2.0 HAZARD IDENTIFICATION AND RISK ASSESSMENT

Hardin County has experienced many disasters in the past century, ranging from natural storms including tornadoes to blizzards and technical or human-caused incidents. The purpose of the Hazard Identification and Risk Assessment (HIRA) is to identify the number and frequency of disasters in Hardin County and the risk to people, property, and structures that those hazards cause. This process allows officials and residents to better prepare for incidents when they occur. The first section of the HIRA, the County Profile, provides information about Hardin County and its jurisdictions. In the Hazard Identification section, each hazard that poses a threat to the county will be discussed in detail. The final two sections, Vulnerability Analysis and Risk Assessment, will explain the risks and vulnerabilities Hardin County must address to prepare for and mitigate the identified hazards.

This plan section will identify and describe specific hazards for the municipalities in the county, describe the specific vulnerabilities in each, and address the local ability to respond to a variety of incidents. The social, financial, and physical vulnerability of each community and the county will be discussed. The local capacity to address core capabilities associated with response will be examined and analyzed, and gap areas where capabilities are not sufficient for worst-case scenarios will be addressed. Hardin County's ability to manage all seven community lifelines will be examined and gap areas will be described, including where and how the county would compensate for and backfill those needs. Various tools have been used to address social vulnerability and community resilience, factors that will provide the foundation for mitigation strategies formulated to meet the unique and individualized needs of Hardin County's small communities. As a rural county with less population than most of Ohio's metropolitan and small city areas, Hardin County is unlikely to receive significant outside assistance in a widespread disaster, and therefore, the stakeholders have diligently worked to identify gaps in capabilities and resources, potential areas of response compromise, and the special needs of various populations within the county. This section will address non-English speaking communities, disabled and disadvantaged persons, and transient populations that are common to the county.

To meet the requirements in 2023 for additional social vulnerability and community resilience information, sections have been added to address those issues. The demographics now include additional information about minority populations and their needs, as well as age-based and disability-based data that includes both the traditional multi-generational residents of Hardin County and the new residents who have come for jobs, rural community life, or other considerations. Discussions have occurred to examine and analyze community capabilities to respond in a significant disaster as well as a long-term incident, and to identify where additional help would be found in an incident that reached past the limitations of local capabilities. As one of Ohio's smaller counties, Hardin County officials recognize the likelihood of receiving measurable state and federal resources in a widespread incident is unlikely; therefore, it is the county's burden to identify alternate and non-traditional resources to meet those potential needs as a way to minimize long-term negative effects on residents, their families and their

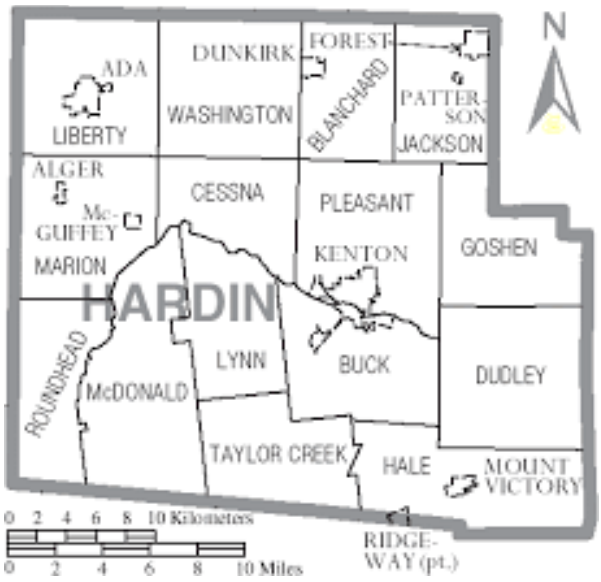
property. Goals of discussion included the identification of ways to ensure every person in Hardin County has a similar opportunity to survive a disaster in a similar manner, and has the ability to recover to the same degree as other residents. Realizing that some populations would require more resources and services to make that happen, discussions included the identification of those probable groups of people and discussion about how that process might work to enable them to survive the worst of days.

Indicators of climate change have been discussed and deliberated. Situated a significant distance from any metropolitan area in Ohio, Hardin County is not over-run with urban sprawl, massive manufacturing plants, or excessive traffic flows. Some of the very negative impacts felt in the major metropolitan areas like Columbus, Cincinnati, and Cleveland are not apparent in Hardin County. Because in small communities, people all tend to know one another and take their neighbor in when disaster strikes, resources are limited. Small towns of less than a thousand residents have few resources and structures. Needs after a severe storm may be addressed differently, and perhaps anecdotally, in these communities because they may not have access to fully certified shelters, commercially provided food supplies, and personnel in sufficient numbers to meet post-disaster needs for help. In many ways, Hardin County residents may have to help themselves. These characteristics unique to small rural communities change little over the years. However, changes in storm characteristics and other natural phenomenon are noted, and discussions included these potential effects of climate change that may make the hazards strike harder and last longer.

This plan, through application of the information in this Hazard Identification and Risk Analysis section, intends to then develop mitigation strategies that will equitably and inclusively provide potential solutions for disaster outcomes likely in Hardin County. Stakeholders worked to identify, characterize and understand how each group of its local society will react and respond to disasters of catastrophic or serious magnitude, and developed solutions to ensure that all populations, all communities, and all parts of Hardin County can survive and recover from a disaster successfully and become as whole as possible after the incident.

2.1 COUNTY PROFILE

Hardin County is located in west central Ohio. The county was founded on April 1, 1820. The county is named for John Hardin, a colonel in the Revolutionary War. Hardin County is bordered by Hancock County (north), Wyandot County (northeast), Marion County (east), Union County (southeast), Logan County (south), Auglaize County (southwest), and Allen County (northwest). The county is governed by a three-person Board of Commissioners and other elected officials.



2.1.1 Demographics

The current population, according to 2022 US Census estimates, is 30,621. This represents a slight decrease from the 2016 Census estimates. The county experienced its highest population in 1980 and has remained relatively steady since that time, a trend that is expected to continue over the next several decades.

Hardin County is home to the OId Order Amish, with the concentrated population of approximately 200 families located between SR 309 and SR 31, mostly living in the southeast quarter of the county. The Ohio Department of Transportation Amish Travel Study, finalized in March 2020, finds that the Amish population in Ohio is growing, and is expected to double every 21 years. In 2018, it was estimated that Hardin County had roughly 1,300 Amish individuals living there; that would mean that the population mid-century could easily reach 4,000 people. Originally brought to the Midwest from Europe in the 17th Century, Old Order Amish broke from the Mennonite church due to differences in religious practices. Today's Amish still use the horse and buggy as their main form of transportation. The Amish lifestyle centers on farming through the use of horse-drawn equipment and hard physical labor. They do not use farm tractors, cars, and other motorized vehicles. Hardin County is home to a plethora of small Amish businesses that sell eggs, honey, maple syrup, baked goods, handmade toys, quits, furniture, and fruit and vegetables from their homes. In an effort to isolate themselves from modern day media and customs, they have no electricity, internet, or radio and television. They are a very private people who seek no attention. The taking of photographs and work on Sunday, the Day of the Lord, is prohibited.

Table 2-1: Hardin County Population Statistics

Statistic	Figure
Land Area	470.3 sq. miles
Population (2016 Estimate)	30,621
Population Density	65.3 persons/sq. mile

Female Population	50.0%
Male Population	50.0%
Population under 18	23.5%
Population over 65	16.2%
White (only)	94.1%
African American or Black	1.1%
Hispanic	2.2%
Other, Non-white	2.6%
Number of Households	11,557
Average Household Size	2.46
Median Household Income	$52,112
Households Below Poverty Level	16.9%
Non-English-speaking households	7.0%
Foreign-born population	2.1%
Households with Internet access	82.3%
Households with a computer	89.8%
Households with a disability <65 years old	10.4%

Within Hardin County, there are 12,904 housing units. The owner occupation rate is 71.6% and the median value of owner-occupied housing units is $114,600. Multi-unit housing structures such as apartment buildings and other rental residences account for 28.4% of all housing units. There are approximately 1,454 mobile homes according to Hardin County GIS mapping. Approximately 40% of those mobile homes are located in organized mobile home parks; the remaining 60% are on private property in an undetermined manner. The median gross rent for a residence is $710 per month while the median cost to own a home is $1,106 per month.

There are several special residential housing facilities in Hardin County. As of 2010, the types of facilities and estimated number of residents in each type are as follows:

Table 2-2: Special Housing Facilities

Facility	Approximate Population
College/University Student Housing	1,577
Nursing/Skilled Nursing Facilities	263
Group Homes	37
Special Medical Need Schools/Facilities	38
Special Group Homes	17
Non-Institutional Group Quarters	14
Local Jails/Confinement Facilities	2

2.1.2 Special Populations and Social Considerations

According to Data USA (datausa.io/profile/geo/hardin-county-oh), Hardin County experiences severe housing problems. They estimate that in 2021, 12.3% of the population considered themselves to have severe housing challenges. This number, since 2014 when the number was 15.4% and in 2015 was 16.9%, is trending down, indicating that housing access is improving for county residents and challenges are possibly being addressed strategically. However, the

percentage of residents living below the poverty line is 16.9%, well above the national average of 12.8%. While males and females are said to each constitute exactly half of the population, females live in poverty at a much higher rate than males, comparing 29.1% for white females against 19.7% for males, and 28.7% for white non-Hispanic females to 19.6% for the same male group. Children, however, fare better in 2021 with 18.2% living in poverty, compared to a high of 24.8% in 2016.

Discussions included identification of services that assist persons with emotional, mental and addiction needs. The Allen, Auglaize, and Hardin Board of Mental Health and Recovery Services Board provides funding and support to the providers of behavioral services in Hardin County. There are 24/7/365 crisis counseling and service providers, therapists for behavioral, mental and emotional conditions, and addiction services. The affiliates of the MHRSB provide group therapy, one-on-one therapy, and in-patient services through nearby hospitals, and through direct services. Multiple providers are available for crisis intervention, counseling, critical incident stress management, and group therapy. They work with schools in prevention services, education and early intervention, and support response for family stabilization and crisis stabilization. Agencies assist with housing needs for both individuals and families through supportive housing and recovery housing.

Hardin County Council on Aging provides various services for the elderly. These include adult day care, home chore volunteers, homemaker assistance, information and referral services, social activities, and transportation. Adult day care services are provided as needed on an intermittent basis. Simple home chores assistance is provided for a voluntary donation, and services like snow removal and simple repairs (not electrical or plumbing) can sometimes be provided. Main living areas can be cleaned on a regular schedule to keep individuals in their homes longer. The Hardin Council on Aging can provide social activities and critical transportation to doctor's offices, local shopping, and other important appointments. The council provides this assistance to elderly, disabled, minority and handicapped people through a local tax levy and other grants.

The Hardin County Board of Developmental Disabilities provides assistance for children and adults with disabilities. These programs include early intervention programs for children under 3 years of age. Through programs in pre-kindergarten through high school, they provide speech, occupational and physical therapy services, and they provide specialized transportation for school children with mobility needs. Services for the adult clients include assistance with housing, various benefits, employment, transportation, community integration and vocational needs. They provide recreational activities, and connect adults to services they need for daily life.

Amish are a unique population. While they do not have, in general, physical, behavioral or developmental special needs, their lifestyle requires special consideration be given to warning and notification, and should there be a need for shelters, the cultural differences based upon their religion would necessitate special arrangements in some cases. Their recovery needs may be completely unlike another group in that they do not use utilities and infrastructure in the

same way most of the population uses those parts of society. Their support systems revolve exclusively around their church, and whether they would accept individual assistance must be examined. While the Amish tend to be a very self-sufficient and self-reliant culture, Hardin County has to be constantly aware and positioned to offer services to them in a manner that is respectful of their beliefs and practices.

2.1.3 Demographic Risk Assessment Tools

Recently created by the federal government, various tools exist online to assist is assessment of risks and vulnerabilities in the United States. Tools that were used for information include the National Risk Index, the Justice40 Initiative Screening Tool, and a Neighborhoods at Risk developed by Headwaters Economics.

HAZUS Loss Estimator

HAZUS is a regional loss estimation model developed by FEMA and the National Institute of Building Sciences. This system provides information on potential damages and loss caused by earthquake and 100-year flood incidents specifically for a given county and its jurisdictions.

The complete HAZUS earthquake (Kenton) and 100-year flood (countywide) are included as 05 Appendix B.

The earthquake estimation was produced on December 13, 2022.

The general area (Hardin County) was defined 470.61 square miles and 8 census tracts with 11,000+ homes and 30,696 residents. It included over 14,000 buildings with a total replacement value of $5,777,000,000 with 92% of the buildings associated with residential housing. Critical facilities were categorized as essential facilities (hospitals, safety stations, emergency management facilities, schools, and medical facilities) and high potential loss facilities (dams, levees, military installations, nuclear power plants and hazardous materials sites). There are no high potential loss facilities in Hardin County.

Lifelines were described as included transportation (highways, railways, light rail, bus, and airports), utility systems (potable water, wastewater, natural gas, crude and refined oil, electricity, and communications), residential structures, critical facilities, and hazardous materials.

The scenario placed a 5.0 magnitude earthquake with a five-kilometer depth in Kenton, the county seat and generally located centrally in the county.

Major estimations of shortages or gaps in services include the following projections:

- Only 23% Hospital beds may be available for both existing patients and those injured by the earthquake; in 30 days, that is likely to increase to 74%.
- Of 23 school buildings, only 10 are likely to have >50% functionality on Day 1.
- The EOC would be likely to not function due to >50% damage.
- Four of five police stations would likely have >50% functionality on Day 1.

- Eight of nine fire stations would likely have >50% functionality on Day 1.
- 169,000 tons of debris is likely to be created, in categories of brick/wood and reinforced concrete/steel. At 25 tons per truckload, that represents 6,760 truckloads of debris.
- Of an estimated 231 person displaced, it is estimated that 132 would need public shelters.
- Total economic lost is estimated at $974.10M.

Table 2-3 Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	%	Count	%	Count	%	Count	%	Count	%
Agriculture	28.57	0.33	13.60	0.42	17.03	0.87	9.33	1.42	2.48	1.36
Commercial	305.94	3.54	171.62	5.28	216.99	11.09	115.02	17.52	36.43	20.08
Education	8.53	0.10	3.43	0.11	3.80	0.19	1.70	0.26	0.54	0.30
Government	10.86	0.13	6.77	0.21	9.47	0.48	4.43	0.67	1.48	0.81
Industrial	36.37	0.42	19.66	0.61	27.85	1.42	16.97	2.59	5.15	2.84
Other Residential	1,088.83	12.59	412.25	12.69	387.27	19.79	150.32	22.90	32.33	17.82
Religion	60.97	0.70	25.17	0.77	22.91	1.17	11.45	1.74	3.49	1.93
Single Family	7109.26	82.19	2596.40	79.92	1271.63	64.98	347.17	52.89	99.55	56.86
Total	**8,649**		**3249**		**1,957**		**656**		**181**	

The flood estimation was produced the same day with the same scenario parameters. The scenario is a 100-year flood that affects the entire county, with flooding in all floodplains.

General flood damages and gap-capacity threats are summarized in the following bullet points:

- 35 residences and 2 commercial buildings may be damaged; those buildings would be primarily wood structures, but some masonry and steel may be present.
- No significant damage to critical facilities is anticipated.
- Debris estimations total 1,076 tons that would take 44 25-ton loads to remove.
- While 498 residents may be displaced, it is estimated that 107 would seek public temporary shelter.
- Business interruption losses will more than double structural losses.

Table 2-4 Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Total
Residential	**3,684,112**	**63.8%**
Commercial	**965,937**	**16.7%**
Industrial	**395,066**	**6.8%**
Agricultural	**132,552**	**2.3%**
Religious	**116,021**	**2.0%**
Government	**68,828**	**1.2%**
Education	**407,833**	**7.1%**
Total	**5,770,349**	**100%**

National Risk Index

The National Risk Index (NRI) was released in 2021. It can be found online at https://hazards.fema.gov/nri and a report can be created for Hardin County, Ohio. This geospatial tool assesses risks and vulnerability for all counties across the USA. Like the HAZUS took, the NRI estimates the likelihood that a given hazard may strike a specific area, and then estimates the value of property, daily activities, or lives lost in a worst-case scenario. It also views losses in the context of social vulnerability, taking into account factors like economic status, disabilities, or other special needs. The NRI then assesses the community resilience based upon community characteristics and threat levels. The extensions then can be combined to draw estimates and conclusions about how a specific community may fare, and what needs may be, after a disaster occurs.

