Champaign County received nearly 5 inches of rain in less than 24 hours and suffered \$75,000 in property loss.

On January 4-5, 2005, a stationary front stalled across central Ohio and dropped heavy rain across the region for nearly 24 hours. Because the ground was already saturated from recent

snowmelt, the additional four inches of rain caused widespread flooding. The event caused more than \$600,000 in damage across central Ohio. In Champaign County, property damage was limited to \$20,000 but many roads were flooded.

2.2.5 Hazardous Materials Incident

A hazardous materials spill or release occurs when a hazardous substance breaches its container. The release can occur during operations at a fixed facility or during transportation of the substance, which can occur via ground or rail transport. Hazardous substances are stored in numerous types of containers, including drums, cans, jars, pipes, and other vessels. Some releases are incidental and can be safely cleaned up by on-site facility personnel. An incidental release does not threaten the health or safety of the immediate area or community because the spill involves only a small quantity. If the release involves a larger quantity than can be handled by facility personnel and requires action by first responders or agencies outside of the spiller's facility, the incident is considered an emergency response. To protect the community, evacuation from the facility or area surrounding the spill may be necessary.

Every hazardous substance is unique and can have toxic, flammable, explosive, and/or corrosive properties. Each material is assigned a class based on these properties; hazardous materials classifications are described in table 2-27 below. When a hazardous substance is released into the environment, it can negatively impact the safety and health of the community by contaminating the air, water, and/or ground.

Table 2-26: Hazardous Material Classifications

Class	Description
1	Explosives
2	Gases
3	Flammable liquids and combustible liquid
4	Flammable solid, spontaneously combustible, dangerous when wet
5	Oxidizer and organic peroxide
6	Poison (toxic) and poison inhalation hazard
7	Radioactive
8	Corrosive
9	Miscellaneous

Traffic accidents on roadways can cause the vehicles carrying hazardous substances to overturn, collide with other vehicles, or ignite and burn. The runoff caused by chemical spills, the vapors created as a chemical dissipates, or the burning of a substance can expose anyone in the immediate vicinity of the incident to extreme danger. Vehicular accidents compound the vulnerabilities of people and the environment to include both traumatic injury due to the crash or kinetics of the incident and the negative effects of absorbing the chemical that is released into the atmosphere.

Injuries from exposure to hazardous substances can involve direct contact with the substance and traumatic injuries from explosions or fires. Most hazardous materials releases involve the breach of a container or the unintended combining of chemicals. These spills and leaks can occur in businesses, homes, and industries or anywhere else that hazardous substances exist.

There is no unified reporting system for hazardous materials incidents. Industrial spills involving reportable quantities are documented in accordance with state and federal regulations. Smaller spills often go undocumented unless someone is hurt and requires medical attention. Large industrial spills and leaks are investigated by local hazardous materials teams, regulators, and government responders. Spills that occur on highways and railroads become known because local first responders and emergency management officials are involved in responding to the incident. Incidents of non-lethal exposure, such as a small chemical spill in a residence or a broken mercury thermometer, may not even be recognized as an emergency. Individuals do not always know the risks associated with these incidents so they clean up the spill as best they can without any additional reporting.

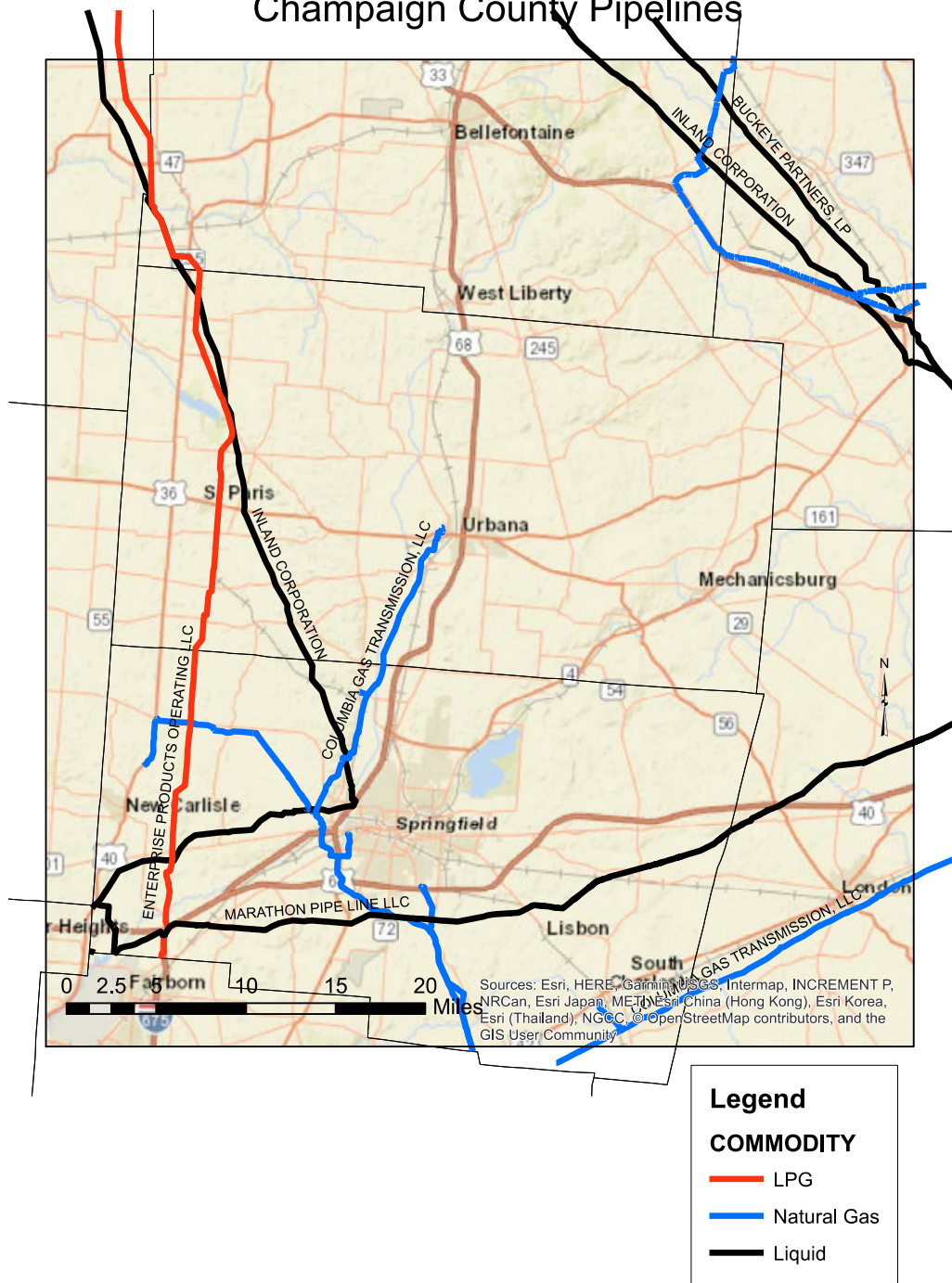
Hazardous Materials Incident Risk Assessment

Champaign County has a moderate risk for hazardous materials incidents. The county is home to numerous facilities that manufacture, utilize, and/or store hazardous substances. There are also numerous grain and livestock farms that use fertilizers, pesticides, and other agricultural chemicals in the course of production. Anhydrous ammonia and other agricultural chemicals are often transported across county and township roads, and occasionally on a state highway. Individual homes have substances to care for their property, including large lawns and lush landscaping. There are parks and recreational areas, as well as golf courses and other areas that boast of recreational use with well groomed and richly fertilized grass. Hazardous substances are transported on county roads and state highways. Populated jurisdictions along these highways and railroads are particularly vulnerable to hazardous materials incidents because of their proximity to the major transportation routes on which these substances are carried.

Pipelines are also present throughout Champaign County, particularly in the western portion of the county. Map 2-6 identifies the most significant pipelines in the county. These pipelines carry natural gas, petroleum products, and other substances. In the St. Paris area, there is a large natural gas storage facility. While it is believed that the pipelines and storage areas are well maintained, there is always a risk for an incident. First responders participate in training to prepare for these potential responses.

Because of the movement of hazardous materials on different types of transportation systems throughout the county, hazardous materials incidents are a countywide hazard and can affect all areas and jurisdictions.

Map 2-6: Champaign County Pipelines
Champaign County Pipelines



Local Hazardous Materials Incident History

According to the Pipeline and Hazardous Materials Safety Administration (PHMSA), Champaign County has experienced 8 hazardous materials spills or releases on highways or rail between 1978 through April 2019. These incidents all occurred at a location with an Urbana zip code, likely because of the concentration of highways in central Champaign County. All incidents except one were associated with highway transportation by a commercial carrier. The substances being hauled were mostly petroleum-based products or anhydrous ammonia. Losses were minor, with a range from zero to \$1,300 per incident. There were no deaths or injuries associated with the PHMSA data. Champaign County LEPC maintains additional records on hazardous materials spills in the county.

2.2.6 Invasive Species

An invasive species is a plant or animal species that is not native to the local ecosystem and whose introduction is likely to cause economic or environmental harm or harm to human life. Across the United States, more than 5,000 species are recognized as invasive. Invasive species are classified as terrestrial plants, terrestrial wildlife, insects and diseases, and aquatic species.

Invasive terrestrial plants can displace native species, impact the wildlife that rely on native species as a source of food or shelter, or form monoculture plant communities that reduce biodiversity. While more than 25% of the plant species in Ohio originate from other areas, most are not invasive; fewer than 100 species are actually considered invasive.

Invasive terrestrial wildlife is much less common than other types of invasive species but can still cause significant damage to natural habitats. Aquatic invasive species are plants and animals that impact the quality of waterways. These can affect large bodies of water, such as Lake Erie and the Ohio River, and much smaller rivers, lakes, and streams. Invasive insects and diseases are insects, fungus, and other small organisms that can negatively impact plants, forests, and the health of wildlife. Table 2-29 identifies the invasive species across these categories that have the greatest impact in Ohio.

Table 2-27: Invasive Species in Ohio

Species	Type
Asian Carp	Aquatic
Curlyleaf Pondweed	Aquatic
Hydrilla	Aquatic
Round Goby	Aquatic
Ruffe	Aquatic
Red Swamp Crayfish	Aquatic
Sea Lamprey	Aquatic
White Perch	Aquatic
Zebra Mussel	Aquatic
Asian Longhorned Beetle	Insects & Diseases
Emerald Ash Borer	Insects & Diseases
Gypsy Moth	Insects & Diseases
Hemlock Woolly Adelgid (HWA)	Insects & Diseases
Walnut Twig Beetle	Insects & Diseases
Japanese Honeysuckle	Terrestrial Plant
Japanese Knotweed	Terrestrial Plant
Autumn-Olive	Terrestrial Plant
Buckthorns	Terrestrial Plant
Purple Loosestrife	Terrestrial Plant
Common Reed or Phragmites	Terrestrial Plant
Reed Canary Grass	Terrestrial Plant
Garlic Mustard	Terrestrial Plant
Multiflora Rose	Terrestrial Plant
Bush Honeysuckles	Terrestrial Plant
Feral Pig	Terrestrial Wildlife

Invasive Species Risk Assessment

Like most counties in Ohio, Champaign County has many trees and wooded areas, all of which are vulnerable to damage from invasive species. When trees that are dead or weakened from invasive species fall, they become storm debris and can damage homes, buildings, vehicles, and anything else in their path. Diseases trees also fall into rivers, creeks, and streams, clogging the waterways and impeding drainage and increasing the county's vulnerability to flooding.

The most recent invasive species to impact Ohio, including Champaign County, is the Emerald Ash Borer. The county is equally vulnerable to damage caused by other tree-infecting insects. Waterways could also be impacted by invasive plant and animal species. An infestation of any type would cause damage across Champaign County, making invasive species a countywide hazard that can affect all areas and jurisdictions.

The cost to a community from invasive species is difficult to quantify because it comes from the long-term effects and cleanup costs rather than direct property damage. Actions like removing and disposing of diseased trees and vegetation, repairing damage caused by falling trees,

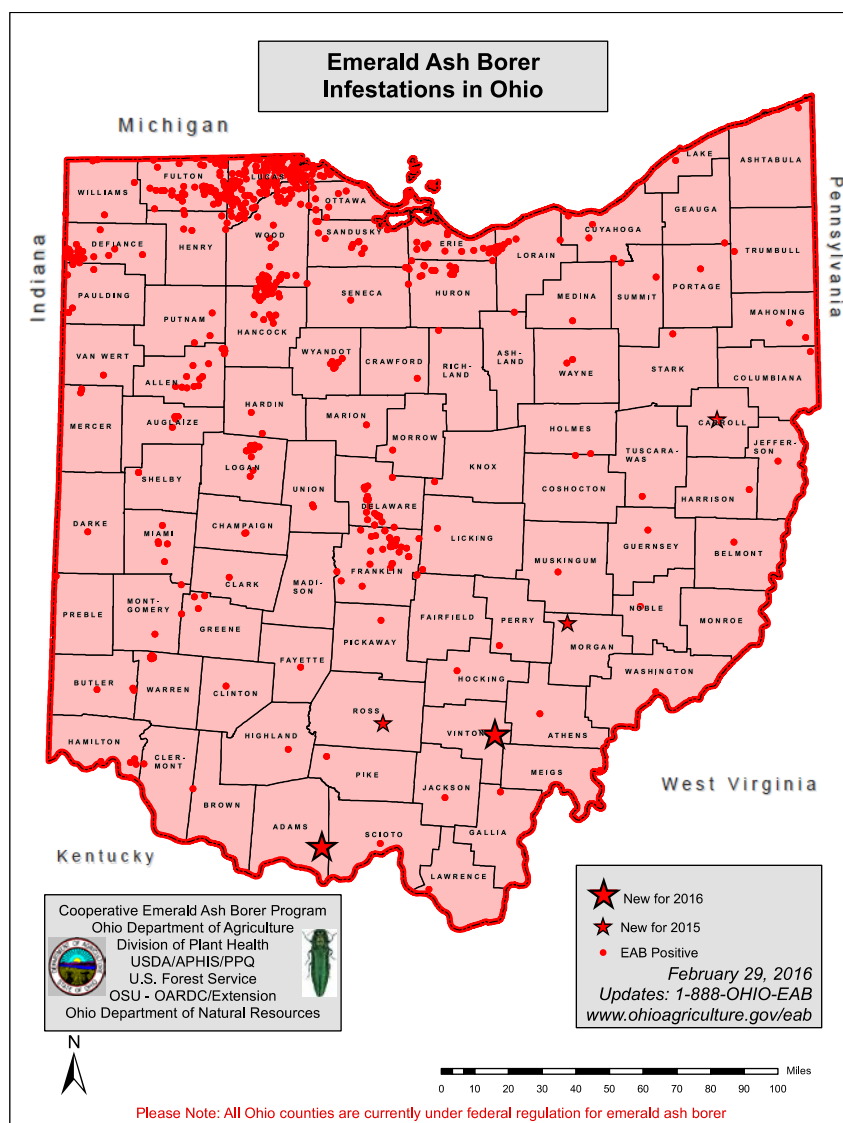
cleaning and dredging debris-filled waterways, and repairing infrastructure damaged by the infestation are all costs associated with invasive species. These tasks are extremely expensive and can cost jurisdictions hundreds of thousands of dollars.

Local Invasive Species History

Emerald Ash Borer (EAB) is the most recent invasive species to impact Ohio, including Champaign County. EAB is an ash-tree killing insect native to Asia that kills trees within three to five years of infestation. It was first discovered in Ohio in 2003. To mitigate EAB impact, the Ohio Department of Agriculture and partner agencies worked to protect the state's 3.8 billion ash trees. Map 2-7 identifies EAB infestation areas in Ohio. Champaign County was not one of the most heavily affected areas of the state but was impacted by the infestation and statewide quarantine on ash wood. The quarantine was lifted in 2011, indicating that the worst of the infestation has passed. While the infestation threat has passed, most communities are still dealing with the thousands of dead and diseased trees that have not been removed. It will take individual property owners and communities thousands of dollars and years of time to remove these trees. From a disaster perspective, these weakened trees create an increased risk for property damage from high wind events. Dead and diseased trees are extremely susceptible to wind damage. Along waterways, diseased trees also increase flood risk as they fall into streams and impeded drainage.

Other invasive species that are currently under quarantine in parts of Ohio include the Gypsy Moth, Walnut Twig Beetle, and Asian Longhorned Beetle.

Across Champaign County, all jurisdictions have experienced significant effects from the EAB infestation. As diseased trees along rivers and streams have died, they have fallen into waterways, impacting drainage and the flow of water. Diseased trees along the public right-of-way have also impacted infrastructure, as they are more likely to fall during a storm or high wind event. The county engineer and municipal street and road departments have aggressively removed diseased trees along the public right-of-way. This has been effective at reducing the impact on utility lines and other infrastructure but has been a significant financial burden for jurisdictions. Public agencies are also not able to remove trees from private property. Individual landowners are responsible for removing dead and diseased trees from their personal property. Because this does not always occur, there are still hundreds of dead and diseased trees that will continue to cause problems across the county.

Map 2-7: Emerald Ash Borer Infestation Map

2.2.7 Land Subsidence

Land subsidence is the gradual or sudden sinking of the Earth's surface caused by subsurface movement of earth materials. Subsidence is an issue that develops over time. The primary causes are aquifer-system compaction, underground mining, drainage of organic soils, natural compaction, sinkholes, and thawing permafrost. Land subsidence affects more than 17,000 square miles across the United States, an area equivalent to the size of New Hampshire and Vermont. For more than 80% of this area, subsidence is the result of groundwater exploitation and overuse.

Karst is a specific type of topography that can contribute to land subsidence issues. While Champaign County has some known karst areas, few known problems have occurred. Karst is a landscape shaped by the dissolution of limestone or dolomite layers of bedrock. Surface water

percolates through these layers, slowly dissolving the limestone or dolomite and creating voids. The voids may be visible or invisible, depending on their depth. Visible voids can allow surface water to flow directly into the water table. Deeper voids are not visible at the surface. Over time, the water table can change, potentially destabilizing the deeper voids. Much of southwest Ohio features karst topography, as identified on the map below.

Map 2-8: Ohio Karst Areas

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Land Subsidence Risk Assessment

Champaign County is located in an area identified as having some karst topography. Per the map above, the east and northwest areas of the county are identified as having Silurian and Devonian age carbonate bedrock overlain by more than 20 feet of glacial drift and/or alluvium. The southwest portion of the county is Interbedded Ordovician-age limestone and shale overlain by more than twenty feet of glacial drift and/or alluvium. From a risk perspective, this means that these areas are at slight risk to develop voids below the surface where soft rock has been washed away by the water table over thousands of years. This creates open areas that become unstable and result in shifting and moving, creating sink holes and settling where no apparent reason for it exists. Because of unseen voids and areas that seem to open up, direct openings into the aquifer can develop and result in a direct route for contaminants to enter the water source. Septic system contaminants and application of ground chemicals in these areas can leech into the aquifer through these openings and cause water quality problems.

Local Land Subsidence History

Planning team members do not report known incidents involving land subsidence. In Urbana, however, the northwest quadrant of the city is known to have a very high water table that is more susceptible to contamination than other areas of the county. There are no known cases of sink hole development or land deterioration in other areas of the county, including those identified as having karst characteristics on current ODNR maps.

Because identification of unstable karst formations is expensive and time-consuming, the Ohio Department of Natural Resources Division of Geological Surveys has not fully mapped all areas. Because of this, Champaign County is not fully aware of the extent of their land subsidence risk. More risk assessment will continue in the future as the Ohio Department of Natural Resources and the Miami River Watershed Conservancy District to develop projects and preserve natural resources. This mapping falls under the umbrella of ODNR.

2.2.8 Power Outage

While electrical system failures can occur because of a disaster or storm, breakdown of this critical utility can also occur independent of another hazard. When this happens, it is often the result of system overload or lack of improvements, updates, and maintenance to the system's infrastructure. Residents and businesses rely on electricity to support basic daily functions. When the system fails or service is interrupted, the effects are felt immediately. Populations with special needs, including children, the elderly, and those with serious medical conditions, suffer the most during electrical system failures.

Power failures do not generally cause significant structural damage. The greatest risk for physical damage is from broken distribution lines, poles, and substations. The most significant impact is the hardship for the people and businesses affected by the outage, including the potential economic impact. If businesses are unable to operate for several days or longer until power is restored, the negative effect would quickly ripple across the community. Power outages are a countywide hazard and can affect all areas and jurisdictions.

Local Power Outage History

The most significant utility failures to impact Champaign County were the direct result of natural disasters. In September 2008, the county was impacted by a major power outage. As the sub-tropical remnants of Hurricane Ike traveled north from the Gulf of Mexico, heavy winds affected significant portions of the Midwest. In Ohio, the sustained 75 mph winds caused an estimated 2.6 million power outages. While some outages were brief, more than 300,000 people were without power for more than a week. Businesses were shut down, leading to significant economic loss.

On June 29, 2012, the area again experienced power outages as the result of a major storm system when a derecho moved across the Midwest and Mid-Atlantic states. This massive storm system caused power outages across two-thirds of Ohio; more than one million people were without power, some as long as five days.

2.2.9 Severe Thunderstorm

A thunderstorm is a local storm produced by a cumulonimbus cloud accompanied by a combination of thunder, lightning, and hail. Lightning is a brief, naturally occurring electrical discharge that occurs between a cloud and the ground. Hail is frozen rain pellets that can damage buildings, vehicles, and other structures as they fall. Hail forms in the higher clouds and accumulates size as it falls as precipitation. If temperatures close to the ground are warm, the hail can partially melt or become freezing rain. Most thunderstorms include heavy precipitation and wind. These storms can produce hail, lightning, flash floods, tornadoes, and damaging winds that pose significant risk to people and property in the area. A thunderstorm that produces a tornado, winds of 58 mph or greater, and/or hail with a diameter of at least 1", is considered a severe thunderstorm. These storms typically develop as part of a larger storm front and are preceded and followed by regular thunderstorms.

Severe Thunderstorm Risk Assessment

Thunderstorms occur frequently in Champaign County, especially during the spring and summer. In these months, heat warms the atmosphere throughout the day, creating an atmosphere ripe for thunderstorms with hail, lightning, heavy rain and wind. Microbursts often include strong straight-line winds that can damage or destroy standing crops and develop quickly with little warning. Most thunderstorms include heavy precipitation, wind, and thunder. Hail and lightning are possible but are less frequent. Thunderstorms are a countywide hazard and can affect all areas and jurisdictions. These storms range from minor to severe, although the most are minor or moderate. Thunderstorms are relatively frequent but generally result in limited property damage.

Even minor thunderstorms can damage property and infrastructure. Hail typically damages vehicles, roofs, and siding although injuries or loss of life are rare. Thunderstorm winds can damage standing crops, especially those at a vulnerable growth stage. Damage to crops can drastically reduce yields, causing significant or even extreme loss to farmers for that year's crop.

Table 2-28 describes the overall vulnerability of countywide property to worst case severe thunderstorm damage, including hail, wind, heavy precipitation and lightning. The HAZUS analysis property values for flood were used as the basis, maintaining consistency from one hazard vulnerability description to another, and damage estimates were calculated at a 25% damage factor as a worst-plausible case scenario for widespread severe thunderstorm damage. This 25% was based upon comparative data between flood and severe thunderstorm loss statistics from a variety of past incidents. The HAZUS MH Loss Estimator calculation tool was used to develop this table.

Table 2-28: Thunderstorm Scenario Vulnerability Analysis

Building Type	Number of Buildings	Exposure
Residential	756	\$199,211,000
Non-Residential	168	\$44,455,000
Critical Facilities	21	\$5,557,000
<i>Totals</i>	<i>945</i>	<i>\$249,223,000</i>

Local Severe Thunderstorm History

Thunderstorms are a frequent hazard in Champaign County. According to NCDC records, the county has experienced more than 195 incidents since 1950. While thunderstorm occurrences are minor and cause little or no damage, a few have caused considerable property damage. Collectively, thunderstorm incidents have caused nearly \$1,000,000 in property damage.

Table 2-29: Champaign County Severe Thunderstorm History

Hazard	Incidents	Property Loss	Crop Loss	Deaths	Injuries
Thunderstorm Wind	137	\$914K	0	0	1
Hail	57	\$38K	0	0	0
Lightning	1	0	0	0	3

While thunderstorms are common in Champaign County and rarely cause significant damage, there are exceptions. One of the more damaging thunderstorm events to impact the county occurred on June 29, 2012. A very large and unstable air mass produced a derecho in northern Illinois. This super-size thunderstorm moved across Illinois, Indiana, and through central Ohio. The storm produced extreme winds, hail, and rain and caused widespread damage and power outages. In some areas of Ohio, power outages lasted nearly two weeks. In Champaign County, significant tree damage occurred, causing power outages and damage to some homes and buildings. In total, the county experienced \$137,000 in property loss. Across the state, damage totals reached more than \$1,500,000.

On August 7, 2011, another severe thunderstorm caused significant damage in the county. A cluster of severe thunderstorms moved into Ohio from Indiana in the late afternoon. The storm system produced high winds and precipitation that damages trees and power lines. A mobile home in the Northville area was destroyed, as were multiple trailers and vehicles. Damage from the incident totaled \$70,000.

2.2.10 Tornado

A tornado is an intense, rotating column of air that protrudes from a cumulonimbus cloud in the shape of a funnel or rope whose circulation is present on the ground. If the column of air does not touch the ground, it is referred to as a funnel cloud. This column of air circulates around an area of intense low pressure, almost always in a counterclockwise direction. Tornadoes usually range from 300 to 2,000 feet wide and form ahead of advancing cold fronts. They tend to move from southwest to northeast because they are most often driven by southwest winds.

A tornado's life progresses through several stages: dust-whirl, organizing, mature, shrinking, and decay. Once in the mature stage, the tornado generally stays in contact with the ground for the duration of its life cycle. When a single storm system produces more than one distinct funnel clouds, it is referred to as a tornado family or outbreak.

Tornado magnitude is measured using the Enhanced Fujita scale, abbreviated as EF. The ratings range from EF-0 to EF-5 and are based on wind speeds and related damage. The Enhanced Fujita Scale has been used as the official tornado rating scale since 2007. The following table is provided by FEMA and indicates the type of damages typically caused by a tornado according to the Enhanced Fujita Scale.

EF-Scale	Wind Speed	Typical Damage
0	65 – 85 mph	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over,
1	86 – 110 mph	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
2	111 – 135 mph	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground
3	136 – 165 mph	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
4	166 – 200 mph	Devastating damage. Whole frame and well-constructed houses completely leveled; cars thrown and small missiles generated.
5	>200 mph	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters; high-rise buildings have significant structural damage; incredible phenomena will occur
No rating		Inconceivable damage. Should a tornado with the maximum wind speed in excess of EF-5 occur, the extent and types of damage may not be conceived. A number of missiles such as iceboxes, water heaters, storage tanks, automobiles, etc. Will create serious secondary damage on structures.

Tornadoes are the most damaging of all atmospheric phenomena. While their frequency is low, the probability of significant damage is high. Because tornadoes occur as part of a storm

system, they rarely occur as independent incidents. Emerging out of a storm front or super cell, the tornado can be extremely damaging, especially when accompanied by heavy rain, straight-line wind, lightning, and hail. Effects of a tornado include uprooted trees, damaged or destroyed buildings, and smashed vehicles. Twisting and flying debris turns into projectile weapons, which can cause injuries and fatalities.

Tornado Risk Assessment

Unlike in the Great Plains states, tornadoes in Ohio are typically narrow and do not reach width of the mega-tornadoes frequent in other parts of the country. Locally, tornadoes are generally 25-500 yards wide and stay on the ground for a few miles. Ohio ranks among the top twenty states in injuries, fatalities, and property damage from tornado events. Tornadoes are not a frequent occurrence in Champaign County but their severity and impact can be substantial. The magnitude of past tornadoes has ranged from F/EF0 to F/EF3; two of the county's five incidents have been classified as F/EF-2. Tornadoes are a countywide hazard and can affect all areas and jurisdictions.

Most residential buildings in the county are constructed from wood, concrete, brick, and stone. Older homes are typically constructed using limestone and other masonry materials and built on traditional foundations with basements or crawl spaces. Newer residential construction is frequently built on concrete slabs without basements or crawl spaces. These homes are most prone to superficial damage, roof damage, and falling trees during tornadoes and severe windstorms. Mobile homes are more vulnerable to wind damage because they are less secured to the ground than buildings with foundations, are lighter weight, and constructed of less wind-resistant material than traditionally built homes.