The NRI classifies Hardin County as *very low risk*, in a general sense. Social vulnerability is rated as *relatively moderate*, and community resilience is *relatively high* according to this tool. This report states that "23.8% of counties in Ohio have a lower Risk Index".

According to this tool, Hardin County relative hazard risk and expected annual loss ranking, as well as total exposure values are listed in the following table.

Table 2-5 NRI Hazard types, expected annual loss and exposure values

Hazard	Expected Annual Loss Rating	NRI Score	Total Exposure Value	Annualized Frequency	Expected Annual Loss
Cold wave	Relatively Low	35.4	$362,031,206,294	0.8/year	$8,858
Drought	No Expected Loss	0.0	n/a	0/year	$0
Earthquake	Very Low	53.6	$361,845,295,000	0.060% chance/year	$168.398
Hail	Very Low	20.9	$362,031,206,294	3.7/year	$18,485
Heat Wave	Relatively Low	48.9	$362,031,206,294	0.8/year	$62,151
Hurricane	Very Low	41.5	$362,028,352,193	0/year	$93,775
Ice Storm	Relatively Low	58.1	$361,775,604,496	0.5/year	$86,138
Landslide	Relatively Low	71.5	$7,425,421,689	0/year	$21,900
Lightning	Relatively Low	53.0	$361,775,780,125	61.4/year	$97,961
Riverine Flooding	Very Low	29.6	$5,652,001,466	1.5/year	$127,939
Strong Wind	Relatively Low	52.2	$362,031,381,923	2.8/year	$334,711
Tornado	Relatively Low	45.8	$362,031,381,923	0.3/year	$809,235
Wildfire	Very Low	2.8	$6,165,411,345	0.003% chance/year	$1,221
Winter Weather	Relatively Low	37.5	$362,031,206,294	2.7/year	$27,521

Social vulnerability, the vulnerability of people rather than structures and property, is rated at 36.76; that means Hardin County has a relatively low susceptibility to adverse impacts of disasters when compared to other areas in the United States. Only about one-third of the country has lower social vulnerability. In Ohio, only 1% of the other 88 counties has lower social vulnerability.

Social vulnerability measures the susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss or disruption of livelihood, according to the NRI narratives. The census tract that includes the City of Kenton rates the highest in social vulnerability, followed by the Village of Ada and its surrounding area.

Hardin County is rated as "relatively moderate" in community resilience. Compared to other counties across the United States, Hardin County is more resilient than approximately 63% of other counties. In Ohio, nearly all other counties have a higher resilience rating, making Hardin County one of the least resilient areas in Ohio. Community resilience measures, according to the NRI narrative, a community's ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.

Resilience is based upon variables that include human social and cultural values like education levels, transportation access, disabilities, and health factors; economic issues like home ownership, livelihoods, income inequality, and institutional restoration potential; infrastructure and structural conditions, medical care availability, and access to internet; institutional access and governance capability; and environmental conditions.

Both social vulnerability and community resilience are measures using data published by the University of South Carolina's Hazards and Vulnerability Research Institute.

Climate and Economic Justice Screening Tool (CEJST)

This open, online geospatial mapping tool for all communities in the United States assesses the status of disadvantaged communities by measuring marginalized, underserved, and overburdened conditions in relation to the ability to withstand the effects of climate change and to promote environmental justice. This program foundation is rooted in Executive Order 14008, signed by President Biden in January 2021.

Justice40 Initiatives consider climate change, clean energy, energy efficiency, clean transit, affordable and sustainable housing, training and workforce development, remediation and reduction of legacy pollution, and the development of critical clean water and wastewater infrastructure. Those communities that fall above the 90th percentile will receive, collectively, 40% of the programs associated with this initiative. Those programs include the Inflation Reduction Act, the Bipartisan Infrastructure Law, and the American Rescue Plan, among others as created and enacted. Programs include some of those from the Department of Homeland Security and FEMA, Department of Health and Human Services, the Environmental Protection Agency, and others.

Hardin County is not considered a community at risk, as assessed by this tool. The tracts are generally described, and detailed information about each tract and this assessment is available at this web address: https://screeningtool.geoplatform.gov/en/#11.89/40.66171/-83.61542. Findings in this plan were posted on that site in November 2022.

The rating scale is expressed mostly in percentiles on a national scope. The threshold-meeting categories per community, and each area's designation as disadvantaged or not disadvantaged are described below.

Kenton is broken into a north and south side for the purposes of this planning tool. Both the north and south sides of Kenton are considered disadvantaged. The south side of Kenton, whose area includes city limits south of SR 67 from the northeast and south of SR 309 to the west has a lower life-expectancy than 92% of other census tracts in the USA, and has income lower than 83% of other areas. The area has more transportation barriers in terms of cost and time spent travelling than 91% of other areas across the country. 13% of the residents have less than a high school diploma. On the north side of Kenton, disadvantage is attributable to income lower than 77% of other areas, access to less green space than 90% of other areas, and lack of indoor plumbing in more cases than 98% of other areas.

No other areas are considered disadvantaged because they did not meet enough factors and have low enough income as compared to other areas in the USA. Some communities did fall under acceptable levels of services in some areas. The southeast corner of the county has less indoor plumbing than 99% of other areas, has more transportation barriers than 96% of other areas, and 13% of the residents have less than a high school education. The northeast section has more transportation barriers than 90% of other areas in the country. The west central tract experiences higher energy costs than 92% of other areas, has more transportation barriers than 95% of the country, and has 14% of its residents with less than a high school education.

Neighborhoods at Risk by Headwaters Economics

This social assessment tool is developed by Headwaters Economics Research, an independent, nonpartisan, nonprofit research group that works to improve community development and land management, and is commonly used to assess community challenges and strengths. Their data is found at http://www.headwaterseconomics.org/apps/neighborhoods-at-risk.

Headwaters Economics research findings include, per census tract, among other things, data on number of families with no transportation, without health insurance, renters or mobile-home residents, age demographics, disability numbers, non-English proficient persons, properties with flood risk, areas lacking tree canopy, and percentage of impervious surfaces. This data can be accessed on an open platform, and will help estimate the needs of specific areas in Hardin County. For example, persons with no transportation will affect the ability to evacuate to a shelter not within walking distance. Impervious surface percentages can help estimate flash flooding. Ages, disabilities and language skills can assist in communication, assistance provided,

and needs in shelters. Mobile home numbers can indicate damages in severe storms, and rental properties can help in determining personal assistance and social program needs.

The Climate Projections portion of Headwaters Economic research can identify changes in weather patterns that are in process or indicated from scientific data. For example, this research indicates that by 2048, Hardin County will be warmer. Approximately 21 days more per year will reach 90 degrees Fahrenheit, 11 more days per year will see temperatures above 95 degrees Fahrenheit, and 100 degrees Fahrenheit will be reached 4 more times a year. The average annual temperature may increase from 53 degrees Fahrenheit to 56 degrees. These hot days will contribute to heat-associated injury and death, and chronic higher temperatures will facilitate drought conditions, more severe field fire probability, and warmer water temperatures in large bodies of water.

Hardin County is anticipated to have 0.3 more days per year of heavy precipitation, taking that anticipated number from 2.8 days to 3.1 days. Average annual precipitation is expected to increase from 37.6 inches to 38.1 inches by 2048. Faster, heavier rain leads to more riverine and flash flooding because the ground cannot absorb that much rain. The chances of sustained flooding are higher when general flooding incidents increase as events compound one another, or don't allow for complete drainage in between events.

This research is one source that when combined with others, can give reliable projections for local communities to develop disaster expectations for future years.

Resilience Analysis and Planning Tool (RAPT)

This open-source online tool is another place to find relevant community data. It provides community date, infrastructure information, natural hazards, county indicators, census tract information, and options to map incidents to discover important characteristics to support response and recovery efforts. Some of the information is available in many other locations, but RAPT allows the users to find it in one easy-to-use location.

Hardin County can use this tool to manage a response, likely enhancing capabilities in a more expedient manner because they can discover factual information that will help with methodology of a response mechanism. For example, RAPT includes the presence of civic and social clubs (1.91 per 10,000 people in Hardin County); this data will show that in Hardin County, in particular, there are not many individual organizations to call upon in disaster response. With a population of just over 30,000, that calculates to about six organizations. That low number of organizations tells you there are few volunteers through an organized group to run shelters, volunteer reception centers, and do damage assessment. Most volunteers may be unaffiliated spontaneous volunteers who need a thorough orientation and training when they volunteer. This tool also tells us that 20.2% of the households with children are a single parent household. Less than 1% claim no affiliation with a religious body, however, so churches may likely be a ready source for EMA social services support with community lifelines that include food, sheltering, and life necessities. The RAPT gives the location of those churches in the infrastructure tab. By clicking on any of these identified spots, the user can obtain basic

information about that resource. There are at least 24 churches in Hardin County that would be potential feeding, comfort or shelter locations.

Infrastructure can be assessed using RAPT. In Hardin County, it is easy to identify the fact that five wastewater treatment facilities are in proximity to a major waterway. Power plants are located in the western half of the county. There is a single landfill just west and north of Kenton. Solar and wind generation sites are placed on the map, allowing responders to see where damages may be related to power generation.

Hardin County has one historical tornado track from southeast of Kenton into Wyandot County. Floodplains do not show for Hardin County, likely due to the adoption process for approved flood maps. This process has been delayed due to challenges and corrections for this section of the state.

Using the RAPT, Hardin County knows that religious organizations are plentiful, but civic clubs are not. Shelters and comfort stations might most successfully be placed in schools and the university. Volunteers may be mostly spontaneous helpers who need training. There will likely be a high number of elderly and single parents who need assistance, and there are some persons who have disabilities and will need additional assistance. There is a high percentage of renters vs homeowners, and some homes are utility-challenged. Kenton is the most impoverished area, in general, and has the highest population.

Climate Risk and Resilience Portal (ClimRR)

This portal, developed by the Center for Climate Resilience and Decision Science at Argonne National Laboratory, in collaboration with AT&T and FEMA, helps address the specific changes that will be experienced as the climate changes. It allows local communities to simulate changes and identify the consequences, and then overlay those with a new picture of disasters and emergencies on the home front. This tool projects specific outcomes, with the RCP 4.5 projection being a conservative projection and the RCP 8.5 being a more dramatic outcome. Reports will show average annual and seasonal temperatures, minimum and maximum temperatures, precipitation, consecutive days without precipitation, degree days and wind speeds. This tool was used in this planning process to identify potential scenarios at approximately 2050 in consideration of climate change.

Summary

All of this information from the various tools is most useful in a specific situation with defined areas of impact, and known resources. Hardin County can use these tools to identify gap areas, compare with information they know in the EOC vs what the maps and tools illustrate, and then identify unknown or undiscovered areas of need. Each disaster is unique in who is impacted and what the specific needs are, so through research and thorough assessment, Hardin County emergency management can attempt to learn who and where help is needed faster and more accurately.

2.1.4 Incorporated Jurisdictions

Hardin County is comprised of one city, eight incorporated villages, fifteen townships and multiple unincorporated neighborhoods. There are many "census-designated areas" that are neighborhoods and post-office locations from years ago, but have no governmental structure or organization into a leadership group. These areas were considered part of the township where they lie.

Ada

Ada, Hardin County's largest village, is located in the northwest corner of the county. The village is home to Ohio Northern University and Wilson Sporting Goods, both major employers in the county.

Table 2-6: Ada Statistics

Statistic	Figure
Land Area	2.08 sq. mi.
Population, 2021 Estimate	5,256
White	83.7%
Black or African American	4.6%
Asian	2.5%
Other	9.2%
Number of Households	1,438
Persons per Household	2.19
Median Income	$51,507
Persons Below Poverty Level	17.7%

Alger

Alger is a small village in western Hardin County. It is located along State Route 235 south of Ada. The village was incorporated in 1896 under the original name of Jagger. The name was changed to Alger in honor of the 20th Governor of Michigan, Russell Alger.

Table 2-7: Alger Statistics

Statistic	Figure
Land Area	0.28 sq. mi.
Population, 2020 Estimate	875
White	97.6%
Black or African American	0.5%
Other	1.9%
Number of Households	356
Persons per Household	2.46
Median Income	$36,741

Dunkirk

The village of Dunkirk is located in north central Hardin County along State Route 68. It is named after Dunkirk, New York and was originally platted in 1852 when rail service first reached the area.

Table 2-8: Dunkirk Statistics

Statistic	Figure
Land Area	0.72 sq. mi.
Population, 2021 Estimate	712
White	91.2%
Bi-racial	0.5%
Other	8.75%
Number of Households	307
Persons per Household	2.32
Median Income	$36,875

Forest

Forest is located in the northeast corner of Hardin County along the Wyandot County border. The village's name was derived from the heavily forested area that used to surround the building. Like Dunkirk, the village came into existence when the railroad came through the area. State Routes 53 and 67 run through the village.

Table 2-9: Forest Statistics

Statistic	Figure
Land Area	1.61 sq. mi.
Population, 2021 Estimate	1,458
White	95.7%
Hispanic	2.3%
Other	1.6%
Number of Households	593
Persons per Household	2.46
Median Income	$43,750

Kenton

Kenton is the largest jurisdiction in Hardin County and the only city. It is centrally located in the county and was named for frontiersman Simon Kenton. As the largest jurisdiction in the county, Kenton is the center of commerce for many residents. People travel to Kenton for shopping and services. County government offices are located in the city, as well as the county's only hospital. Multiple state highways pass through the downtown of Kenton where the county court house and many businesses are located around a town square.

Table 2-10: Kenton Statistics

Statistic	Figure
Land Area	5.13 sq. miles
Population, 2021 Estimate	7,951
White	95.1%
Black or African American	1.1%
Other	3.8%
Number of Households	3,382

Persons per Household	2.30
Median Income	$42,731
Persons below Poverty Level	22.5%

McGuffey

McGuffey is located in west central Hardin County along State Route 195. It was incorporated in 1896 but has had a functional post office since 1883.

Table 2-11: McGuffey Statistics

Statistic	Figure
Land Area	0.36 sq. miles
Population, 2021 Estimate	499
White	94.2%
Two or more racial/ethnic groups	5.8%
Other	0%
Number of Households	225
Persons per Household	2.0
Median Income	$50,313

Mount Victory

Mount Victory is located in southeast Hardin County along State Route 31. The village was formed in 1851, one year before the railroad came the area. The village's name is said to come from the proprietor's shout of "Victory!" when he obtained the land.

Table 2-12: Mount Victory Statistics

Statistic	Figure
Land Area	0.77 sq. mi.
Population, 2016 Estimate	641
White	96.4%
Hispanic	2.2%
Other	1.4%
Number of Households	281
Persons per Household	2.28
Median Income	$49,821

Patterson

Patterson is the smallest incorporated jurisdiction in Hardin County. It is located along State Route 53 in the northeast corner of the county. The village is incorporated and maintains a standard statutory form of government with an elected mayor and village council but has no municipal buildings or post office.

Table 2-13: Patterson Statistics

Statistic	Figure
Land Area	0.11 sq. mi.
Population, 2016 Estimate	138
White	99.3%

Other	0.7%
Number of Households	78
Persons per Household	1.77
Median Income	$36,681

Ridgeway

The village of Ridgeway is located along State Route 292 on the Hardin-Logan County border. The majority of households in the village are located in Hardin County; the extreme south portion of town falls in Logan County. Originally formed when railroad tracks were built in the area, the village continues to experience significant rail traffic today.

Table 2-14: Ridgeway Statistics

Statistic	Figure
Land Area	0.59 sq. mi.
Population, 2021 Estimate	232
White	100%
Other	0%
Number of Households	132
Persons per Household	1.76
Median Income	$38,681

2.1.5 Townships and Unincorporated Communities

All areas outside the incorporated municipalities are part of the townships. Municipalities sit within a township, but the municipal jurisdiction governs within its boundaries. All other areas are considered part of townships, including the unincorporated areas.

Townships

Hardin County is divided into fifteen townships. Each township and its population according to 2020 U.S. Census figures is listed in Table 2-12. The population counts listed do not include the township residents that live within the incorporation limits of a city or village within the township. Data is taken from the Ohio Township Association's 2020 census data resource. (www.ohiotownships.org/ohio-townships-census-data)

Table 2-15: Township Population Statistics

Township	Population
Blanchard	619
Buck	1,058
Cessna	501
Dudley	1,490
Goshen	529
Hale	729
Jackson	549
Liberty	1,726
Lynn	591
Marion	998

McDonald	874
Pleasant	1,423
Roundhead	630
Taylor Creek	593
Washington	740

Unincorporated Communities

Hardin County has eighteen unincorporated communities and neighborhoods located throughout the townships. These informal neighborhoods do not have a jurisdiction government and are considered part of the township in which they are located. Some exist because they sit on an important crossroads between other points and some are simply a high area where a collection of homes went up in the county's founding years. Blocktown has been eliminated from anecdotal listings of unincorporated towns after the founding Block family moved out of state in the early 1900's. McVitty is no longer listed and there is no identifiable information explaining the deletion. Unincorporated areas include the following

- Blanchard
- Dola
- Foraker
- Grant
- Grassy Point
- Hepburn
- Holden
- Huntersville
- Jumbo
- Jump
- Maysville
- Mentzer
- Pfeiffer
- Roundhead
- Silver Creek
- Yelverton

2.1.6 Institutions and Special Facilities

Education and healthcare resources exist across Hardin County to provide local service for residents. The availability of these services improves the quality of life in Hardin County and contributes to the local economy.

Education

Hardin County residents have access to many educational institutions across the county. From primary and secondary school districts to post-secondary education, there are multiple options to meet the varied needs of residents.

For primary and secondary education, eight public school districts serve the county. Six of these districts are located primarily in Hardin County. The others are located in adjacent counties but provide service to some students within Hardin County.

Table 2-16: Hardin County School Districts

Public School Districts
Ada Exempted Village School District
Benjamin Logan Local School District
Elgin Local School District
Hardin Community School (7-12)*
Hardin Northern Local School District
Kenton City School District

Little Eggcorn school (1-8)*
Pine Ridge School (1-8)*
Ridgemont Local School District
Riverdale Local School District
Upper Scioto Valley Local School District
Willow Brook School (1-7)*

*Indicates a private school

Ohio Northern University is located in Ada. While it is the only post-secondary school located in Hardin County, many additional post-secondary education opportunities are available within 50 miles of the county.

Healthcare

Hardin County has one hospital. Ohio Health/Hardin Memorial Hospital is a critical access 25-bed facility that has served the Hardin County community for 60 years. Hardin Memorial Hospital is a member of the OhioHealth system. The hospital provides acute and short-term skilled care and a complete range of outpatient services, as well as a 24-hour emergency department staffed by specialty trained doctors and nurses. Urgent care facilities that provide walk-in care during extended hours of operation are located in Ada and Kenton. OhioHealth Hardin Rehabilitation and Wellness Center is located in Kenton, providing fitness and rehabilitation programs.

The county has 2 licensed nursing homes with 178 beds and 2 licensed residential care facilities with 85 beds. These facilities provide healthcare and housing for elderly individuals, dementia patients, and others recovering from short- and long-term illnesses and injuries.

2.1.6 Infrastructure

Hardin County's infrastructure provides residents, workers, and visitors with critical access and services. This section describes local transportation and utility systems.

Transportation

Hardin County is traversed by more than 1,000 miles of roads. Of these, 22 miles are U.S routes, 148 are state highways, and 826 miles are county, township, and municipal roadways. The Hardin County Engineer's Office is responsible for the maintenance and repair of 368 miles of roadway. The County Engineer also maintains 360 miles of county ditches.

Hardin County maintains 361 bridges and culverts on county and township roadways. The remaining structures are maintained by local jurisdictions or other agencies, including the Ohio Department of Transportation.

There are three airports in Hardin County: Hardin County Airport, Ada Airport, and Elliotts Landing Mount Victory Airport. Hardin County Airport is three miles southwest of Kenton, and offers fuel supplies and mechanic services. The facility has an asphalt runway but does not have a control tower. It is owned by the Hardin County Airport Authority. Ada Airport is a

privately owned public use airport northwest of the business district in Ada. It does not have a control tower. Elliotts Landing Airport is located in Mount Victory and is privately owned and operated. There is no control tower.

CSX operates multiple rail lines across the county. A rail line crosses the northern part of the county with tracks dissecting the communities of Forest, Dunkirk and Ada. The rail line crosses residential and industrial areas, and passes directly through Ohio Northern University's campus. Another line comes north through Ridgeway into Kenton and crosses the downtown area as it follows the Scioto River out of the city to the north. It passes through Dunkirk where it intersects the other rail line from Forest to Ada. A short Erie Lackawanna line runs from County Road 175 on the southeast of Kenton to slightly west of SR 68 and then turns south to the industrial area along the highway.

Hardin County has several large pipelines. The Ashland Pipeline is a 12" high-pressure line in the vicinity of Township Road 90 as it lays from Goshen Township in the east to the south side of Alger in Marion Township on the west. Another pipeline enters Dudley Township's southeast corner and travels to the northwest along the south side of Kenton and through McGuffey and Alger, exiting the county on the south side of County Road 92, near the Ashland line. A third pipeline cuts the southwest corner of the county, entering at SR 68 in Taylor Creek Township, crossing McDonald Township and exiting through Roundhead Township near County Road 130.

Utilities

The vast majority of homes in Hardin County, more than 68%, are heated with natural gas or electricity. These services are provided by a variety of companies. The Public Utilities Commission of Ohio (PUCO) regulates private companies that provide public utility services. These companies that provide service in Hardin County, along with municipal electric utilities, are identified in Table 2-14.

Table 2-17: Utility Service Providers

Electric Service	Natural Gas Service
Dayton Power & Light	Columbia Gas of Ohio
Hancock-Wood Electric	Dominion East Ohio
Mid-Ohio Energy	Sheldon Gas Company
American Electric Power (Ohio Power)	

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

- Bottled, tank, or LP gas 21.9%
- Coal, coke or wood 7.9%
- Fuel oil, kerosene 0.7%
- Solar energy or other fuel 0.6%
- No fuel used 0.2%

Municipal systems provide water and wastewater service across Hardin County, either through direct service or by contracting with a neighboring municipality. In the unincorporated areas of

the county, individual wells are the primary water source. The Hardin County Health Department provides permits for these installations.

2.1.8 Topography

Hardin County's landscape is flat to gently rolling. The highest elevation in Hardin County is 1,140 feet. This point is located in the southeast corner of the state. Jurisdiction elevations across the county are calculated between 922 feet in Patterson and 1,060 feet in Ridgeway. Given the county's location along the continental divide and at the top of several watersheds, it has a higher elevation that most of the surrounding area.

The climate of Hardin County is consistent with most of Ohio. The humid continental climate zone features cold winters and hot summers. July is the warmest month with an average temperature of 85 degrees Fahrenheit, and January is the coldest with an average of 33 degrees Fahrenheit. The county's average annual rainfall is 36.43 inches and average snowfall is 25 inches. The wettest rain month is May, and the driest is February. The heaviest snow tends to fall in January and February.

Land Use

Agricultural statistics were taken from the Ohio Department of Agriculture "Ohio Agricultural Statistics 2020-2021 Annual Bulletin" at http://www.nass.usda.gov/Statistics_by_State/Ohio issued cooperatively with the US Department of Agriculture.

Agriculture is the predominant land use in Hardin County. There are 301,059 total acres in Hardin County and 726 farms. Cropland accounts for 81.05% of all land at 243,997 acres. Harvested cropland accounts for 76.07% of the that land. The county also features approximately 9,000 acres of woodland, and 3,256 acres of pasture. This includes 1,060 acres of parks, forests, nature preserves, and wildlife areas. The major crops in Hardin County include grain (corn, soybeans, wheat), fruits and vegetables, and nurseries. Livestock includes cattle, calves, dairy cows, hogs and pigs, sheep, and goats.

The Hardin County Economic Profile 2022 indicates there are 23 agriculture, forestry, fishing and hunting employers in Hardin County, and they provide work for 92 employees.

Table 2-18: Hardin County Land Use

Land Use	Percentage
Cultivated Crops	76.07%
Forest	3.01%
Developed, Lower Intensity	7.25%
Pasture/Hay	1.08%
Other Farmland, not in production	9.79%
Shrub/Scrub and Grasslands	1.43%
Developed, Higher Intensity	1.01%
Wetlands	0.19%

Open Water	0.14%
Barren (strip mines, gravel pits, etc.)	0.03%

2.1.9 Waterways and Watershed

St. Lawrence Continental Divide

The St. Lawrence Continental Divide splits Hardin County in two, running through Marion Township north of Alger, and progressing on through Cessna Township and then dipping south to split the City of Kenton and to then travel east through Pleasant and Goshen Townships. The waterways on the north of the St. Lawrence Continental Divide drain into Lake Erie, via the Maumee River Watershed and the Sandusky River Watershed, then into Lake Ontario and the St. Lawrence Seaway and into the Atlantic Ocean. The waterways to the south of the divide drain into the Ohio River through the Scioto River Watershed, then west through the Ohio River to the Mississippi River, and south through the Mississippi River into the Gulf of Mexico.

Watersheds

The very northwest tip of Hardin County, North of Ada, is part of the Riley Creek sub-basin of the Blanchard River Watershed. The Eagle Creek basin dips to the east and south of Dunkirk, and includes part of Washington Township. The Headwaters basin falls to the east of that, taking in the Villages of Dunkirk, Patterson, and Forest and most of Blanchard and Jackson Townships. It also includes the Cessna Creek, Outlet-Blanchard River, Ripley Run and Potato Run sub-basins. This water from the Blanchard River ends up in the Auglaize River after it goes north through Findlay and Ottawa on its way to the Maumee River. The two join together south of Defiance County.

The Village of Ada and to the south just north of the Village of Alger, including parts of Liberty and Marion Township is part of the Auglaize Watershed. This watershed drains to the northwest, into Allen, Putnam, Van Wert and Paulding counties via the Auglaize River before it combines with the Blanchard River, and the water eventually dumps into the Maumee River and goes out into Lake Erie. It includes the Little Hog Creek, Lower Hog Creek, Middle Hog Creek and Upper Hog Creek basins.

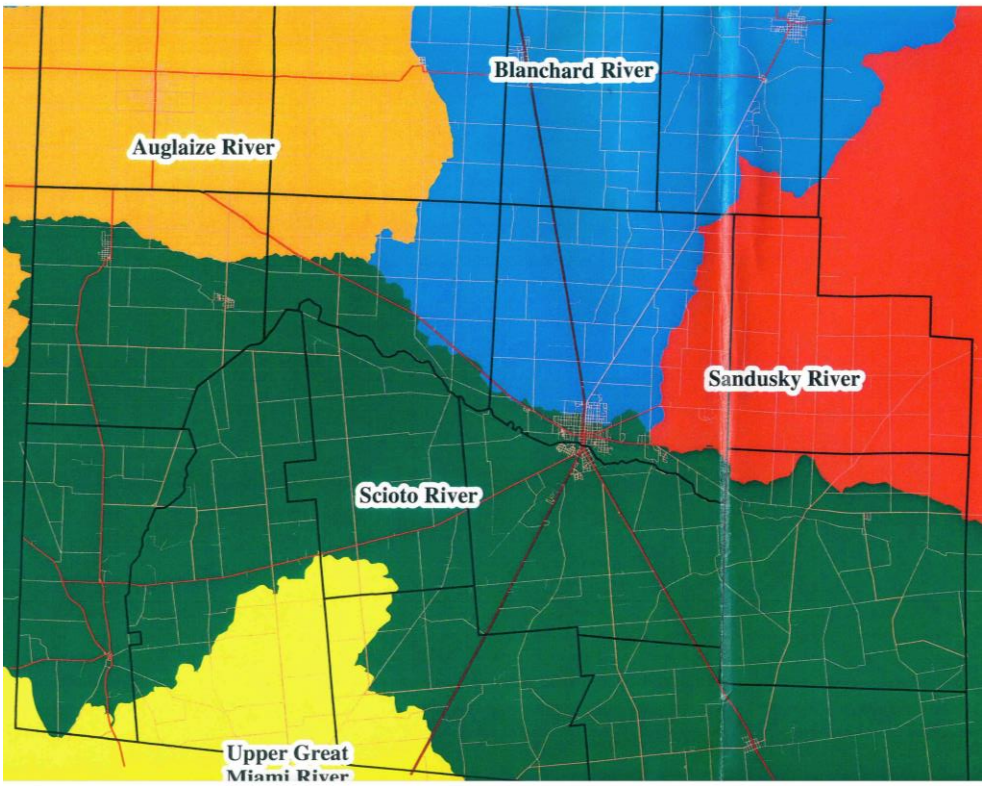
A majority of Hardin County south of the continental divide is included in the Upper Scioto River Watershed. From just north of Alger to a jagged line at the southern border of the county and east to just before McCoy Run is Sub-watershed 1 and includes Cottonwood Ditch and Headwaters Scioto basins in Marion, Roundhead and McDonald Townships and a small corner of Lynn Township. Sub-watershed 2 is referred to as Silver Creek-Scioto basin, and picks up at McCoy Run and goes east as far as Taylor Creek, taking in most of Lynn Township and half of Taylor Creek Township and the western quarter of Buck Township. Sub-watershed #3, the Gander Run, Wolf Creek and Panther Creek basins includes the remaining Taylor Creek and Buck Township areas, as well as a small part of Goshen, Hale, and Dudley Townships. The remaining part of Goshen and Dudley Townships is part of Sub-watershed #4 and includes Wildcat Creek, Town of La Rue, and a small part of McDonald Creek basins. These drain into the Scioto River and head south to the Ohio River.

A small portion of the far northwest corner of Hardin County, in Goshen Township along SR 67 drains into the Sandusky River Watershed. This include the Upper Little Tymoch, Reevhorn Run, Lower Little Tymoch and Paw Paw Run sub-basins. The water flows through Upper Sandusky, Tiffin and Fremont where the Sandusky River widens and joins into Lake Erie in Ottawa County.

Another small portion on the southwest corner, in Roundhead and McDonald Townships, is part of the Great Miami River Watershed. This includes the North Fork GMR and South Fork GMR sub-basins. This small area drains south through the Upper Great Miami sub-watershed and into the Miami River. It then goes south to the Ohio River and into the Mississippi as it enters the Gulf of Mexico on its journey to the Atlantic Ocean.

Being located at the juncture of the St. Lawrence Continental Divide places Hardin County high in every watershed. This allows drainage to occur relatively rapidly, and eliminates the challenge of having to add drainage from other areas to the quantity of water in the rivers and streams. Hardin County is basically deluged by only water that falls in Hardin County. Surface flooding, stormwater back-up, and ponding can occur as easily in Hardin County as anywhere else, but riverine flooding is the first of all in each watershed to drain away.

Map 2-1: Hardin County Watersheds



To summarize, Hardin County is part of five different watersheds. These include the Blanchard River Watershed, the Auglaize River Watershed that end up part of the Maumee River Watershed that empties into Lake Erie. The Sandusky River Watershed empties directly into Lake Erie as well. These basins are north of the St. Lawrence Continental Divide; thus, the

drainage ends up in Lake Erie, goes out through the St. Lawrence Seaway and ends up in the Atlantic Ocean.

The part of Hardin County south of the continental divide is included in the Scioto Watershed and the Upper Great Miami Watershed.

Table 2-19: Hardin County Watersheds

Watershed	Origin Point	End Point
Auglaize River	Northwest tip of the county north of Ada	Lake Erie through the Maumee Watershed
Sandusky	Far northeast part of Goshen Township	Lake Erie through Upper Sandusky, Fremont and Port Clinton into Lake Erie
Blanchard River	Most of the northern portion including Dunkirk, Forest, and Patterson in three sub-basins	Blanchard River through Findlay and Ottawa and on to the Maumee into Lake Erie near Toledo
Upper Scioto	Most of the county south of the continental divide, grouped into four sub-watersheds	South to the Scioto River that flows south past Columbus and then on to the Ohio River, Mississippi River, and Gulf of Mexico via Portsmouth
Upper Great Miami Watershed	Small portion on the southwest tip of the county	Joins the Great Miami River that flows south to Dayton to the Ohio River and the Mississippi and on to the Gulf of Mexico and Atlantic Ocean

Source: Hardin County Soil and Water Conservation District

2.1.10 Regulation

Hardin County Regional Planning was established to address countywide issues related to infrastructure, zoning, land use, and development. Specific functions of the office include community development, land use planning, and transportation planning.

The Hardin County Engineer serves as the Floodplain Administrator for the unincorporated areas of the county. Additionally, each municipality that has adopted floodplain designated a Floodplain Administrator. These jurisdictions include Ada, Kenton, and McGuffey. Section 3.0 of the floodplain regulations designates a Floodplain Administrator and specifies the duties of that office, which include updating regulations and enforcing such regulations under Section 6.0. Additionally, Floodplain Administrators routinely monitors flood hazard areas to enforce regulations and provide community assistance, such as encouraging owners to maintain flood insurance policies. Each incorporated jurisdiction has a designated Floodplain Administrator who maintains and enforces floodplain regulations within each jurisdiction.