Property damage from tornadoes can include damaged roofs, gutters, downspouts, and trees. Outbuildings, barns, and storage buildings are at risk for damage because these structures are less resistant to wind damage and are frequently built on concrete slabs or dirt foundations.

Table 2-30 describes the overall vulnerability of countywide property to worst case tornado damage. The HAZUS analysis property values for flood were used as the valuation basis, maintaining consistency from one hazard vulnerability description to another, and damage estimates were calculated at a 10% damage factor as a worst-plausible case scenario for tornado damage that historically hits isolated and sporadic areas. This 10% was based upon comparative data between flood and tornado loss statistics from a variety of past incidents. The HAZUS MH Loss Estimator calculation tool was used to develop this table.

Table 2-30: Tornado Scenario Vulnerability Analysis

Building Type	Number of Buildings	Exposure
Residential	302	\$79,684,000
Non-Residential	67	\$17,782,000
Critical Facilities	24	\$6,520,000
<i>Totals</i>	<i>394</i>	<i>\$6,520,000</i>

Local Tornado History

Champaign County has experienced 5 tornadoes according to NCDC records. Most of these have resulted in limited property damage although they have rated high on the Enhanced Fujita scale. The map below identifies the location of tornado incidents in Champaign County.

Map 2-9: Tornado History

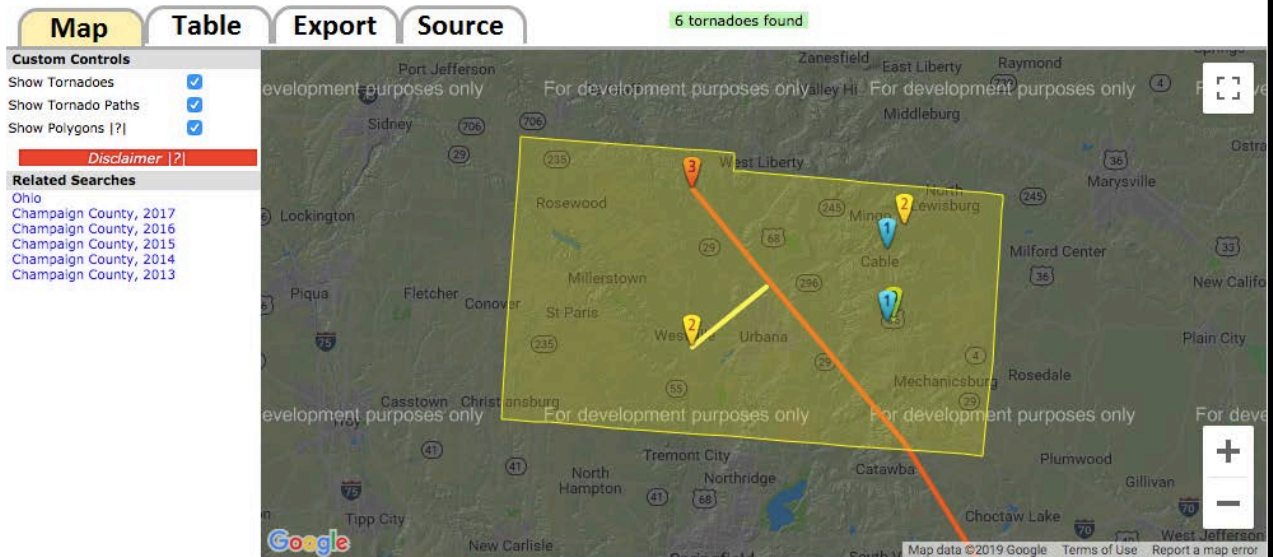


Table 2-31: Champaign County Tornado History

Hazard	Incidents	Property Loss	Crop Loss	Deaths	Injuries
Tornado	5	\$592K	0	0	4

Of the five tornadoes in Champaign County's history, two have caused significant damage. On June 13, 1958, a tornado originated in Mad River Township and moved northeast of Urbana, leaving a 5-mile path of damage. The tornado was classified as F2 on the Fujita scale and caused \$250,000 in property damage. On April 9, 1999, the county was hit by a F1 tornado in the northeast section of the county. The storm damaged multiple houses and mobile homes and downed trees. Total property damage was \$300,000.

2.2.11 Water Quality Emergency

Water quality refers to the chemical, physical, biological, and radiological characteristics of water. It is a measure of the water relative to the requirements of one or more biotic species and human need or purpose. A water quality emergency occurs when the quality of water available for human consumption is compromised. In recent years, water quality has become a growing concern in northwest Ohio as Lake Erie and its associated rivers and streams have been affected. Other areas of the state have also experienced water quality issues in inland lakes and reservoirs, making water quality a growing concern statewide. Algal blooms are one of the more common causes of water quality issues. Algal blooms occur when colonies of algae grow

out of control and produce toxic harmful effects on people and animals. In Lake Erie, high phosphorous levels caused by runoff are considered a contributing factor to these harmful algal blooms. Some algal blooms produce microcystin, which is a poisonous bacterium that can sicken or kill people, fish, birds, and other animals. When microcystin or other toxins infiltrate a public water supply, the water becomes contaminated and unsafe for consumption. These incidents can have a drastic human and economic toll on the affected area.

In addition to harmful algal bloom risk, water treatment and distribution systems are susceptible to infrastructure failure. This can include anything from long-term lack of repair, maintenance and/or upgrade to contamination from lead pipes and other substances.

Water Quality Emergency Risk Assessment

Because a water quality emergency can occur in any source body of water or water treatment facility, water quality is a countywide hazard that can affect all areas and jurisdictions. When water quality is compromised, risks to the community include public health and the economy. From a public health perspective, contaminated water can cause serious illness when consumed. Persons with special medical needs, compromised immune systems, the elderly, and children are most susceptible to this. Animals, including family pets and livestock, are also susceptible to illness from contaminated water. If the water supply is contaminated, residents lose access to drinking water in their homes and restaurants, grocery stores, and businesses that use water in their regular operations are forced to close until water service is restored. Retail and service businesses may be affected if the public travels to other communities for shopping and food service needs during the emergency. This revenue loss, even if only for a short duration, can have a significant economic impact. Businesses lose critical revenue which quickly leads to reduced wages for employees. The longer the emergency lasts, the more significant the economic impact. Any compromise in the water supply also affects the public's trust of government officials. If the public is concerned about the safety of their water and doesn't feel local officials are being transparent and fully communicating about the issue, they may question the information provided by local officials.

To protect the community's water supply, jurisdictions must continually monitor, repair, and upgrade water treatment infrastructure. Because this is costly, jurisdictions must plan and budget for it. If the infrastructure is not well maintained and emergency work must be completed when a water quality emergency occurs, the economic cost is higher than if work is completed as part of ongoing maintenance and upgrades. In addition to the direct economic loss resulting from the emergency, the jurisdiction must immediately identify funds to make the repairs. These costs are often recouped through increases in the fees charged to consumers, ultimately costing residents more money through increases to water rates, user fees, and local taxes.

Local Water Quality Emergency History

The most significant water quality emergency in Ohio occurred on August 3, 2014. This incident did not directly impact Champaign County but garnered national attention and forced municipalities statewide to consider the impact a similar situation would have on their community. In the early morning hours of August 3, the water treatment plant for the city of

Toledo, northwest of Champaign County, detected microcystin from a toxic algal bloom in their water supply and declared the water unsafe to drink. The Toledo water system supplies municipal water to approximately 400,000 people in the northwest Ohio region. Local emergency management and government officials scrambled to provide drinking water to the affected communities. Within hours, stores across the region sold out of bottled water as residents scrambled to purchase critical water supplies. Restaurants and food service businesses were forced to close until safe water could be provided and hospitals experienced a surge of patients who believed they were ill from consuming contaminated water. Within three days, Toledo's water was declared safe to drink but the economic and political ramifications lasted much longer. Five years later, the city is still determining how to fund critical improvements to their water treatment infrastructure and the municipalities who purchase water from Toledo are exploring alternate water sources.

Champaign County has not experienced a water crisis to this extent but municipalities do have concerns about their water supply. Inland lakes and reservoirs in other areas of the state have experienced toxic algal blooms and other water quality issues. Across Ohio, research is underway to determine the root cause of the increase in toxic algal blooms and identify actions that can be taken to reduce their occurrence.

2.2.12 Windstorm

A windstorm is a weather event with very strong winds but little to no precipitation. Wind speed in this type of event typically reaches at least 34 mph but can be any speed that causes light or greater damage to trees and buildings. Damage can be caused by gusts, which are short bursts of high-speed wind, or longer periods of sustained wind.

A derecho is a widespread, long-lived windstorm. It is often associated with bands of rapidly moving thunderstorms. This type of storm can produce damaging straight-line winds over extremely large areas, sometimes spanning hundreds of miles. To be classified as a derecho, the storm must produce damage over at least 250 miles, have wind gusts of at least 58 mph across most of the storm's length, and multiple gusts of 75 mph or greater. The destruction produced by a derecho can be very similar to that of a tornado. However, the damage from this type of storm generally occurs in one direction along a straight path.

Windstorm Risk Assessment

The slightly rolling topography of west central Ohio is vulnerable to damage from high wind incidents, making windstorms are a countywide hazard that can affect all areas and jurisdictions. Most severe wind events are part of larger storm systems that typically include heavy rain, hail, ice, snow, or thunderstorms. Extreme winds can also occur independent of other hazards.

The most frequent damage from windstorms is downed trees, which can cause power outages and obstruct roadways. Damage to agriculture industry during the growing season when fields

are planted is also a risk. High winds can damage crops and reduce yields, which has a negative effect on the county's economy.

Table 2-30 describes the overall vulnerability of countywide property to worst case wind storm damage. The HAZUS analysis property values for flood were used as the valuation basis, maintaining consistency from one hazard vulnerability description to another, and damage estimates were calculated at a 2% damage factor as a worst-plausible case scenario for wind damage that historically hits very isolated and sporadic structures. This 2% was based upon comparative data between flood and wind loss statistics from a variety of past incidents. This vulnerability does not take in account multi-hazard damage from storms that combine wind with precipitation, tornadoes, ice, or heavy snow. The HAZUS MH Loss Estimator calculation tool was used to develop this table.

Table 2-32: Wind Storm Scenario Vulnerability Analysis

Building Type	Number of Buildings	Exposure
Residential	605	\$159,369,000
Non-Residential	134	\$35,554,000
Critical Facilities	17	\$4,428,000
<i>Totals</i>	<i>756</i>	<i>\$199,351,000</i>

Local Windstorm History

Champaign County has experienced 9 high wind incidents since 1950, according to NCDC records. Of these incidents, only one caused significant damage.

Table 2-33: Champaign County Windstorm History

Hazard	Incidents	Property Loss	Crop Loss	Deaths	Injuries
High Wind	9	\$4.75M	0	0	0

The most severe windstorm in the county's history occurred on September 14, 2008 when the remnants of Hurricane Ike moved across Ohio. Damage across Ohio exceeded \$500,000,000. In Champaign County, sustained winds of 40-50 mph and gusts of 60 mph caused extensive damage to tree and utility poles, leading to widespread multi-day power outages. Because the incident occurred as crops were ready for harvest, agricultural losses were significant. According to most estimates, corn and soy bean yields were reduced by at least 3-5% as a result of the storm. Statewide, losses from the event exceeded \$581,300,000. In Champaign County property loss was estimated to be \$4,700,000.

2.2.13 Winter Storm

A winter storm is a weather event that includes several winter weather hazards and can develop anytime between late fall and early spring. These storms can include any combination of extremely cold temperatures, wind, snowfall, sleet, ice, rain, or freezing rain. These severe winter storms are frequent in Ohio but the specific components of each storm depend on the weather conditions at the time. Winter temperatures can be mild and relatively warm (above

freezing), or they can fall below zero and stay there for several days. A winter season may include several fluctuations between cold and warm spells or be relatively constant.

A blizzard is a specific type of winter storm characterized by sustained winds or frequent gusts of 35 mph or greater and falling or blowing snow that reduces visibility to less than $\frac{1}{4}$ mile; both of these conditions must be present for at least three hours to be considered a blizzard.

A non-blizzard version of a severe winter storm often begins with warmer air followed by very cold temperatures and heavy precipitation. An initial blast of warm air can cause temperatures to hover at the freezing point as precipitation falls, causing $\frac{1}{4}$ "to $\frac{1}{2}$ " ice (or more) to form on roads, trees, electrical lines, gutters and roofs, and vegetation. The precipitation starts out as freezing rain and/or sleet and, as the temperatures drop, turns to snow that adheres to the ice and forms heavy clumps that bring down power lines and trees. As the storm system moves through and winds kick up, temperatures drop and the heavy falling snow drifts across roads, ice damages trees and buildings, and road conditions becomes treacherous. This type of storm can drop several inches of heavy, wet snow across the county.

Another type of severe winter storm that can affect northwest Ohio begins with extremely cold weather (below 10 degrees Fahrenheit) and heavy snowfall, high winds, and extreme cold. A severe storm of this nature would likely pack sustained winds of 15-25 miles per hour, over ten inches of snow, and temperatures below ten degrees Fahrenheit for more than 24 hours. This kind of storm can easily dump a foot or more of snow on Champaign County and disrupt daily activities for several days. Because the ice is not part of this kind of storm, damages are generally less as power lines are not destroyed and structural damage is not severe. However, the amount of snow is challenging in light of the extreme low temperatures. The snow tends to be fluffy and creates deep snowdrifts and blocks roads.

Ice storms are another type of winter storm event that can impact the area. An ice storm occurs when damaging ice accumulations occur during freezing rain situations. The accumulated ice can cause trees and utility lines to come down, resulting in loss of utilities and communications systems. As ice accumulates on roadways, travel also becomes dangerous. A significant ice accumulation is considered anything $\frac{1}{4}$ "or more.

Winter Storm Risk Assessment

Severe winter weather is a risk across all of Ohio. Winter storms range from short, mild bursts of snow and ice to multi-day events incidents with significant snowfall. In Champaign County, winter storms are a countywide hazard and can affect all areas and jurisdictions.

Winter storms often include multiple hazards, such as ice and snow. Ice accumulates as temperatures fall then turns to snow, creating a dangerous layer of snow-covered ice, increasing the potential for vehicular accidents. Road crews work continuously to clear roadways. Occasionally, ice storms occur independent of other winter weather hazards. Although rare, when this occurs it can have a significant negative effect on the community. Power outages are a frequent outcome of ice storms when precipitation accumulates on trees

and power lines causing them to break. Extremely cold temperatures can also occur without other accompanying winter weather hazards, although this is infrequent. These incidents are typically very short, lasting only a day or two, and are an inconvenience to residents and businesses more than the direct cause of property loss.

Across the county, the greatest risk from winter storms is the loss of utilities. Power outages can occur during ice storms or winter storms that include significant wind or snowfall. Because most electric lines are above ground, they are vulnerable to damage from wind and ice. While many electric providers have improved their distribution systems in recent years and new construction generally includes underground utilities, the main transmission lines are still above ground and vulnerable to weather-related damage. In spite of this, power outages are infrequent and generally not widespread outside of an extreme ice event.

Anticipated losses from winter storms include content loss, such as food and perishables due to power interruptions, and minor economic loss due to short-term business closures. Except for the extreme but rare blizzard, loss of residential and commercial structures or infrastructure is not expected. Most winter storms are a short-term inconvenience that make residents uncomfortable but last for a few hours up to several days. Casualties are extremely rare, with the exception of traffic accidents resulting from dangerous road conditions.

Table 2-30 describes the overall vulnerability of countywide property to worst case winter storm damage. The HAZUS analysis property values for flood were used as the valuation basis, maintaining consistency from one hazard vulnerability description to another, and damage estimates were calculated at a 2% damage factor as a worst-plausible case scenario for tornado damage that historically hits isolated and sporadic areas. This 2% was based upon comparative data between flood and tornado loss statistics from a variety of past incidents. The HAZUS MH Loss Estimator calculation tool was used to develop this table.

Table 2-34: Winter Storm Scenario Vulnerability Analysis

Building Type	Number of Buildings	Exposure
Residential	60	\$15,936,000
Non-Residential	13	\$3,556,000
Critical Facilities	2	\$443,000
<i>Totals</i>	<i>76</i>	<i>\$19,935,000</i>

Local Winter Storm History

Champaign County has experienced 30 winter storm-related incidents since 1950, according to records maintained by NCDC. These incidents caused limited property damage and no loss of life.

Table 2-35: Champaign County Winter Storm History

Hazard	Incidents	Property Loss	Crop Loss	Deaths	Injuries
Blizzard	1	0	0	0	0
Extreme Cold/Wind Chill	1	0	0	0	0
Ice Storm	7	0	0	0	0
Winter Storm	21	\$525K	0	0	0

In Ohio, the most significant historical winter weather event is the Blizzard of 1978. On January 26, 1978, two low-pressure systems combined over Ohio to produce record-breaking snowfall, winds of up to 70 mph, and extremely low temperatures. Most areas received fifteen inches of snow or more, in addition to the significant accumulation already on the ground. High winds caused severe blowing and drifting, making roads impassable and burying buildings and vehicles. Across the county, many roads were blocked for almost a week, forcing schools and businesses to close. Statewide, 50 people lost their lives and damages exceeded \$100,000,000. To date, this remains one of the most significant winter weather events in Champaign County history.

Another significant winter storm incident occurred on January 6, 1996, also known as the Blizzard of 1996. A massive winter storm produced nearly 14 inches of snowfall across southwest and central Ohio. Wind gusts of 50 mph caused whiteout conditions over a 24-hour period. Some structures suffered roof collapses from the weight of accumulated snowfall. In Champaign County, property loss was \$500,000.

2.3 VULNERABILITY ASSESSMENT

The Vulnerability Assessment addresses each jurisdiction's vulnerability to the identified hazards.

2.3.3 Countywide Vulnerability

Champaign County mitigation planning participants identified the risks associated with severe storms as the county's biggest threat. This group of high-rated hazards includes severe thunderstorms, power outages, windstorms, tornadoes, and winter storms. These incidents can disrupt daily activities, damage property, and cause significant loss of revenue and income. As a small rural county, the damages can be significant but there the likelihood of receiving outside financial recovery assistance is limited because the total number of structures destroyed is not likely to be high. That places extensive recurring cost of repairs and replacement on individuals, families, and small businesses. Flooding was rated sixth, closely following the severe weather incidents. Although flooding was ranked lower, the damages caused by heavy precipitation often occurs during those severe weather events. It can be difficult to separate the hazards because they often occur simultaneously and increase damages.

These storms can develop suddenly, and frequently there is little warning time before damaging cells cross the county. Champaign County weather in the spring and fall can change drastically, sometimes within the same day, and this facilitates the development of severe storms. Most of these severe storms include high wind, heavy rain, and sometimes hail. On occasion they develop into high-powered cells that include rotating tornadoes and strong straight-line winds. Because tornadoes in Ohio generally have a relatively narrow pathway, part of the county can easily be affected by a tornado while the rest of the county gets just heavy rain and wind, or straight-line wind damage. In the more severe cases, damages spread consistently through the county; in other more concentrated storms, damages can be confined to one part of the county or another. Trees are downed, structures are damaged, grain operations and other outdoor equipment facilities are destroyed, and there could be an excessive amount of tree debris strewn across the county. Crop damage could be extensive, especially when hail occurs. Hail is a major risk to corn and other crops and can easily destroy entire fields. If corn is flattened by wind or hail, there is little that can be done to restore it and the farmer can suffer significantly reduced yields, and therefore income, from even a brief severe storm. There is deep concern over mobile homes in the county and their easy destruction by high wind.

The ranking of the storms related mostly to frequency. Because severe thunderstorms happen most often, they ranked first. Windstorms are more frequent than tornadoes, so they ranked third and tornado was fourth.

Damages from these storms include flash flooding of streets, highways and rural roads. In a gently rolling topography, the low-lying areas flood first. Intense rain, or rain that totals two to three inches in a day or two can cause significant road flooding. If the storm comes in the spring when the ground is frozen, the flooding can be severe because the water cannot percolate into the soils and all becomes surface runoff, flooding fields, roads, and even basements and

driveways to homes. When temperatures rise and precipitation is combined with snow and ice melt, the rivers overflow, the creeks and streams far out-reach their banks, and flooding is widespread. People lose the use of their property, farmers cannot easily feed pastured livestock, and roads are closed. When flooding is extensive, the county struggles to be able to mark all the closed and flooded roadways due to not having enough signage.

These severe storms and heavy precipitation can cause damage to buildings, including roof, siding, and window breakage and flooding of lower floors and basements. Storm water that is unable to drain naturally ends up in basements, under the foundation of mobile homes, and even seeps through foundations and washes away the supporting soils around buildings. Roadways deteriorate under the constant water, and berms become drainage pathways for pavement runoff. This eventually affects the pavement itself, causing edge deterioration, potholes, and cracks in the surface of the roads.

Flooding is a concern in some areas; in some locations, basements can fill with water, destroying appliances, furnaces, other mechanical systems, and possessions. Crop debris clogs sewers and makes water drain poorly. Cemeteries are strewn full of crop and lawn fodder and have to be cleaned up. Some houses have no recourse, and suffer loss of use, damage to foundations, and destruction of all contents. Debris in yards, on roadways, and simply cluttering and clogging everything is common once floodwaters recede.

There are many areas in the county that are tiled, at least to some extent, which helps facilitate drainage. Much of the tile, especially those referred to as “county tiles” are old and of clay composition. Over the years, the constant wear and tear on the tiles due to excessive drainage and heavy equipment driving over them has deteriorated the condition of the tiles. The broken tiles do not carry water away and ponding results as the water drains gravitationally instead. There are several locations where railroad tracks and underpasses have tile that is old and undersized, and this causes back up of water. Although the county engineer has replaced culverts and bridges with upsized structures, the broken tiles diminish the effectiveness in some areas.

There are only 21 miles of ditch on county maintenance so property owners are responsible for maintaining many ditches and streams. This leads to inconsistency in the maintenance both in quality and methods, and an inconsistent monitoring of damage due to heavy precipitation or rapid flow of water. Some owners don’t have the capability to maintain the ditch that flows through their property, so it gets clogged with debris and obstructions, and backs up regularly into yards and basements. Others maintain their ditches very well and do not have many flooding problems. In some areas the county has installed tiles many years ago to facilitate this drainage, and the tiles that lead to the ditches are old, cracked and collapsed. Sometimes these tiles cause more water back up into surface ponds than they prevent due to deterioration.

It is suspected that there are areas where heavy rain flow through the waterways is causing a deterioration and erosion of the ditch banks that is not yet noticed or is not considered a problem by property owners until it is bad enough to impinge upon the lawns and areas of the

property that is used on a regular basis. The unfortunate part of this kind of damage is that it goes unnoticed and unchecked for years, and when it finally is identified, the damage is extensive and difficult to repair.

There are no storm sewer districts in the county and limited options for the county to manage drainage. Improvements in the rural and unincorporated areas are nearly impossible; within municipalities, storm water is by the individual jurisdiction. This causes a lack of consistency and collaboration in storm water management practices.

Planning participants ranked power outages as their second concern. Most of these outages are the consequence of severe storms and/or wind, but the outages can occur due to many reasons. Vehicular crashes, equipment failure, and other technological failures can cause outages as well. When power fails, everything stops in Champaign County. Alternate power supplies are limited, and most business and personal activity is based upon electrical service. Not all critical facilities are generator powered, including emergency shelters. Some of the generators that are in place need to be upgraded, or replaced. Without generators, a return to normal daily activities and function is slow, expensive, and tiring.

The weather in Champaign County requires the use of heating or air conditioning for most of the year. Temperatures in the spring and fall are so varied that few days are comfortable without one or the other, making power outages very uncomfortable and disruptive. When power is out, farmers are unable to care for livestock, operate grain systems, feeding equipment, and conduct regular operations in their farm shops. Just like other business and industry, they are severely crippled by the lack of electrical power. This can cause the loss of farm products, disease in livestock, and damage to grain and other crops. Planning team participants were very concerned about power outages for all these reasons.

The vulnerability to winter storms was exemplified through stories about the Blizzard of '78 and how Champaign County was simply shut down for an extended period of time until snow could be removed from highways and private property, utilities restored, and damages to structures repaired. Those memories are easily rekindled when several inches of snow falls, winds kick up, and visibility disappears. Roads become drifted and impassable, power outages occur, and daily activities are interrupted. Schools close, highway accidents increase in frequency, and people are unable to get to work or other commitments in Dayton, Columbus or locations within the county. With manufacturing giants such as Honda in the county, this causes a great deal of financial strain and loss in addition to property damage as people try to navigate impassable roadways.

Hazardous materials incidents are of moderate to low concern in Champaign County. While they are fortunate to have a great deal of manufacturing in the county, most of it does not involve hazardous materials. They do have farms that use anhydrous ammonia and other agricultural chemicals, which are often transported by tractor along county and township roads. The low volume of traffic allows this to result in few spills and releases due to crashes. A hazardous materials incident inside Urbana, especially on the city square, could result in a

significant evacuation, but other than that area, most incidents would have low impact. There is always the remote possibility of an incident near a school or a hospital, or near the tri-county jail in Mechanicsburg, that would cause a difficult evacuation. This would affect the entire county as evacuees were transported and housed, secured and cared for, and the clean up meant that there would be extensive traffic and activity that would interfere with daily activities. Should a spill occur in proximity to a waterway, or if the runoff from a spill were to reach a waterway, there is concern of contamination. If this happened during heavy precipitation or after a heavy storm, the draining runoff could facilitate the contamination of a waterway.

Drought and excessive heat are not of high concern. So long as electricity flows, the county can operate, as high temperatures do not usually exceed 90 degrees Fahrenheit. Schools and healthcare residential facilities that are not air-conditioned suffer in these situations and either close or make adaptations. Extended hot spells can be very disruptive. If the water supply is sufficient and power stays on, the county can adapt and avoid damages. Some livestock may need to be brought inside, and a few crops may fail. Field fires can become common in extended dry spells, and since fire departments must haul water to fight these fires, the losses can be extensive as they struggle to get enough water fast enough to get the fire under control. Otherwise, damages are more of an inconvenience than actual loss.

Earthquake (#9) is not of high concern even though neighboring Shelby County is home to a high percentage of the earthquakes that have affected Ohio over the years. Very few rumbles from those have been felt in the county, and there is an extremely low incidence of damages. If an earthquake were to occur that was of damaging nature, the sewer lines, water lines, underground utilities, and buildings of masonry or stone would be the most damaged. Roads could be significantly damaged, and bridges and culverts would be unsafe or destroyed.

Champaign County has a dependable and steady groundwater supply. Many homes and businesses are dependent upon wells, and those wells are stable. The public water systems are also well supplied, and few planning committee participants could recall a time when there was a serious threat to the quality or quantity of water available to county residents. They are well aware of concerns over phosphorus and nitrogen runoff into waterways and the effect upon water quality. They also understand the increased threat to man-made lakes in Ohio including Champaign County's Kaiser Lake. However, since conservation efforts and agricultural attention to the potential problem is at the forefront in the county, concerns over potential water emergencies is very low.

Invasive species ranked low at #11. Most of the Emerald Ash Borer-affected trees have long been removed so there not current tree issues. However, that changes quickly and if other invasive species that affect pines, maples, and oaks that are starting to surface in Ohio migrate to the county, that situation could change quickly. A severe wind incident could quickly damage any tree affected even slightly, and cause a major debris management issue. Clearing roadways and public property after significant numbers of trees were to fall could be extremely

expensive, causing financial distress for jurisdictions as well as individuals. For the moment, zebra mussels in waterways do cause a few problems, such as near North Lewisburg.

Dam failure is of low concern since the dams in the county are, by and large, privately owned unclassified structures on private property. There is no location where a dam breach would cause loss of life, and property damage would be low. This hazard ranked #12.

Last on the hazard list was land subsidence. There is no known karst area, although the entire western side of Ohio does have mapped karst substructure. There are some documented problems near the Mad River and Spring Hills where some soil types allow for floating of roads and some deterioration. There are a couple roads that were built on timbers years ago, and they are at risk of damage in heavy rains. There are active mines in the eastern part of the county but there is no history of collapsing surfaces due to mines. Planning participants for the most part felt that sinkholes could occur in a new location but that is not supported by historic data. Therefore, possibility kept the hazard on the list and lack of substantiated damages make it the lowest ranking hazard.

2.3.2 Jurisdiction Vulnerability

Although jurisdictions in Champaign County share many characteristics, each individual jurisdiction is somewhat unique in how it is affected by the identified hazards. This section describes how each jurisdiction prioritized hazards and describes their impact.