Ada has a Planning Commission in charge of monitoring zoning and making recommendations for development and changes, and a Community Improvement Corporation that guides new development and growth. While they have adopted minimum property maintenance standards, they do not have residential building codes. Forest has subdivision regulation, and

they hold informal work sessions with builders and the general public to provide advice and guidance consistent with their Comprehensive Plan before formal development plans are submitted for review. Kenton has limited building permits for homes that include deck, roofs, and patio construction or replacement.

All jurisdictions participate in the Hardin County Chamber and Business Alliance which serves as the county's regional planning, land use planning, and community development arm. While not all municipalities have planning commissions, they do all participate in the alliance. There are no residential building codes in any jurisdiction, but Kenton Fire Department does regular fire inspections, and commercial construction is permitted and inspected by the Ohio Department of Commerce. Nine of Hardin County's fifteen townships and three municipalities have zoning regulations in place. They utilize part-time zoning inspectors to administer their local zoning requirements. Not all municipalities have floodplain regulations, as indicated, and only Kenton and Ada are NFIP members. McGuffey is sanctioned by NFIP. A complete list of the planning and building regulation status for each Jurisdiction is provided in Table 2-20.

Table 2-20: Regulation and Code Status

Jurisdiction	Planning Commission	Comprehensive Plan	Commercial Bldg. Codes	Residential Bldg. Codes	Zoning Ordinances	Floodplain Regulations	Capital Budget for Mitigation	Public Works Budget for Mitigation
Hardin Co.	Yes	Yes	Yes	No		Yes	Yes	Yes
Ada	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Alger	Yes	Yes	Yes	No	No	No	No	No
Dunkirk	Yes	Yes	Yes	No	No	No	No	No
Forest	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Kenton	Yes	Yes	Yes	Some	Yes	Yes	Yes	Yes
Mt. Victory	Yes	Yes	Yes	No	No	No	No	No
McGuffey*	Yes	Yes	Yes	No	No	No*	No	No
Patterson	No	Yes	Yes	No	No	No	No	No
Ridgeway	Yes	Yes	Yes	No	No	No	No	No
Blanchard	Yes	Yes	Yes	No	Yes			
Buck	Yes	Yes	Yes	No	Yes			
Cessna	Yes	Yes	Yes	No	Yes			
Dudley	Yes	Yes	Yes	No	Yes			
Goshen	Yes	Yes	Yes	No	Yes			
Hale	Yes	Yes	Yes	No	Yes			
Jackson	Yes	Yes	Yes	No	Yes			
Liberty	Yes	Yes	Yes	No	No			
Lynn	Yes	Yes	Yes	No	No			
Marion	Yes	Yes	Yes	No	No			
McDonald	Yes	Yes	Yes	No	No			
Pleasant	Yes	Yes	Yes	No	Yes			
Roundhead	Yes	Yes	Yes	No	No			
Taylor Creek	Yes	Yes	Yes	No	Yes			
Washington	Yes	Yes	Yes	No	No			

***Sanctioned by NFIP**
A greyed-out box indicates that particular regulation type is inapplicable to the corresponding jurisdiction, and/or is delegated to another entity.

Over the years, the Old Order Amish have objected to various regulations in Hardin County, as well as elsewhere in Ohio where they reside, based upon their religious beliefs that they claim are directly ordered in their version of the Bible. These objections include, but may not be limited to, the ordering of containment pits and hauling away of waste in outhouses, the use of rotating orange beacons on their buggies after sundown, and other traffic and sanitation compliance mandates. These issues are settled through the courts and often non-compliance is accepted due to the religious nature of their objections.

2.1.11 Economy and Development

Employment and Economic Development

Hardin County has a diverse economy based in the manufacturing, agriculture, healthcare, and service industries. Manufacturing development occurred in the industrial revolution due to the availability of rail and truck transportation. Secondary auto manufacturing and other industrial endeavors prospered because of easy access to rail and highway transportation.

Hardin County has a Chamber and Business Alliance that brings together the industry leaders, businesses in the county, and development and government officials in a cooperative effort to improve and enhance the county's economy and financial health. This group, whose leadership was part of the county officials who participated in the mitigation planning effort, includes 303 county business representatives from service and manufacturing, jurisdictions, lenders and financial institutions, churches, healthcare professionals, cultural facilities, and development organizations. The group wrote a five-year strategic plan for 2015 through 2019, and they prepared annual reports that measured the accomplishments against the goals. In 2019, they began work on the 2021-2025 Strategic Plan, and that plan was used for this project.

According to the Hardin County Five-Year Strategic Plan for 2021 - 2025, there are six core goals in development:

- To build community collaboration;
- To foster economic vitality;
- To strengthen the Hardin County Business Alliance;
- To invest in people; and
- To revitalize communities.

Particular actions include widespread inter-community participation in local efforts and projects, and to broaden the scope of Alliance membership to include specialty groups and individuals with a goal of encouraging the development of unified community planning efforts. They intend to develop additional industrial areas, foster the creation of new employers, and to participate in additional buy local activities. They strive to grow Alliance membership by 7-10% per year, with commensurate social media reach, community presence, and organizational activities. They will provide additional job fairs and people-promotions, assessing the manner

in which it is done for effectiveness. Lastly, they will enhance services such as restaurants and events, and will increase events by 10% per year.

The Hardin County Business Alliance works through four committees to accomplish these goals: Executive, Chamber and Tourism, Economic Development, and Community Development. They are working toward very specific outcomes that include objectives in all of the areas listed above. Their objectives are very definable, measurable, and time sensitive. They have assembled a very concise document and published it in a way that is shareable and understandable for anyone who is interested in Hardin County.

The Business Alliance stakeholder interviews indicated that there is a strong working relationship between them and the county's building professionals that include the zoning officers for areas that are zoned, building inspection officials for areas that have building regulation, fire code enforcement for areas that are covered by those codes, and others who issue the various permits for wells, sewer systems and other components of the construction process. This general category also includes the floodplain manager, tax map coordinator, and zoning inspectors from some areas. There is little connection to emergency management, and the mitigation efforts driven by emergency management planning. Officials indicated in meetings that they consider the risks from all the hazards discussed in this plan, but the connection with the Hardin County EMA is more casual and anecdotal than formal.

The economic development group identified several risk areas in the county that are detrimental to successful business recruitment and expansion. Loss of electrical power is devastating to industries that are unable to start and stop production lines at a whim. Therefore, highly dependable electrical service with alternate source back-ups is critical. Aging infrastructure, especially water treatment and distribution systems, are detrimental to business safety and operations when they shut down. While the 2005 ice storm that affected Hardin County allowed utility companies to update a great deal of distribution infrastructure, there are still needed improvements.

On the people side of economic development, officials cited the need for more housing that is upscale, single and multi-family friendly, and able to service persons with functional needs. They identified parks and recreational space as "low" and thoughts presented included the use of areas that flood for more parks and recreational space.

The Hardin County Chamber of Commerce and Business Alliance has successfully supported the Hardin County economy and fostered innovation and new business growth in the county. In 2022, Hardin County reported 734 active businesses in the "Hardin County Economic Profile 2022. Of those businesses, 38 employed 1 – 4 people; 134 had 5 – 9 employees; 75 employed 10-19 people; 54 employed 20-49 people; 22 employed 50-99 people; 6 were large enough to employ 100-249 people, and only 4 employ between 500 and 999 people. One business employs over 1,000 workers. Obviously, very small and small businesses provide a cornerstone for Hardin County's workforce. The top five jobs by occupation included production workers,

office/administrative support, sales, education/training/library workers, and executive/managers/administrators, in that order.

Table 2-21: Employment Sectors

Employment Sector	Share of Work Force
Manufacturing, Skilled Trades	25.3%
Education and Healthcare Services	12.77%
Retail & Sales	8.56%
Food & Food Services	7.53%
Management and Admin. Assistants	18.8%
Transportation and Utilities	5.39%
Arts & Entertainment	1.0%
Personal Care Services	2.31%
Public Safety	10.7%
Professional and Business Services	5.34%
Other	2.3%

Major employers in Hardin County include:

Table 2-22: Major Employers

Company	Product/Service
Ada Technologies	Manufacturing
Amer Group/Wilson Sporting Goods	Manufacturing
Hardin County Government	Government
OhioHealth/Hardin Memorial Hospital	Service
International Paper Co./Graphic Packaging Int.	Manufacturing
Kenton City Schools	Government
Ohio Northern University	Service
Reliance Steel & Aluminum/Precision Strip Inc.	Manufacturing
Sumitomo Bakelite/Durez Corp.	Manufacturing
Triumph Group Inc.	Manufacturing

Employment statistics have improved in Hardin County since the economic downturn of 2008-2009. By 2015, the county's unemployment rate had dropped to 4.7%. The rate has remained relatively steady since then. In the 2022 Economic Development Report, Hardin County's unemployment was 5.6%. A total of 9,577 residents were not included in the labor force.

Table 2-23: Unemployment Trends

	2012	2013	2014	2015	2016	2022
Employed	13,800	13,800	14,200	14,200	13,600	13,892
Unemployed	1,100	1,200	900	700	700	830
Unemployment Rate	7.5%	7.7%	5.7%	4.7%	5.0%	5.6%

Agriculture

Agriculture is a major contributor to Hardin County's economy. The county's 261,744 acres of farmland account for 86.9% of all land use in the county. Corn, soybeans, and wheat are the most prevalent crops. Livestock is also a major segment of the agriculture industry. Hogs, cattle, dairy cows, sheep and goats, and poultry are the largest individual livestock enterprises in the county. Hardin County ranks #5 in soybean, #17 in corn, and #22 in wheat production, compared to all 88 Ohio counties. They rank 12th of 88 in dairy production and 32 in 88 in cattle and calf production.

Table 2-24: Agriculture Statistics

Statistic	Figure
Total Farm Acreage	261,744
Number of Farms	726
Average Farm Size (acres)	361
Total Cash Receipts	$222,866,222
Receipts per Farm	$306,978
Crop Receipts	$107,220,222
Livestock/Product Receipts	$115,646,000

2.2 HAZARD IDENTIFICATION

This section of HIRA defines each hazard that can impact Hardin County, identifies the likely risks, and examines historical hazard events that have occurred in the county. The natural, human-caused, and technological hazards assessed include:

- Climate Change
- Dam failure
- Drought/extreme heat
- Earthquake
- Erosion
- Flood
- Hazardous materials incident
- Invasive species
- Severe thunderstorm
- Tornado
- Utility or infrastructure system failure
- Windstorm
- Winter storm

Some natural hazards were excluded from this plan because they pose no risk to Hardin County. Table 2-22 identifies these hazards and explains why the hazard is not local hazards.

Table 2-25: Excluded Hazards

Excluded Hazard	Justification
Coastal Erosion	Not a coastal community
Coastal Flooding	Not a coastal community
Land subsidence	Not identified as a concern

Mud/landslide	Elevation not conducive to this hazard
Tsunami	Geographically impossible
Volcano	Geographically impossible
Wildfire	Insufficient forested area

Hardin County does not have a long history of federal disaster declarations or financial assistance. Hardin County has been included in six federal disaster and emergency declarations. Table 2-23 identifies these incidents. While the State of Ohio has a longer comprehensive list of incidents than displayed, Hardin County escaped damages in most of the incidents that have impacted Ohio over the years. The county's most recent declaration was received in 2012 following a severe storm and wind event.

Table 2-26: Federal Disaster Declaration History

DR/EM Number	Declaration Date	Incident Type
DR-90-OH	January 23, 1959	Flood
EM-3055-OH	January 26, 1978	Winter Storm
EM-3198-OH	January 11, 2005	Winter Storm
DR-1580-OH	February 15, 2005	Flood, Mudslide, Winter Storm
EM-3286-OH	April 24, 2008	Winter Storm
DR-4077-OH	August 20, 2012	Severe Storm, Straight-Line Wind

To understand Hardin's County's risk to the identified hazards, it is important to define hazard characteristics. Local history is one factor in determining the county's risk for each hazard. This section defines each hazard, identifies the most significant events of each type to impact Hardin County, and provides a summary of the county's history with each incident. A complete list of historical occurrences for each natural hazard is provided in Appendix A: Hazard and Vulnerability Data. Historical information was obtained from the National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC) and supplemented with information from local officials.

2.2.1 Climate Change

According to scientific theory, climate change, specifically the warming of the earth in general, is causing more severe storms and exaggerated natural hazards. As with water quality and other developing issues, the final answer for this potential threat is still in under identification and development. As a rural, agricultural area, Hardin County officials see the county as less contributing to global warming than large metropolitan areas, but are not willing to simply shift the cause to other uncontrollable sources. Climate change effects impact the local community level; prevention of those outcomes and changes to business and residential practices will come after a period of examination, study, and analysis. Hardin County will again look to the future through a lens of community responsibility and, in doing so, will examine the presence, cause, and mitigation of climate change on the local community in the coming years. This hazard makes it necessary for the county to continually consider development goals and strategies, building techniques, conservation methods, and land use plans. Through that

consideration comes the preservation of natural resources, historical landmarks and symbols, and changes in processes and culture.

Discussions about climate change at stakeholder meetings revealed a continuing concern for protection of natural resources. As an agricultural community, stakeholders are engaged in farming practices that conserve the soils, waterways, and other natural resources. They work diligently to minimize the loss of top soils through surface flooding, rapid runoff drainage in fields and open areas, and erosion, especially in areas where muck soils that blow and move are prevalent. They continually use practices like installation of sod strips, grassy drainage waterways, and cover crops to protect the soil in Hardin County.

Discussions revealed an acute awareness of changing storm characteristics, but varying beliefs on actual storm components. The anecdotal opinion that winds are, at the very least, more consistently present and at higher average speeds was common among many individuals. The local consensus is that storms blow in harder, move through faster, and seem more intense while there, even if statistics do not yet indicate that is an accurate conclusion. Residents collectively felt that rain comes faster, harder, and is more likely to cause surface and flash flooding now than even a few years ago. They feel the rainstorms come faster and harder, but there is more time in between storms for the ground to dry out and become hard, facilitating surface runoff when the next storm hits. Farmers indicated that most crop damage is not from the quantity of rain, but from the rate at which it falls, coming so fast that it cannot drain naturally through the streams and ditches to the rivers. They also see damages to the berms of county and township roads as gully-washer-storms whisk away the edges of roads. The see more roof and tree damage as storms are more aggressive now, and tornadoes seem to develop more frequently. While the number of tornadoes is still low, there is anecdotal awareness to increasing debris in fields and yards, and heavier debris-flow in minor local waterways that impedes drainage. All participants agreed that several inches of rain, coming slow and easy over several days, may be a blessing in the late spring; however, when it all comes inside one 24-hour period, that “blessing” contributes to localized flooding, standing water, washed away infrastructure, and destroyed crops.

2.2.2 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 flood control purposes or to store water 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.

Dam failure, including levee failure, is the uncontrolled release of the water held back by the dam in a lake or reservoir. The majority of dams have a small enough storage volume that a breach or failure will have limited impact on the surrounding community. But the failure of a large dam can cause substantial flooding downstream and lead to significant loss of life and property.

There are many causes of dam failure, including:

- Sub-standard construction
- Geological instability
- Spillway design error
- Poor maintenance
- Internal erosion
- Extreme inflow
- Earthquake

The Ohio Department of Natural Resources 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	Probable loss of life, serious hazard to health, structural damage to high value property (i.e., homes, industries, major public utilities)
Class II	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	Damage to low value non-residential structures, local roads, agricultural crops, and livestock
Class IV	Losses restricted mainly to the dam

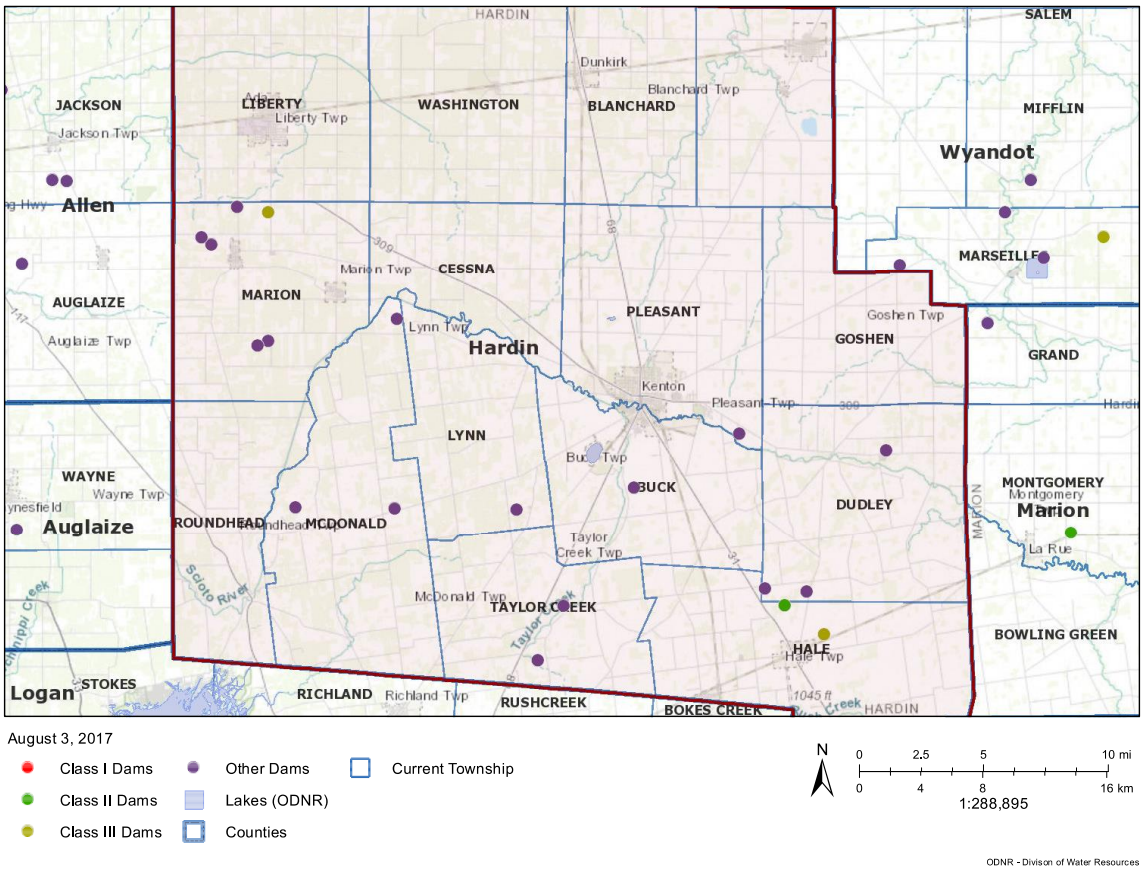
Hardin County has nineteen dam structures with classifications ranging from Class II to other/Class IV, according to ODNR. There are no low head or Class I dam structures, and only one Class II dam. Table 2-24 lists each dam and its classification, according to the Ohio Department of Natural Resources. Hardin County has no levees, according to both local information and the National Levee Database.

Table 2-27: Hardin County Dams per ODNR GIS Mapping

Dam	Class	Jurisdiction	Ownership
Allen Lake Dam	Other	Buck Township	Private
Anderson Lake Dam	Other	McDonald Township	Private
Battles Pond Dam	III	Dudley Township	Private
Dugan Lake Dam	Other	Taylor Creek Township	Private
Duprey Lake Dam	Other	McDonald Township	Private
Hall Lake Dam	Other	Marion Township	Private
Hill Lake Dam	Other	Pleasant Township	Private
Hubbell Lake Dam	III	Marion Township	Private
Hunters Lake Dam	Other	Dudley Township	Private

Jordan Lake Dam	Other	Marion Township	Private
Lake Idlewild Dam	Other	McDonald Township	Private
Linke Lake Dam	Other	Lynn Township	Private
Mount Victory Sewage Lagoon	II	Dudley Township	Village of Mt. Victory
Radcliffe Lake Dam	Other	Dudley Township	Private
Seiler Lake Dam	Other	Dudley Township	Private
Unknown Name	Other	Marion Township	Private
Unknown Name	Other	Taylor Creek Township	Private
Van Duerzen Dairy Pond No. 1	Other	Marion Township	Private
Van Duerzen Dairy Pond No. 2	Other	Marion Township	Private

Map 2-2: Hardin County Dams



According to the National Inventory of Dams, there are two identified dams in Hardin County.

Battles Pond Dam is an earthen dam located in Hale Township along Wildcat Creek. It is privately owned for recreational purposes. It is considered a "low" hazard potential dam. There is an ODNR approved Emergency Action Plan that was updated in 2017, and it was last inspected in November 2020, and then classified in "poor" condition.

The other listed dam is the Mt. Victory Sewage Lagoon, owned by the village but located in Hale Township. It is located along Panther Creek and was professionally engineered when built in 1996. There are no outlet gates, and it is an earthen structure. This lagoon was inspected in November 2020 and carries a "significant" hazard potential classification. Its condition was assessed as "satisfactory". There is no Emergency Action Plan. The closest inhabited area is a census-designated area called "Hepburn" which is 6.3 miles to the northeast.

This information is available at https://nid.sec.usace.army.mil/#/ and was posted on March 8, 2023.

Local Dam Failure History

The risk of dam failure in Hardin County is negligible. According to the Association of State Dam Safety Officials, they show no failure of dams in Ohio as of February 10, 2023. In a dam failure incident identification map on their website, James S. Halgren of the Office of Hydrologic Development of the National Weather Service of National Oceanic and Atmospheric Administration indicates Ohio is at low risk for dam failure based upon historic data. Stanford University's National Performance of Dams Program identifies no written reports of dam incidents, breaches, or failures in Hardin County. There is a less than 1% probability of a dam incident.

2.2.3 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 standard amount of time required for an extended dry period to be considered a drought. It is considered a drought when the dry period lasts long enough to impact the environment and economy of a region, typically a period of months or years. There are four common types of droughts:

Type	Description
Meteorological	Based on the degree of dryness (rainfall deficit) and length of dry period
Hydrological	Based on impact of rainfall deficits on water supply such as stream flow, reservoir and lake levels and water table decline
Agricultural	Based on impacts to agriculture by rainfall deficits, soil water deficits, reduced ground water, and reservoir levels needed for irrigation

Socioeconomic	Based on the impact of drought conditions on supply and demand of some economic goods

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 length of time 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.

Average temperatures and rainfall for Kenton, Ohio:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. High	33°	37°	47°	61°	71°	81°	85°	83°	76°	64°	51°	37°
Avg. Low	18°	20°	29°	39°	49°	60°	64°	62°	54°	42°	33°	23°
Avg. Precip.	2.36”	2.2”	2.52”	3.39”	4.13”	3.66”	3.7”	3.31”	2.76”	2.4”	3.07”	2.91”

Drought and extreme heat are countywide hazards that can affect all areas and jurisdictions. Heat waves are possible in Hardin County and all of Ohio but they are rare and typically short in duration, lasting only a few days. Extreme temperatures are considered anything above 90 degrees Fahrenheit. In Ohio’s humid continental climate, these temperatures are often accompanied by high humidity. Temperatures rarely exceed the mid-90s, although the region does occasionally experience temperatures of 100 degrees or slightly higher. These brief heat waves rarely last more than a few days. A heat wave lasting longer than a week is extremely rare. There are no documented incidents of extreme heat in Hardin County, per NCDC records.

Drought is not common in Hardin County. Dry spells can last for several weeks but most months have sufficient rainfall to support crop growth and human sustenance. Drought conditions, when they do occur, can have a significant impact on the agriculture industry that prevails in the county.

Local Drought and Extreme Heat History

Drought is not common but Hardin County has been impacted by several droughts in recent decades. The 1988-1989 North American Drought followed a milder drought in the Southeastern United States and California the year before. This drought spread from the Mid-Atlantic, Southeast, Midwest, Northern Great Plains, and Western United States. It was widespread, unusually intense, and accompanied by heat waves that killed thousands of people and substantial numbers of livestock nationwide. One particular reason for the severity of the drought was the farming of land that was only marginally arable. Another factor was the pumping of groundwater near the depletion mark. The Drought of 1989 destroyed crops almost nationwide. Lawns went brown and many cities and jurisdictions enacted water restrictions. This catastrophic drought continued to impact the Midwest and Northern Plains states during 1989. The drought was not declared over until 1990. According to the planning team, this drought was one of the most severe drought incidents that they could recall impacting Hardin County.

The 2012 North American Drought impacted all of Ohio, including Hardin County. 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. Moderate drought conditions were identified in Hardin County and all of Ohio in 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 in severity, which is the most recent comparable drought. While this incident significantly impacted many areas of the Midwest and Western United States, planning team members do not recall the event being that severe in Hardin County. According to the committee, the incident was more of a prolonged dry spell than a significant drought.

On July 30, 2012, the Governor of Ohio sent a memorandum to the USDA Ohio State Executive Director requesting primary county natural disaster declarations for eligible counties due to agricultural losses caused by the drought and other natural disasters during the 2012 crop year. The USDA reviewed the Loss Assessment Reports and determined that there were significant enough production losses in 85 counties to warrant a Secretarial disaster designation. On September 5, 2012, Hardin County was included as one of the designated counties.

Most recently, Hardin County experienced extreme heat on two days in 2019. From July 19th through the 20th, Hardin County had heat indexes exceeding 100 degrees Fahrenheit. There were no deaths or injuries due to the heat, and no property damage from the 48-hour period of extremes.

Table 2-28: Drought/Extreme Heat History

Hazard	Total Incidents	Total Property Loss	Total Crop Loss	Total Deaths	Total Injuries	Average Loss/Incident
Drought	2	0	0	0	0	0
Excessive Heat	0	0	0	0	0	0

2.2.4 Earthquake

An earthquake occurs when two blocks of earth, called 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 below:

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.

According to the Ohio Seismic Network, seismic risk in Ohio is difficult to evaluate because earthquakes are infrequent. The recurrence interval is generally very long, sometimes spanning hundreds or thousands of years. Another factor in earthquake risk is the nature of the geologic materials upon which a structure is built. According to the Ohio Department of Natural Resources, "ground motion from seismic waves tends to be magnified by unconsolidated sediments such as thick deposits of clay or sand and gravel."

Local Earthquake History

Ohio has experienced more than 120 earthquakes since 1776. While only fourteen of these events have caused damage, there is a greater risk for earthquakes in Ohio than most people realize. West central and northeast Ohio are the areas of Ohio with the highest earthquake risk.

The strongest earthquake recorded in Ohio occurred in Shelby County 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 previously reported earthquake activity in 1875 and 1884. The Pomeroy area, southeast of Columbus, experienced an earthquake in 1926, and residents in Anna felt minor quakes in 1930 and 1931, just a few years prior to the 1937 incident. None of these earthquakes caused widespread damage or devastation. The minor quakes caused shaking buildings, crumbling mortar, and limited property damage. Impacts were only felt locally; no statewide damages were reported.

Two earthquakes have been recorded in Hardin County through February 2023. One event occurred on June 30, 2020 and was a 2.0 earthquake. Another occurred on June 30, 2020 as a 2-magnitude with an epicenter in Hardin County. Several minor quakes that caused no damage have been recorded previously in nearby Allen and Logan counties.

2.2.5 Erosion and Land Subsidence

Erosion is the gradual wearing away of rock, soil, and other surfaces by the continual force of wind or water. In some areas of Hardin County, roadways are vulnerable to erosion of berms, soil that supports bridges and culverts, and washout of entire sections of road in these vulnerable soil areas. This occurs when infrastructure or structures are built on unstable soils that are unable to support the weight of the materials over time. This risk is most prevalent in the west central part of the county near Alger and McGuffey where muck soils prevail. Muck soils are composed almost entirely of dark, fertile organic material. While the soil is excellent for growing some types of vegetables, it is very soft and lacks the strength and stability necessary to support buildings and roads.

Local Erosion History

Several roadways in west central Hardin County are directly impacted by erosion. State Highway 195 begins in Marion Township a few miles north of McGuffey and used to travel south along the Scioto River through Roundhead Township. In the area of muck soils just south of the village, the road continually deteriorated to the point that the pavement crumbled. This was determined to be caused by the soft, powdery soils that lack form and cannot provide a solid foundation for a roadway. Between Township Roads 110 and 120, the State of Ohio

abandoned the highway and turned the property back over to Hardin County. Barricades block the crumbled pavement, and today the road is closed. Some township roads in the area suffer from crumbling berms and instability, and are continually under repair by Hardin County. These roads are blocked by barricades and warning signs, and load limits are adjusted to prevent further damage due to excessive vehicle weight.

The muck soils are so soft and fluffy that high winds make the area look like a dust storm. When the soils are unstable, the typical black color turns gray, and swirling dust is clearly visible. The soil does not keep a form and provides a very fluid foundation to anything resting on it, such as farm buildings, houses, or other structures as well as roads and bridges. Due to this instability, there are few structures in the area. The soils are used for root crops like carrots, and are very productive in that sense. The only mitigation of damage is to simply not build on the land and use it for vegetable production.

Stakeholders reported some erosion in farm fields due to rapid rainfall in excess amounts, and the overwhelming surface runoff that occurs causes some loss of topsoil. This is being combatted and reduced through the use of cover crops and sod strips, but the more rain comes in torrential downpours, the more this hazard will worsen.

2.2.6 Flood

A flood is defined as any high flow, overflow, or inundation of water over typically dry land that causes or threatens damage. Floods occur subsequent to meteorological events such as substantial precipitation, thunderstorms with heavy rainfall, rapid snowmelt, or extreme wind events along coastal waterways.

Riverine flooding occurs when a river or stream rises to an elevation that causes the river to overflow its banks. The rising water damages roadways, homes, buildings, and occupied spaces near the overflowing waterway. Lower levels of a watershed are more susceptible to this type of flooding because these waterways receive all the water from the upper levels and are responsible for carrying a much higher volume of water than the tributaries.

Flash floods are the rapid and extreme flow of high water into a normally dry area. A flash flood can also occur when there is a rapid rise in the water level of a stream or creek and the water rises above a pre-determined flood level within six hours of a precipitation event. This type of flooding occurs 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.

Worldwide, flooding is the most common and costly disaster, resulting in significant loss of life and property every year. Floods have a substantial impact on the infrastructure of a region. Common effects include roadway breeches, bridge washouts, roadway wash away, and water-covered roadways. As floodwater moves rapidly and forcefully, it washes away the surface and sub-surface of roads, causing holes, ruts, and other problems for vehicles. Floodwater that is one foot deep, sometimes less depending on the force of the water, is strong enough to carry

vehicles away 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, seeping into and occupying any structure in its path. Basements and lower levels of buildings can become inundated with floodwater. Placing sandbags along the exterior of a building is only a temporary stopgap; if floodwaters do not recede quickly, the force of the water will move through the sandbags and infiltrate the structure.

The aftermath of flooding can be just as damaging and dangerous as the flooding itself. Cleanup is often a long, protracted activity with its own set of hazards. Prolonged power outages cause issues with refrigeration and sanitation. Sewer systems can become inundated with floodwater and cease to function properly. Standing water becomes 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 initial recovery phase of the disaster.

Flooding has always been considered a low risk for Hardin County. Historical records indicate the county has been impacted by only 35 flood events since 1950, each relatively minor. Collectively, these events have caused $114,000 in property damage. Flooding has typically been considered such a low risk for the community that, until 2015, Hardin County did not participate in the National Flood Insurance Program.

Local Flood History

Of the floods that have affected Hardin County, two of the most significant occurred in 2000 and 2005. On June 13, 2000, heavy precipitation caused a flash flood near Roundhead in the southwest corner of the county. On State Route 195, several cars were submerged. Total property damage for the incident was $20,000.

On January 5, 2005, the county was impacted by a flood following an extended period of heavy precipitation across much of central and southern Ohio. Because the ground was already saturated from a recent snowmelt, the additional precipitation quickly caused rivers and streams to rise and breach their banks. In Hardin County, property damage totaled $20,000. This event had a much more significant impact on other counties in the region but still caused more damage for Hardin County than nearly all other flood events on record.

Of the most recent recorded floods, roughly two-thirds have been concentrated in Kenton. These incidents occurred in 2018 (1), 2019 (4) and 2020 (3). None caused damages or casualties.

Table 2-29: Flood History

Hazard	Total Incidents	Total Property Loss	Total Crop Loss	Total Deaths	Total Injuries	Average Loss/Incident
Flood	43	$114K	Undetermined	0	0	$2.7K

2.2.7 Hazardous Materials Incident

A hazardous materials spill or release occurs when a hazardous substance breaches its container. Releases can occur within facilities that store and use hazardous materials and during the transport of these substances. Hazardous materials 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 hazard to the immediate area or greater community because of the small quantity that is released. A release that requires action by first responders or agencies outside of the spiller's facility is considered an emergency response.

Every hazardous material is unique and can have one or more of these properties: toxic, flammable, explosive, corrosive. 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. To protect the community, evacuation from the facility or area surrounding the spill may be necessary.

Accidents on highways and roadways can cause the vehicles carrying substances to overturn, collide with other vehicles, or to ignite and burn. The runoff as a chemical spills, the vapors as a chemical dissipates, or the flash point and burning of a substance can expose those nearby to extreme danger from both trauma and chemical absorption. These vehicle 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 thrown into the atmosphere or soils.