Christiansburg

This village of just over 500 residents occupies one-quarter of a square mile in the far southwest corner of Champaign County. Christiansburg planning participants rated power outages as their greatest concern because the village is not adequately equipped with generators and is somewhat isolated from other municipalities. Without power, it is difficult to maintain daily activities and care for families. The fire department has a generator, and their station could be used as a shelter for residents. The village infrastructure includes a water system that sources water from wells which are considered stable and very dependable; this system is generator powered. There is a modified sewage treatment system where each house has a holding tank for sewage where the liquids are pumped off and sent to a treatment plant in the village. Areas in town have storm sewers, and other do not and drain gravitationally. There are two retail stores available for limited supplies, one inside the village and one just outside village limits.

Flooding was the second most-feared incident because the village does not have complete coverage by storm sewers, and some areas of the village drain gravitationally into the creek. The lowest elevation is on the west side of the village near Wilson Street where the West Fork of Honey Creek flows past town. The entire south side of the village is prone to surface flooding which affects streets, yards, and some basements. While there is not much serious flooding, it restricts access, damages vegetation, and destroys utilities, water heaters, appliances, furnaces

and other property in basements or lower levels. Residents cannot get to and from work and out-of-town relatives have difficulty coming to care for elderly in town.

Severe storms, including windstorms, thunderstorms, tornadoes, and winter storms interfere with daily activities. These incidents damage roofs, siding, windows, and outbuildings. Trees are damaged or destroyed, creating significant amounts of debris. When ice is involved in winter storms, residents must clear sidewalks and driveways and streets must be salted or brined. Without that maintenance, vehicle accidents occur and people are injured.

Village residents use village water that comes from wells for water and homes have a septic system for wastewater that pumps liquids off and sends it to a treatment facility. Heavy rain or drought can affect the function of these systems. If the water table were to be contaminated through a hazardous materials spill or toxic chemicals, the village water source could be ruined. This would cause extreme difficulty for residents. Extreme drought could cause the village wells to produce insufficient water to support the village's population.

While earthquake is possible, damages would be limited to structural damage to one and two-story homes, and roadway damage. Electrical supply lines would be damaged and require repair or replacement.

Because the sub-structure of soils in the general area includes isolated karst features, there could be land subsidence. While no incidents of sinkholes or other subsidence have been noted, the possibility exists that deteriorating karst pockets could cause an area to fail. This hazard rated very low on Christiansburg's prioritization because there is no history of this type of incident.

Mechanicsburg

This village in the southeast corner of Champaign County rated power outages as their top hazard. Power outages can occur with any storm that involves wind and/or ice or during high demand in extreme heat. Residents report lengthy outages and slow response, perhaps because the village is at the end of distribution zones. The distribution lines are all above ground on poles and vulnerable to weather conditions. Dayton Power and Light has recently replaced many poles and completed an aggressive tree-trimming program but transformers are in need of replacement and some distribution lines are still in bad condition. Residents report that storms cause the old transformers to fail, resulting in power outages. Two-way radio communication for first responders is severely impacted because the communications tower is not generator powered. Base radio operations in Champaign County are located in Urbana at a lower elevation than Mechanicsburg, which causes connectivity problems, especially when Mechanicsburg responders attempt to transmit on their radios. The signals are not able to reach the lower-elevation base stations from the main tower in Urbana. With a three-county jail at the outskirts of the village, there is a great deal of concern over inability to transmit messages by emergency workers when inmates are released at any time of night or day, have no transportation or supplies, and walk into the village upon release. This is especially problematic during adverse weather conditions. The village's primary emergency shelter is

located at a local church but the church is not generator powered so there is no disaster shelter site that is not dependent upon electricity to be operational.

Severe storms, including windstorm, winter storm, and thunderstorms, ranked as the next three areas of concern. Keeping streets, culverts, and storm drains clear of debris in storms is difficult and costly for the village as they pay workers overtime to manage this. Windstorms cause trees to fall, roof shingles to be damaged, and siding to be dented and destroyed. Debris blocks streets and bridges or culverts, closing off access to parts of the village and making travel difficult. Vehicles can be damaged by falling debris, and ditches are blocked by tree debris. Severe thunderstorms do all of that and more. Lightning strikes can cause fires in the village and damage property; hail damages homes, including roofs, siding and windows. Elderly and disabled residents become dependent upon the community for clean-up. Winter storms have the additional task of removing snow from sidewalks, streets, and parking areas. The combination of snow, ice, wind, and extreme cold causes roads to become impassible, school to close, power to be interrupted, and individuals to fall and be injured. The village experiences vehicle accidents, access interruptions, and business closures. Snow removal is a significant expense for the village due to the additional staff and equipment costs necessary to keep streets clear.

Drought and extreme heat are rare but can be very disruptive for the community. In the most extreme heat events, Mechanicsburg. Schools close when the heat index is high enough to create an unsafe environment for students and staff. The increased demand for electricity stresses the distribution system, leading to outages. Field fires are a greater risk in dry conditions and can be caused by a discarded cigarette, a lightning strike, or some other reason. These fires are difficult to fight as fire departments struggle to have adequate water supply to feed pumpers.

Mechanicsburg is vulnerable to hazardous materials spills and leaks. Several EHS-reporting facilities, including a farm cooperative and an industry, report chemicals stored and used to the Champaign County LEPC. Both facilities have anhydrous ammonia in large quantities, which poses an airborne and liquid threat. The state highways that cross the village and the tractors pulling anhydrous ammonia tanks can collide, creating an exposure risk for the community. Some officials are concerned about detours caused by hazmat spills and how this would take into consideration bridge capacity and weight limits for commercial traffic. A serious vehicle accident in the vicinity of the village's water wells could expose the water supply to contamination if a large amount of a liquid were to leech into the soils. Residents and officials are concerned about the risk of chemical spills draining into catch basins. A more unusual concern is caused by a high presence of fentanyl in the jail, and the possibility that local areas could be contaminated with this potent and deadly chemical. In a disaster, there could be unanticipated release of inmates nearing the end of their incarceration period; these inmates would be a challenge to care for or serve because their personal history makes them inappropriate inhabitants of a community emergency shelter.

Officials ranked a water emergency caused by a compromise of the water supply, contamination of the village's three wells, problems with distribution lines, or malfunction of water treatment, as seventh out of thirteen hazards. While not highly likely, should this occur the impact would be significant. The elderly, children, and others with special needs would need immediate access to alternate water supplies. Schools and businesses could close and farmers would have a hard time watering livestock.

Flooding would also have serious consequences for the village. Little Darby Creek, which drains most of the village, is a protected waterway. Because of this protected status, officials are unable to remove the debris that blocks drainage and causes more debris to jam during high water levels. Elsewhere in town, clogged drainage tiles and other tiles and culverts are collapsing. With an old and unmapped storm sewer system, it is difficult for the village to anticipate tile collapse; instead they wait until a depression or large hole develops as a sign that tile has deteriorated to the breaking point. In some cases, those drains are as large as 24 inches in diameter, causing a huge hole. In other areas, catch basins clog with debris and prevent water from draining away, and flash flooding fills the streets, yards, and a few basements. Because homes were constructed in flood-prone areas well before floodplain management efforts began, there are residential structures in areas that flood, including one known structure within the flood zone. Some streets and ditch banks are damaged by fast-flowing flood water; curbs and banks are washed away, some streets are closed, and a few parking areas are flooded. If power fails, sump pumps don't work and living areas, basements, and other areas that are otherwise protected can flood. Water heaters, appliances, and furnaces can be damaged or destroyed when floodwaters overtake basements.

Mechanicsburg officials are concerned about tornadoes but the frequency of this hazard is low. If a tornado did occur, the impact would be severe and shelters would be necessary. Any property struck by a tornado is generally destroyed. Power poles, infrastructure, critical facilities, and equipment would also likely be impacted.

Hazards that rated at the bottom of the village's ranking include invasive species, earthquake, and land subsidence. Invasive species, should a new bug develop or move into the area, could devastate trees and vegetation, and possibly ruin food crops. Currently, the Emerald Ash Borer damage has been handled but new problems can develop. An earthquake would be low in severity and frequency. Ohio has never experienced a strong earthquake but Champaign County is close to Ohio's most-affected earthquake areas in adjacent Shelby County. Most buildings are one or two stories, so it is believed the effect would be minimal. However, a strong quake could destroy homes, businesses and other structures like sewer lines, roadways, and water towers. Mechanicsburg is not susceptible to dam failure.

Mutual

This small village is located between Urbana and Mechanicsburg where SR 161 ends at SR 29. It is just over one-tenth of a square mile in size. Officials ranked the hazards for Mutual the same as they ranked for Mechanicsburg, which is to be expected as the two jurisdictions are only three miles apart.

With 100 residents, power outages are a concern for Mutual. They experience high wind incidents that take down trees and power lines, and outages occur as a result. Because the village is somewhat isolated from other municipalities, repair of their power lines is often a low priority. Mechanicsburg provides public safety services for the so they experience the same radio and communications issues. They have difficulty maintaining emergency and crisis communications, which becomes a bigger concern when power is interrupted.

Severe storms, including windstorms, winter storms, thunderstorms, and tornadoes, affect Mutual by damaging homes, tearing off roofs, ripping off siding, and breaking windows. Homes could be rendered unlivable and residents have no local option for an emergency shelter.

People would have to travel to Mechanicsburg or Urbana for sheltering. Vehicles can be damaged by hail and wind and trees are blown down, potentially striking houses and falling on other property. Vehicles travelling through the village on SR 29 can be blown off the road or collide due to wind, rain, snow or ice. The village does not provide services, so they depend on Champaign County and Union Township to plow roads and clear property of debris.

Drought and extreme heat can place additional burden on electrical service, cause medical emergencies, and compromise the function of individual wells and septic systems. The village does not provide water service so concerns about well water include drought and contamination by a hazardous spill or leak, as well as deteriorating equipment. One of the biggest concerns for the small community is the lack of a retail store in the village to provide bottled water, foodstuffs, and other necessary items for residents if they become isolated due to a storm.

Flooding in Mutual is mostly surface flooding. The center of the village is at the lowest immediate elevation so water pools on the alley ways that connect School Street to SR 29. The state highways are slightly elevated, and it's anticipated that drainage from these main roads would inundate yards and driveways before draining gravitationally. All drainage in the village is gravitational because there are no storm or sanitary sewers.

Hazardous materials incidents in Mutual are a concern. Because the village relies on other communities for emergency services, the detection and the initial management of an incident could be challenging. Located at the juncture of two state highways and amid farmland, the chances of a hazmat incident are significant.

Invasive species, earthquake, and land subsidence are very low concerns for Mutual. Should another tree disease similar to the Emerald Ash Borer develop, more trees could be affected, and become debris after storms. An earthquake is possible because Champaign County sits near the highest earthquake risk area in Ohio but buildings are one and two stories high so damage would be manageable. There is no public water or wastewater infrastructure but wells and septic systems could be affected. Power lines would be vulnerable and roadways would be damaged. Again, isolation is one of the most concerning consequences. Land subsidence is possible as karst areas exist and are not completely mapped accurately, but the hazard is considered to be low-impact and not likely to occur. Mutual is not vulnerable to dam failure.

North Lewisburg

The village of North Lewisburg identified severe thunderstorms and windstorms as the two top concerns, followed by power outages and floods. Village officials pointed out that those four hazards can actually impact the village all at once. Rarely does high wind come without heavy rain, and the consequences include interrupted power and flooding.

There is no generator-equipped emergency shelter in the village and most homes do not have a basement. When power is out for an extended period of time, as happens in widespread storms, there is nowhere for residents to go that has electricity. This is life threatening for people who require regular use of medical equipment and those who need heating and cooling to remain well. Elderly and children are highly vulnerable to the impact of extreme heat and cold conditions.

Severe storms create significant amounts of debris. The village's picturesque landscape with shade trees and vegetation is highly vulnerable to wind. With minimal village staff, it is challenging to collect and dispose of debris in a timely manner after the storm. Severe thunderstorms and windstorms can damage mobile homes, manufactured homes and other structures. Roofs are damaged by wind and hail, siding is dented and torn off by wind and hail, and high winds cause trees, light poles, and other objects to fall onto houses and other buildings. Vehicles and outdoor equipment are easily damaged or destroyed by wind and hail.

Spain Creek runs through the village and exposed several apartments and properties to flash and riverine flood risk. The creek is filled with debris but is not part of the county ditch maintenance program. The village and private residents have done their best to clean debris from the waterway, but EPA regulations has prevented enough clearing of debris to improve water flow during and after heavy precipitation. It does not take much rainfall at all to cause street flooding and basements to hold water. Storm sewers are not able to carry enough water away; once the water gets to the creek, the debris jams prevent it from flowing freely. It is difficult in general for the village to manage any of the debris because the financial burden of overtime and additional disposal and equipment cost is overwhelming.

The few homes that do have basements experience sewer back up as well as seepage through walls, causing several inches of flooding. Some water heaters, furnaces, appliances and other possessions are destroyed. For all homes, yards become flooded and some low-lying first floor spaces are inundated with floodwater. On occasion, some residents are forced to leave their homes until the water recedes. Berms on streets are damaged, vehicles are stranded, and pavement can be lifted or broken apart by the water.

Winter storms increase the burden of snow management. Plowing sufficient to keep up with drifting streets and alleys is a full-time endeavor. The extreme cold, wind, low visibility, and ice underneath the snow makes managing of streets time consuming and expensive. If winter storm conditions cause power outages, the very old and the very young tend to be the most vulnerable. Businesses suffer because of closures, lost access, and the inability of employees to

report to work due to weather. Schools are often closed due to road conditions or power outages.

Extreme heat impacts the village as does as extreme cold. These incidents can place burden on electrical service and lead to outages. Elderly, disabled, and children need environmentally controlled residences so an extended outage could necessitate emergency sheltering for residents. The village faces the dilemma of not having a generator-equipped shelter. A water outage would worsen this situation worse by limiting the use of water during an extreme heat event. Water outages, in general, would impact the community abruptly because of the lack of adequate, on-site bottled water and the need to bring supplies to the village from outside sources. Any water emergency could negatively impact the ability to fight fires, especially if high wind, extreme heat, drought or very dry conditions, and a water compromise occurred simultaneously.

North Lewisburg has been impacted by tree damage from the Emerald Ash Borer but most of the ash trees have been removed. If another invasive species were to develop or find its way to the village, they could anticipate tree problems and vegetation management issues.

Village officials are concerned slightly about earthquake because of the history in adjacent counties, although an incident is not highly likely. Roads and infrastructure could be damaged or destroyed by a strong quake but residential structures are expected to withstand the forces of a mild earthquake. Trees, power lines, and other utilities could be destroyed.

Hazardous materials incidents are possible but participants rated the hazard low on the list of possibilities. The state highways that cross the village bring truck traffic and local farmers transport anhydrous ammonia through town. A collision or container failure could cause an incident but officials felt that first responders are able to handle most incidents.

Land subsidence is only a concern if undetermined karst or underground voids collapse. While there are no known areas of this substructure, the entire area is surrounded by karst features. Not all karst in Ohio is well-mapped, so officials feel there is some risk, although minimal. The village is not vulnerable to dam failure.

St. Paris

St. Paris is located on the west-central side of Champaign County and is home to slightly over 2,000 residents. Village officials rated power outages as their highest priority hazard. Planning participants said that outages are frequent and most likely caused by poor distribution lines and the village's location at the end of distribution zones. They indicated that residents endure lengthy outages when repairs are not made quickly. Power outages cause loss of foodstuffs, difficulty heating and cooling homes and businesses, and short-term business and school closures. Residents who require regular use of medical equipment are unable to stay at home. There are generators at the school, but the village does not have a generator to power the police department where emergency communications are housed. The school serves as a shelter when power outages are extended in duration.

Flooding is a high concern to St. Paris officials. The northeast quadrant of the village is prone to flooding as drainage flows through the Harmon Main Ditch, Sarah McMorran Ditch, McMorran Brothers Ditch, McMorran Ditch and Saint Paris Ditch. These waterways are too small for the amount of land that drains into them, and thus a back-up of floodwaters occurs. Roads are closed or partially closed, and debris collects in the area. There are no houses in this particular segment of the village but the impact on streets, roads, and clean-up efforts is significant. There are a few areas where water collects in basements, yards, and sidewalks. Recreational areas and parks are flooded and unable to be used. In extreme precipitation events, St. Paris does experience flooding inside homes. Basements are flooded and residents lose appliances, furnaces, water heaters, and possessions. Sometimes the interior flooding is seepage through the structures' walls and other times the sanitary and storm sewers back up into the homes. Outside, water spewing out of storm drains or catch basins can be observed in the heaviest part of the storm. Post-storm cleanup is difficult and some areas are inaccessible for quite some time due to standing water.

Severe thunderstorms, winter storms, windstorms, and tornadoes also concern St. Paris residents and officials. Storms involving wind take trees down, destroy roofs, siding and windows in homes and businesses, and damage vehicles. Streets can be blocked by debris, including vegetation and trees as well as remnants of homes or buildings. Critical communications are affected when power is out or towers have been damaged by wind. Mobile and manufactured homes are particularly susceptible to damage and often fare the worst. Winter storms bring ice, sleet, snow, and drifting that places additional burden on village services. Falls, injuries, medical emergencies, and vehicle accidents increase in extreme winter weather conditions, placing additional stress on first responders. Special populations require assistance and village crews are stretched to meet needs. The village incurs significant expense as they struggle to help residents recover and sustain village operations.

A water emergency in St. Paris would close many businesses and the school and impact residents without access to alternate water supplies. A malfunction of the water service could signal significant expense as the village completed repairs to an old and under capacity system. If the water source were contaminated and new wells had to be drilled, the expense would be devastating. Drought and heat incidents would have the most negative impacts if water supply were to be involved, independently and/or with a power outage. While most consequences would be inconvenience and nuisance, the elderly and children would suffer the most.

An earthquake is unlikely but could damage all infrastructure, including water treatment, wastewater treatment, distribution lines, electricity poles and lines, and roadways, bridges and culverts. Homes would be damaged but probably not destroyed; schools, police stations and other critical infrastructure would be severely damaged.

Hazardous materials incidents are considered another serious concern. In addition to highway and rail lines, there are numerous pipelines in the St. Paris area. These pipelines transport natural gas and petroleum products through 6" and 8" lines. Additionally, there is a 90,000-gallon propane storage facility just outside the village. As a rural community, agricultural

chemicals are also moved through town on a regular basis. There is also an agriculture facility just across the Clarke County border to the south. An incident at this facility would have a significant impact on St. Paris and the surrounding townships. All of these issues increase the village's risk for hazardous materials incidents.

Land subsidence and invasive species ranked as the lower concerns in St. Paris. Planning team participants did not feel it was a significant risk in the village but did recognize it as a possibility. They also felt that invasive species was not a significant risk because the trees damaged by the Emerald Ash Borer have been taken down in years past. The village is not susceptible to dam failure.

Urbana

Urbana officials ranked severe thunderstorms, winter storms, and windstorms as their major concerns. While tornado ranked lower on the hazard list, that is mostly because so few tornadoes have occurred in Urbana. Severe storms damage homes, commercial buildings, vehicles and landscape. Homeowners experience roof damage, dented and bent siding, downed trees, damaged landscaping, and large amounts of debris to clean up. Mobile and manufactured homes are more susceptible to wind damage because they have a less resistant foundation and are easier to tip over and pull off the foundation. Commercial buildings suffer structural losses such as roof damage, windows, siding, and exterior surface damage from pelting hail, high wind, or ice. Hail, ice and flying debris also damage to vehicles, and high-profile vehicles like box trucks and vans can tip over in wind and wind gusts. Trees will topple under extreme conditions, and smaller branches become flying debris that strikes buildings and vehicles, or anything else in the way.

In addition to property damage, smaller debris tends to collect in waterways and block storm drains, catch basins, culverts, and drainage ditches; these blockages prevent water from draining and cause or exacerbate flash flooding. In the most severe storms, streets can become blocked with branches and limbs that must be removed by city workers before streets can reopen. It is possible but infrequent for city workers or property owners to be injured lifting limbs or moving debris. The greatest risk to those cleaning up after storms is coming into contact with a live electrical wire.

Urbana officials are concerned about sheltering in severe storms. The city has many homes without basements, including slab construction and multi-family apartment buildings. They expressed concern for elderly, disabled, and low-income populations in the context of severe storms and storm clean up. Adequate warning and notification, protective actions, and clean-up activities can be difficult for these particular groups. They are often at higher risk due to health conditions or a lack of general resources and concern for their safety and well-being after storms is a concern of city officials.

The city is also concerned about the lack of warning and notification systems that make residents aware of dangerous weather situations. Urbana does not have outdoor warning sirens but does use an opt-in mass notification system. It is always difficult to convince all residents to

sign up for opt-in notification calls, and officials are concerned about those residents who do not register. Transient and non-residential people can be hard to reach as well, and often do not know anything about signing up for cell phone alerts. Alternate methods of personal notification are hard to identify, and even more difficult to implement. Outdoor warning sirens are very expensive to install and maintain; therefore, warning and notification are challenging in this small rural city. Severe weather can make communication between first responders difficult too. While the county has adopted the MARCS radio system, not all departments and disciplines are able to use it. There are some transmission problems in the county and officials are concerned that the statewide MARCS system will not have the capacity to serve everyone in a catastrophic incident. In general, they are very concerned about the lack of radio communication and warning/notification redundancy.

Power outages caused by severe storms, wind, ice, or excessive demand due to extreme temperatures are high on Urbana's disaster radar. The city has identified viable community shelters but many facilities do not have generators and would be hard pressed to meet housing needs for more than a few hours. While the university and schools have facilities that would be excellent storm shelters, they are not equipped with alternate power supplies with the exception of the Urbana Pre K – 8 building. Most city infrastructure is generator equipped but some generators are old or undersized and should be replaced. Because of this, their concern about power outages is high.

Urbana is vulnerable to flash flooding. Streets in some sections of town drain slowly, leaving ponded water that interferes with travel for a period of time after heavy downpours. Some basements experience water from seepage through the walls and some multi-family housing units have a history of floodwater in living spaces. In the northwest section of the city, the basement and living space water issues are caused by insufficient storm water infrastructure, varied land use within watershed basins, elevated roads and highways, low elevation of buildings compared to surrounding areas, and shallow water tables rather than a direct result of only heavy precipitation. This complex flooding issue causes the loss of furnaces, hot water heaters and appliances as well as possessions and furnishings in an area with concentrated population density. The parking area and helipad around the local hospital can flood during heavy rainfall, rendering that area inaccessible and unusable. The City Hall basement can flood under extreme conditions, causing operations to be relocated and materials stored there to be damaged. Some storm drains and storm sewers have been replaced, which has lessened the street flooding but there are still streets that become temporarily impassable.

Because of the major highways and thoroughfares that traverse Urbana, the city has significant risk for hazardous materials spills. Route 68 is a federal highway that crosses the center of Urbana, including the roundabout in the center of the downtown area. This roadway has especially high volume. At least 25,000 vehicles per day; at least 10% of these vehicles are trucks. When commercial traffic is combined with regular traffic, crashes can occur, creating the potential for a hazardous substance spill or leak. If this occurred in a highly populated area, evacuation would be necessary, and safe routes out of the area could be impacted and make it difficult for people to leave. While most truck and rail traffic transports farm products like grain,

the exception involving a chemical could have an impact. Many type of hazardous materials, including petroleum products, agricultural chemicals, and any other material hauled through the area, could cause significant problems if a crash were to occur that caused a tank to fail or a stem to breach.

An invasive species affecting trees or vegetation would cause debris and weakened trees, all becoming fodder and flying objects in storms. Officials have managed the Emerald Ash Borer outbreak and those trees have been removed, so they do not rank this high on their concern list.

An earthquake is highly unlikely but if a strong quake were to occur, damage could be significant. Infrastructure, including power lines, sewers and water lines, underground utilities, and roadways, could incur extensive damage. While there are few multi-story buildings, there are many buildings that would be vulnerable to shaking and rumbling because they are constructed of brick, stone and other masonry. Building damage could be significant. This ranked low not because there would be no damage, but, like tornado, because the incidence numbers are low.

Urbana utilizes underground well for water and there is a strong water supply available. While city officials recognize that contamination of groundwater or malfunction of a treatment plant could cause a water outage, the likelihood is low. They recognize that an incident would be difficult and require distribution of bottled water, adaptation of manufacturing process or closures, and cessation of business operations for schools and many others, they feel this is highly unlikely.

Land subsidence is possible in Urbana because the city is located in a part of Ohio with some karst sub-structure. There is ample limestone and dolomite deposits underground which can result in unanticipated voids developing. There is little elevation change that is sufficient to cause landslides or mudslides, but streams and creeks can be impacted by extremely fast and furious currents after heavy storms and significant rainfall or snowmelt. However, being located far enough at the high end of the watershed, the likelihood is lower than it would be in other counties. While not a significant concern, officials did recognize that land subsidence is possible in Urbana. The city is not susceptible to dam failure.

Woodstock

This tiny community ranked severe storms, including thunderstorms, wind, and winter weather events, of all type as their primary concerns. The village is vulnerable to wind damage such as roof, siding, and window damage in homes and structural damage to farm buildings, grain operations, and homesteads. The wind can cause trees to fall, blocking streets, driveways, and alleys. Rapid rainfall can cause streets to flood and houses to become surrounded by water. Homes with basements can experience some basement flooding, ruining furnaces, hot water heaters, appliances, and possessions. Driveways can be isolated from roadways, cars can be flooded in, and the highway can be covered in water. With almost completely flat elevations, water can take some time to naturally drain away.

Ice storms, wind, and vehicle accidents can cause power outages. The village has no generators, so they are forced to go to North Lewisburg or Mechanicsburg for sheltering. There is only one small food market in town so residents must travel to purchase supplies, food, and bottled water. There is no designated shelter in the village, but there could be an agreement with the Freewill Baptist Church if necessary. The church is not generator powered so the ability to provide refuge for affected residents would be diminished in a prolonged power outage.

It is difficult for the village to manage clearing streets amid heavy, blowing snow or huge amounts of debris. Workers are volunteers and have jobs elsewhere but work as available to meet the village's needs. Heavy debris or streets that need significant maintenance present a big challenge to the village officials.

Woodstock is an isolated rural community with one state highway that crosses town. Hazardous materials spills can result from vehicle accidents as trucks travel the area. Farmers and agricultural services haul anhydrous ammonia and other farm chemicals through town for field application and they can incur spills, leaks, and accidents as well. Woodstock is dependent upon a district fire service to manage these incidents and at times it takes expertise beyond the local capacity to handle a chemical incident. The resulting vulnerability of the air, land, and waterways is a concern, although not an incredibly likely incident.

Land subsidence could affect Woodstock if uncharted karst or limestone and dolomite characteristics actually exist. While nothing is currently charted, Champaign County is not fully documented with reference to this hazard. Woodstock is not vulnerable to dam failure.

2.3.3 Vulnerability Summary

Precipitation combined with wind is by far the most concerning event for county officials and residents. They experience storms that combine threats, such as severe thunderstorms that spawn tornadoes, have some lightning and hail during the storm, and include straight-line or rotating winds. Historically, rotational and straight-line winds have not resulted in extremely different consequences. Most storms that cause significant damages or expensive repairs involve both precipitation and wind. Most of these repairs are funded by either personal property owners or insurance companies. Damage occurs every year in every jurisdiction due to heavy precipitation and high wind. This includes damage to structures, vehicles, crops, equipment, and natural resources like trees and lawns.

Power outages were of concern because of the high disruption of daily activities, as well as the cost to business and industry. The failure of heating and air conditioning causes health concerns for elderly and children, as well as those who have special needs. Maintaining traffic without signals is dangerous and, when power takes the signals out of order, crash incidence increases.

Small hazardous materials incidents are relatively common in the county and that is mostly due to the combination of many miles of state and interstate highway and the prevalence of roadway traffic all across the area. Vehicular incidents and spills at fixed facilities keep first

responders busy. Rail incidents are minimal because there is not a great deal of rail in the county although there are several major pipelines that carry petroleum products and natural gas. Those lines, substations, and storage facilities pose a threat to nearby residents and businesses. As an agricultural county, many farm chemicals are transported across the county. Farm tractors and vehicles that move slowly typically carry these chemicals, increasing the risk of crashes as other vehicles pass and maneuver around them. Streams and rivers could easily be contaminated by any kind of hazardous materials spill; therefore, this ranked high as a threat of concern. The risk of evacuation and major inconvenience that interrupts business and life activities is significant. The biggest threat of evacuation was determined to be a hazardous spill and crash of some sort located in downtown Urbana where a round-about is located at the junction of several state highways. This kind of incident could cause major evacuation, including many city government officials and employees as well as residential neighborhoods. This commercial zone is home to a variety of businesses and offices, and is a hub of activity during business hours when most traffic passes through. The roundabout is difficult for navigation due to limited space and thus presents a significant risk.

Flooding is common in the context of closed rural roads and flooded rural properties. Most flooding causes a great deal of inconvenience but areas that flood do so regularly enough that they are not lands farmed for profit nor are they heavily populated residential areas. Damage results in closed roads, inaccessible resources and businesses, and extreme inconvenience to institutions and individuals due to impaired access and damaged infrastructure. Some damage is done to structures, road berms and foundations are weakened by the water, and bridges can become impassable. Travelers must take alternate routes, and the risk of a flooded highway that is not marked is the result of rapidly rising water from fast-falling precipitation.

Winter storms interrupt business, prevent transportation of goods, keep workers at home, and close the schools. Drifting roads and slippery pavement make travel difficult, and if winds increase and blow the snow around, drifting is a part of the problem. Snow management and removal inside the municipalities can be difficult when space to move the snow to is limited. The roundabout in downtown Urbana is one specific case where plowing the roadway open is relatively easily accomplished, but there is nowhere to go with the snow that was removed. It has to be hauled somewhere, causing difficulty in maintaining that section of road in a heavy snowfall high wind event. Management of blowing and drifting snow, both inside municipalities and in the rural areas, is a difficult undertaking in worst-case storms. Roads drift shut quickly and plows must constantly circulate to keep roadways open. While few roofs collapse under the weight of snow, many businesses and schools close due to road issues, and commerce in the county comes to a halt. Vehicle accidents are increased, causing injury, loss of work and medical costs.

Water emergencies are possible but not highly likely. Water retention, whether in dams or reservoirs, is done with attention to maintenance and repairs of the structures. Most dams are small farmstead structures with the exception of two low-head dams that do not change the flow or collection of water but instead hold back a pool of water mostly for recreational uses.

While the county is abundant production farmland, production practices prevent a great deal of contaminated runoff and pesticide pollution.

Invasive species has affected ash trees but most of those have been removed and cleaned up. The county is aggressive in detecting and treating infestations, and the consequence of invasive species is additional debris loads after storms. Weed type invasive species are treated chemically and removed from fields, preventing widespread prolific growth on production land or set aside natural plots. The entry of another form of insect or disease could cause big problems for Champaign County, but there has not been evidence of that circumstance. Participants pointed out that invasive species is a very dynamic kind of incident, and a new threat can appear almost out of nowhere, causing significant problems very quickly.

Drought and extreme heat result in inconvenience, and those without air conditioning sometimes go to comfort stations established by the EMA. There is little actual loss associated with this hazard. Most concern in this area was for power outages, not the heat or cold itself.

Dam failure is not a high concern. Most of the water retention structures are reservoirs that are well maintained and of little risk. The dams that do present risk are continually maintained and emergency action plans establish procedures for evacuation and recovery. The dam at Kaiser Lake is the only area officials expressed any concern over, and the dam is well maintained, has all necessary emergency plans, and the inundation zone is mostly farmland or natural habitat. The losses of a breach were estimated to be very low.

Earthquake would damage infrastructure, including roads, water towers and water lines, utilities, institutions and other critical infrastructure. Homes would be damaged and pipelines could rupture. Officials are aware that adjacent Shelby County has experienced the highest number of earthquakes of any Ohio area, but those quakes have been mild and not very destructive, ranking as mild earthquakes. There is little data documenting any quake effects in Champaign County. Therefore, they determined the likelihood of future incidents that cause any loss is extremely low. The risk is low enough that local officials feel little needs to be done but convey information about a response should the unlikely event ever take place., and do an inventory of what might be damaged.

Champaign County's major concerns will likely always involve the combination of wind and water. Incidents than involve those components can come fast and furious, and leave must destruction in their path. If temperature extremes are concurrent with heavy precipitation, the consequences can be worsened. That results in the most concerning hazard not being one single hazard by itself, but the combination of two, three or four at the same time.

Table 2-38 provides a summary of the hazard rank developed by each jurisdiction.

Table 2-38: Jurisdictional Vulnerability

Jurisdiction	Dam/Levee Failure	Drought/Extreme Heat	Earthquake	Flood	Hazardous Materials Incident	Invasive Species	Land Subsidence	Power Outage	Severe Thunderstorm	Tornado	Water Emergency	Windstorm	Winter Storm
Champaign County	12	8	9	6	7	11	13	2	1	4	10	3	5
Christiansburg	N/A	8	9	2	10	12	11	1	3	6	7	5	4
Mechanicsburg	N/A	5	11	8	6	10	12	1	4	9	7	2	3
Mutual	N/A	6	10	4	11	9	12	3	1	7	8	5	2
North Lewisburg	N/A	6	10	4	11	9	12	3	1	7	8	5	2
St. Paris	N/A	8	9	2	10	12	11	1	3	6	7	5	4
Urbana	N/A	5	10	6	8	9	12	4	1	7	11	3	2
Woodstock	N/A	5	11	8	6	10	12	1	4	9	7	2	3

2.4 RISK ANALYSIS

Based on the available hazard and vulnerability information, Champaign County has risk for damage from a variety of disasters. To determine the county's overall level of risk, each hazard was evaluated and scored based on common criteria. The criteria included frequency, response duration, speed of onset, magnitude, and impact on businesses, people, and property. Table 2-39 describes the overall scale used to score each hazard. Table 2-40 explains the scale used to measure magnitude. The composite scores and overall rank for each hazard are in table 2-41.

Table 2-39 Assessment Scale

Score	Frequency	Response Duration	Speed of Onset	Magnitude	Business Impact	Human Impact	Property Impact
1	None	< ½ Day	> 24 Hours	Localized	< 24 Hours	Minimum	< 10%
2	Low	< 1 Day	12-24 Hours	Limited	1 Week	Low	10-25%
3	Medium	< 1 Week	6-12 Hours	Critical	2 Weeks	Medium	25-50%
4	High	< 1 Month	< 6 Hours	Catastrophic	> 30 Days	High	> 50%
5	Excessive	> 1 Month	No warning				

Frequency

Hazard events that occur regularly are a higher risk than those that occur infrequently.

- 1 = None/Once in 100 years
- 2 = Low/Once in 50 years
- 3 = Medium/Once in 25 years
- 4 = High/Once in 1-3 years
- 5 = Excessive/More than annual

Response Duration

Response duration is defined as the amount time the response to a particular hazard is anticipated to last.

- 1 = Less than ½ day
- 2 = Less than 1 day
- 3 = Less than 1 week
- 4 = Less than 1 month
- 5 = More than 1 month

Speed of Onset

Speed of onset addresses the amount of advance warning before each hazard occurs.

- 1 = More than 24 hours
- 2 = 12-24 hours
- 3 = 6-12 hours
- 4 = Less than 6 hours
- 5 = No warning

Magnitude

Magnitude is rated using standard damage scales such as the Enhanced Fujita Scale, or through development of a local comparative scale that is comparable in damages at like levels using the established damage scales. Some scales from other geographic regions, such as the North East Snow Index Scale, were used as models to develop a comparative tool in Champaign County.

Table 2-40: Magnitude Scale

Score	Tornado	Windstorm	Flood	Earthquake	Drought	Winter Storm
1	EF-0/1	<65 mph	Minor	<5.9	D-0 Very Dry D-1 Moderate	<8" snow
2	EF-2	65-75 mph	Moderate	6.0-6.9	D-2 Severe	8-12" snow
3	EF-3	76-85 mph	Significant	7.0-7.9	D-3 Extreme	12-16" snow
4	EF-4/5	>86 mph	Major	>8.0	D-4 Exceptional	>16" snow

For all other hazards, the impact was measured as follows:

- 1 = < 10% of population affected directly
- 2 = 11-25% of population affected directly
- 3 = 26-50% of population affected directly
- 4 = > 50% of population affected directly

Business Impact

Business impact refers to the potential economic impact a hazard event is likely to have on a community. The definition of each score refers to the amount of time critical facilities are likely to be shut down in the impacted community.

- 1 = Less than 24 hours
- 2 = 1 week
- 3 = At least 2 weeks
- 4 = More than 30 days

Human Impact

Human impact is defined as the number of lives potentially lost for a particular hazard.

- 1 = Minimum/Minor injuries
- 2 = Low/Some injuries
- 3 = Medium/Multiple severe injuries
- 4 = High/Multiple fatalities

Property Impact

Property impact is defined as the number amount of property potentially lost during a given hazard event.

- 1 = Less than 10% damaged
- 2 = 10-25% damaged
- 3 = 25-50% damaged
- 4 = More than 50% damaged

The factors identified above were assigned values as described and rated against anecdotal analysis based upon history and past incidents. This scoring mechanism resulted in very similar assessment of risks and vulnerabilities for the countywide vulnerability analysis.

Table 2-41: Risk Analysis

Hazard	Frequency	Response Duration	Speed of Onset	Magnitude	Business Impact	Human Impact	Property Impact	Score	Rank
Severe Thunderstorm	5	4	5	4	1	2	4	25	1
Power Outage	5	3	5	4	2	2	3	24	2
Windstorm	5	4	3	3	2	2	3	22	3
Tornado	3	4	4	3	2	2	1	19	4
Winter Storm	4	3	1	3	2	2	2	17	5
Flood	4	3	2	2	1	2	2	16	6
Hazardous Materials Incident	4	2	5	1	1	2	1	15	7
Drought/Extreme Heat	3	3	1	2	1	3	1	14	8
Earthquake	2	1	5	1	1	1	2	13	9
Water Quality Emergency	1	1	4	3	1	1	1	12	10
Invasive Species	2	1	1	1	1	1	2	9	11
Dam Failure	1	2	1	1	1	1	1	8	12
Land Subsidence	1	1	1	1	1	1	1	7	13

3.0 MITIGATION STRATEGIES

As the Champaign County hazard mitigation planning developed mitigation goals and strategies, their intention was to address the identified risks and vulnerabilities for the county and individual jurisdictions. Because of this approach, these mitigation goals and strategies are more comprehensive and jurisdiction-specific than those developed in the 2004 plan. While there are similarities in the goals and strategies identified by each jurisdiction, each community included actions designed to address risks and vulnerabilities in their community.

3.1 STATUS OF PAST MITIGATION EFFORTS

The 2004 Champaign County Hazard Mitigation Plan identified mitigation goals and activities by hazards and jurisdiction. The current mitigation planning team reviewed these goals and activities to determine their current status, which is described in table 3-1.

Table 3-1: Status of 2004 Mitigation Goals and Actions

Action Item	Status
ACTIONS BY HAZARD	
Severe Storms	
<i>Goal: To increase awareness of severe storms, save lives, and reduce property damages.</i>	
Evaluate centralizing 911 systems.	Not Complete
Evaluate Champaign County EOP	Continue; EOP has not been updated.
Seek funding for better, more reliable interoperable communication between incorporated and unincorporated areas within Champaign County.	Partially Complete; MARCS is being implemented.
Enhance communication efforts between Champaign County and its municipalities with surrounding counties and other agencies within the State of Ohio.	Partially Complete; MARCS is being implemented.
Flooding	
<i>Goal: To save lives and property, reduce damage and increase education (awareness) of community.</i>	
Evaluate existing emergency operations and equipment within the county and determine the needs across the county for handling a severe storm disaster.	Partially Complete; Continue as ongoing effort.
Educate public about NFIP and reducing uninsured loss.	Complete; Continue because it is an ongoing activity.
Increase public awareness of high hazard areas, such as floodplains, through educational outreach.	Partially Complete; Continue because it is an ongoing activity.
Work with the county engineer to determine flood-prone properties and designate them as flood-prone properties utilizing GIS.	Complete; GIS includes more details
Tornadoes	
<i>Goal: To save lives, reduce potential damage, and increase awareness of the hazards of tornadoes.</i>	
Evaluate needs of shelter to have back-up generators.	Not Complete; Continue because generators are still needed.

Action Item	Status
Need to establish Tornado Shelter Network throughout the county.	Not Complete
Evaluate procedures for verifying tornado sightings.	Not Complete
Evaluate location of current shelter locations and determine needs.	Partially Complete; Continue as ongoing effort.
Conduct study to determine existing facilities; determine where the gaps are as it relates to shelters.	Partially Complete; Continue as ongoing effort.
Drought	
<i>Goal: To reduce potential damage and to increase awareness of drought occurrences through Champaign County by increased preparedness.</i>	
Increase awareness of urban/rural interface and the damage potential of such interface.	Not Complete
Increase public awareness of how droughts can lead to wildfires.	Not Complete; Continue as ongoing effort.
Earthquake	
<i>Goal: To reduce the potential loss of lives and damage to property as well as increase awareness.</i>	
Increase public awareness by developing an Innovative Public Service Announcement (PSA)	Not Complete
Evaluate infrastructure and coordinate with agencies responsible to determine areas of concern.	Not Complete; Continue as ongoing effort.
ACTIONS BY JURISDICTION	
Christiansburg	
Provide an alternate power source, such as back-up generators, for critical facilities serving as shelters that must have continuous power to preserve and protect human life.	Not Complete; Continue as ongoing effort.
Provide an alternate power source, such as back-up generators, for the community's water and wastewater work stations.	Not Complete; Continue as ongoing effort.
Curb, gutter, and storm drain replacement and improvements to alleviate flooding conditions.	Not Complete; Continue as ongoing effort.
Woodstock	
Provide an alternate power source, such as back-up generators, for critical facilities serving as shelters that must have continuous power to preserve and protect human life.	Not Complete; Continue as ongoing effort.
Mutual	
Provide an alternate power source, such as back-up generators, for critical facilities serving as shelters that must have continuous power to preserve and protect human life.	Not Complete; Continue as ongoing effort.
Urbana	
Implement an equalizing basin to control excessive flow to waste treatment plant due to severe storms/flooding SS/F.	Complete
Replace aging infrastructure at waste treatment plant and in the process increase capacity to better manage increased flows during SS/F.	Complete
Implement a (CMOM) Capacity, Management, Operation and Maintenance program ahead of state requirements to oversee the entire sewage network.	Partially Complete; Continue because there is additional work to be done.

Action Item	Status
Provide back-up SCADA (Supervisory Control and Data Acquisition) communications in case SS/F knock out primary systems. Water department uses this system to monitor/control water plant, towers and wells.	Complete
Purchase new backhoes and dump trucks that would serve as backups for water main repairs that happen periodically. The number of repairs could grow exponentially given the occurrence of a very severe cold spell or an earthquake, in which case backups would be utilized.	Complete
Improve preventive maintenance program for storm sewer lines that plug/limit flow during SS/F.	Complete
Plan development for reducing flooding in different areas of Urbana.	Continue; this is an ongoing effort.
Once major flood-reduction projects are finished, coordinate a study to reestablish the 100-year base flood elevations in Urbana and submit any changes to FEMA, who in turn will update the Flood Insurance Rate Maps. (FIRM)	Complete
Maintain a list of right-of-way trees. Those rated poorly should be removed to minimize damage from SS/T.	Partially Complete; Continue because this is an ongoing effort.
North Lewisburg	
Provide emergency shelter-operations center in the village.	Partially Complete; Continue as ongoing effort.
Mechanicsburg	
Provide an alternate power source, such as back-up generators, for critical facilities serving as shelters that must have continuous power to preserve and protect human life.	Not Complete; Continue because this is still a need.
St. Paris	
Funding for removal of hazardous trees would enable the village to continue the acquisition and planting of young, healthy trees which the community can enjoy for years to come.	Partially Complete; Continue because it is an ongoing activity.

3.2 RISK PRIORITIES

The Hazard Identification and Risk Assessment provides a detailed explanation of the hazards and risks in Champaign County through a discussion of the frequency and severity of past hazards and potential damages from future incidents. Building on that hazard information, this section identifies mitigation strategies that could reduce vulnerability to the identified hazards. When developing and prioritizing strategies, participants considered actions that would benefit the greatest number of people and considered how the strategy would be funded. In some cases, funding would come from the jurisdiction's general budget while others would require special funding, including state and federal grants. Ultimately, the planning team determined that strategies should be prioritized according to the hazard rank in the HIRA. The hazards were ranked using a comprehensive process that included frequency, response duration, speed of onset, magnitude, business impact, human impact, and property impact.

For each jurisdiction, a goal related to each specific hazard was developed. Within each goal, multiple mitigation strategies, or objectives, were created based on the proposed actions to reduce vulnerability. When prioritizing the strategies, the planning team considered cost of implementation and feasibility in completing the action. In general, strategies that were less expensive or easier to implement were prioritized higher because they were more likely to be completed. Projects requiring state or federal grant funding, extensive multi-agency collaboration, or other more complicated processes were considered lower priority because they would take more time to complete.

At strategy review meetings and during the final review phase of the plan, jurisdictions and stakeholders had the opportunity to revise strategies and adjust the prioritization. The final strategies presented in this section reflect those adjustments and revisions.

3.3 MITIGATION GOALS AND STRATEGIES

Mitigation strategies were developed based on the input from planning team members, jurisdiction representatives, and a variety of stakeholders, including various forms of established districts (school, utility, service, and conservation), non-profit organizations, and institutions (universities, churches). These strategies were presented to the broad community for review and comment prior to completion of the plan. This section identifies the mitigation goals and strategies for the county and each incorporated jurisdiction, along with the priority, action type, lead agency, timeline, and potential funding source for to each. While strategies are listed according to the authority having jurisdiction, including county and municipality, it may be most appropriate to delegate project administration and implementation to another party at the time a strategy becomes an actionable project. It is not possible to foresee which districts, nonprofit organizations, or other entities might be that appropriate party at the time this plan is developed; therefore, other entities may actually be selected to apply for mitigation grants, administer the grants, implement the projects, and evaluate the results.

A variety of grant programs will be utilized to fund projects, as those grants become available. Pre-Disaster Mitigation and Flood Mitigation Assistance are grant programs that typically cycle annually, and funding is made available through local jurisdictions like counties, cities, villages and townships. Hazard Mitigation Grant Program funds become available after an incident, and these are available to jurisdictions and special districts, nonprofit organizations, watershed coalitions, and conservancy districts as well. Champaign County will work to establish the most effective method of application, as well as the most logical administrative entity for each application and project when grants are awarded.

At the time of this plan development, one private nonprofit property owner expressed interest in using mitigation funding to reduce losses at a multi-family residential property that experiences frequent flooding.

Other grant programs may be utilized as well as those mentioned above. This might include Community Development Block Grants, Clean Ohio grants, or Ohio Public Works funding as well as many other federal, state and private grant programs and low interest loan options. With new funding programs on the horizon, it was not possible to name all potential funding sources at the time this plan was developed.

Strategy Descriptors

When developing strategies, the planning team considered who would be responsible for leading mitigation efforts, how the work would be funded, and in what order jurisdictions would address potential actions. These elements are defined in table 3-2 and identified for each strategy. Some of this information may change over the five-year life of this plan and as strategies are implemented. For the planning process, the exercise of assigning timelines required stakeholders to evaluate current resources and determine how to best reduce the effects of disasters.

Table 3-2: Strategy Descriptors

Element	Definition
<i>Priority</i>	Each jurisdiction ranked hazards according to their jurisdiction's priorities; that result is expressed in a table in the HIRA under each municipality's vulnerability statement. In this section, all goals and strategies are expressed alphabetically according to hazard for ease of comparison and review and use of the plan. The jurisdictions will address strategies in order of priorities as established in their individual jurisdiction. If the #1 hazard in a community is flood, then the flood strategies will be addressed as the highest priority.
<i>Action Type</i>	<p>The kind of activity described in the strategies Includes these types of actions;</p> <ul style="list-style-type: none"> • Natural Resource Protection – Reduce the impacts of natural hazard by preserving or restoring natural areas and their mitigation functions • Prevention – Avoid hazard problems or stop impact from worsening • Property Protection – Protect structures by modifying or strengthening building to withstand impact • Public Information – Advise the public about hazards, hazardous areas, and mitigation techniques to protect people and property • Structurally Engineered Project – Lessen the impact of a hazard by modifying the environment or progression of the hazard event through designed and engineered projects • Public Safety Enhancement – These actions will improve, enhance, update or expand the services or support of services provided by law enforcement, fire departments and/or emergency medical services
<i>Lead Agency</i>	The entity charged with championing the strategy and ensuring that jurisdiction officials look for opportunities to complete the strategy over the five-year planning cycle. This agency may not have the authority or power to execute a strategy or be responsible for project oversight or completion. Rather, the lead agency is responsible for coordinating the overall effort, plays a key role in championing the project or, by default, is the entity most appropriate to lead project development at the initial stage. If the strategy becomes a feasible project, this agency is not the only entity that would be involved in its execution, nor is it the only entity involved in keeping the strategy on the jurisdiction's radar. For accountability purposes, the strategy is assigned to a single entity. When the strategy becomes a project, the jurisdiction would identify a project manager who may or may not represent the lead agency assigned in this plan.
<i>Timeline</i>	The timeframe in which a mitigation strategy could realistically be implemented. The actual time frame may vary from what is described in this plan, depending on funding, grant opportunities, or changes in priorities as other critical activities are adjusted to meet evolving community needs. At the time of plan development, these timelines fit logically within each jurisdiction's resources and support programs.
<i>Funding Source</i>	<p>The potential funding source(s) for the strategy. Potential funding sources include;</p> <ul style="list-style-type: none"> • CDBG – Community Development Block Grants • FMA – Flood Mitigation Assistance Grant • PDM – Pre-Disaster Mitigation Grant • HMGP – Hazard Mitigation Grant Program • SRL – Severe Repetitive Loss Grant • RFC – Repetitive Flood Claims Program • COG – Clean Ohio Grant

Element	Definition
	<ul style="list-style-type: none">• ICC – Increased Cost of Compliance (including rate increases or premiums)• LOC – Local Funds• ST – State Funds• Other (including private funds and non-governmental agency funding)

3.3.1 Champaign County

The Champaign County mitigation goals and strategies address countywide mitigation issues and those in the unincorporated areas of the county. County officials will oversee implementation of these strategies. These mitigation strategies will be managed by county government officials, including the EMA Director, County Engineer, and Soil and Water Conservation District Manager. The County Engineer is responsible for road maintenance and floodplain management; Soil and Water Conservation District works with natural resources. The EMA Director works with jurisdictions and officials across the county to promote and implement disaster and emergency preparedness measures.

Many of the identified strategies will be funded through the county's budget. These local funds come from a variety of sources, including tax revenue, user fees, and others. Some of the larger natural resource preservation, property protection, and structurally engineered projects will require funding through special sources. These can include federal mitigation programs such as Pre-Disaster Mitigation and Hazard Mitigation Grant Program or other state and federal grant programs that may become available.

Table 3-3: Champaign County Mitigation Strategies

Priority	Action Type	Lead	Start Date	End Date	Funding
Goal 1 – Dam Failure: Champaign County will work to ensure all dams and reservoirs are well maintained and limit the risk to the community.					
1.1 The County will ensure that dams have emergency plans that identify inundation areas and facilitate for emergency actions in the case of a serious failure.					
53	Property Protection	EMA Director	09/01/2019	08/31/2024	LOC; Other
Goal 2 – Drought/Extreme Heat: Champaign County will assess the reliability of water supplies during drought and extreme heat.					
2.1 The County will advocate and support the hardening of water supply infrastructure to include alternate sources of water and protection of treatment plants and distribution systems.					
40	Property Protection	EMA Director	09/01/2019	08/31/2024	LOC
2.2 The County will establish water conservation procedures for implementation in drought conditions.					
41	Natural Resource Protection	EMA Director	09/01/2019	08/31/2024	LOC
Goal 3 - Earthquake: Champaign County will assess damage potential from earthquakes and establish a safety plan for residents.					
3.1 The County will identify the structures and infrastructure that would likely be damaged or destroyed in an earthquake of moderate to severe magnitude.					
42	Property Protection	EMA Director	09/01/2019	08/31/2024	LOC
Goal 4 – Flood: Champaign County will work to reduce flooding and limit loss of life or injury and property damage caused by flooding.					
4.1 The County will require construction of water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) to prevent flooding of properties.					
17	Structurally Engineered Projects	County Engineer	09/01/2019	08/31/2024	LOC; PDM; HMGP; CDBG; ICC
4.2 The County will acquire, demolish, and/or retrofit flood-prone structures.					

Priority	Action Type	Lead	Start Date	End Date	Funding
18	Prevention	EMA Director	09/01/2019	08/31/2024	PDM; HMGP; SRL; FMA; RFC; Other
4.3 The County will clear debris, fallen trees, excess sediment, and other obstructions from waterways to improve flow.					
19	Natural Resource Protection	County Engineer	09/01/2019	08/31/2024	LOC; ICC; Other
4.4 The County will work with watershed or conservancy districts and other jurisdictions that share an interest in waterways to facilitate cleaning, maintaining, and eliminating problems.					
20	Natural Resource Protection	Soil & Water Conservation Director	09/01/2019	08/31/2024	LOC; ICC; Other
4.5 The County will utilize natural habitat creation and/or use of vegetative buffers inside waterways to slow the rapid flow of floodwater and/or hold excess storm water.					
21	Natural Resource Protection	County Engineer	09/01/2019	08/31/2024	LOC; ICC; Other
4.6 The County will maintain and enforce floodplain, zoning, and building regulations to manage development in flood-prone areas.					
22	Prevention	Chief Building Official	09/01/2019	08/31/2024	LOC
4.7 The County will maintain participation in NFIP and engage in floodplain management activities to support flood prevention.					
23	Prevention	County Engineer	09/01/2019	08/31/2024	LOC
4.8 The County will conduct a public awareness campaign for individual flood insurance awareness.					
24	Public Information	EMA Director	09/01/2019	08/31/2024	LOC
4.9 The County will procure adequate temporary or changeable signs to mark flooded roadways quickly.					
25	Public Information	County Engineer	09/01/2019	08/31/2024	LOC
4.10 The County will improve and repair roadways and berms damaged by rapid runoff and heavy precipitation.					
26	Property Protection	County Engineer	09/01/2019	08/31/2024	CDBG; LOC
4.11 The County will work with railroads to identify a means to repair and improve railroad owned bridges, culverts, and abandoned tracks and keep them clear of debris and abandoned equipment.					
27	Property Protection	County Engineer	09/01/2019	08/31/2024	LOC
4.12 The County will identify and implement methods to collect debris in runoff water before it clogs ditches, streams, culverts, and other waterways.					
28	Natural Resource Protection	County Engineer	09/01/2019	08/31/2024	LOC
4.13 The County will protect banks and land near waterways from deterioration due to rapid or excessive flow by planting stream bank vegetation, installing dormant woody stakes and posts, planting trees, shrubs and grasses along banks and berms, or using deflectors to prevent deterioration, or other similar methods to accomplish the same.					
29	Natural Resource Protection	Soil & Water Conservation Director	09/01/2019	08/31/2024	LOC; Other

Priority	Action Type	Lead	Start Date	End Date	Funding
4.14 The County will utilize biotechnical methods (placement of willow posts, hardwood tree plantings, fascines, brush layering, evergreen revetments, log revetments, tree kickers, lunker structures, or placed rocks as examples) to minimize the deterioration or destruction of stream banks due to excessive flow.					
30	Natural Resource Protection	Soil & Water Conservation Director	09/01/2019	08/31/2024	LOC; Other
4.15 The County will manage stream flow through channel, sedimentation, debris and obstruction, and stream ecology management practices.					
31	Natural Resource Protection	Soil & Water Conservation Director	09/01/2019	08/31/2024	LOC; ICC; Other
4.16 The County will utilize stream bank protection measures such as gabion revetments, riprap revetments, and crib walls, and other structural methods to protect the banks and berms.					
32	Natural Resource Protection	Soil & Water Conservation Director	09/01/2019	08/31/2024	LOC; ICC; Other
4.17 The County will require developers and/or construction crews in urban development zones to use tools such as chemical stabilization, compost blankets, geotextiles to control soil deterioration, mulching of new plantings, seeding and sodding of areas highly vulnerable to rapid surface runoff, installation of grass lined channels, slope diversion for surface runoff, and other methods to reduce the damages to land and property due to heavy and rapid surface runoff or drainage from rainfall or other precipitation or draining water.					
33	Natural Resource Protection	Soil & Water Conservation Director	09/01/2019	08/31/2024	LOC; ICC; Other
4.18 The County will encourage the use of eco-friendly green materials and practices in development, such as green parking policies, green roof materials, and alternate paving materials that promote absorption instead of runoff.					
34	Property Protection	County Engineer	09/01/2019	08/31/2024	LOC; Other
4.19 The County will protect soil quality by advocating for crop rotation, crop residue management, contour buffer strips, contour farming and strip-cropping, use of cover crops, installation of field borders, rotation grazing, pasture planting, establishment of grassy waterways, grade stabilization structures, water and sediment control basins, critical area planting, diversion, terracing, manure storage and runoff control, nutrient management, pest management, well abandonment, riparian buffers, wetland restoration, windbreaks, woodlot management, tree planting, and creation of upland wildlife habitat on farmland inside, adjacent to, or near incorporated County property.					
35	Natural Resource Protection	Soil & Water Conservation Director	09/01/2019	08/31/2024	LOC; Other
4.20 The County will encourage management of surface runoff and chemical residue through techniques such as installation of grassy waterways, creation of infiltration basins and trenches, porous pavement installation, filtration techniques like use of catch basin inserts, sand and organic filters, rain gardens and vegetated filter strips.					
36	Natural Resource Protection	Soil & Water Conservation Director	09/01/2019	08/31/2024	LOC; ICC; Other