Rail incidents are a growing concern as several major derailments have occurred elsewhere in Ohio. The hauling of highly flammable and toxic materials on the railroads is believed to be increasing, although a recent commodity study has not been completed. The trains that move through the county are up to three miles long, and are staffed with minimal personnel. Crossings can be blocked for long periods, and there is no longer any responsiveness to local lack of access by the railroads themselves. The local communities are without options to open crossings for emergency needs, let alone other necessary traffic access.
Industrial and residential exposure to hazardous substances can also involve both trauma and exposure. Most incidents involve the breech of a container or the undesirable combination of chemicals that results in a lethal substance. These spills and leaks can occur in businesses, homes, and industries or anywhere else that hazardous substances exist.

No infallible reporting system for hazardous materials incidents exists anywhere. Many times, incidents of non-lethal exposure are unrecognized as an emergency. Old thermometers are

dropped and mercury is spilled, swept up, and thrown in garbage unless individuals know of the risks. They do not always know, and thus those kinds of incidents go totally unreported.

Industrial reporting is gauged by regulation. Spills involving reportable quantities are documented according to regulation. Smaller less significant 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.

Table 2-30: Hazardous Material Classifications

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

Hardin County has significant risk for hazardous materials incidents. The county is home to multiple manufacturing and industrial sites that manufacture or utilize hazardous substances. These substances are transported across the county on many state, and local roadways and rail lines. The majority of these transportation routes pass through municipalities and populated areas in Hardin County, increase the population's risk for exposure. The town square in downtown Kenton is a vulnerable area for a vehicle accident and semi tractor-trailer units hauling hazardous substances navigate their way around the square as they follow one of multiple state highways through the city.

Nationally, there were 330 hazardous materials incidents on railroads in 2022 during the in-transit phase of movement. An additional 14 occurred during storage, loading or unloading. Highway accidents totaled 7,534 incidents during transport, 300 during storage, and 15,174 during loading or unloading. Ohio had 1.690 incidents with one fatality in 2022, resulting in damages in the amount of $4,606,417.00. Ohio was also home to 74 undeclared incidents. This data is according to the Pipeline and Hazardous Materials Safety Administration website database. These statistics are for 2022 only.

Local Hazardous Materials Incident History

According to records maintained by the Hardin County Local Emergency Planning Committee, Hardin County has historically experienced mostly minor hazardous materials spills. These incidents involved vehicle accidents on the many roads or highways in the county, equipment failure in operation or during distribution of a chemical (such as agricultural application of chemicals), industrial spills during manufacturing, failure of containers to effectively hold the substance, or accidental mishandling of a hazardous substance.

Hazardous materials incidents are a countywide hazard and can affect all areas and jurisdictions. The populated jurisdictions along highways are particularly vulnerable to this hazard because of their proximity to the major roadways on which these substances are transported.

2.2.8 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 and noxious weeds 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 non-invasive. Fewer than 100 of these are actually considered to be 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 2-28 identifies the invasive species across these categories that have the greatest impact in Ohio.

Table 2-31: Invasive Species in Ohio

Species	Type
Invasive Carp (Asian, etc.)	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 Wooly Adelgid (HWA)	Insects & Diseases
Walnut Twig Beetle	Insects & Diseases
Spotted Lanternfly	Insect
Japanese Honeysuckle	Terrestrial Plant
Japanese Knotweed	Noxious Weed
Autumn-Olive	Terrestrial Plant
Buckthorns	Noxious Weed
Purple Loosestrife	Noxious Weed

Common Reed or Phragmites	Terrestrial Plant
Reed Canary Grass	Terrestrial Plant
Garlic Mustard, Wild Mustard	Noxious Weed
Multiflora Rose	Terrestrial Plant
Bush Honeysuckles	Terrestrial Plant
Feral Pig	Terrestrial Wildlife
Unwanted Exotic Pets/Animals	Exotic animals
Japanese Stiltgrass	Annual Grass
Kudzu	Noxious Weed
Japanese Barberry	Deciduous Shrub
Callery Pear	Deciduous Tree
Oriental Bittersweet	Deciduous Vine
Apple of Peru	Noxious Weed
Canada Thistle	Noxious Weed
Cressleaf Groundsel	Noxious Weed
Giant Hogweed	Noxious Weed
Grapevines	Noxious Weed
Johnsongrass	Noxious Weed
Kochia	Noxious Weed
Marestail	Noxious Weed
Mile-a-minute	Noxious Weed
Musk Thistle	Noxious Weed
Oxeye Daisy	Noxious Weed
Palmer Amaranth	Noxious Weed
Poison hemlock	Noxious Weed
Russian Thistle	Noxious Weed
Shattercane	Noxious Weed
Wild Carrot	Noxious Weed
Wild Parsnip	Noxious Weed
Poison Ivy	Noxious Weed

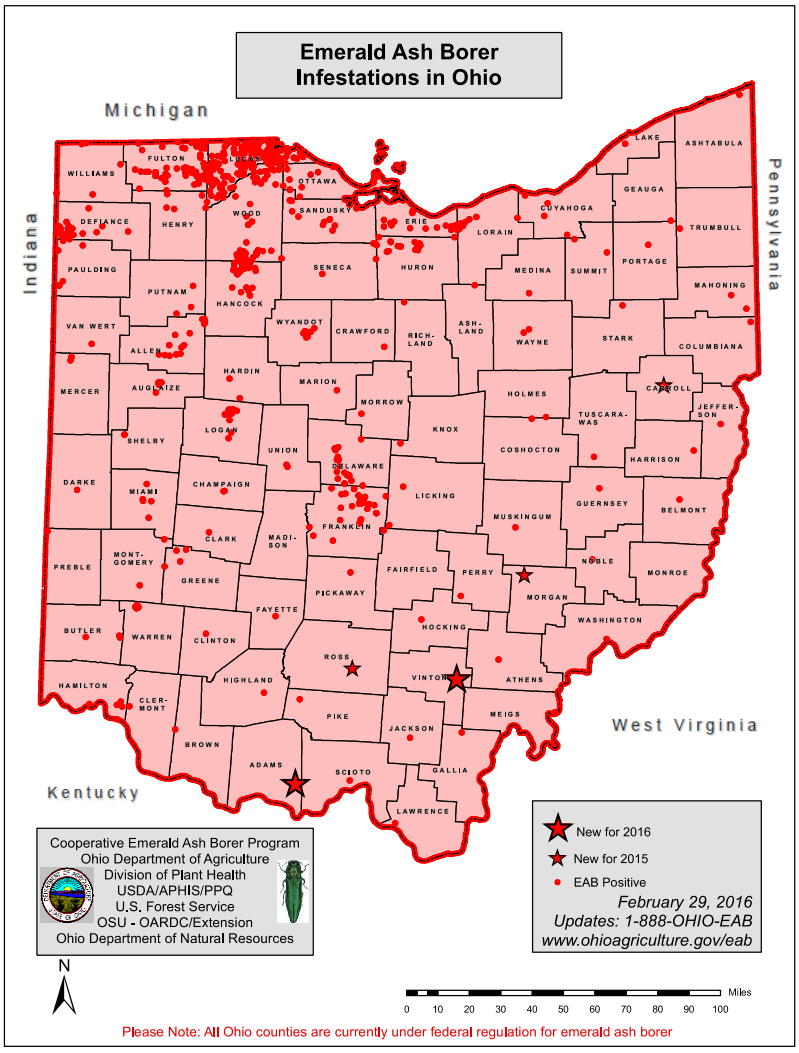
Local Invasive Species History

The most recent invasive species to impact Hardin County is the Emerald Ash Borer (EAB). EAB is an ash-tree killing insect native to Asia; it kills trees within three to five years of infestation. It was first discovered in Ohio in 2003. Since that time, the Ohio Department of Agriculture and partner agencies have worked to protect the state's 3.8 billion ash trees. The infestation was initially identified in northwest Ohio near Toledo but has since spread across the entire state. Map 2-3 identifies EAB infestation areas in Ohio. According to natural resources officials, the worst of the EAB infestation has passed. While there are many dead and diseased trees that must still be removed, a process that will take years to accomplish, significant work has been completed to remove a significant number of these hazards.

Hardin County was not the most impacted area of Ohio but it has experienced effects of the EAB infestation. As diseased trees along waterways have died, they have fallen into the 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 jurisdiction street and road departments have aggressively removed diseased trees along the public right-of-way, which has been effective at reducing the impact on utility lines and other infrastructure. They are not, however, able to remove trees from private property. Individual landowners are responsible for removing dead and diseased trees from their personal property. In 2023, the effects of EAB still cause excessive debris, weakened and falling trees, and limb damages to property.

Map 2-3: Emerald Ash Borer Infestation Map



Recent concerns about invasive species include the spotted lanternfly, an insect that feeds on a variety of woody and herbaceous plants. This weakens the plants. They produce large amounts of "honeydew" that is a sticky, sugary liquid attractive to ants, flies and wasps. Sooty mold fungus can develop, ruining yields of production plants by interruption of photosynthesis.

Bagworms are causing plant death in many areas in Ohio. This species is a native form of a moth, and uses camouflage to protect itself during growth. Undetected and undisturbed, the

larvae feeds on leaves, branches, and foliage. The bags reach about 2 inches in length. This slow-spreading invader can go unnoticed until extensive damage is done to host plants.

Four species of carp are invasive to Ohio. Bighead, black, grass, and silver carp post high risks for fish life in Ohio's bodies of water. The sea lamprey is a predaceous, eel-like fish. It is parasitic, feeding on other fish.

Hydrilla verticillate is a non-native and highly undesirable aquatic plant currently found in nearly 25% of Ohio's counties. This mat-forming plant clogs water control structures and prevents recreational activities like swimming and fishing.

While the Emerald Ash Borer is less of a concern today than it has been in the recent past, new invasive species are continually a concern for the vegetation and trees in the county. When the stability of trees and vegetation are damaged, the surrounding infrastructure, utility systems, and buildings are threatened. County and jurisdiction agencies and utility companies must allocate additional resources to maintaining trees along their rights-of-way and infrastructure systems to ensure their viability for public use. This increased expense can be a challenge for agencies with limited funding to bear.

2.2.9 Severe Thunderstorm

A thunderstorm is a local storm produced by a cumulonimbus cloud accompanied by thunder, lightning, and/or hail. Lightning is a brief, naturally occurring electrical discharge that occurs between a cloud and the ground. Hail is frozen rain pellets that form in the higher clouds and accumulate size as they reach the ground as precipitation. In this part of Ohio, the state of the rain is dependent upon the higher elevation temperatures, the temperature of the atmosphere through which the precipitation falls, and the temperature of the ground, all of which can be significantly different at any given time. If temperatures close to the ground are warm, the hail can partially melt and become sleet. If the surface is cold and the air is cold, it falls as hail. Frequently the upper atmosphere is cold, the air the precipitation falls through is warm, and the ground is cold. This results in small sized hail. Rarely does Ohio have large hail in Hardin County because temperatures of the air do not support the formation of large hail. Hail can damage buildings, vehicles, and other structures as it falls, and the larger the hail, the greater the damage. Most thunderstorms include heavy precipitation but not many include hail and lightning. Severe thunderstorms can produce, 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.

<u>Local Severe Thunderstorm History</u>

Hardin County experiences many thunderstorm events every year. Most of these are not severe and include only heavy precipitation, wind, and thunder. Thunderstorms with hail and lightning are much less frequent than wind and heavy precipitation. These storms are relatively frequent but generally result in little property damage. Although they can range from minor to

severe but rarely exceed the minor or moderate level. Thunderstorms are a countywide hazard and can affect all areas and jurisdictions. According to NCDC records dating back to 1950, Hardin County has experienced 113 days with thunderstorm events. Of these, 59 incidents resulted in some property damage. Thunderstorms with hail accounted for 41 of these incidents but resulted in very limited property damage. Lightning was identified as a hazard only once, causing no property damage but leading to one fatality.

One of the most damaging thunderstorms recorded in Hardin County occurred on November 17, 2013. A strong low-pressure system combined with unseasonably warm air to produce a series of severe thunderstorms. The storms produced tornadoes and high wind in Illinois and Indiana but diminished to severe thunderstorm upon entering Ohio. In Hardin County, a garage was destroyed and the adjacent house damaged. A hog barn was also partially destroyed and trees and utility lines downed. Property damage for the county totaled $200,000.
One decade prior to the 2013 incident, Hardin County experienced another severe and unseasonable thunderstorm. On November 11, 2002, a severe thunderstorm system moved through the county, causing damage primarily in the village of Ada. In Ada, several outbuildings and barns were damaged. In other areas of the county, trees and utility lines were downed. Total property damage for the event was $60,000.

Between 2018 and 2022, Hardin County experienced 11 recorded severe thunderstorms. One storm included hail that struck Kenton. The other ten incidents involved severe thunderstorm wind, spread across seven separate weather events. All totaled, these storms added $71K in damages to Hardin County property to the list.

Table 2-32: Summary of Thunderstorm History

Hazard	Total Incidents	Total Property Loss	Total Crop Loss	Total Deaths	Total Injuries	Average Loss/Incident
Severe Thunderstorm	158	$847K	0	1	0	$5.4K
Hail	42	$7K	0	0	0	<$200
Lightning	1	0	0	1	0	0

**Includes all incidents with thunderstorm wind, hail, and/or lightning.*

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 rankings range from EF-0 to EF-5 and are based on damages caused by the tornado. Prior to 2012, the Fujita scale was used to measure tornado damage and was abbreviated F-1 to F-2, depending on the level of impact.

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 do not strike as independent incidents. Emerging out of a storm front or super cell, the tornado, especially when accompanied by heavy rain, straight-line wind, lightning, and hail, can be extremely damaging. 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.

<u>Local Tornado History</u>

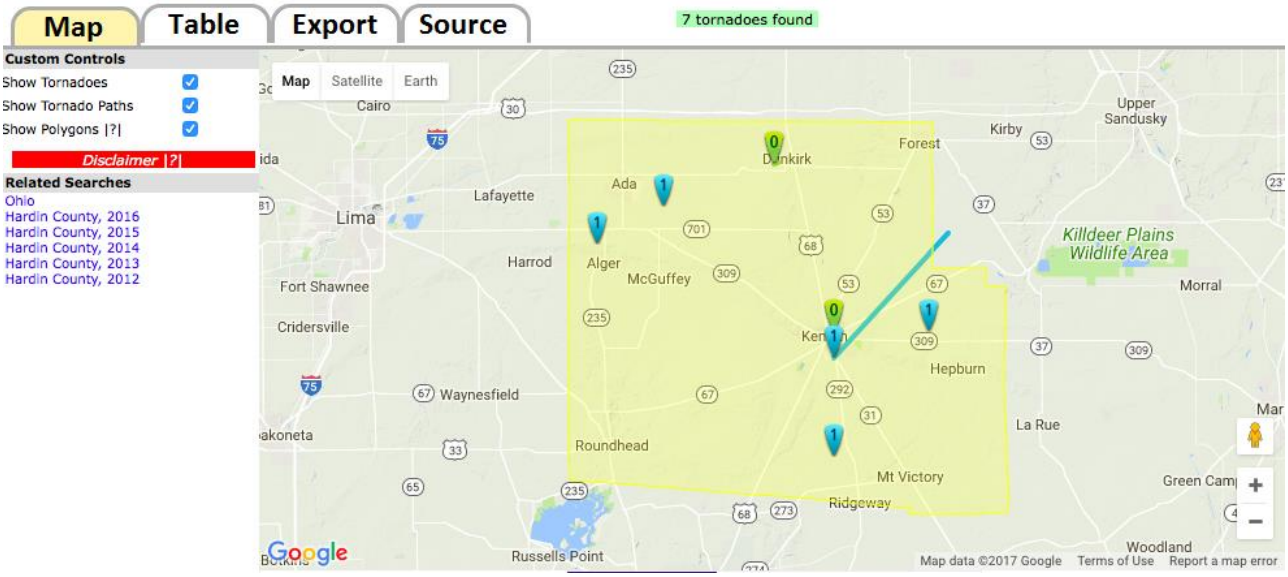
Tornadoes do not occur frequently in Hardin County; the rare tornado that does occur has typically caused only limited damage. The county has experienced 7 tornado events since 1950, according to NDPC records, and has suffered more than $552,000 in total damages. The

magnitude of the tornadoes has ranged from F/EF0 to F/EF1. Two incidents have been measured as F/EF0 and five as F/EF1.

During the past five years, Hardin County has experienced two tornadoes. One an EF-0 that struck Yelverton in 2019 causing $25K in damages, and the other an EF-1 in Alger in 2021, causing $300K in damages as it hit a barn and several structures. Both hit the ground and went back up into the clouds somewhat quickly, causing limited chaos on the ground. There were no injuries or deaths.