Priority	Action Type	Lead	Start Date	End Date	Funding
Goal 5 – Hazardous Materials Incident: Champaign County will work to lessen both the number of spills, leaks, and releases from hazardous materials sources, as well as lessen the damages from such incidents.					
5.1 The County will ensure signage on highways and roadways is clear and easy to follow to decrease the likelihood of vehicle accidents due to unsure routes of travel.					
37	Public Information	County Engineer	09/01/2019	08/31/2024	LOC; ST
5.2 The County will advocate for funding for and conduct of additional first responder training to prepare responders for highway hazardous materials incidents and pipeline and rail incidents.					
38	Public Safety	EMA Director	09/01/2019	08/31/2024	LOC; Other
5.3 The County will collaborate with entities that bring new hazardous substances to communities through construction of additional highways, railroads, or pipelines for first responder training.					
39	Public Safety	EMA Director	09/01/2019	08/31/2024	LOC; ST; Other
Goal 6 – Invasive Species: Champaign County will lessen the cost of plant debris caused by invasive species that weaken and destroy trees that cause large amounts of debris requiring removal after storms.					
6.1 The County will maintain trees and vegetation on public/jurisdiction property and advocate for the same on private property.					
52	Property Protection	County Engineer	09/01/2019	08/31/2024	LOC; Other
6.2 The County will work to clear public and private areas of dead or diseased trees that will easily be damaged by wind events and cause destruction of other property.					
16	Property Protection	County Engineer	09/01/2019	08/31/2024	LOC; Other
Goal 7 – Land Subsidence: Champaign County will reduce the risk of property damage due to land subsidence in at-risk areas.					
7.1 The County will support and conduct programs that reduce erosion and sedimentation along riverbanks, ditch banks, road berms, and areas that wash away after heavy or prolonged precipitation.					
15	Natural Resource Protection	County Engineer	09/01/2019	08/31/2024	LOC; Other
7.2 The County will encourage the development of more specific and accurate mapping of karst areas in Champaign County that interfaces the geologic characteristics with the soil types, as well as identifying abandoned and functioning wells and mines of various types, to more accurately identify karst locations and predict where sink holes or other structural problems are likely to occur.					
43	Property Protection	Chief Building Official	09/01/2019	08/31/2024	LOC; ST
7.3 The County will develop collaborative efforts with environmental and water quality advocates to more accurately determine risk to groundwater resources in the county, and work together to adequately and effectively prevent contamination of the groundwater.					
44	Natural Resource Protection	Public Health Commissioner	09/01/2019	08/31/2024	LOC
Goal 8 – Severe Thunderstorm, Tornado, and Windstorm: Champaign County will lessen the damages suffered from windstorms or severe thunderstorms, including heavy rain, wind, hail, and lightning.					
8.1 The County will advocate and support the construction of safe rooms for single- and multi-family homes and congregate facilities, including mobile home parks, apartment complexes, and mass gathering facilities.					
1	Property Protection	EMA Director	09/01/2019	08/31/2024	PDM; HMGP
8.2 The County will repair or retrofit public properties with wind-resistant materials (i.e. metal roofing, siding, etc.) to decrease damage due to wind.					
2	Property Protection	Chief Building Official	09/01/2019	08/31/2024	LOC; Other

Priority	Action Type	Lead	Start Date	End Date	Funding
8.3 The County will develop agreements for emergency shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations.					
3	Property Protection	EMA Director	09/01/2019	08/31/2024	LOC; Other
8.4 The County will research and identify resources for affordable debris disposal after storms, possibly through creation of special funding to pay for landfill fees or finding facilities that will receive debris for reduced rates.					
4	Property Protection	EMA Director	09/01/2019	08/31/2024	LOC
8.5 The County will establish, maintain, improve, and/or promote public warning and notification systems (reverse 911, opt-in systems, outdoor warning sirens, etc.).					
5	Public Information	EMA Director	09/01/2019	08/31/2024	LOC; PDM; Other
8.6 The County will provide community education about protective actions, evacuation procedures, and other disaster preparedness information.					
6	Public Information	EMA Director	09/01/2019	08/31/2024	LOC
8.7 The County will advocate for residents to maintain adequate insurance coverage (homeowners, renters, flood, etc.).					
7	Property Protection	EMA Director	09/01/2019	08/31/2024	LOC
8.8 The County will maintain building regulations and land-use planning practices that encourage responsible development in high-risk areas.					
8	Property Protection	Chief Building Official	09/01/2019	08/31/2024	LOC; ICC; Other
8.9 The County will work to develop a local, affordable and functional county-wide public safety communication system with the capability for multi-discipline and multi-jurisdictional communication.					
9	Public Safety	EMA Director	09/01/2019	08/31/2024	LOC; Other
8.10 The County will work to fill gaps in warning and notification systems by adding outdoor warning sirens, developing reverse 911 capabilities, and by enhancing public notification processes.					
10	Property Protection	EMA Director	09/01/2019	08/31/2024	LOC; ST; ICC; Other
8.11 The County will advocate and support the hardening of utilities (distribution lines, generating plants, and other system components).					
11	Property Protection	County Engineer	09/01/2019	08/31/2024	Other
8.12 The County will identify alternate/back-up utility resources for use when primary source is compromised (generators, redundant suppliers, etc.).					
12	Property Protection	EMA Director	09/01/2019	08/31/2024	Other
Goal 9 – Water Quality; Champaign County will work to improve the safety of the water supply whether it is sourced from private wells or public or privately-owned water treatment systems.					
9.1 The County will advocate for improvements to water treatment plants, including enhanced testing and monitoring and improved treatment capabilities.					
45	Natural Resource Protection	Public Health Commissioner	09/01/2019	08/31/2024	LOC
9.2 The County will advocate for additional research into root causes of water quality issues, including but not limited to runoff monitoring and analysis, contamination tracing, and conservation practice implementation.					
46	Natural Resource Protection	Public Health Commissioner	09/01/2019	08/31/2024	LOC

Priority	Action Type	Lead	Start Date	End Date	Funding
9.3 The County will advocate for study of runoff from residential properties, including but not limited to lawn chemicals and other incidental threats.					
47	Natural Resource Protection	Public Health Commissioner	09/01/2019	08/31/2024	LOC
9.4 The County will work for early and pro-active collaboration between jurisdictions regarding spills or leaks into the water supply through seepage into wells, aquifers, reservoirs or waterways that will eventually affect local water quality.					
48	Natural Resource Protection	Public Health Commissioner	09/01/2019	08/31/2024	LOC; COG
9.5 The County will advocate for and support the implementation of regulations and supportive programs that help farmers manage manure and waste from concentrated animal feeding facilities in the interest of protecting the groundwater and waterways from contamination.					
49	Natural Resource Protection	Soil & Water Conservation Director	09/01/2019	08/31/2024	LOC; Other
9.6 The County will support the implementation of measures to manage distressed watersheds in the county and advocate for support programs to help farmers implement these regulations and measures while maintaining the agricultural economic well-being.					
50	Natural Resource Protection	Soil & Water Conservation Director	09/01/2019	08/31/2024	LOC; Other
9.7 The County will support studies that identify the complete discovery of water resource contamination, including analysis of practices by industrial, personal use, manufacturing, and agricultural communities.					
51	Natural Resource Protection	Public Health Commissioner	09/01/2019	08/31/2024	LOC; Other
Goal 10 – Winter Storms: Champaign County will lessen damages suffered from severe winter storms and blizzards.					
10.1 The County will work to plow and clear county-maintained roadways to facilitate emergency traffic, necessary travel, and business access.					
13	Property Protection	County Engineer	09/01/2019	08/31/2024	LOC
10.2 The County will develop collaborative efforts with environmental and water quality advocates to more accurately determine risk to groundwater resources in the county and work together to adequately and effectively prevent contamination of the groundwater through snow removal and salting of icy roads.					
14	Natural Resource Protection	Public Health Commissioner	09/01/2019	08/31/2024	LOC

3.3.2 Christiansburg

For Christiansburg, mitigation strategies will be monitored and championed by the mayor, who will work with other community officials to identify mitigation opportunities and implement strategies. The majority of mitigation actions will be funded through local budgets. When possible, state and federal grants will be sought to help fund these efforts.

Table 3-4: Christiansburg Mitigation Strategies

Priority	Action Type	Lead	Start Date	End Date	Funding
Goal 1 – Drought/Extreme Heat: Christiansburg will assess the reliability of water supplies during drought and extreme heat.					
1.1 The Village will advocate and support the hardening of water supply infrastructure to include alternate sources of water and protection of treatment plants and distribution systems.					
25	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 2 - Earthquake: Christiansburg will assess damage potential from earthquakes and establish a safety plan for residents.					
2.1 The Village will identify the structures and infrastructure that would likely be damaged or destroyed in an earthquake of moderate to severe magnitude.					
26	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 3 – Flood: Christiansburg will work to reduce flooding and limit loss of life or injury and property damage caused by flooding.					
3.1 The Village will require construction of water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) to prevent flooding of properties.					
3	Structurally Engineered Project	Mayor	09/01/2019	08/31/2024	LOC; PDM
3.2 The Village will acquire, demolish, and/or retrofit flood-prone structures.					
4	Prevention	Mayor	09/01/2019	08/31/2024	PDM; SRL; FMA; HMGP
3.3 The Village will clear debris, fallen trees, excess sediment, and other obstructions from waterways to improve flow.					
5	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
3.4 The Village will utilize natural habitat creation and/or use of vegetative buffers inside waterways to slow the rapid flow of floodwater and/or hold excess storm water.					
6	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC
3.5 The Village will maintain and enforce floodplain, zoning, and building regulations to manage development in flood-prone areas.					
7	Prevention	Mayor	09/01/2019	08/31/2024	LOC
3.6 The Village will maintain participation in NFIP and engage in floodplain management activities to support flood prevention.					
8	Prevention	Mayor	09/01/2019	08/31/2024	LOC
3.7 The Village will improve and repair roadways and berms damaged by rapid runoff and heavy precipitation.					
9	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 4 – Hazardous Materials Incident: Christiansburg will work to lessen both the number of spills, leaks, and releases from hazardous materials sources, as well as lessen the damages from such incidents.					

Priority	Action Type	Lead	Start Date	End Date	Funding
4.1 The Village will ensure signage on highways and roadways is clear and easy to follow to decrease the likelihood of vehicle accidents due to unsure routes of travel.					
19	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
4.2 The Village will advocate for funding for and conduct of additional first responder training to prepare responders for highway hazardous materials incidents and pipeline and rail incidents.					
20	Public Safety	Mayor	09/01/2019	08/31/2024	LOC; Other
Goal 5 – Invasive Species: Christiansburg will lessen the cost of plant debris caused by invasive species that weaken and destroy trees that cause large amounts of debris requiring removal after storms.					
5.1 The Village will maintain trees and vegetation on public/jurisdiction property and advocate for the same on private property.					
21	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
5.2 The Village will work to clear public and private areas of dead or diseased trees that will easily be damaged by wind events and cause destruction of other property.					
22	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
Goal 6 – Land Subsidence: Christiansburg will reduce the risk of property damage due to land subsidence in at-risk areas.					
6.1 The Village will encourage the development of more specific and accurate mapping of karst areas in Champaign County that interfaces the geologic characteristics with the soil types, as well as identifying abandoned and functioning wells and mines of various types, to more accurately identify karst locations and predict where sink holes or other structural problems are likely to occur.					
23	Prevention	Mayor	09/01/2019	08/31/2024	LOC
Goal 7 – Severe Thunderstorm, Tornado, and Windstorm: Christiansburg will lessen the damages suffered from windstorms or severe thunderstorms, including heavy rain, wind, hail, and lightning.					
7.1 The Village will advocate and support the construction of safe rooms for single- and multi-family homes and congregate facilities, including mobile home parks, apartment complexes, and mass gathering facilities.					
10	Property Protection	Mayor	09/01/2019	08/31/2024	PDM; Other
7.2 The Village will develop agreements for emergency shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations.					
11	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
7.3 The Village will research and identify resources for affordable debris disposal after storms, possibly through creation of special funding to pay for landfill fees or finding facilities that will receive debris for reduced rates.					
12	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
7.4 The Village will establish, maintain, improve, and/or promote public warning and notification systems (reverse 911, opt-in systems, outdoor warning sirens, etc.).					
13	Public Information	Mayor	09/01/2019	08/31/2024	LOC; PDM; Other
7.5 The Village will provide community education about protective actions, evacuation procedures, and other disaster preparedness information.					
14	Public Information	Mayor	09/01/2019	08/31/2024	LOC
7.6 The Village will maintain building regulations and land-use planning practices that encourage responsible development in high-risk areas.					
15	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
7.7 The Village will work to develop a local, affordable and functional county-wide public safety communication system with the capability for multi-discipline and multi-jurisdictional communication.					
16	Public Safety	Mayor	09/01/2019	08/31/2024	LOC; Other

Priority	Action Type	Lead	Start Date	End Date	Funding
7.8 The Village will work to fill gaps in warning and notification systems by adding outdoor warning sirens, developing reverse 911 capabilities, and by enhancing public notification processes.					
17	Public Information	Mayor	09/01/2019	08/31/2024	LOC; Other
7.9 The Village will advocate and support the hardening of utilities (distribution lines, generating plants, and other system components).					
1	Prevention	Mayor	09/01/2019	08/31/2024	Other
7.10 The Village will identify alternate/back-up utility resources for use when primary source is compromised (generators, redundant suppliers, etc.).					
2	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; PDM; HMGP; Other
Goal 8 – Water Quality: Christiansburg will work to improve the safety of the water supply whether it is sourced from private wells or public or privately-owned water treatment systems.					
8.1 The Village will advocate for additional research into root causes of water quality issues, including but not limited to runoff monitoring and analysis, contamination tracing, and conservation practice implementation.					
18	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 9 – Winter Storms: Christiansburg will lessen damages suffered from severe winter storms and blizzards.					
9.1 The Village will work to plow and clear village-maintained roadways to facilitate emergency traffic, necessary travel, and business access.					
24	Property Protection	Mayor	09/01/2019	08/31/2024	LOC

3.3.3 Mechanicsburg

In Mechanicsburg, the Village Administrator will monitor mitigation strategies and collaborate with other village officials to identify mitigation opportunities and implement strategies. The majority of mitigation actions will be funded through local budgets. When possible, state and federal grants will be sought to help fund these efforts.

Table 3-5: Mechanicsburg Mitigation Strategies

Priority	Action Type	Lead	Start Date	End Date	Funding
Goal 1 – Drought/Extreme Heat: Mechanicsburg will assess the reliability of water supplies during drought and extreme heat.					
1.1 The Village will advocate and support the hardening of water supply infrastructure to include alternate sources of water and protection of treatment plants and distribution systems.					
38	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC
Goal 2 - Earthquake: Mechanicsburg will assess damage potential from earthquakes and establish a safety plan for residents.					
2.1 The Village will identify the structures and infrastructure that would likely be damaged or destroyed in an earthquake of moderate to severe magnitude.					
39	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC
Goal 3 – Flood: Mechanicsburg will work to reduce flooding and limit loss of life or injury and property damage caused by flooding.					
3.1 The Village will require construction of water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) to prevent flooding of properties.					
36	Structurally Engineered Projects	Village Administrator	09/01/2019	08/31/2024	LOC; PDM; CDBG; Other
3.2 The Village will elevate structures (buildings, roadways, bridges, culverts etc.) where necessary to reduce flooding.					
37	Structurally Engineered Projects	Village Administrator	09/01/2019	08/31/2024	LOC; CDBG; PDM; HMGP
3.3 The Village will acquire, demolish, and/or retrofit flood-prone structures.					
26	Prevention	Village Administrator	09/01/2019	08/31/2024	LOC; PDM; SRL; FMA; Other
3.4 The Village will consider channel diversion or modification (deepening or widening) to re-route water or increase capacity and reduce flooding.					
28	Structurally Engineered Project	Village Administrator	09/01/2019	08/31/2024	LOC; CDBG; PDM; Other
3.5 The Village will clear debris, fallen trees, excess sediment, and other obstructions from waterways to improve flow.					
27	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
3.6 The Village will work with watershed or conservancy districts and other jurisdictions that share an interest in waterways to facilitate cleaning, maintaining, and eliminating problems.					
25	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC

Priority	Action Type	Lead	Start Date	End Date	Funding
3.7 The Village will utilize natural habitat creation and/or use of vegetative buffers inside waterways to slow the rapid flow of floodwater and/or hold excess storm water.					
29	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
3.8 The Village will maintain and enforce floodplain, zoning, and building regulations to manage development in flood-prone areas.					
24	Prevention	Village Administrator	09/01/2019	08/31/2024	LOC; ICC; Other
3.9 The Village will maintain participation in NFIP and engage in floodplain management activities to support flood prevention.					
23	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC
3.10 The Village will conduct a public awareness campaign for individual flood insurance awareness.					
42	Public Education	Village Administrator	09/01/2019	08/31/2024	LOC
3.11 The Village will maintain, repair, upgrade, and/or replace storm sewers and related systems and increase culvert sizes and bridge spans to improve drainage.					
30	Structurally Engineered Project	Village Administrator	09/01/2019	08/31/2024	LOC; CDBG; Other
3.12 The Village will improve and repair roadways and berms damaged by rapid runoff and heavy precipitation.					
31	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
3.13 The Village will identify and implement methods to collect debris in runoff water before it clogs ditches, streams, culverts, and other waterways.					
32	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC
3.14 The Village will require developers and/or construction crews in urban development zones to use tools such as chemical stabilization, compost blankets, geotextiles to control soil deterioration, mulching of new plantings, seeding and sodding of areas highly vulnerable to rapid surface runoff, installation of grass lined channels, slope diversion for surface runoff, and other methods to reduce the damages to land and property due to heavy and rapid surface runoff or drainage from rainfall or other precipitation or draining water.					
34	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
3.15 The Village will encourage the use of eco-friendly green materials and practices in development, such as green parking policies, green roof materials, and alternate paving materials that promote absorption instead of runoff.					
35	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
3.16 The Village will encourage management of surface runoff and chemical residue through techniques such as installation of grassy waterways, creation of infiltration basins and trenches, porous pavement installation, filtration techniques like use of catch basin inserts, sand and organic filters, rain gardens and vegetated filter strips.					
33	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other

Priority	Action Type	Lead	Start Date	End Date	Funding
Goal 4 – Hazardous Materials Incident: Mechanicsburg will work to lessen both the number of spills, leaks, and releases from hazardous materials sources, as well as lessen the damages from such incidents.					
4.1 The Village will ensure signage on highways and roadways is clear and easy to follow to decrease the likelihood of vehicle accidents due to unsure routes of travel.					
16	Prevention	Village Administrator	09/01/2019	08/31/2024	LOC; Other
4.2 The Village will advocate for funding for and conduct of additional first responder training to prepare responders for highway hazardous materials incidents and pipeline and rail incidents.					
15	Public Safety	Fire Chief	09/01/2019	08/31/2024	LOC; ST; Other
4.3 The Village will collaborate with entities that bring new hazardous substances to communities through construction of additional highways, railroads, or pipelines for first responder training.					
17	Prevention	Fire Chief	09/01/2019	08/31/2024	LOC; Other
Goal 5 – Invasive Species: Mechanicsburg will lessen the cost of plant debris caused by invasive species that weaken and destroy trees that cause large amounts of debris requiring removal after storms.					
5.1 The Village will maintain trees and vegetation on public/jurisdiction property and advocate for the same on private property.					
4	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC
5.2 The Village will work to clear public and private areas of dead or diseased trees that will easily be damaged by wind events and cause destruction of other property.					
3	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC
Goal 6 – Land Subsidence: Mechanicsburg will reduce the risk of property damage due to land subsidence in at-risk areas.					
6.1 The Village will encourage the development of more specific and accurate mapping of karst areas in Champaign County that interfaces the geologic characteristics with the soil types, as well as identifying abandoned and functioning wells and mines of various types, to more accurately identify karst locations and predict where sink holes or other structural problems are likely to occur.					
40	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
6.2 The Village will develop collaborative efforts with environmental and water quality advocates to more accurately determine risk to groundwater resources in the county, and work together to adequately and effectively prevent contamination of the groundwater.					
41	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
Goal 7 – Severe Thunderstorm, Tornado, and Windstorm: Mechanicsburg will lessen the damages suffered from windstorms or severe thunderstorms, including heavy rain, wind, hail, and lightning.					
7.1 The County will advocate and support the construction of safe rooms for single- and multi-family homes and congregate facilities, including mobile home parks, apartment complexes, and mass gathering facilities.					
6	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; PDM
7.2 The County will develop agreements for emergency shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations.					
7	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other

Priority	Action Type	Lead	Start Date	End Date	Funding
7.3 The County will research and identify resources for affordable debris disposal after storms, possibly through creation of special funding to pay for landfill fees or finding facilities that will receive debris for reduced rates.					
12	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
7.4 The Village will establish, maintain, improve, and/or promote public warning and notification systems (reverse 911, opt-in systems, outdoor warning sirens, etc.).					
11	Public Information	Village Administrator	09/01/2019	08/31/2024	LOC; ST
7.5 The Village will provide community education about protective actions, evacuation procedures, and other disaster preparedness information.					
8	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC
7.6 The Village will advocate for residents to maintain adequate insurance coverage (homeowners, renters, flood, etc.).					
10	Property Protection	Village Administrator	09/01/2019	08/31/2024	Other
7.7 The Village will maintain building regulations and land-use planning practices that encourage responsible development in high-risk areas.					
13	Prevention	Village Administrator	09/01/2019	08/31/2024	LOC
7.8 The Village will work to develop a local, affordable and functional county-wide public safety communication system with the capability for multi-discipline and multi-jurisdictional communication.					
5	Public Safety	Police Chief	09/01/2019	08/31/2024	LOC; ST; Other
7.9 The Village will work to fill gaps in warning and notification systems by adding outdoor warning sirens, developing reverse 911 capabilities, and by enhancing public notification processes.					
9	Public Information	Village Administrator	09/01/2019	08/31/2024	LOC; ST
7.10 The Village will advocate and support the hardening of utilities (distribution lines, generating plants, and other system components).					
2	Property Protection	Village Administrator	09/01/2019	08/31/2024	ICC; Other
7.11 The Village will identify alternate/back-up utility resources for use when primary source is compromised (generators, redundant suppliers, etc.).					
1	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; ICC; Other
Goal 8 – Water Quality: Mechanicsburg will work to improve the safety of the water supply whether it is sourced from private wells or public or privately-owned water treatment systems.					
8.1 The Village will advocate for improvements to water treatment plants, including enhanced testing and monitoring and improved treatment capabilities.					
21	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; ST; Other
8.2 The Village will advocate for additional research into root causes of water quality issues, including but not limited to runoff monitoring and analysis, contamination tracing, and conservation practice implementation.					

Priority	Action Type	Lead	Start Date	End Date	Funding
22	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; ST; Other
8.3 The Village will advocate for study of runoff from residential properties, including but not limited to lawn chemicals and other incidental threats.					
20	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
8.4 The Village will work for early and pro-active collaboration between jurisdictions regarding spills or leaks into the water supply through seepage into wells, aquifers, reservoirs or waterways that will eventually affect local water quality.					
18	Natural Resource Protection	Fire Chief	09/01/2019	08/31/2024	LOC; Other
8.5 The Village will support studies that identify the complete discovery of water resource contamination, including analysis of practices by industrial, personal use, manufacturing, and agricultural communities.					
19	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
Goal 9 – Winter Storms: Mechanicsburg will lessen damages suffered from severe winter storms and blizzards.					
9.1 The Village will work to plow and clear village-maintained roadways to facilitate emergency traffic, necessary travel, and business access.					
14	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC

3.3.4 Mutual

The Village of Mutual mitigation strategies will be monitored by the Mayor. The Mayor, along with village council and other community officials, will identify opportunities to implement appropriate mitigation actions. The majority of mitigation actions will be funded through the village's local budgets; state and federal grants will be sought when possible.

Table 3-6: Mutual Mitigation Strategies

Priority	Action Type	Lead	Start Date	End Date	Funding
Goal 1 – Drought/Extreme Heat: Mutual will assess the reliability of water supplies during drought and extreme heat.					
1.1 The Village will advocate and support the hardening of water supply infrastructure to include alternate sources of water and protection of treatment plants and distribution systems.					
20	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; CDBG
Goal 2 - Earthquake: Mutual will assess damage potential from earthquakes and establish a safety plan for residents.					
2.1 The Village will identify the structures and infrastructure that would likely be damaged or destroyed in an earthquake of moderate to severe magnitude.					
21	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; ST
Goal 3 – Flood: Mutual will work to reduce flooding and limit loss of life or injury and property damage caused by flooding.					
3.1 The Village will require construction of water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) to prevent flooding of properties.					
13	Structurally Engineered Projects	Mayor	09/01/2019	08/31/2024	PDM; HMGP
3.2 The Village will acquire, demolish, and/or retrofit flood-prone structures.					
12	Prevention	Mayor	09/01/2019	08/31/2024	PDM; HMGP
3.3 The Village will clear debris, fallen trees, excess sediment, and other obstructions from waterways to improve flow.					
11	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
3.4 The Village will utilize natural habitat creation and/or use of vegetative buffers inside waterways to slow the rapid flow of floodwater and/or hold excess storm water.					
14	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
3.5 The Village will maintain and enforce floodplain, zoning, and building regulations to manage development in flood-prone areas.					
10	Prevention	Mayor	09/01/2019	08/31/2024	LOC
3.6 The Village will maintain participation in NFIP and engage in floodplain management activities to support flood prevention.					
9	Prevention	Mayor	09/01/2019	08/31/2024	LOC
3.7 The Village will improve and repair roadways and berms damaged by rapid runoff and heavy precipitation.					
15	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
Goal 4 – Hazardous Materials Incident: Mutual will work to lessen both the number of spills, leaks, and releases from hazardous materials sources, as well as lessen the damages from such incidents.					
4.1 The Village will advocate for funding for and conduct of additional first responder training to prepare responders for highway hazardous materials incidents and pipeline and rail incidents.					

Priority	Action Type	Lead	Start Date	End Date	Funding
16	Public Safety	Mayor	09/01/2019	08/31/2024	LOC; ST; Other
Goal 5 – Invasive Species: Mutual will lessen the cost of plant debris caused by invasive species that weaken and destroy trees that cause large amounts of debris requiring removal after storms.					
5.1 The Village will work to clear public and private areas of dead or diseased trees that will easily be damaged by wind events and cause destruction of other property.					
17	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 6 – Land Subsidence: Mutual will reduce the risk of property damage due to land subsidence in at-risk areas.					
6.1 The Village will encourage the development of more specific and accurate mapping of karst areas in Champaign County that interfaces the geologic characteristics with the soil types, as well as identifying abandoned and functioning wells and mines of various types, to more accurately identify karst locations and predict where sink holes or other structural problems are likely to occur.					
18	Prevention	Mayor	09/01/2019	08/31/2024	LOC
Goal 7 – Severe Thunderstorm, Tornado, and Windstorm: Mutual will lessen the damages suffered from windstorms or severe thunderstorms, including heavy rain, wind, hail, and lightning.					
7.1 The Village will advocate and support the construction of safe rooms for single- and multi-family homes and congregate facilities, including mobile home parks, apartment complexes, and mass gathering facilities.					
3	Property Protection	Mayor	09/01/2019	08/31/2024	PDM; HMGP
7.2 The Village will develop agreements for emergency shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations.					
4	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
7.3 The Village will research and identify resources for affordable debris disposal after storms, possibly through creation of special funding to pay for landfill fees or finding facilities that will receive debris for reduced rates.					
5	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
7.4 The Village will establish, maintain, improve, and/or promote public warning and notification systems (reverse 911, opt-in systems, outdoor warning sirens, etc.).					
6	Public Information	Mayor	09/01/2019	08/31/2024	LOC; ST; Other
7.5 The Village will provide community education about protective actions, evacuation procedures, and other disaster preparedness information.					
7	Public Information	Mayor	09/01/2019	08/31/2024	LOC
7.6 The Village will advocate and support the hardening of utilities (distribution lines, generating plants, and other system components).					
2	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
7.7 The Village will identify alternate/back-up utility resources for use when primary source is compromised (generators, redundant suppliers, etc.).					
1	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; HMGP; PDM; Other
Goal 8 – Water Quality: Mutual will work to improve the safety of the water supply whether it is sourced from private wells or public or privately-owned water treatment systems.					
8.1 The Village will advocate for additional research into root causes of water quality issues, including but not limited to runoff monitoring and analysis, contamination tracing, and conservation practice implementation.					
19	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC

Priority	Action Type	Lead	Start Date	End Date	Funding
Goal 9 – Winter Storms: Mutual will lessen damages suffered from severe winter storms and blizzards.					
9.1 The Village will work to plow and clear village-maintained roadways to facilitate emergency traffic, necessary travel, and business access.					
8	Property Protection	Mayor	09/01/2019	08/31/2024	LOC

3.3.5 North Lewisburg

In North Lewisburg, mitigation strategies will be monitored and championed by the Village Administrator. The Administrator will work with the mayor, council, other community officials to identify mitigation opportunities. The majority of mitigation actions will be funded through local budgets. When possible, state and federal grants will be sought to help fund these efforts.