In Hardin County, tornadoes are a countywide hazard and can affect all areas and jurisdictions. The map below identifies the location and magnitude of tornado incidents in the county since 1950. The accuracy of the information on this map was confirmed by two sources: NCDC and TornadoHistoryProject.com. This is the best image available from that website.

Map 2-4: Tornado History



One of the most damaging tornadoes in Hardin County's history occurred on March 10, 1986. An F1 tornado initially touched down south of Kenton before moving northeast into Wyandot County. In its wake, the tornado left $250,000 in property damage.

In 1992, the county experienced another tornado that caused significant property damage. On February 15, 1992, an F1 tornado touched down in the western part of the county near the Allen County line. The tornado stayed on the ground for 0.3 miles but caused property damage in excess of $250,000.

Table 2-33: Summary of Tornado History

Hazard	Total Incidents	Total Property Loss	Total Crop Loss	Total Deaths	Total Injuries	Average Loss/Incident

Tornado	9	$877K	0	0	0	$97.5K

2.2.11 Utility/Infrastructure System Failure

While utility system failures can occur as a consequence of a natural disaster, breakdown of a utility system is also an independent hazard. When this occurs, outages are typically caused by system overload or lack of improvements, updates, and maintenance to the system's infrastructure. People and businesses rely on electrical, water, wastewater, heating/cooling, natural gas, and other fuel distribution systems to provide essential resources necessary to support basic, daily functions. Infrastructure like water treatment systems, wastewater treatment facilities, and roads, bridges, and culverts fail as well. Sometimes the support structures fade away, the main working systems quit, or the storage and testing of contents fails. Sometimes, especially in the case of potable water systems, testing methods do not keep pace with diagnostic and process needs. The effects of system interruptions and failures are felt immediately. Populations with special needs, including children, the elderly, and those with serious medical conditions, suffer the most during utility system failures.

Although Hardin County has not experienced these failures on a large scale, community leaders realize the negative impact economic downturns have had on the maintenance and improvement to infrastructure and utility systems. Many jurisdictions have not been able to implement infrastructure improvement and replacement programs that are as aggressive as they would like them to be. With economic challenges and unemployment woes, the revenue generation through taxes and other incentives has not existed. Therefore, all infrastructure is in worse condition than officials would like, and they recognize this as a potential vulnerability. Through early recognition and planning, officials hope that they can avert any costly incidents in the future. Including infrastructure and utility failure as a possibility is considered the first step toward protection and improvement.

Utility failures do not generally cause significant structural damage. The greatest risk for physical damage would result from broken distribution lines within facilities. Broken water lines and wastewater backups can cause significant physical damage to buildings; gas line breaks that cause fires would also contribute to physical damage from utility failures. The greatest concern with utility failures is the significant hardship and discomfort they cause for people and potential impact on the local economy. If businesses were unable to operate for several days or longer because of system failures, the negative effect would quickly ripple across the community. Utility system failures are a countywide hazard and can affect all areas and jurisdictions.

<u>Local Utility/Infrastructure System Failure History</u>

The most significant utility failure to impact Hardin County in recent history was the direct result of a natural disaster. In early 2005, rain combined with falling temperatures and wind to create a wintery mix of ice and blowing snow. The rain first clung to trees, buildings, and roadways and then began to freeze. As the precipitation continued, it formed a mystical garden of ice-laden vegetation, utility distribution lines, and roadways. Trees were downed, utilities were interrupted, and the roads were too dangerous for restoration crews to work

quickly or efficiently. Businesses were shut down and power was out in some areas for several days. Food was spoiled, businesses were halted, workers were stranded, and activities were temporarily abandoned. The ice storm of 2005 effectively shut down Hardin County and the surrounding areas.

Several years later, in September 2008, the county was again 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.

2.2.12 Windstorm

A windstorm is a weather event with exceptionally 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 specific type of windstorm that is widespread and fast moving. These storms can produce damaging straight-line winds over extremely large areas, sometimes spanning hundreds of miles long and more than 100 miles wide. To be defined as a derecho, the storm must produce damage over at least 240 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 from a tornado. However, the damage from this type of storm generally occurs in one direction along a straight path.

The topography of north central Ohio can be vulnerable to damages from high winds unaccompanied by any kind of precipitation, making windstorms a countywide hazard. All areas and jurisdictions can be affected by severe wind. The relatively limited change in elevation and lack of extensive wooded cover area are not adequate to reduce the effects of strong windstorms. Although winds in excess of 50 miles per hour can occur as a sole hazard, this is uncommon. Most of the time, severe winds are part of a larger storm system. The wind occurs when precipitation and unstable air moves into the area. High winds are frequently accompanied by heavy rain, hail, ice, snow, or thunderstorms.

<u>Local Windstorm History</u>

In Hardin County, wind-only incidents occur infrequently but can be severe. According to NCDC records, 20 high wind events have been recorded since 1950, resulting in nearly $3,862,000 in property damage.

Although windstorms have not typically caused significant damage in Hardin County, there is one notable exception. The county's most significant wind event occurred on September 14,

2008. As the remnants of Hurricane Ike moved from the Gulf of Mexico towards the northeast, damaging winds were reported across much of Ohio. In Hardin County, sustained winds of 40-50 mph and gusts up to 60 mph were recorded. The storm caused extensive damage to trees and utility poles, leading to significant power outages. Property damage exceeded $3,800,000, making this incident the worst wind event in Hardin County's history.

Although much less significant than the 2008 event, Hardin County was impacted by a wind event on March 9, 2002. This widespread windstorm damaged trees and utility poles across much of central Ohio. In Hardin County, property damage was limited to $35,000.

Table 2-34: Summary of Windstorm History

Hazard	Total Incidents	Total Property Loss	Total Crop Loss	Total Deaths	Total Injuries	Average Loss/Incident
Windstorm	12	$3.877M	0	0	0	$323K

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, or rain with temperatures low enough to form ice. 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 ¼ mile; both of these conditions must be present for at least three hours to be considered a blizzard.

The greatest risk associated with winter storms is the loss of utilities. Young children, the elderly and people with medical conditions are the most at risk for injury due to cold or limited ingress and egress due to snow-blocked roads and drifting. When hazardous winter storms prevent medical supplies, food, and other essential supplies from reaching their destination or people are unable to travel to purchase these necessities, special populations endure the greatest amount of hardship. Motor vehicle accidents also increase when hazardous conditions make travel treacherous. While winter storms may make residents uncomfortable, it is extremely rare for casualties or significant property damage to occur as a result. Most outcomes are of the inconvenience or discomfort type. Injuries and fatalities that result from traffic accidents and dangerous road conditions are the exception.

Severe winter weather is a risk in Hardin County and northern Ohio. Most areas of the state are susceptible to winter storms that bring heavy snow, high winds, ice, and/or extreme cold. These storms range from short, mild bursts of snow and ice to extreme cold snaps with significant snowfall that last several days. In Hardin County, winter storms are a countywide hazard and can affect all areas and jurisdictions. The most frequent winter storms include multiple winter weather hazards, such as ice and snowfall. The ice begins to accumulate as temperatures fall before turning to snow, creating a layer of ice under the snowfall. These icy conditions make roadways slick and dangerous, increasing the potential for vehicular accidents.

Road crews are challenged to clear snow and ice from roadways and maintain safe transportation routes for residents. If temperatures hover near the freezing point, precipitation can freeze and accumulate on trees and power lines. If winds kick up, the vulnerability of power lines and drifting of roadways is increased. This can lead to power outages if branches and lines break. These conditions are generally short-term, lasting less than 24 hours. Extremely cold temperatures can occur independent of other winter weather hazards, but this is infrequent. When extremely cold, sub-zero temperatures do occur, they are typically brief, lasting one to two days. These incidents are inconvenient to residents and businesses but rarely cause physical damage to buildings or infrastructure.

Local Winter Storm History

Hardin County experiences multiple winter weather events every year but these incidents are rarely severe enough to cause property damage. While people might be inconvenienced by most winter storm events, it is infrequent for a winter weather event to cause significant, widespread property damage. Ice storms are rare but, when they do occur, can cause major damage. According to NCDC records, Hardin County has experienced 32 winter storm events since 1950. Collectively, these incidents have caused $50,000 in property damage. All of the documented property damage is attributed to one incident. Four incidents were classified as ice storms and two as blizzards, although none of these included property damage, per NCDC records.

The winter storm that accounts for the property damage recorded by NCDC occurred on January 2, 1996. Much of central Ohio received heavy snow and high winds. In some places, snowfall totals reached one foot. Travel along east-west roads was treacherous because of blowing and drifting. The damage and inconvenience were relatively short and property damage across the county was limited to $50,000.

Like many counties in northern Ohio, one of the most significant winter storms to impact Hardin County was the Blizzard of ‘78. On January 26, 1978, this historic storm produced seventeen inches of snow across the county, on top of the twelve inches already on the ground. Extremely low temperatures and sustained winds of 50 to 70 mph combined to create blizzard conditions that caused significant damage and hardship across the county. Local snow removal equipment was not adequate because of the extreme volume of snow; only when the National Guard brought in heavy-duty equipment were roadways able to be cleared. Because of this, schools and businesses were closed for nearly a week. Many people suffered from food, medication, and supply shortages, as they were not prepared to be in their homes for so long. Scattered utility outages across the area also caused hardship, although these were not widespread. In areas where power was out, families with fireplaces, wood-burning stoves, and alternate heat sources opened their homes to neighbors and welcomed travelers who became stranded on roadways. While the county has experienced many winter storm events since 1978, this incident continues to be the storm against which all others are measured.

Table 2-35: Summary of Winter Storm History

Hazard	Total Incidents	Total Property Loss	Total Crop Loss	Total Deaths	Total Injuries	Average Loss/Incident
Winter Storm*	44	$50K	0	0	0	$1.1K
Ice Storm	4	0	0	0	0	0
Blizzard	2	0	0	0	0	0

**Includes all incidents with blizzard conditions, extreme cold, ice storm, and winter storm.*

2.3 VULNERABILITY ASSESSMENT

Hardin County is vulnerable to the effects of wind, water, and extreme temperature fluctuations. Local communities and structures experience some level of damage from these incidents every year. While storms do not typically cause widespread devastation, they do cause significant short-term disruptions of daily life and cause enough damage to properties to be measurable. This section will describe the type and extent of damage Hardin County typically experiences.

Hardin County is also susceptible to social losses and challenges. With higher-than-average poverty levels, an aging population, and enough disabled and elderly who would need extra help, Hardin County social services could be overwhelmed by a large-scale incident. While the culture of rural populations is one of self-reliance and self-sufficiency, Hardin County lacks the extensive public services like mass transit, large food programs, extensive behavioral health resources, and services for children and elderly in high demand situations. If a large portion of the population is negatively affected by a widespread disaster, there will be a diminished volunteer response, and organizations like Red Cross will set up shelters and services in metropolitan areas instead of small villages. This will require transportation for intake and services, something Hardin County residents may not be able to do under such circumstances.

Hardin County is likely to experience resource gaps in any large-scale disaster. As a small county with significant rural population and few large municipalities, first responders are frequently volunteers who have limited availability and equipment; dependent upon the time of day when a disaster strikes, many of these volunteers may not be available. While paid departments exist in Kenton, they are not large enough to serve the whole county in extreme situations Special response resources and additional crews accessed through mutual aid may not be close by when needed, and unless an incident is unique to Hardin County, they are unlikely to command a remarkable response from higher levels of government. Hardin County could easily find itself alone in serving their own catastrophic needs.

Hardin County and the various bodies of local government are filled with community-minded active individuals who often wear multiple hats. The Red Cross volunteer may also be the township trustee who also works for the county highway department. The village fire chief or council member may also work out of town, and when home, fill various roles as school volunteer, church leader, and be the parent of several children with a spouse who also works out of the county. This places a burden on volunteer capacity, first responder capacity, and overall ability to be self-sufficient in times of need.

All this taken into account, Hardin County is highly resilient. Their work ethic and self-sufficiency are significant, and they are generally highly participatory in meeting their own needs. Their farm community is resourceful and willing to help neighbors, as are populations in the municipalities. They have the ability and desire to make the most of the resources they have, and to provide the leadership and inspiration for their own recovery.

2.3.1 Floodplain Mapping and the National Flood Insurance Program

Hardin County joined NFIP and adopted floodplain regulations in 2015. In addition to the county, only three jurisdictions (Hardin County, Ada and Kenton) participate in NFIP because of the minimal floodplain areas in the county. Table 2-33 and 2-34 provide National Flood Insurance Program status for communities in Hardin County based on the FEMA Community Status Book Report for Ohio.

While the non-participating communities do not have designated floodplain areas, the lack of participation in NFIP prevents any of their residents or businesses from obtaining flood insurance as individual property owners. This inability to purchase flood insurance could impact a business that is victim to flash flooding or unusual flood events due to their location, below-grade facilities, or other unusual risk and vulnerability.

Table 2-36: Communities Participating in NFIP

Community	Init FHBM Identified	Init FIRM Identified	Curr EFF Map Date	Reg-Emer Date
Hardin County	01/03/1975	09/01/2015	09/01/2015	09/01/2015
Ada	06/07/1974	--	NSFHA	05/28/2008
Kenton	01/09/1974	04/17/1996	04/17/1996	04/17/1996

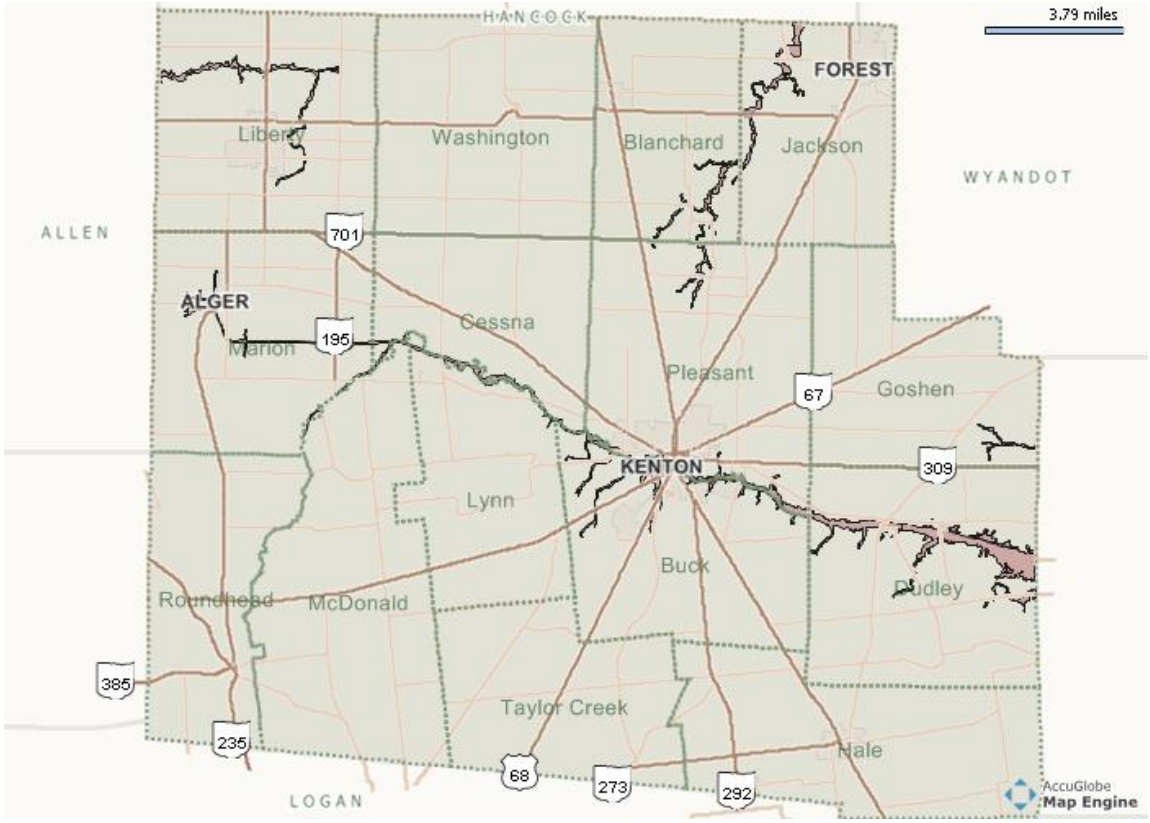
Table 2-34: Communities Not in NFIP (Sanctioned)

Community	Init FHBM Identified	Init FIRM Identified	Curr EFF Map Date	Sanction Date
McGuffey	05/10/1974	--	05/28/1976	05/10/1975

Alger, Dunkirk, Forest, Mount Victory, Patterson, and Ridgeway do not currently participate in NFIP because they have no identified flood hazard areas. However, in the current mapping update by FEMA, there will be changes to the flood maps in the Alger and McGuffey areas. Membership will likely become necessary for both villages so that residents and property owners have access to flood insurance.