Table 3-7: North Lewisburg Mitigation Strategies

Priority	Action Type	Lead	Start Date	End Date	Funding
Goal 1 – Drought/Extreme Heat: North Lewisburg will assess the reliability of water supplies during drought and extreme heat.					
1.1 The Village will advocate and support the hardening of water supply infrastructure to include alternate sources of water and protection of treatment plants and distribution systems.					
25	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; ST; Other
Goal 2 - Earthquake: North Lewisburg will assess damage potential from earthquakes and establish a safety plan for residents.					
2.1 The Village will identify the structures and infrastructure that would likely be damaged or destroyed in an earthquake of moderate to severe magnitude.					
27	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC
Goal 3 – Flood: North Lewisburg will work to reduce flooding and limit loss of life or injury and property damage caused by flooding.					
3.1 The Village will add temporary or changeable signs to mark flooding roadways quickly.					
17	Structurally Engineered Projects	Village Administrator	09/01/2019	08/31/2024	LOC; HMGP; PDM; CDBG; Other
3.2 The Village will acquire, demolish, and/or retrofit flood-prone structures.					
15	Prevention	Village Administrator	09/01/2019	08/31/2024	LOC; PDM; HMGP; Other
3.3 The Village will clear debris, fallen trees, excess sediment, and other obstructions from waterways to improve flow.					
14	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
3.4 The Village will work with watershed or conservancy districts and other jurisdictions that share an interest in waterways to facilitate cleaning, maintaining, and eliminating problems.					
16	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
3.5 The Village will utilize natural habitat creation and/or use of vegetative buffers inside waterways to slow the rapid flow of floodwater and/or hold excess storm water.					
18	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; ST; Other
3.6 The Village will maintain and enforce floodplain, zoning, and building regulations to manage development in flood-prone areas.					
13	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC

Priority	Action Type	Lead	Start Date	End Date	Funding
3.7 The Village will maintain participation in NFIP and engage in floodplain management activities to support flood prevention.					
11	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC
3.8 The Village will maintain, repair, upgrade, and/or replace storm sewers and related systems and increase culvert sizes and bridge spans to reduce flooding and improve drainage.					
19	Structurally Engineered Projects	Village Administrator	09/01/2019	08/31/2024	LOC; CDBG; Other
3.9 The Village will utilize channel diversion or modification including deepening and widening to re-route water or increase capacity and reduce flooding.					
10	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; CDBG; Other
3.10 The Village will identify and implement methods to collect debris in runoff water before it clogs ditches, streams, culverts, and other waterways.					
21	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
3.11 The Village will protect banks and land near waterways from deterioration due to rapid or excessive flow by planting stream bank vegetation, installing dormant woody stakes and posts, planting trees, shrubs and grasses along banks and berms, or using deflectors to prevent deterioration, or other similar methods to accomplish the same.					
22	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; ST; Other
3.12 The Village will utilize biotechnical methods (placement of willow posts, hardwood tree plantings, fascines, brush layering, evergreen revetments, log revetments, tree kickers, lunker structures, or placed rocks as examples) to minimize the deterioration or destruction of stream banks due to excessive flow.					
20	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
3.13 The Village will utilize stream bank protection measures such as gabion revetments, riprap revetments, and crib walls, and other structural methods to protect the banks and berms.					
24	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; ST; Other
3.14 The Village will require developers and/or construction crews in urban development zones to use tools such as chemical stabilization, compost blankets, geotextiles to control soil deterioration, mulching of new plantings, seeding and sodding of areas highly vulnerable to rapid surface runoff, installation of grass lined channels, slope diversion for surface runoff, and other methods to reduce the damages to land and property due to heavy and rapid surface runoff or drainage from rainfall or other precipitation or draining water.					
23	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
Goal 4 – Hazardous Materials Incident: North Lewisburg will work to lessen both the number of spills, leaks, and releases from hazardous materials sources, as well as lessen the damages from such incidents.					
4.1 The Village will advocate for funding for and conduct of additional first responder training to prepare responders for highway hazardous materials incidents and pipeline and rail incidents.					
28	Public Safety	Fire Chief	09/01/2019	08/31/2024	LOC; ST; Other
Goal 5 – Invasive Species: North Lewisburg will lessen the cost of plant debris caused by invasive species that weaken and destroy trees that cause large amounts of debris requiring removal after storms.					

Priority	Action Type	Lead	Start Date	End Date	Funding
5.1 The Village will maintain trees and vegetation on public/jurisdiction property and advocate for the same on private property.					
26	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
5.2 The Village will work to clear public and private areas of dead or diseased trees that will easily be damaged by wind events and cause destruction of other property.					
12	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC
Goal 6 – Land Subsidence: North Lewisburg will reduce the risk of property damage due to land subsidence in at-risk areas.					
6.1 The Village will encourage the development of more specific and accurate mapping of karst areas in Champaign County that interfaces the geologic characteristics with the soil types, as well as identifying abandoned and functioning wells and mines of various types, to more accurately identify karst locations and predict where sink holes or other structural problems are likely to occur.					
29	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
Goal 7 – Severe Thunderstorm, Tornado, and Windstorm: North Lewisburg will lessen the damages suffered from windstorms or severe thunderstorms, including heavy rain, wind, hail, and lightning.					
7.1 The Village will advocate and support the construction of safe rooms for single- and multi-family homes and congregate facilities, including mobile home parks, apartment complexes, and mass gathering facilities.					
5	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; PDM; Other
7.2 The Village will develop agreements for emergency shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations.					
6	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
7.3 The Village will research and identify resources for affordable debris disposal after storms, possibly through creation of special funding to pay for landfill fees or finding facilities that will receive debris for reduced rates.					
7	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
7.4 The Village will establish, maintain, improve, and/or promote public warning and notification systems (reverse 911, opt-in systems, outdoor warning sirens, etc.)					
4	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; ST; Other
7.5 The Village will provide community education about protective actions, evacuation procedures, and other disaster preparedness information.					
8	Public Information	Village Administrator	09/01/2019	08/31/2024	LOC; Other
7.6 The Village will advocate and support the hardening of utilities (distribution lines, generating plants, and other system components).					
2	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; ICC; Other
7.7 The Village will repair or retrofit public properties with wind-resistant materials (i.e. metal roofing, siding, etc.) to decrease damage due to wind.					

Priority	Action Type	Lead	Start Date	End Date	Funding
3	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
7.8 The Village will identify alternate/back-up utility resources for use when primary source is compromised (generators, redundant suppliers, etc.)					
1	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC; PDM; ST; Other
7.9 The Village will advocate for residents to maintain adequate insurance coverage (homeowners, renters, etc.)					
9	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC
Goal 8 – Water Quality: North Lewisburg will work to improve the safety of the water supply whether it is sourced from private wells or public or privately-owned water treatment systems.					
8.1 The Village will advocate for additional research into root causes of water quality issues, including but not limited to runoff monitoring and analysis, contamination tracing, and conservation practice implementation.					
33	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC; Other
8.2 The Village will advocate for county-wide water management strategies to develop a water-supply redundancy plan to help communities during an extended water emergency.					
32	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC
8.3 The Village will work for early and proactive collaboration between jurisdictions regarding spills or leaks into the water supply through seepage into wells, aquifers, reservoirs or waterways that will eventually affect local water quality.					
31	Natural Resource Protection	Village Administrator	09/01/2019	08/31/2024	LOC: Other
Goal 9 – Winter Storms: North Lewisburg will lessen damages suffered from severe winter storms and blizzards.					
9.1 The Village will work to plow and clear village-maintained roadways to facilitate emergency traffic, necessary travel, and business access.					
30	Property Protection	Village Administrator	09/01/2019	08/31/2024	LOC

3.3.6 St. Paris

The mitigation strategies for St. Paris will be monitored by the Mayor, who will coordinate with village council and other community officials to identify mitigation opportunities. Most of mitigation actions will be locally funded; state and federal grants will be sought to help fund these efforts when available.

Table 3-8: St. Paris Mitigation Strategies

Priority	Action Type	Lead	Start Date	End Date	Funding
Goal 1 – Drought/Extreme Heat: St. Paris will assess the reliability of water supplies during drought and extreme heat.					
1.1 The Village will advocate and support the hardening of water supply infrastructure to include alternate sources of water and protection of treatment plants and distribution systems.					
46	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
1.2 The Village will establish water conservation procedures for implementation in drought conditions.					
47	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 2 - Earthquake: St. Paris will assess damage potential from earthquakes and establish a safety plan for residents.					
2.1 The Village will identify the structures and infrastructure that would likely be damaged or destroyed in an earthquake of moderate to severe magnitude.					
45	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 3 – Flood: St. Paris will work to reduce flooding and limit loss of life or injury and property damage caused by flooding.					
3.1 The Village will require construction of water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) to prevent flooding of properties.					
10	Structurally Engineered Projects	Mayor	09/01/2019	08/31/2024	LOC; PDM
3.2 The Village will consider elevation of structures (buildings, roadways, bridges, culverts etc.) to reduce flooding.					
11	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; PDM; HMGP; Other
3.3 The Village will acquire, demolish, and/or retrofit flood-prone structures.					
12	Prevention	Mayor	09/01/2019	08/31/2024	PDM; HMGP
3.4 The Village will consider channel diversion or modification (deepening or widening) to re-route water or increase capacity and reduce flooding.					
13	Structurally Engineered Project	Mayor	09/01/2019	08/31/2024	PDM
3.5 The Village will clear debris, fallen trees, excess sediment, and other obstructions from waterways to improve flow.					
9	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
3.6 The Village will work with watershed or conservancy districts and other jurisdictions that share an interest in waterways to facilitate cleaning, maintaining, and eliminating problems.					
14	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other

Priority	Action Type	Lead	Start Date	End Date	Funding
3.7 The Village will utilize natural habitat creation and/or use of vegetative buffers inside waterways to slow the rapid flow of floodwater and/or hold excess storm water.					
15	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
3.8 The Village will maintain and enforce floodplain, zoning, and building regulations to manage development in flood-prone areas.					
5	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
3.9 The Village will maintain participation in NFIP and engage in floodplain management activities to support flood prevention.					
4	Prevention	Mayor	09/01/2019	08/31/2024	LOC
3.10 The Village will conduct a public awareness campaign for individual flood insurance awareness.					
16	Public Information	Mayor	09/01/2019	08/31/2024	LOC
3.11 The Village will maintain, repair, upgrade, and/or replace storm sewers and related systems and increase culvert sizes and bridge spans to reduce flooding and improve drainage.					
6	Structurally Engineered Project	Mayor	09/01/2019	08/31/2024	LOC; CDBG; Other
3.12 The Village will procure adequate temporary or changeable signs to mark flooded roadways quickly.					
7	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
3.13 The Village will ensure that dams have emergency plans that identify inundation areas and facilitate for emergency actions in the case of a serious failure.					
17	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
3.14 The Village will improve and repair roadways and berms damaged by rapid runoff and heavy precipitation.					
18	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
3.15 The Village will work with railroads to identify a means to repair and improve railroad owned bridges, culverts, and abandoned tracks and keep them clear of debris and abandoned equipment.					
19	Property Protection	Mayor	09/01/2019	08/31/2024	Other
3.16 The Village will identify and implement methods to collect debris in runoff water before it clogs ditches, streams, culverts, and other waterways.					
8	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
3.17 The Village will protect banks and land near waterways from deterioration due to rapid or excessive flow by planting stream bank vegetation, installing dormant woody stakes and posts, planting trees, shrubs and grasses along banks and berms, or using deflectors to prevent deterioration, or other similar methods to accomplish the same.					
20	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
3.18 The Village will utilize biotechnical methods (placement of willow posts, hardwood tree plantings, fascines, brush layering, evergreen revetments, log revetments, tree kickers, lunker structures, or placed rocks as examples) to minimize the deterioration or destruction of stream banks due to excessive flow.					
21	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
3.19 The Village will manage stream flow through channel, sedimentation, debris and obstruction, and stream ecology management practices.					
22	Structurally Engineered Projects	Mayor	09/01/2019	08/31/2024	LOC; CDBG; Other

Priority	Action Type	Lead	Start Date	End Date	Funding
3.20 The Village will utilize stream bank protection measures such as gabion revetments, riprap revetments, and crib walls, and other structural methods to protect the banks and berms.					
23	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
3.21 The Village will require developers and/or construction crews in urban development zones to use tools such as chemical stabilization, compost blankets, geotextiles to control soil deterioration, mulching of new plantings, seeding and sodding of areas highly vulnerable to rapid surface runoff, installation of grass lined channels, slope diversion for surface runoff, and other methods to reduce the damages to land and property due to heavy and rapid surface runoff or drainage from rainfall or other precipitation or draining water.					
24	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; ICC; Other
3.22 The Village will encourage the use of eco-friendly green materials and practices in development, such as green parking policies, green roof materials, and alternate paving materials that promote absorption instead of runoff.					
25	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; ICC; Other
3.23 The Village will protect soil quality by advocating for crop rotation, crop residue management, contour buffer strips, contour farming and strip-cropping, use of cover crops, installation of field borders, rotation grazing, pasture planting, establishment of grassy waterways, grade stabilization structures, water and sediment control basins, critical area planting, diversion, terracing, manure storage and runoff control, nutrient management, pest management, well abandonment, riparian buffers, wetland restoration, windbreaks, woodlot management, tree planting, and creation of upland wildlife habitat on farmland inside, adjacent to, or near incorporated Village property.					
27	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
3.24 The Village will encourage management of surface runoff and chemical residue through techniques such as installation of grassy waterways, creation of infiltration basins and trenches, porous pavement installation, filtration techniques like use of catch basin inserts, sand and organic filters, rain gardens and vegetated filter strips.					
26	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
Goal 4 – Hazardous Materials Incident: St. Paris will work to lessen both the number of spills, leaks, and releases from hazardous materials sources, as well as lessen the damages from such incidents.					
4.1 The Village will ensure signage on highways and roadways is clear and easy to follow to decrease the likelihood of vehicle accidents due to unsure routes of travel.					
48	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
4.2 The Village will advocate for funding for and conduct of additional first responder training to prepare responders for highway hazardous materials incidents and pipeline and rail incidents.					
49	Public Safety	Fire Chief	09/01/2019	08/31/2024	LOC; ST; Other
4.3 The Village will collaborate with entities that bring new hazardous substances to communities through construction of additional highways, railroads, or pipelines for first responder training.					
50	Public Safety	Fire Chief	09/01/2019	08/31/2024	Other
Goal 5 – Invasive Species: St. Paris will lessen the cost of plant debris caused by invasive species that weaken and destroy trees that cause large amounts of debris requiring removal after storms.					

Priority	Action Type	Lead	Start Date	End Date	Funding
5.1 The Village will maintain trees and vegetation on public/jurisdiction property and advocate for the same on private property.					
51	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
5.2 The Village will work to clear public and private areas of dead or diseased trees that will easily be damaged by wind events and cause destruction of other property.					
52	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 6 – Land Subsidence: St. Paris will reduce the risk of property damage due to land subsidence in at-risk areas.					
6.1 The Village will support and conduct programs that reduce erosion and sedimentation along shorelines, riverbanks, ditch banks, road berms, and areas that wash away					
53	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
6.2 The Village will advocate for, support, and implement slope protection actions along waterways and other vulnerable areas where natural causes endanger property, structures, or other vulnerabilities exist.					
54	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other; ODM
6.3 The Village will encourage the development of more specific and accurate mapping of karst areas in Champaign County that interfaces the geologic characteristics with the soil types, as well as identifying abandoned and functioning wells and mines of various types, to more accurately identify karst locations and predict where sink holes or other structural problems are likely to occur.					
55	Prevention	Mayor	09/01/2019	08/31/2024	LOC
6.4 The Village will develop collaborative efforts with environmental and water quality advocates to more accurately determine risk to groundwater resources in the village, and work together to adequately and effectively prevent contamination of the groundwater.					
56	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 7 – Severe Thunderstorm, Tornado, and Windstorm: St. Paris will lessen the damages suffered from windstorms or severe thunderstorms, including heavy rain, wind, hail, and lightning.					
7.1 The Village will advocate and support the construction of safe rooms for single- and multi-family homes and congregate facilities, including mobile home parks, apartment complexes, and mass gathering facilities.					
28	Property Protection	Mayor	09/01/2019	08/31/2024	PDM; LOC; HMGP; Other
7.2 The Village will repair or retrofit public properties with wind-resistant materials (i.e. metal roofing, siding, etc.) to decrease damage due to wind.					
30	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
7.3 The Village will develop agreements for emergency shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations.					
3	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
7.4 The Village will research and identify resources for affordable debris disposal after storms, possibly through creation of special funding to pay for landfill fees or finding facilities that will receive debris for reduced rates.					
29	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; ICC; Other
7.5 The Village will establish, maintain, improve, and/or promote public warning and notification systems (reverse 911, opt-in systems, outdoor warning sirens, etc.).					

Priority	Action Type	Lead	Start Date	End Date	Funding
31	Public Information	Fire Chief	09/01/2019	08/31/2024	LOC; ST
7.6 The Village will provide community education about protective actions, evacuation procedures, and other disaster preparedness information.					
32	Public Information	Mayor	09/01/2019	08/31/2024	LOC
7.7 The Village will advocate for residents to maintain adequate insurance coverage (homeowners, renters, flood, etc.).					
34	Public Information	Mayor	09/01/2019	08/31/2024	LOC
7.8 The Village will maintain building regulations and land-use planning practices that encourage responsible development in high-risk areas.					
33	Prevention	Mayor	09/01/2019	08/31/2024	LOC
7.9 The Village will work to develop a local, affordable and functional county-wide public safety communication system with the capability for multi-discipline and multi-jurisdictional communication.					
35	Public Safety	Fire Chief	09/01/2019	08/31/2024	LOC; ST; Other
7.10 The Village will work to fill gaps in warning and notification systems by adding outdoor warning sirens, developing reverse 911 capabilities, and by enhancing public notification processes.					
36	Public Information	Fire Chief	09/01/2019	08/31/2024	LOC; ST
7.11 The Village will advocate and support the hardening of utilities (distribution lines, generating plants, and other system components).					
2	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; ICC
7.12 The Village will identify alternate/back-up utility resources for use when primary source is compromised (generators, redundant suppliers, etc.).					
1	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; PDM; HMGP; Other
Goal 8 – Water Quality: St. Paris will work to improve the safety of the water supply whether it is sourced from private wells or public or privately-owned water treatment systems.					
8.1 The Village will advocate for improvements to water treatment plants, including enhanced testing and monitoring and improved treatment capabilities.					
38	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC
8.2 The Village will advocate for additional research into root causes of water quality issues, including but not limited to runoff monitoring and analysis, contamination tracing, and conservation practice implementation.					
40	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC
8.3 The Village will advocate for study of runoff from residential properties, including but not limited to lawn chemicals and other incidental threats.					
39	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC
8.4 The Village will work for early and pro-active collaboration between jurisdictions regarding spills or leaks into the water supply through seepage into wells, aquifers, reservoirs or waterways that will eventually affect local water quality.					
41	Property Protection	Fire Chief	09/01/2019	08/31/2024	LOC
8.5 The Village will advocate for and support the implementation of regulations and supportive programs that help farmers manage manure and waste from concentrated animal feeding facilities in the interest of protecting the groundwater and waterways from contamination.					

Priority	Action Type	Lead	Start Date	End Date	Funding
42	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
8.6 The Village will support the implementation of measures to manage distressed watersheds in the county and advocate for support programs to help farmers implement these regulations and measures while maintaining the agricultural economic well-being.					
44	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
8.7 The Village will support studies that identify the complete discovery of water resource contamination, including analysis of practices by industrial, personal use, manufacturing, and agricultural communities.					
43	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
Goal 9 – Winter Storms: St. Paris will lessen damages suffered from severe winter storms and blizzards.					
9.1 The Village will work to plow and clear village-maintained roadways to facilitate emergency traffic, necessary travel, and business access.					
37	Property Protection	Mayor	09/01/2019	08/31/2024	LOC

3.3.7 Urbana

In Urbana, the Director of Administration will monitor progress on mitigation strategies and coordinate with other community officials to identify mitigation opportunities. The majority of mitigation actions will be funded through local budgets. When possible, state and federal grants will be sought to help fund these efforts. During the planning process county and city officials discussed the possibility of mitigation strategies being implemented by various entities other than the city, including private property owners such as non-profit organizations, institutions of higher learning, school districts, or other special interest districts. This could be especially relevant in mitigating damages to multi-family structures, institutional buildings, and other non-government owned critical facilities. These parties were involved in discussion during the planning process, and could be the most likely administrators of a project at the time of implementation.

Table 3-9: Urbana Mitigation Strategies

Priority	Action Type	Lead	Start Date	End Date	Funding
Goal 1 – Drought/Extreme Heat: Urbana will assess the reliability of water supplies during drought and extreme heat.					
1.1 The City will advocate and support the hardening of water supply infrastructure to include alternate sources of water and protection of treatment plants and distribution systems.					
39	Natural Resources Protection	Director of Administration	09/01/2019	08/31/2024	LOC; CDBG
Goal 2 - Earthquake: Urbana will assess damage potential from earthquakes and establish a safety plan for residents.					
2.1 The City will identify the structures and infrastructure in the city that would likely be damaged or destroyed in an earthquake of moderate to severe magnitude.					
38	Property Protection	City Engineer	09/01/2019	08/31/2024	LOC
Goal 3 – Flood: Urbana will work to reduce flooding and limit loss of life or injury and property damage caused by flooding.					
3.1 The City will require construction of water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) to prevent flooding of properties.					
21	Structurally Engineered Projects	City Engineer	09/01/2019	08/31/2024	LOC; PDM; HMGP; FMA; CDBG; Other
3.2 The City will elevate structures and infrastructure (buildings, roadways, bridges, culverts etc.).					
32	Property Protection	City Engineer	09/01/2019	08/31/2024	LOC; PDM; HMGP; FMA; CDBG; Other
3.3 The City will acquire, demolish, and/or retrofit flood-prone structures.					
20	Prevention	City Engineer	09/01/2019	08/31/2024	PDM; FMA; SRL; HMGP
3.4 The City will consider channel modification (deepening or widening) to re-route water or increase flow capacity and reduce flooding.					
25	Structurally Engineered Project	City Engineer	09/01/2019	08/31/2024	PDM; FMA; HMGP; ST; CDBG; Other

Priority	Action Type	Lead	Start Date	End Date	Funding
3.5 The City will clear debris, fallen trees, excess sediment, and other obstructions from waterways to improve flow.					
22	Property Protection	City Engineer	09/01/2019	08/31/2024	LOC
3.6 The City will work with watershed or conservancy districts and other jurisdictions that share an interest in waterways to facilitate cleaning, maintaining, and eliminating problems.					
23	Natural Resource Protection	Director of Administration	09/01/2019	08/31/2024	LOC
3.7 The City will utilize natural habitat creation and/or use of vegetative buffers inside waterways to slow the rapid flow of floodwater and/or hold excess storm water.					
24	Natural Resource Protection	City Engineer	09/01/2019	08/31/2024	LOC; Other
3.8 The City will maintain and enforce floodplain, zoning, and building regulations to manage development in flood-prone areas.					
13	Prevention	Director of Administration	09/01/2019	08/31/2024	LOC
3.9 The City will maintain participation in NFIP and engage in floodplain management activities to support flood prevention.					
14	Prevention	Director of Administration	09/01/2019	08/31/2024	LOC
3.10 The City will maintain, repair, upgrade, and/or replace storm sewers and related systems and increase culvert sizes and bridge spans, as necessary, to reduce flood risk.					
15	Structurally Engineered Projects	City Engineer	09/01/2019	08/31/2024	LOC; ST; CDBG; Other
3.11 The City will improve and repair roadways and berms damaged by rapid runoff and heavy precipitation.					
16	Property Protection	City Engineer	09/01/2019	08/31/2024	LOC
3.12 The City will work with railroads to identify a means to repair and improve railroad owned bridges, culverts, and abandoned tracks and keep them clear of debris and abandoned equipment.					
30	Property Protection	Director of Administration	09/01/2019	08/31/2024	Other
3.13 The City will identify and implement methods to collect debris in runoff water before it clogs ditches, streams, culverts, and other waterways.					
17	Property Protection	City Engineer	09/01/2019	08/31/2024	LOC
3.14 The City will protect banks and land near waterways from deterioration due to rapid or excessive flow by planting stream bank vegetation, installing dormant woody stakes and posts, planting trees, shrubs and grasses along banks and berms, or using deflectors to prevent deterioration, or other similar methods to accomplish the same.					
26	Property Protection	City Engineer	09/01/2019	08/31/2024	LOC; Other
3.15 The City will utilize biotechnical methods (placement of willow posts, hardwood tree plantings, fascines, brush layering, evergreen revetments, log revetments, tree kickers, lunger structures, or placed rocks as examples) to minimize the deterioration or destruction of stream banks due to excessive flow.					
27	Natural Resource Protection	City Engineer	09/01/2019	08/31/2024	LOC; Other
3.16 The City will manage stream flow through channel, sedimentation, debris and obstruction, and stream ecology management practices.					
28	Natural Resource Protection	City Engineer	09/01/2019	08/31/2024	LOC; Other

Priority	Action Type	Lead	Start Date	End Date	Funding
3.17 The City will utilize stream bank protection measures such as gabion revetments, riprap revetments, and crib walls, and other structural methods to protect the banks and berms.					
29	Natural Resource Protection	City Engineer	09/01/2019	08/31/2024	LOC; Other
3.18 The City will require developers and/or construction crews in urban development zones to use tools such as chemical stabilization, compost blankets, geotextiles to control soil deterioration, mulching of new plantings, seeding and sodding of areas highly vulnerable to rapid surface runoff, installation of grass lined channels, slope diversion for surface runoff, and other methods to reduce the damages to land and property due to heavy and rapid surface runoff or drainage from rainfall or other precipitation or draining water.					
18	Property Protection	Director of Administration	09/01/2019	08/31/2024	LOC; ICC
3.19 The City will protect soil quality by advocating for crop rotation, crop residue management, contour buffer strips, contour farming and strip-cropping, use of cover crops, installation of field borders, rotation grazing, pasture planting, establishment of grassy waterways, grade stabilization structures, water and sediment control basins, critical area planting, diversion, terracing, manure storage and runoff control, nutrient management, pest management, well abandonment, riparian buffers, wetland restoration, windbreaks, woodlot management, tree planting, and creation of upland wildlife habitat on farmland inside, adjacent to, or near incorporated city property.					
31	Natural Resource Protection	Director of Administration	09/01/2019	08/31/2024	LOC; Other
3.20 The City will encourage management of surface runoff and chemical residue through techniques such as installation of grassy waterways, creation of infiltration basins and trenches, porous pavement installation, filtration techniques like use of catch basin inserts, sand and organic filters, rain gardens and vegetated filter strips.					
19	Natural Resource Protection	City Engineer	09/01/2019	08/31/2024	LOC; ICC; Other
Goal 4 – Hazardous Materials Incident: Urbana will work to lessen both the number of spills, leaks, and releases from hazardous materials sources, as well as lessen the damages from such incidents.					
4.1 The City will ensure signage on highways and roadways is clear and easy to follow to decrease the likelihood of vehicle accidents due to unsure routes of travel.					
33	Property Protection	Director of Administration	09/01/2019	08/31/2024	LOC; Other
4.2 The City will advocate for funding for and conduct of additional first responder training to prepare responders for highway hazardous materials incidents and pipeline and rail incidents.					
34	Property Protection	Fire Chief	09/01/2019	08/31/2024	LOC; ST; Other
4.3 The City will collaborate with entities that bring new hazardous substances to communities through development of first responder training.					
35	Property Protection	Fire Chief	09/01/2019	08/31/2024	LOC; Other
Goal 5 – Invasive Species: Urbana will lessen the cost of plant debris caused by invasive species that weaken and destroy trees that cause large amounts of debris requiring removal after storms.					
5.1 The City will maintain trees and vegetation on public/jurisdiction property and advocate for the same on private property.					
36	Property Protection	Director of Administration	09/01/2019	08/31/2024	LOC; Other

Priority	Action Type	Lead	Start Date	End Date	Funding
5.2 The City will work to clear public and private areas of dead or diseased trees that will easily be damaged by wind events and cause destruction of other property.					
37	Property Protection	Director of Administration	09/01/2019	08/31/2024	LOC; Other
Goal 6 – Land Subsidence: Urbana will reduce the risk of property damage due to land subsidence in at-risk areas.					
6.1 The City will support and conduct programs that reduce erosion and sedimentation along riverbanks, ditch banks, road berms, and areas that wash away after heavy or prolonged precipitation.					
44	Natural Resource Protection	Director of Administration	09/01/2019	08/31/2024	LOC; ST; Other
6.2 The City will advocate for, support, and implement slope protection actions along waterways and other vulnerable areas where natural causes endanger property, structures, or other vulnerabilities exist.					
45	Natural Resource Protection	Director of Administration	09/01/2019	08/31/2024	LOC; Other
6.3 The City will encourage the development of more specific and accurate mapping of karst areas in Champaign County that interfaces the geologic characteristics with the soil types, as well as identifying abandoned and functioning wells and mines of various types, to more accurately identify karst locations and predict where sink holes or other structural problems are likely to occur.					
46	Natural Resource Protection	Director of Administration	09/01/2019	08/31/2024	LOC
Goal 7 – Severe Thunderstorm, Tornado, and Windstorm: Urbana will lessen the damages suffered from windstorms or severe thunderstorms, including heavy rain, wind, hail, and lightning.					
7.1 The City will advocate and support the construction of safe rooms for single- and multi-family homes and congregate facilities, including mobile home parks, apartment complexes, and mass gathering facilities.					
6	Property Protection	Director of Administration	09/01/2019	08/31/2024	LOC; PDM
7.2 The City will repair or retrofit public properties with wind-resistant materials (i.e. metal roofing, siding, etc.) to decrease damage due to wind.					
7	Property Protection	City Engineer	09/01/2019	08/31/2024	LOC; Other
7.3 The City will develop agreements for emergency shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations.					
2	Property Protection	Director of Administration	09/01/2019	08/31/2024	LOC
7.4 The City will research and identify resources for affordable debris disposal after storms, possibly through creation of special funding to pay for landfill fees or finding facilities that will receive debris for reduced rates.					
1	Property Protection	City Engineer	09/01/2019	08/31/2024	LOC
7.5 The City will establish, maintain, improve, and/or promote public warning and notification systems (reverse 911, opt-in systems, outdoor warning sirens, etc.).					
3	Public Information	Director of Administration	09/01/2019	08/31/2024	LOC; ST; Other
7.6 The City will maintain building regulations and land-use planning practices that encourage responsible development in high-risk areas.					
8	Property Protection	Director of Administration	09/01/2019	08/31/2024	LOC; ICC

Priority	Action Type	Lead	Start Date	End Date	Funding
7.7 The City will work to develop a local, affordable and functional county-wide public safety communication system with the capability for multi-discipline and multi-jurisdictional communication.					
10	Public Safety	Fire Chief	09/01/2019	08/31/2024	LOC; Other
7.8 The City will work to fill gaps in warning and notification systems by adding outdoor warning sirens, developing reverse 911 capabilities, and by enhancing public notification processes.					
9	Public Information	Fire Chief	09/01/2019	08/31/2024	LOC; ST; Other
7.9 The City will advocate and support the hardening of utilities (distribution lines, generating plants, and other system components).					
4	Property Protection	Director of Administration	09/01/2019	08/31/2024	LOC; ICC; Other
7.10 The City will identify alternate/back-up utility resources for use when primary source is compromised (generators, redundant suppliers, etc.).					
5	Property Protection	City Engineer	09/01/2019	08/31/2024	LOC; Other
Goal 8 – Water Quality: Urbana will work to improve the safety of the water supply whether it is sourced from private wells or public or privately-owned water treatment systems.					
8.1 The City will advocate for improvements to water treatment plants, including enhanced testing and monitoring and improved treatment capabilities.					
40	Natural Resource Protection	Director of Administration	09/01/2019	08/31/2024	LOC; Other
8.2 The City will advocate for additional research into root causes of water quality issues, including but not limited to runoff monitoring and analysis, contamination tracing, and conservation practice implementation.					
43	Natural Resource Protection	Director of Administration	09/01/2019	08/31/2024	LOC; Other
8.3 The City will advocate for study of runoff from residential properties, including but not limited to lawn chemicals and other incidental threats.					
41	Property Protection	City Engineer	09/01/2019	08/31/2024	LOC; Other
8.4 The City will work for early and pro-active collaboration between jurisdictions regarding spills or leaks into the water supply through seepage into wells, aquifers, reservoirs or waterways that will eventually affect local water quality.					
42	Natural Resource Protection	Director of Administration	09/01/2019	08/31/2024	LOC; Other
Goal 9 – Winter Storms: Urbana will lessen damages suffered from severe winter storms and blizzards.					
9.1 The City will work to plow and clear city-maintained roadways to facilitate emergency traffic, necessary travel, and business access.					
11	Property Protection	City Engineer	09/01/2019	08/31/2024	LOC
9.2 The City will develop collaborative efforts with environmental and water quality advocates to more accurately determine risk to groundwater resources in the county and work together to adequately and effectively prevent contamination of the groundwater through snow removal and salting of icy roads.					
12	Natural Resource Protection	Director of Administration	09/01/2019	08/31/2024	LOC; Other

3.3.8 Woodstock

In Woodstock, the Mayor will monitor progress on the identified mitigation strategies and coordinate the execution of mitigation activities. While most mitigation strategies will be funded through the village budget, grants will be sought to fund projects when possible.

Table 3-10: Woodstock Mitigation Strategies

Priority	Action Type	Lead	Start Date	End Date	Funding
Goal 1 – Drought/Extreme Heat: Woodstock will assess the reliability of water supplies during drought and extreme heat.					
1.1 The Village will advocate and support the hardening of water supply infrastructure to include alternate sources of water and protection of treatment plants and distribution systems.					
15	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 2 - Earthquake: Woodstock will assess damage potential from earthquakes and establish a safety plan for residents.					
2.1 The Village will identify the structures and infrastructure that would likely be damaged or destroyed in an earthquake of moderate to severe magnitude.					
19	Prevention	Mayor	09/01/2019	08/31/2024	LOC
Goal 3 – Flood: Woodstock will work to reduce flooding and limit loss of life or injury and property damage caused by flooding.					
3.1 The Village will require construction of water control structures (reservoirs, retention/detention ponds, dams, levees, dikes, floodwalls, etc.) to prevent flooding of properties.					
16	Structurally Engineered Projects	Mayor	09/01/2019	08/31/2024	PDM; HMGP; Other
3.2 The Village will acquire, demolish, and/or retrofit flood-prone structures.					
12	Prevention		09/01/2019	08/31/2024	PDM; HMGP
3.3 The Village will maintain and enforce floodplain, zoning, and building regulations to manage development in flood-prone areas.					
13	Prevention	Mayor	09/01/2019	08/31/2024	LOC
3.4 The Village will maintain participation in NFIP and engage in floodplain management activities to support flood prevention.					
2	Prevention	Mayor	09/01/2019	08/31/2024	LOC
3.5 The Village will improve and repair roadways and berms damaged by rapid runoff and heavy precipitation.					
14	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 4 – Hazardous Materials Incident: Woodstock will work to lessen both the number of spills, leaks, and releases from hazardous materials sources, as well as lessen the damages from such incidents.					
4.1 The Village will advocate for funding for and conduct of additional first responder training to prepare responders for highway hazardous materials incidents and pipeline and rail incidents.					
17	Public Safety	Mayor	09/01/2019	08/31/2024	ST; Other
Goal 5 – Invasive Species: Woodstock will lessen the cost of plant debris caused by invasive species that weaken and destroy trees that cause large amounts of debris requiring removal after storms.					
5.1 The Village will maintain trees and vegetation on public/jurisdiction property and advocate for the same on private property.					
18	Property Protection	Mayor	09/01/2019	08/31/2024	LOC

Priority	Action Type	Lead	Start Date	End Date	Funding
Goal 6 – Land Subsidence: Woodstock will reduce the risk of property damage due to land subsidence in at-risk areas.					
6.1 The Village will encourage the development of more specific and accurate mapping of karst areas in Champaign County that interfaces the geologic characteristics with the soil types, as well as identifying abandoned and functioning wells and mines of various types, to more accurately identify karst locations and predict where sink holes or other structural problems are likely to occur.					
19	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 7 – Severe Thunderstorm, Tornado, and Windstorm: Woodstock will lessen the damages suffered from windstorms or severe thunderstorms, including heavy rain, wind, hail, and lightning.					
7.1 The Village will advocate and support the construction of safe rooms for single- and multi-family homes and congregate facilities, including mobile home parks, apartment complexes, and mass gathering facilities.					
7	Property Protection	Mayor	09/01/2019	08/31/2024	PDM
7.2 The Village will develop agreements for emergency shelters to be used for a variety of disaster-related purposes during severe storms and/or evacuations.					
6	Public Information	Mayor	09/01/2019	08/31/2024	LOC
7.3 The Village will research and identify resources for affordable debris disposal after storms, possibly through creation of funds to pay for landfill fees or finding facilities that will receive debris for reduced rates.					
8	Property Protection	Mayor	09/01/2019	08/31/2024	LOC
7.4 The Village will establish, maintain, improve, and/or promote public warning and notification systems (reverse 911, opt-in systems, outdoor warning sirens, etc.).					
1	Public Information	Mayor	09/01/2019	08/31/2024	LOC; ST; Other
7.5 The Village will provide community education about protective actions, evacuation procedures, and other disaster preparedness information.					
3	Public Information	Mayor	09/01/2019	08/31/2024	LOC
7.6 The Village will maintain building regulations and land-use planning practices that encourage responsible development in high-risk areas.					
9	Prevention	Mayor	09/01/2019	08/31/2024	LOC
7.7 The Village will work to develop a local, affordable and functional county-wide public safety communication system with the capability for multi-discipline and multi-jurisdictional communication.					
4	Public Safety	Mayor	09/01/2019	08/31/2024	LOC; Other
7.8 The Village will work to fill gaps in warning and notification systems by adding outdoor warning sirens, developing reverse 911 capabilities, and by enhancing public notification processes.					
5	Public Information	Mayor	09/01/2019	08/31/2024	LOC; ST; Other
7.9 The Village will advocate and support the hardening of utilities (distribution lines, generating plants, and other system components).					
10	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; Other
7.10 The Village will identify alternate/back-up utility resources for use when primary source is compromised (generators, redundant suppliers, etc.).					
11	Property Protection	Mayor	09/01/2019	08/31/2024	LOC; ST; Other
Goal 8 – Water Quality: Woodstock will work to improve the safety of the water supply whether it is sourced from private wells or public or privately-owned water treatment systems.					
8.2 The Village will advocate for additional research into root causes of water quality issues, including but not limited to runoff monitoring and analysis, contamination tracing, and conservation practice implementation.					

Priority	Action Type	Lead	Start Date	End Date	Funding
20	Natural Resource Protection	Mayor	09/01/2019	08/31/2024	LOC
Goal 9 – Winter Storms: Woodstock will lessen damages suffered from severe winter storms and blizzards.					
9.1 The Village will work to plow and clear village-maintained roadways to facilitate emergency traffic, necessary travel, and business access.					
21	Property Protection	Mayor	09/01/2019	08/31/2024	LOC

3.4 IMPLEMENTATION

The identified mitigation strategies are general actions that could be taken to reduce the negative impact of disasters and large-scale emergencies. For a strategy to become an actionable item, it must be converted to a specific project with funding, action steps, timelines, and project goals. For example, a project to acquire and demolish a repetitive loss property must begin with identification of the specific property to be acquired and funding for the project. The property owner must agree to accept the buy-out and use the money to purchase another home. The jurisdiction must accept its share of cost, planning responsibility, and project management roles. Only then can the actual project be executed. A similar process must be followed for any of the strategies identified here to become projects.

The Champaign County EMA will monitor the implementation of these grant-based strategies through ongoing communication with jurisdiction officials and stakeholders. When mitigation grants or other funding sources become available, reasonable efforts will be made to secure funding. For strategies that must be funded through local budgets, jurisdictions will work diligently to identify local funding sources that can be used to address disaster vulnerability. When funding is secured, a detailed project timeline will be developed and action steps taken to complete the project. Upon completion, the jurisdiction will evaluate project effectiveness and share that information with the EMA and planning team for consideration in developing future projects.

There may be instances where a mitigation project to be completed would most efficiently be initiated, managed, and administered by a property owner, special district, or a nonprofit organization. Examples might include a non-profit property owner or a property owners' association, an institution of higher learning, or a special district like a school district, utility district, or a service district. In such cases, the jurisdiction having authority might delegate grant application and administration directly to that entity in the interest of efficiency and effectiveness, bearing in mind that successful overall project implementation is the critical factor. They may delegate various rights and responsibilities to that entity, including, but not limited to, project oversight, vendor procurement, and construction. This delegation might be done in consideration of staffing and oversight capabilities, timeliness of work performance, or logistics. The authority having jurisdiction (county, city, or village) will require that all building codes, floodplain regulations, and other development and land use regulations be followed and will verify that compliance was enforced. Non-governmental and external entities performing this work will be required to comply with all rules, procedures, and grant terms and conditions. All permits will be reviewed and issued by the local authority that typically does so, and all inspections and final occupancy approvals will be given by the local or state party that typically issues those approvals. This delegation will be done in a way that does not compromise or reduce the collaborative efforts of mitigation planning, land use planning, or development regulations in Champaign County by various officials and jurisdictions.

The collaboration between stakeholders used to develop these strategies was the most valuable part of the mitigation planning process for Champaign County. Developing this plan required stakeholders to evaluate hazards and risks in their community through extensive

collaboration and conversation. They were required to examine the local community, predict where and under what conditions damages would occur, and identify opportunities to reduce or eliminate those potential damages. The solutions, currently in the form of mitigation goals and actions that will ultimately develop into projects, had to be developed to maximize benefit to the community while minimizing cost. This process required whole community involvement so that all sectors of the community were represented in the planning process.

Champaign County ultimately developed comprehensive, relevant, and effective solutions to their unique risks and vulnerabilities. Given the availability of funding, personnel, and support, Champaign County and its jurisdictions are positioned to move forward and implement these strategies and accomplish their goal of making the county more disaster resilient.

4.0 PLAN ADOPTION

The final step in the mitigation plan process is plan adoption. Champaign County followed the formal process for state review, federal approval, and local adoption. This section describes that process and includes all dates relevant to plan approval, adoption, and expiration.

4.1 STATE REVIEW AND FEDERAL PLAN APPROVAL

After extensive review by stakeholders and the community, the Champaign County Hazard Mitigation Plan was submitted to the Ohio Emergency Management Agency for review on June 21, 2019. The recommended revisions were incorporated into the plan. Approval pending adoption was issued on July 11, 2019. Upon receipt of this approval, Champaign County EMA began to pursue adoption by the jurisdictions.

4.2 LOCAL ADOPTION

Champaign County was the first jurisdiction to formally adopted the plan. Following county adoption, all incorporated jurisdictions were asked to formally adopt the plan through a provided sample legislation to assist in this process. A complete list of plan adoptions by jurisdiction is provided in table 4-1. Adoption resolutions from each jurisdiction are also attached to this section.

Table 4-1: Jurisdiction Adoption

Jurisdiction	Date of Adoption
Champaign County	07/30/2019
Christiansburg	
Mechanicsburg	
Mutual	
North Lewisburg	
St. Paris	
Urbana	
Woodstock	

Following adoption, final plan approval was issued on September 4, 2019. The approved plan was uploaded into the Ohio EMA's SHARRP portal.

4.3 PLAN EXPIRATION

The Champaign County Hazard Mitigation Plan will expire on September 4, 2024. The process to maintain the plan will be ongoing throughout the five-year period, as explained in section 1.0 The Planning Process.

5.0 APPENDIX A: HAZARD MITIGATION PLANNING

Throughout the planning process, a broad group of stakeholders and community members were invited to participate in the hazard mitigation plan. More than 70 individuals representing jurisdictions and organizations from across Champaign County contributed to the plan. The table below identifies each individual who participated and the agency or jurisdiction represented.

Participant	Position/Title	Agency/Jurisdiction
Steve Cook	Trustee	Adams Township
Marky Jo Kies	Fiscal Officer	Adams Township
Kevin Pence	Trustee	Adams Township
Paul Pullins	Trustee	Adams Township
Dave Faulkner	Commissioner	Champaign County
Steve Hess	Commissioner	Champaign County
Dennis Lamb	ARES/EMA Volunteer	Champaign County
James Landenberg	GIS/Permits Coordinator, Engineer's Office	Champaign County
Gary Ledford	Risk Manager	Champaign County
Stephen McCall	Engineer	Champaign County
Matt Melvin	Sheriff	Champaign County
Marcia Bailey	Economic Development Director	Champaign Economic Partnership
Jeanne Bowman	Coordinator	Champaign Health District
Gabe Jones	Health Commissioner	Champaign Health District
Max Coates	Board of Health Member	Champaign Health District
David Vernon	Board of Health Member	Champaign Health District
Robert Hoey	Chief	Christiansburg Fire Company
Shari Deao	Director	Farm Service Agency
Tim Cassady	Trustee	Goshen Township
Keith Rutan	Trustee	Goshen Township
Don Burley	Director of Operations	Graham Local Schools
Joe Buck	Trustee	Harrison Township
David Jenkins	Trustee	Jackson Township
Steve Runkle	Trustee	Jackson Township
Gary Dowty	Trustee	Johnson Township
Dennis Kauffman	Trustee	Johnson Township
Nicolette Sarver	Fiscal Officer	Johnson Township
Scott Massie	Chief	JSP Fire District (St, Paris, Johnson Township)
Brad Bodenmiller	Director	LUC Regional Planning

Participant	Position/Title	Agency/Jurisdiction
Aaron Smith	Planner	LUC Regional Planning
Richard Ford	Fiscal Officer	Mad River Township
John Alexander	Police Chief	Mechanicsburg
Steve Castle	Assistant Chief/EMS Coordinator	Mechanicsburg
April Davis	Village Administrator	Mechanicsburg
Robert Keene	Fire Chief	Mechanicsburg
Greg Kimball	Mayor	Mechanicsburg
David Patrick	Police Lieutenant	Mechanicsburg
Kaiti Overholser	Emergency Manager	Mercy Health Urbana Hospital
Kristin West	ED Nurse Manager	Mercy Health Urbana Hospital
Ron Nieman	District Conservationist	Natural Resource Conservation Service
Mike Penhorwood	Chief	Northeast Champaign County Fire District
Trevor Clark	Water/Sewer Department	North Lewisburg
Cheryl Hollingsworth	Mayor	North Lewisburg
Andy Yoder	Village Administrator	North Lewisburg
Kiley Horn	4-H Program Advisory	OSU Extension Service
Thomas Smith	Trustee	Salem Township
Dale Goddard	Trustee District Technician	Mad River Township Champaign Soil and Water Conservation District
Erica Barga	Police Chief	St. Paris
Brenda Cook	Mayor	St. Paris
Vickie Hoffman	Superintendent	Triad Local Schools
Charles Dooley	Trustee	Union Township
James Virts	Trustee	Union Township
Rhonda Wallace	Fiscal Officer	Union Township
Ronnie Williams	Trustee	Union Township
Bill Bean	Mayor	Urbana
Kerry Brugger	Director of Administration	Urbana
Tyler Bumbalough	Engineer	Urbana
Doug Crabill	Community Development Manager	Urbana
Chad Hall	Public Works Superintendent	Urbana
Josh Jacobs	Police Officer	Urbana
Matt Lingrell	Police Chief	Urbana
Adam Moore	Floodplain Manager, Zoning/Compliance	Urbana
Dean Ortlieb	Fire Chief	Urbana

Participant	Position/Title	Agency/Jurisdiction
Joe Sampson	Water Superintendent	Urbana
Roger Koerner	Trustee	Urbana Township
Ruth Rooney	Fiscal Officer	Urbana Township
Lewis Terry	Trustee	Urbana Township
Paul Wright	Trustee	Urbana Township
Glenn Gregg	Trustee	Wayne Township

6.0 APPENDIX B: HAZARD AND VULNERABILITY DATA

The information in this appendix supplements the discussion of Champaign County's hazards and vulnerabilities from Section 2: Hazard Identification and Risk Assessment. A complete list of historical incidents of each hazard is provided here. Additionally, detailed data on the anticipated damage to Champaign County from a 100-year flood and earthquake, per HAZUS estimates, is provided.

5.1 HAZARD HISTORY DATA

The National Climactic Data Center has maintained records on weather incidents across the United States since 1950. The tables below provide a history of the incidents on record for Champaign County from 1950 through present day.

5.1.1 Drought and Extreme Heat

These incidents include all occurrences categorized as drought or extreme heat.

Hazard	Location	Date	Injuries	Deaths	Property Damage	Crop Damage
Drought	Champaign (Zone)	07/01/1999	0	0	0	0
Drought	Champaign (Zone)	08/01/1999	0	0	0	0

5.1.2 Flood

The flood incidents identified in this table include events classified as flood and flash flood that occurred in Champaign County since 1950.

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Flash Flood	Champaign County	04/29/1996	0	0	2K	0
Flash Flood	Champaign County	05/11/1996	0	0	5K	0
Flash Flood	Champaign County	06/01/1997	0	0	75K	0
Flash Flood	St. Paris	01/21/1999	0	0	0	0
Flash Flood	St. Paris	04/28/1999	0	0	0	0
Flash Flood	Champaign County	09/23/2000	0	0	10K	0
Flash Flood	Rosewood	04/19/2002	0	0	0	0
Flood	Champaign County	06/05/2002	0	0	0	0
Flood	Champaign County	09/27/2002	0	0	0	0
Flood	Champaign County	11/10/2002	0	0	0	0
Flood	Champaign County	07/07/2003	0	0	0	0
Flood	Champaign County	08/02/2003	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Flood	Champaign County	01/04/2004	0	0	0	0
Flood	Champaign County	01/04/2004	0	0	0	0
Flood	Champaign County	01/05/2005	0	0	20K	0
Flood	Champaign County	01/11/2005	0	0	10K	0
Flood	Mechanicsburg	06/02/2006	0	0	0	0
Flood	Urbana	03/02/2007	0	0	3K	0
Flood	Urbana	03/14/2007	0	0	2K	0
Flood	Bowlusville	03/19/2008	0	0	3K	0
Flash Flood	Westville	07/12/2008	1	0	15K	0
Flood	Westville	07/13/2008	0	0	1K	0
Flood	Urbana	05/11/2011	0	0	10K	0
Flood	Christiansburg	12/05/2011	0	0	1K	0
Flood	St. Paris	01/27/2012	0	0	1K	0
Flood	North Lewisburg	03/18/2012	0	0	0	0
Flash Flood	Westville	03/18/2012	0	0	1K	0
Flood	St. Paris	07/08/2013	0	0	0	0
Flood	Grandview Hgts	04/29/2017	0	0	0	0
Flood	Catawba	08/11/2017	0	0	0	0
Flood	Bowlusville	02/24/2018	0	0	3K	0
Flood	Cable	06/08/2018	0	0	0	0

5.1.3 Severe Thunderstorm

Thunderstorm incidents include events that produced any combination of hail, lightning and thunderstorm wind; all hazards were not necessarily present in all incidents.

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Thunderstorm Wind	Champaign County	6/13/1958	0	0	0	0
Thunderstorm Wind	Champaign County	6/13/1958	0	0	0	0
Hail	Champaign County	6/22/1960	0	0	0	0
Thunderstorm Wind	Champaign County	6/25/1971	0	0	0	0
Thunderstorm Wind	Champaign County	5/17/1974	0	0	0	0
Thunderstorm Wind	Champaign County	5/17/1974	0	0	0	0
Thunderstorm Wind	Champaign County	1/11/1975	0	0	0	0
Thunderstorm Wind	Champaign County	7/3/1975	0	0	0	0
Thunderstorm Wind	Champaign County	3/26/1976	0	0	0	0
Hail	Champaign County	4/8/1980	0	0	0	0
Thunderstorm Wind	Champaign County	4/8/1980	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Thunderstorm Wind	Champaign County	6/1/1980	0	0	0	0
Thunderstorm Wind	Champaign County	7/5/1980	0	0	0	0
Thunderstorm Wind	Champaign County	7/5/1980	0	0	0	0
Thunderstorm Wind	Champaign County	7/5/1980	0	0	0	0
Hail	Champaign County	7/12/1980	0	0	0	0
Thunderstorm Wind	Champaign County	7/12/1980	0	0	0	0
Hail	Champaign County	7/12/1980	0	0	0	0
Thunderstorm Wind	Champaign County	8/11/1980	0	0	0	0
Thunderstorm Wind	Champaign County	6/21/1981	0	0	0	0
Thunderstorm Wind	Champaign County	3/31/1982	0	0	0	0
Hail	Champaign County	3/31/1982	0	0	0	0
Hail	Champaign County	5/22/1982	0	0	0	0
Hail	Champaign County	5/27/1982	0	0	0	0
Thunderstorm Wind	Champaign County	5/27/1982	0	0	0	0
Hail	Champaign County	3/27/1983	0	0	0	0
Thunderstorm Wind	Champaign County	4/30/1983	0	0	0	0
Hail	Champaign County	5/2/1983	0	0	0	0
Thunderstorm Wind	Champaign County	6/13/1984	0	0	0	0
Thunderstorm Wind	Champaign County	9/13/1984	0	0	0	0
Thunderstorm Wind	Champaign County	4/5/1985	0	0	0	0
Thunderstorm Wind	Champaign County	7/14/1985	0	0	0	0
Thunderstorm Wind	Champaign County	3/10/1986	0	0	0	0
Thunderstorm Wind	Champaign County	5/15/1986	0	0	0	0
Thunderstorm Wind	Champaign County	6/22/1986	0	0	0	0
Thunderstorm Wind	Champaign County	8/5/1989	0	0	0	0
Thunderstorm Wind	Champaign County	11/15/1989	0	0	0	0
Hail	Champaign County	6/8/1990	0	0	0	0
Thunderstorm Wind	Champaign County	9/14/1990	0	0	0	0
Hail	Champaign County	7/2/1991	0	0	0	0
Thunderstorm Wind	Champaign County	7/2/1991	0	0	0	0
Thunderstorm Wind	Champaign County	7/14/1992	0	0	0	0
Hail	Champaign County	7/16/1992	0	0	0	0
Thunderstorm Wind	Urbana	4/27/1994	0	0	5K	0
Thunderstorm Wind	St. Paris and	6/20/1994	0	0	50K	0
Hail	New Madison	7/29/1994	0	0	0	0
Thunderstorm Wind	Urbana	5/24/1995	0	0	3K	
Thunderstorm Wind	Countywide	6/7/1995	0	0	3K	0
Thunderstorm Wind	St. Paris & 4 S Urban	6/22/1995	0	0	5K	0
Hail	St. Paris & 4 S Urban	6/22/1995	0	0	0	0
Thunderstorm Wind	Urbana	6/26/1995	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Thunderstorm Wind	Countywide	7/13/1995	0	0	7K	0
Thunderstorm Wind	Carysville and	7/15/1995	0	0	10K	0
Hail	Carysville and	7/15/1995	0	0	0	0
Thunderstorm Wind	St. Paris	7/16/1995	0	0	2K	0
Thunderstorm Wind	Urbana	4/29/1996	0	0	2K	0
Thunderstorm Wind	Christiansburg	7/7/1996	0	0	50K	0
Thunderstorm Wind	Countywide	10/30/1996	0	0	10K	0
Thunderstorm Wind	Urbana	1/5/1997	0	0	0	0
Thunderstorm Wind	Mechanicsburg	5/18/1997	0	0	10K	0
Thunderstorm Wind	Urbana	7/2/1997	0	0	5K	0
Thunderstorm Wind	Urbana	7/27/1997	0	0	5K	0
Hail	Mechanicsburg	5/13/1998	0	0	0	0
Thunderstorm Wind	Countywide	6/19/1998	0	0	10K	0
Hail	Mechanicsburg	6/28/1998	0	0	0	0
Thunderstorm Wind	Mechanicsburg	7/19/1998	0	0	10K	0
Hail	Urbana	8/25/1998	0	0	10K	0
Thunderstorm Wind	Urbana	11/10/1998	0	0	5K	0
Thunderstorm Wind	Urbana	2/12/1999	0	0	3K	0
Thunderstorm Wind	Countywide	5/6/1999	0	0	3K	0
Thunderstorm Wind	Urbana	6/11/1999	0	0	2K	0
Thunderstorm Wind	Urbana	6/11/1999	0	0	1K	0
Thunderstorm Wind	Urbana	7/6/1999	0	0	5K	0
Thunderstorm Wind	St Paris	7/9/1999	0	0	3K	0
Thunderstorm Wind	North Lewisburg	7/21/1999	0	0	3K	0
Thunderstorm Wind	Countywide	4/20/2000	0	0	75K	0
Thunderstorm Wind	St Paris	5/10/2000	0	0	5K	0
Hail	Urbana	5/18/2000	0	0	25K	0
Hail	Spring Hills	7/28/2000	0	0	0	0
Thunderstorm Wind	Urbana	7/28/2000	0	0	5K	0
Thunderstorm Wind	St Paris	8/9/2000	0	0	10K	0
Thunderstorm Wind	Terre Haute	9/20/2000	0	0	10K	0
Hail	St Paris	4/9/2001	0	0	0	0
Thunderstorm Wind	Mechanicsburg	4/9/2001	0	0	10K	0
Thunderstorm Wind	Urbana	10/24/2001	0	0	7K	0
Lightning	Urbana	5/12/2002	0	3		0
Thunderstorm Wind	Mechanicsburg	5/12/2002	0	0	50K	0
Thunderstorm Wind	Countywide	6/5/2002	0	0	0	0
Hail	North Lewisburg	6/27/2002	0	0	0	0
Thunderstorm Wind	St Paris	7/29/2002	0	0	3K	0
Hail	Mechanicsburg	11/10/2002	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Thunderstorm Wind	Urbana	11/10/2002	0	0	3K	0
Thunderstorm Wind	Countywide	7/4/2003	0	0	7K	0
Thunderstorm Wind	Urbana	7/5/2003	0	0	2K	0
Thunderstorm Wind	Christiansburg	7/6/2003	0	0	3K	0
Thunderstorm Wind	Urbana	7/7/2003	0	0	3K	0
Thunderstorm Wind	Countywide	7/8/2003	0	0	10K	0
Thunderstorm Wind	Urbana	7/8/2003	0	0	20K	0
Thunderstorm Wind	Christiansburg	7/21/2003	0	0	2K	0
Hail	St Paris	5/17/2004	0	0	0	0
Thunderstorm Wind	Urbana	5/18/2004	0	0	3K	0
Thunderstorm Wind	St Paris	5/21/2004	0	0	3K	0
Thunderstorm Wind	St Paris	5/24/2004	0	0	3K	0
Thunderstorm Wind	Mingo	5/13/2005	0	0	0	0
Hail	Urbana	6/6/2005	0	0	0	0
Thunderstorm Wind	Mechanicsburg	7/25/2005	0	0	3K	0
Thunderstorm Wind	Urbana	8/20/2005	0	0	3K	0
Thunderstorm Wind	Urbana	8/20/2005	0	0	5K	0
Hail	Urbana	5/17/2006	0	0	0	0
Thunderstorm Wind	Urbana	5/25/2006	0	0	3K	0
Thunderstorm Wind	St Paris	6/7/2006	0	0	3K	0
Thunderstorm Wind	Countywide	6/22/2006	0	0	7K	0
Thunderstorm Wind	North Lewisburg	7/14/2006	0	0	2K	0
Thunderstorm Wind	Countywide	8/3/2006	0	1	8K	0
Hail	Urbana	9/30/2006	0	0	1K	0
Thunderstorm Wind	Urbana	5/15/2007	0	0	3K	0
Thunderstorm Wind	Urbana	6/17/2007	0	0	8K	0
Thunderstorm Wind	Urbana	8/16/2007	0	0	3K	0
Thunderstorm Wind	Kennard	12/23/2007	0	0	3K	0
Thunderstorm Wind	Urbana	6/13/2008	0	0	5K	0
Thunderstorm Wind	Urbana	6/15/2008	0	0	3K	0
Hail	North Lewisburg	6/22/2008	0	0	1K	0
Thunderstorm Wind	Urbana	6/25/2008	0	0	10K	0
Hail	Urbana	6/25/2008	0	0	1K	0
Thunderstorm Wind	Mechanicsburg	6/25/2008	0	0	3K	0
Thunderstorm Wind	Urbana	7/12/2008	0	0	6K	0
Thunderstorm Wind	Westville	2/11/2009	0	0	8K	0
Thunderstorm Wind	Urbana	5/3/2010	0	0	10K	0
Thunderstorm Wind	Catawba Station	6/15/2010	0	0	2K	0
Thunderstorm Wind	Christiansburg	9/7/2010	0	0	5K	0
Hail	North Lewisburg	3/23/2011	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Thunderstorm Wind	Crayon	4/27/2011	0	0	1K	0
Hail	Mutual	5/11/2011	0	0	0	0
Hail	Urbana	5/11/2011	0	0	0	0
Thunderstorm Wind	Mechanicsburg	5/23/2011	0	0	1K	0
Hail	Urbana	5/25/2011	0	0	0	0
Hail	Urbana	5/26/2011	0	0	0	0
Hail	Urbana	6/10/2011	0	0	0	0
Thunderstorm Wind	Northville	8/7/2011	0	0	70K	0
Thunderstorm Wind	Mechanicsburg	8/9/2011	0	0	2K	0
Thunderstorm Wind	Urbana	9/3/2011	0	0	6K	0
Hail	Spring Hills	3/18/2012	0	0	0	0
Hail	Spring Hills	3/18/2012	0	0	0	0
Hail	North Lewisburg	3/18/2012	0	0	0	0
Hail	North Lewisburg	3/18/2012	0	0	0	0
Hail	Mingo	3/30/2012	0	0	0	0
Thunderstorm Wind	Urbana	3/30/2012	0	0	1K	0
Thunderstorm Wind	St Paris	6/29/2012	0	0	10K	0
Thunderstorm Wind	Millerstown	6/29/2012	0	0	1K	0
Thunderstorm Wind	North Lewisburg	6/29/2012	0	0	10K	0
Thunderstorm Wind	North Lewisburg	6/29/2012	0	0	1K	0
Thunderstorm Wind	North Lewisburg	6/29/2012	0	0	25K	0
Thunderstorm Wind	Westville	9/21/2012	0	0	3K	0
Thunderstorm Wind	Urbana	9/21/2012	0	0	20K	0
Thunderstorm Wind	Kings Creek	7/10/2013	0	0	10K	0
Thunderstorm Wind	Urbana	7/10/2013	0	0	7K	0
Thunderstorm Wind	Urbana	7/10/2013	0	0	2K	0
Thunderstorm Wind	Woodstock	7/10/2013	0	0	2K	0
Thunderstorm Wind	Christiansburg	7/20/2013	0	0	1K	0
Hail	St Paris	8/21/2013	0	0	0	0
Thunderstorm Wind	Carysville	10/31/2013	0	0	30K	0
Thunderstorm Wind	St Paris	11/17/2013	0	0	1K	0
Hail	Thackery	5/13/2014	0	0	0	0
Thunderstorm Wind	Kings Creek	5/13/2014	0	0	3K	0
Hail	North Lewisburg	5/13/2014	0	0	0	0
Hail	Rosewood	5/21/2014	0	0	0	0
Hail	Westville	5/21/2014	0	0	0	0
Hail	Westville	5/21/2014	0	0	0	0
Hail	Millerstown	5/21/2014	0	0	0	0
Hail	Westville	5/21/2014	0	0	0	0
Hail	Westville	5/21/2014	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Hail	Urbana	5/21/2014	0	0	0	0
Hail	Urbana	5/21/2014	0	0	0	0
Hail	Westville	5/21/2014	0	0	0	0
Thunderstorm Wind	Kennard	6/24/2014	0	0	3K	0
Hail	Spring Hills	7/26/2014	0	0	0	0
Hail	Lippincotts	7/26/2014	0	0	0	0
Thunderstorm Wind	Christiansburg	5/11/2015	0	0	0	0
Thunderstorm Wind	Westville	5/11/2015	0	0	1K	0
Thunderstorm Wind	Mutual	6/8/2015	0	0	5K	0
Hail	Bowlusville	7/14/2015	0	0	0	0
Thunderstorm Wind	Northville	12/23/2015	0	0	8K	0
Thunderstorm Wind	Thackery	3/27/2016	0	0	4K	0
Thunderstorm Wind	Christiansburg	7/13/2016	0	0	1K	0
Thunderstorm Wind	Thackery	7/13/2016	0	0	1K	0
Thunderstorm Wind	Mechanicsburg	7/13/2016	0	0	1K	0
Thunderstorm Wind	Mechanicsburg	8/27/2016	0	0	1K	0
Thunderstorm Wind	Urbana	8/27/2016	0	0	0	0
Hail	Grandview Hgts	7/16/2017	0	0	0	0
Thunderstorm Wind	St Paris	7/21/2017	0	0	3K	0
Thunderstorm Wind	Bowlusville	7/21/2017	0	0	5K	0
Thunderstorm Wind	Urbana	7/21/2017	0	0	3K	0
Thunderstorm Wind	Christiansburg	5/15/2018	0	0	3K	0
Hail	Urbana Weller Arpt	5/15/2018	0	0	0	0
Thunderstorm Wind	Millerstown	7/1/2018	0	0	3K	0

5.1.4 Tornado

Confirmed tornadoes in Champaign County since 1950 are listed below.

Hazard	Location	Date	Fujita Scale	Deaths	Injuries	Property Damage	Crop Damage
Tornado	Champaign County	06/13/1958	F2	0	0	250K	0
Tornado	Champaign County	11/16/1965	F2	0	4	25K	0
Tornado	Champaign County	05/10/1973	F3	0	0	2.5K	0
Tornado	Champaign County	04/09/1999	F1	0	0	300K	0
Tornado	Champaign County	07/27/2014	EF0	0	0	15K	0

5.1.5 Windstorm

Incidents identified as windstorms are limited to wind-only events. Events in which severe wind occurred along with another hazards, such as winter weather or severe thunderstorms, are identified under the primary hazard.

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
High Wind	Champaign (Zone)	04/06/1997	0	0	0	0
High Wind	Champaign (Zone)	12/11/2000	0	0	0	0
High Wind	Champaign (Zone)	03/09/2002	0	0	35K	0
High Wind	Champaign (Zone)	05/11/2003	0	0	0	0
High Wind	Champaign (Zone)	12/01/2006	0	0	10K	0
High Wind	Champaign (Zone)	09/14/2008	0	0	4.7M	0
High Wind	Champaign (Zone)	02/11/2009	0	0	0	0
High Wind	Champaign (Zone)	12/09/2009	0	0	2K	0
High Wind	Champaign (Zone)	04/03/2016	0	0	0	0

5.1.6 Winter Storm

Winter storm events include incidents classified as blizzard, extreme cold/wind chill, ice storm, or winter storm that occurred in Champaign County since 1950.

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Winter Storm	Champaign (Zone)	01/02/1999	0	0	25K	0
Winter Storm	Champaign (Zone)	01/06/1996	0	0	500K	0
Ice Storm	Champaign (Zone)	03/06/1996	0	0	0	0
Winter Storm	Champaign (Zone)	03/19/1996	0	0	0	0
Ice Storm	Champaign (Zone)	01/24/1997	0	0	0	0
Winter Storm	Champaign (Zone)	01/01/1999	0	0	0	0
Winter Storm	Champaign (Zone)	01/07/1999	0	0	0	0
Winter Storm	Champaign (Zone)	01/13/1999	0	0	0	0
Ice Storm	Champaign (Zone)	12/13/2000	0	0	0	0
Winter Storm	Champaign (Zone)	03/26/2002	0	0	0	0
Winter Storm	Champaign (Zone)	12/25/2002	0	0	0	0
Winter Storm	Champaign (Zone)	02/15/2003	0	0	0	0
Winter Storm	Champaign (Zone)	01/25/2004	0	0	0	0
Winter Storm	Champaign (Zone)	03/16/2004	0	0	0	0
Winter Storm	Champaign (Zone)	12/22/2004	0	0	0	0
Winter Storm	Champaign (Zone)	01/21/2005	0	0	0	0
Winter Storm	Champaign (Zone)	12/08/2005	0	0	0	0
Winter Storm	Champaign (Zone)	12/15/2005	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Winter Storm	Champaign (Zone)	03/07/2008	0	0	0	0
Ice Storm	Champaign (Zone)	12/23/2008	0	0	0	0
Ice Storm	Champaign (Zone)	01/10/2009	0	0	0	0
Ice Storm	Champaign (Zone)	02/01/2011	0	0	0	0
Blizzard	Champaign (Zone)	12/26/2012	0	0	0	0
Winter Storm	Champaign (Zone)	03/05/2013	0	0	0	0
Winter Storm	Champaign (Zone)	02/04/2014	0	0	0	0
Ice Storm	Champaign (Zone)	11/14/2018	0	0	0	0
Winter Storm	Champaign (Zone)	01/19/2019	0	0	0	0
Extreme Cold/Wind Chill	Champaign (Zone)	01/30/2019	0	0	0	0

5.2 HAZUS LOSS ESTIMATES

HAZUS is a nationally accepted methodology that utilizes U.S. Census and local geographic information systems (GIS) data to estimate losses for earthquakes, hurricanes, and floods. Because floods and earthquakes are identified as risks for Champaign County, HAZUS was used to generate and evaluate the county's vulnerability to these incidents. Estimates from HAZUS were generated using 2010 U.S. Census Bureau data, which calculated Champaign County's population as 40,097. Current building counts are slightly different than this information which is based upon the 2010 census.

5.2.1 Flood

Champaign County's vulnerability to flood was evaluated utilizing a HAZUS scenario for a 100-year flood event. For a flood of this magnitude, the damage to the county would be significant. The incident would expose a significant portion of the county's buildings to damage. Table 5-1 identifies buildings by occupancy type for all of Champaign County and those exposed to risk in this scenario.

Table 5-1: Building Exposure by Occupancy

Occupancy	Champaign County		100-Year Flood Scenario	
	Exposure (\$1000)	Percent of Total	Exposure (\$1000)	Percent of Total
Residential	\$3,349,677	76.4%	\$796,846	80.2%
Commercial	\$531,965	12.1%	\$83,603	8.4%
Industrial	\$230,179	5.2%	\$59,150	6.0%
Agricultural	\$70,058	1.6%	\$32,073	3.2%
Religion	\$99,856	2.3%	\$13,747	1.4%
Government	\$22,444	0.5%	\$4,775	0.5%
Education	\$82,620	1.9%	\$3,712	0.4%
Total	\$4,386,799	100%	\$993,906	100%

Essential Facility Inventory

Essential facilities are healthcare facilities like hospitals and clinics, fire and EMS stations, police stations, and operations and dispatch centers. Schools are included in essential facilities. Champaign County's essential facilities are identified in Table 5-2.

Table 5-2: Essential Facility Inventory

Facility Type	Number
Hospital	1 (20 beds)
Schools	21
Fire Stations	5
Police Stations	5
Emergency Operation Center	1

Estimated Building Damage

Per HAZUS estimates, 31 buildings will sustain at least moderate damage. This accounts for 73% of the total buildings identified for the scenario. Zero buildings are estimated to be completely destroyed. Tables 5-3 and 5-4 identify the anticipated building damage based on occupancy type and building type.

Table 5-3: Expected Building Damage by Occupancy

Occupancy	Percent Damaged					
	1-10%	11-20%	21-30%	31-40%	41- 50 %	> 50%
Agriculture	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Education	0	0	0	0	0	0
Government	0	0	0	0	0	0
Industrial	0	0	0	0	0	0
Religious	0	0	0	0	0	0
Residential	73	30	1	0	0	0
Total	73	30	1	0	0	0

Table 5-4: Expected Building Damage by Building Type

Building Type	Percent Damaged					
	1-10%	11-20%	21-30%	31-40%	41- 50 %	> 50%
Concrete	0	0	0	0	0	0
Manufactured Housing	0	0	0	0	0	0
Masonry	8	2	0	0	0	0
Steel	0	0	0	0	0	0
Wood	65	28	1	0	0	0
Total	81	30	1	0	0	0

Based on this scenario, HAZUS does not predict that any critical facilities will sustain moderate or significant damage. Therefore, it is anticipated that the hospital beds, emergency services,

and institutional services normally present in the county would continue to be functional in a 100-year flood scenario.

Table 5-5: Expected Damage to Essential Facilities

Classification	Total	Moderate Damage	Substantial Damage	Loss of Use
Fire Stations	5	0	0	0
Hospitals	1	0	0	0
Police Stations	5	0	0	0
Schools	21	0	0	0

Shelter Requirements

When flooding forces people from their homes, some will seek refuge at a public shelter. In this incident, it is anticipated that 542 households would be displaced and approximately 713 people would seek temporary shelter.

Building Related Losses

The total economic loss for the identified 100-year flood event is estimated to be \$22.63M.

Building-related losses are separated into two loss categories: direct building loss and business interruption loss. Building losses include structural damage and damage to contents. Business interruption losses include the costs associated with not being able to conduct normal business, displaced workers, and lost opportunities. Table 5-6 provides a summary of the anticipated losses.

Table 5-6: Building-Related Economic Loss Estimates

Area	Residential	Commercial	Industrial	Others	Total
<i>Building Loss</i>					
Building	8.40	0.83	0.97	0.42	10.62
Content	3.69	2.76	2.19	2.77	11.41
Inventory	0	0.10	0.32	0.14	0.55
<i>Business Interruption</i>					
Income	0	0.01	0	0	0.01
Relocation	0.01	0	0	0	0.01
Rental Income	0	0	0	0	0
Wage	0	0.01	0	0.01	0.02
Total	12.10	3.71	3.48	3.35	22.63

5.2.2 Earthquake

The simulated earthquake epicenter was assumed to be in Urbana, the county's most populated jurisdiction. The simulated earthquake had a magnitude of 5.0 on the Richter Scale and a depth of 5.0 km. The HAZUS loss estimation program utilized 2010 U.S. Census data for this scenario. There are an estimated 16,000 buildings in the county with a replacement value of \$4,386M.

Critical Facility Inventory

HAZUS separates critical facilities into essential facilities and high potential loss (HPL) facilities. Essential facilities are healthcare facilities like hospitals and clinics, fire and EMS stations, police stations, and operations centers. Schools are included in essential facilities. HPL facilities include dams, levees, nuclear power plants, military installations and hazardous material sites.

Table 5-7: Critical Facility Inventory

Essential Facilities		High Potential Loss Facilities	
<i>Facility Type</i>	<i>Number</i>	<i>Facility Type</i>	<i>Number</i>
Hospital	1 (20beds)	Hazardous Materials Sites	28
Schools	21		
Fire Stations	5		
Police Stations	5		
EOC	1		

Transportation and Utility Lifeline Inventory

Lifeline systems are defined as transportation and utilities. Transportation systems include highways, railways, and airports. Utility systems include water treatment and potable water plants, wastewater treatment plants, natural gas suppliers, fuel oil suppliers, electrical power plants, and communications hubs. The total value of these lifeline systems exceeds \$1,232M and includes more than 110 km of highway, 185 bridges, and 3,270 km of pipes.

Table 5-8: Transportation System Inventory

System	Components	Quantity	Replacement Value
Highways	Bridges	185	\$47.90M
	Segments	18	\$463.80M
Railways	Bridges	1	\$0.10M
	Facilities	2	\$5.30M
	Segments	13	\$62.50M
Bus	Facilities	1	\$1.10M
Airport	Facilities	2	\$21.30M
	Runways	2	\$75.90M
Total			\$678.00M

Table 5-9: Utility System Inventory

System	Components	Quantity	Replacement Value
Potable Water	Distribution Lines	N/A	\$32.70M
Waste Water	Distribution Lines	N/A	\$19.60M
	Facilities	7	\$489.50M
Natural Gas	Distribution Lines	N/A	\$13.10M
Communication	Facilities	1	\$0.10M
Total			\$555.00M

Building Damage

The estimated building damage according to HAZUS is extensive. The number of buildings projected to sustain moderate damage is 2,316, approximately 14% of all buildings in the county. It is estimated that 226 buildings would be destroyed. Table 5-10 summarizes the anticipated building damages.

Table 5-10: Expected Building Damage by Occupancy

Occupancy	None	Slight	Moderate	Extensive	Complete
Agriculture	107	48	61	34	9
Commercial	370	185	215	108	33
Education	12	5	6	3	1
Government	21	8	9	4	1
Industrial	135	63	79	43	13
Other Residential	784	402	416	190	45
Religion	57	23	21	10	3
Single Family Residential	8,017	3,050	1,509	416	122
Total	9,503	3,786	2,316	808	226

Depending on the type of building construction, damage from an earthquake can be more or less serious. Based on common types of construction, the scenario is extrapolated into damage according to type of construction type.

Table 5-11: Expected Building Damage by Building Type

Building Type	None	Slight	Moderate	Extensive	Complete
Wood	7,198	2,588	955	120	9
Steel	187	77	136	93	28
Concrete	63	26	33	18	4
Precast	60	21	36	26	5
Reinforced Masonry	24	7	12	8	1
Unreinforced Masonry	1,596	844	825	383	142
Manufactured Housing	377	223	318	189	36
Total	9,503	3,786	2,316	808	226

Essential Facility Damage

According to HAZUS estimates, only 3 of the county's hospital beds (16%) would be available and functional on the day of the earthquake. These would be needed by patients already hospitalized at the time of the earthquake and by those requiring hospitalization for injuries sustained in the incident. After one week, it is estimated that 28% of the beds would be available. By the 30-day mark, an estimated 59% would be fully functional. Anticipated damage to other essential facilities is detailed in Table 5-12.

Table 5-12: Expected Damage to Essential Facilities

Classification	Total	Moderate Damage >50%	Complete Damage > 50%	With Functionality >50% on Day 1
Hospitals	1	1	0	0
Schools	21	10	0	10
EOCs	1	1	0	0
Police Stations	5	1	0	4
Fire Stations	5	0	0	5

Transportation and Utility Lifeline Damage

Per HAZUS estimates, most highways, bridges, railways, and rail bridges will have more than 50% functionality on the first day after an earthquake and will continue to experience greater than 50% function throughout the recovery period. Limited damage to these transportation systems is expected.

Airports are also expected to have at least 50% functionality immediately following the incident. It is anticipated that two airports will sustain at least moderate damage. This damage is not expected to prevent them from functioning.

Tables 5-13 and 5-14 describe the anticipated damage to utility system facilities and pipelines.

Table 5-13: Expected Utility System Facility Damage

System	Total	Moderate Damage	Complete Damage	Day 1 >50% Functionality	Day 7 >50% Functionality
Waste Water	7	5	0	1	7
Communication	1	1	0	1	1

Table 5-14: Expected Utility System Pipeline Damage

Utility	Total Pipeline	Anticipated Leaks	Anticipated Line Breaks
Potable Water	1,635	146	37
Waste Water	981	105	26
Natural Gas	654	30	8

Electrical service is more difficult to restore. Table 5-15 outlines the number of customers anticipated to be without electric service following the incident. There are 15,329 households in the county.

Table 5-15: Expected Electric Power System Performance

Days Post-Event	Households Without Service
Day 1	7,655
Day 3	4,793
Day 7	1,835
Day 30	303
Day 90	9

Debris Generation

The amount of debris generated by an earthquake can be substantial. HAZUS classifies debris into two types based on the handling equipment required: brick/wood and reinforced concrete/steel. In the given scenario, a total of 130,000 tons of debris is anticipated. Brick/wood would comprise 49% of that amount. When converting these totals to truckloads, debris removal would require 5,240 truckloads, assuming 25 tons per truck.

Shelter Needs

Temporary public shelters are often necessary post-quake to provide housing for people displaced by the event. HAZUS estimates that 271 households would be displaced and 164 people would seek housing in a temporary shelter.

Casualties

The number of people estimated to be injured or killed by the earthquake is divided into four categories based on the extent of the victim's injuries:

- Level 1 – Require medical attention but not hospitalization
- Level 2 – Require hospitalization for non-life-threatening injuries
- Level 3 – Require hospitalization for critical injuries
- Level 4 – Fatalities

Casualty estimates are provided for 3 times of day that represent periods of the day that various sectors of the community operate at peak capacity loads. These figures are provided in Table 5-16.

Table 5-16: Casualty Estimates

Time	Location	Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	1	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	4	1	0	0
	Other Residential	25	5	1	1
	Single Family Residential	70	16	2	4
	TOTAL	99	22	3	6
2 PM	Commercial	68	16	2	4
	Commuting	0	0	0	0
	Educational	31	8	1	2
	Hotels	0	0	0	0
	Industrial	26	6	1	2
	Other Residential	6	1	0	0
	Single Family	16	4	1	1
	TOTAL	147	35	5	9
5 PM	Commercial	51	12	2	3
	Commuting	0	1	1	0
	Educational	2	1	0	0
	Hotels	0	0	0	0
	Industrial	16	4	0	1
	Other Residential	10	2	0	0
	Single Family Residential	28	6	1	2
	TOTAL	107	26	4	7

Economic Loss

Total economic loss for this earthquake scenario is estimated to be \$580.98M. This includes building and lifeline related losses and is based on the building inventory in the county. Building losses are examined in two categories: direct building loss and business interruption loss. Direct building losses include structural damage and damage to contents. Business interruption losses include the costs associated with not being able to conduct normal business, displaced workers, and lost opportunities.

Total estimated building losses are anticipated to be \$453.44M. Business interruption expenses account for 16% of this total. Residential structures are expected to sustain the greatest loss by far, more than 56% of the total loss for the county.

Table 5-17 provides a summary of the anticipated building-related losses. All figures are expressed in millions of dollars.

Table 5-17: Building-Related Economic Loss Estimates

Area	Single-Family	Other Residential	Commercial	Industrial	Other	Total
Income Losses						
Wage	0	1.07	11.92	1.04	0.91	14.94
Capital Related	0	0.46	10.01	0.62	0.33	11.43
Rental	4.70	2.93	5.57	0.33	0.49	14.02
Relocation	16.39	2.66	9.08	1.46	4.65	34.23
Capital Stock Losses						
Structural	27.66	6.02	16.51	5.36	8.04	63.58
Non-Structural	109.04	30.52	41.18	17.16	15.19	213.09
Content	44.52	9.37	23.02	12.14	9.36	98.41
Inventory	0	0	0.86	2.49	0.39	3.74
TOTAL	202.30	53.01	118.15	40.60	39.37	453.44

Transportation and Utility Lifeline Losses

Earthquakes often cause extensive damage to a community's infrastructure. Tables 5-18 and 5-19 depict the potential damage Champaign County could expect to its transportation and utility systems. Loss figures address only the cost to repair, not business interruption costs. Numbers are expressed in millions of dollars.

Table 5-18: Transportation System Economic Losses

System	Component	Inventory Value	Economic Loss
Highway	Segments	\$463.79M	0
	Bridges	\$47.91M	\$1.33M
Railways	Segments	\$62.49M	0
	Bridges	\$0.08M	0
	Facilities	\$5.33M	\$0.66M
Bus	Facilities	\$1.14M	\$0.51M
Airport	Facilities	\$21.30M	\$8.87M
	Runways	\$75.93M	0
Total		\$678M	\$11.4M

Table 5-19: Utility System Economic Losses

System	Component	Inventory Value	Economic Loss
Potable Water			
	Distribution Lines	\$32.70M	\$0.66M
Waste Water	Facilities	\$489.50M	\$114.88M
	Distribution Lines	\$19.60M	\$0.47M
Natural Gas	Distribution Lines	\$13.10M	\$0.14M
Communication	Facilities	\$0.10M	\$0.03M
Total		\$555.03M	\$116.17M