Map 2-5: Hardin County 100-Year Floodplain (Current Map)

Hardin County GIS



Notes

Hardin County 100-Year Flood Zones

Preliminary Flood Mapping Update

On April 29, 2022, FEMA released preliminary updates to Hardin County floodplains. The public review process is taking place as this plan is written. Preliminary maps can be accessed at https://hazards.fema.gov/preliminaryfloodhazarddata. Hardin County officials were invited to a Flood Map Information Open House meeting on November 9, 2022 at the Jacob Parrot Safety and Security Center. On December 5, 2022 the general public was invited to another open house. A link to the proposed maps was shared with the public in the announcement. FEMA indicated at those meetings that the 90-day appeal period would end in the winter of 2023, and FMEA would likely issue a Letter of Final Determination in the summer of 2023. The effective date of the new maps would occur in winter 2024.

Upon this approval, there will be changes to municipal needs for NFIP participation, as well as changes to local floodplain regulations and maps. McGuffey and Alger will have expanded areas in floodplains, and the lack of NFIP participation will prevent residents from obtaining

flood insurance; it is expected that property owners will, in some cases, be subject to lender-placed flood insurance.

2.3.2 Repetitive and Severe Repetitive Loss Structures

Across Hardin County, few structures experience repetitive flood loss. Table 2-33 lists the one repetitive loss structures that has been identified through loss claims. There is one Severe Repetitive Loss structure on record for Hardin County, and it is the highlighted property in Table 2-37, row one.

Table 2-37: Hardin County Repetitive Loss Properties

Community	County	Type	Losses	Total Paid Out	Average per Incident	Severe Rep Loss Flag
Kenton	Hardin	2-4 Family	4	$79,729.80	$19,932.45	Yes
Kenton	Hardin	Single Family	2	$58,244.47	$29,122,24	No

The data above is provided by State of Ohio Emergency Management Agency. Additional or newly identified repetitive and/or severe repetitive loss structures may exist in Hardin County, especially as changes in floodplain mapping occur. Unidentified structures may now fall inside the flood plain due to recent changes. If these structures have not been impacted by recent flooding events, they may be unknown to local officials. Other parcels may experience flooding because of recent development activities or building projects, public or private, that did not identify drainage issues on a scale larger than the project site plan. Hardin County does not utilize strict land use regulation, and therefore, it is possible for building projects, especially private landowner projects, not to identify cascading consequences in flood risk or to mitigation those unidentified risks.

2.3.3 Social Vulnerability

The National Risk Index rates Hardin County's social vulnerability as moderately low. While this appears to be an advantage, Hardin County must consider that its population is less dense than metropolitan areas that rank higher; the nature of being spread out across the county makes people harder to reach and serve, in some instances. Hardin is a small, rural community and resources are limited. Workers, volunteers, and family members often perform multiple jobs, and that causes resources to be spread very thin after a catastrophic incident. When the helpers and responders are also victims, response is compromised no matter what the vulnerability.

Justification of this moderately low rating would include considerations as listed below:

- Poverty statistics, compared to the nation in 2020, are better than average. The Neighborhoods at Risk study identified 986 (20.4%) families in Hardin County who live in poverty; there were 146 (14.8%) families with children, and 96 (9.7%) single mother families who live in poverty. Those statistics, compared to the same for 2010, are down in all categories by 0.3 – 3.5%.

- Hardin County has about the same percentage of rental properties as communities across the nation; therefore, there would theoretically be no more problems with landlords repairing and maintaining property than there are in other communities.
- There are slightly fewer households without health insurance than the national average. That theoretically helps residents have better access to medical care.
- Hardin County has a high percentage of persons with disabilities. The local percentage, 17.5%, is a full 5% higher than the national average.

Lack of financial resources makes people less resilient to disasters. Those living in poverty must make detrimental changes, such as eating unhealthy food or not obtaining medical care when needed, after damages caused by disasters. Families in poverty have less flexibility in food purchases, and often must eat highly processed and preserved food. They may live in less healthy structures, enduring mold, rodent infestation, or insufficient heat. Relocation, isolation and homelessness are far more likely for impoverished families. These families are more likely to live in rental property, and sometimes properties are not well maintained by landowners. They often must select mobile homes as their residence, and these are less safe and secure during natural disasters. Renters do not achieve the emotional well-being and sense of satisfaction that sometimes those who own their own home receive, and this contributes to behavioral health problems. Financial shortages lead to not having insurance, savings accounts, or cash to use for disaster needs.

- There are few non-English-speaking populations, so warning and notification effectiveness is theoretically high.

Hardin County's warning and notification systems are more likely to be effective and result in action taken by individuals than in communities where there are significant language barriers. The lack of language barriers allows people to receive services locally without additional difficulty, and enables them to trust the messengers who deliver emergency public information.

- There are limited minority populations which indicates most people have a familial support system that would connect them to one another before and after a disaster.

Hardin County has less children under 5 years old than the national average, but more elderly over 65 than the national average. The county has almost double the national average of residents over the age of 80. This indicates that disaster victims may fare not as well medically as in other areas because older people have more underlying conditions that contribute to morbidity, and have less survivability of major injuries. They are therefore more likely to need additional assistance after an injury.

- The percentage of households without a car is about the same as the national average, causing no more vulnerability in Hardin County than in other locations.

People who own vehicles are likely to be employed, and to enjoy a higher level of financial independence due to their access to a wider span of opportunities. Access to transportation allows individuals to travel for services they need. They are more likely to go to a shelter when needed, for overnight shelter or for environmental comfort and healthier existence during a hot or cold spell.

2.3.4 Capability Assessment by Community Lifeline

Hardin County is self-sufficient on a daily basis, and provides all necessary services to its residents. All areas are covered by fire and emergency medical services, and in the central area of the county, BKP Ambulance and Kenton Fire Department provide redundant emergency medical service coverage. All personnel in all services meet at least the State of Ohio minimum certification levels, and all departments have at least the equipment and apparatus necessary for response. All departments have adequate two-way radio and cellular communications, and a dispatch center that receives calls and dispatches resources. Fire departments can provide services that meet the general parameters of the federal core capabilities list. Police departments and the Sheriff's Department are fully staffed and equipped to meet core capabilities as defined by FEMA, as well. They have specialty personnel as well as patrol personnel, and have the equipment or access to services to meet the law enforcement needs of the community. Hardin Public Health is capable of environmental health responsibilities, and provides adequate services for communicable disease management. The hospital is affiliated with OhioHealth and is capable of 24/7/365 emergency and routine services. Schools have reverse notification systems that could be used to distribute information.

Stakeholders identified general problems with lifeline delivery to include difficulty in managing supply lines as there is so much control by external parties in a widespread economy; providing widespread damage assessment by boots-on-the-ground would be a challenge as responders doubled as victims of the incident too and were attempting to care for their families and properties at the same time they would help the community; two-way radio communications would be problematic in Roundhead and McDonald Townships and other locations that are very low elevations and do not receive signals well. If the MARCS were to be incapacitated or overwhelmed, the county would struggle to bring redundant radio systems like VHF units up to operate.

Health and Medical Community Lifeline

Health and Medical community lifelines, under the burden of a severe but localized incident with mutual aid resources available on a limited basis, are reasonably well met in Hardin County on a normal day. Gaps would occur under mass fatality or mass casualty circumstances. If injuries exceeded local capacity to treat and were able to be transported to Findlay, Lima, Upper Sandusky and Marion, and if aeromedical resources were available for critical patients, Hardin County could potentially lead a very successful response to a moderately large incident. If those mutual aid resources were not available for an incident involving over 50 patients, Hardin County would meet its limitations. Those potential incidents might include a mass shooting at a large event; a highly damaging tornado that struck Kenton or Ada during the workday; a hazardous materials incident with significant toxic, poisonous, or explosive characteristics in a highly populated area; an airliner crash with hundreds of victims; or any other incident that involved mass casualty or mass fatality. A long-term incident would challenge resources severely as responders were forced to go to full-time jobs and/or care for family members and personal property. Mass casualties within the county could include critical personnel, and as a result, limit the ability to respond. Should an incident involve moving a high number of patients movable only by cot, the county would have to rely upon outside entities

for assistance. While long-term care facilities are required to have their own evacuation plans, it is believed that those plans do rely upon public services for transportation of some patients. A pandemic, like the COVID-19 incident, would be difficult for public health activities and treatment of patients in excess of local capacity. Lab services and ancillary medical services would find it very hard to keep up with demand, and outside resources would be needed. Behavioral and mental health services and needs would, on a large scale, need assistance from out-of-county providers. Hardin County participates in a regional mass fatality plan with nearby counties and public health departments, but the county coroner has a plan too. Mass fatality operations could require assistance from state resources like the Disaster Mortuary Operations Team. Crisis needs are referred to OhioHealth Hardin Memorial Hospital or Lima providers, but wait times for services are often long. Resources like the suicide hot line (988) do serve Hardin County, and may be the most readily accessible resources for critical needs during a large-scale response.

Safety and Security Community Lifeline

Safety and Security capacity limitations are much the same. If a criminal event took place at a mass gathering and involved a shooter, Hardin County would need to rely upon outside resources at some point. Forces in place are trained and capable of meeting the immediate need for situational control, but ongoing management of the masses and investigation would be challenging. Mutual aid is in place to fill this gap through adjacent counties and the Ohio Buckeye State Sheriffs Association mutual aid plan and the Ohio Chiefs of Police mutual aid plan. A mass evacuation across the county would be handled so long as weather or damage factors did not contribute to the situation. Multiple working fires at the same time, especially involving occupied structures, hazardous substances, or multi-story structures would place a tremendous burden on fire crews. Responders indicated that the departments have ample equipment for almost any incident; however, supplying the manpower to operate the equipment would be a bigger challenge. Between eleven EMS systems and nine fire departments, they are still challenged to have adequate numbers of workers. Between the increasing age of emergency personnel, the lack of available volunteers, and personnel being spread across the county and up to 30 minutes away from a scene, initial and continuing response would suffer. Any combination of simultaneous calls could be highly difficult, especially at a time when volunteer departments were understaffed. If there were multiple locations where fire suppression needed to simultaneously draw on the Kenton water supply, lines would fail and the supply could likely be insufficient. A rail incident with potential explosion, especially near the Ohio Northern University in Ada or inside the City of Kenton, could tax responders to the breaking point. Due to the physical location of response headquarters and equipment in context of the railroad location, it could be a challenge to reach the site. Responders would need help managing a tedious threat and at the same time, evacuate a large number of residents. There is a high volume of ethanol shipped on trains that cross the rails in Hardin County, and this is a recipe for being overwhelmed should multiple cars catch fire, explode, or leak. Hazardous materials teams would be summoned, mostly from Lima or Columbus, dependent upon other incidents occurring at the same time. Bomb squads, structural teams, and other highly specialized resources would have to be called in for collapse response, explosives, water rescue, and other highly specialized areas of response.

Hazardous Materials Community Lifeline

All local fire departments are capable of recognizing and isolating a hazardous spill. The only HazMat Team is in Kenton Fire but it is not a state-typed team; otherwise, resources are requested from Lima or Toledo, and possibly Columbus through the Ohio Fire Chiefs Mutual Aid Plan. Allen County Haz Mat Team is a Type I team; Findlay Fire has a team that would be accessible. There are several robust typed teams within reach. There is limited equipment available to any department other than the City of Kenton. Law enforcement has a full supply of gas masks and other gear, but it is stored at various locations across the county for security purposes; the gear would have to be transported to the officers in need of it. Bomb squads would come from Lima or Toledo In general, Hardin County capacity is to identify, isolate, and protect a spill through defensive action, but most offensive action would need to be carried out by a team called into the situation from another area. Hardin County first responders have the ability to perform gross decontamination operations. Several fire departments have pieces of decontamination equipment and supplies, and county resource lists show where this is housed for easy access and deployment. The hospital and public health department have decontamination capabilities, but providing clean clothing for a large number of victims would be a challenge. County responders estimated they could control and protect a scene for 3 to 4 days, barring any exceptional chemicals or chemical reactions. Local chemical engineers would be available for technical assistance, and if the railroads, pipelines, or industries were involved, their expert personnel would be utilized. Rail incidents would be largely dependent upon railroad experts, excepting the basic scene protection provided by local fire departments. Likewise, a pipeline rupture or leak would receive significant support and defensive actions from local fire, but the pipeline company would have to manage the containment operation. In all cases, the Hardin County Health Department would have some capacity to work with the Ohio EPA and ODH to monitor, detect, and manage airborne and waterborne pollutants.

Communication Community Lifeline

Communications lifelines are currently well served and dispatchers are able to handle call volume. Cell services, internet access, and repeater towers are sufficient for current loads. Redundancy for dispatch services is built in with the ability to transfer dispatch to Hancock County with the flip of a switch, to provide immediate options should the Hardin County Dispatch Center be damaged or impacted by threats. As a double-redundancy, law enforcement mobile units can dispatch other units from remote locations. The Sheriff and 911 Dispatch are able to operate at just about any location that has internet service. Paging capacity may be negatively impacted but all other capabilities would be intact. The switch to using MARCS radios has helped with consistency in two-way radio use, channel access, and equipment, but the ever-increasing fees are a threat to small jurisdictions who struggle to afford the costs. MARCS is still not available to schools and non-public safety crews, so there are gaps in two-way coverage. Additional repeaters are needed to enhance coverage, for example, in Kenton City Schools. Some public safety departments have retained the prior VHF radio systems that were used before MARCS implementation, and that constitutes a redundant back-up two-way radio resource that could be used if MARCS fails or lacks the capacity to serve Hardin County for some reason. There is an amateur radio group that provides another layer of redundancy in communications, with the capacity to place mobile units at multiple locations throughout the

county for the purpose of replacing, enhancing, or creating a communication channel where none exists. Gaps may exist if landline and cell phone networks fail, and messaging is dependent upon social media and other internet methods. An elderly population is not tech-savvy, and local radio broadcast coverage is spotty. Communication from the school districts and churches would help maintain a constant flow of information to these groups.

Notifications and alerts are delivered through a robust approach to systems. Several entities use the Nixle system to send notifications to cell phones and land lines. Schools and churches use reverse notification systems. Most jurisdictions have social media pages and websites that are comfortably used by many residents. An internal notification system using a call-down list is in place with all jurisdictions, using phone lines and cell phone networks.

The need to serve communication-challenged populations is high. The federal H2-A program has brought a wide variety of non-English speaking workers to the county, and the university in Ada has a robust foreign student program. Stakeholders shared that workers come from Mexico and all of Central America, the Caribbean islands, China, Japan, Ukraine, and Russia, speaking languages native to those countries. Employers and the university are capable of providing interpreters. The Amish speak a dialect that combines Dutch and English, but local officials are able to communicate through their church leadership. The Sheriff's Office has two Spanish-speaking officers and one who speaks the Dutch-English dialect of the Amish, who do willingly communicate with law enforcement. EMS systems utilize phone translation apps, and many workers have translation apps on their cell phones. Kenton workers carry language cards with them as they do their work. There are several cases of deaf residents in Alger, Dunkirk, and Kenton, and these individual use various forms of sign language to communicate.

There was some concern about the Amish population in Hardin County. These communities are part of the "Old Order", and as such, shun assistance or involvement with the "English", or the rest of the community. They isolate themselves from other parts of the population, and accept little help from society. They shun publicity, and refuse assistance programs. They help one another, and do not take part in community efforts. To their credit, they are highly self-sufficient. They have food supplies stocked in their homes, and they have wells to supply their own water. There are contacts between Amish leaders and local officials, so it is believed that the county would be able to serve the Amish if needed

Food, Water and Shelter Community Lifeline

Food, water, and shelter lifelines are expected to be adequately covered by local responders, as long as supply chains can ship products freely within the county. If food supplies and water cannot be transported in, the county will be challenged to meet population needs after a few days. Each community has a church or village building that could be used as a community center, whether overnight accommodations were needed or not. It is anticipated that Red Cross will not be able to operate overnight shelters in Hardin County if a disaster is widespread, so the EMA will be required to step in and coordinate efforts. Red Cross may be able to provide equipment and procedures, or if there are local volunteers, they may be able to assist. Communities will have to be involved in the shelter activities in their particular jurisdiction; the

EMA does not have the resources to directly manage a widespread sheltering operation across the county. Locally held water supplies would come from retail outlets, water systems, and contractual providers like Walmart and Sam's Club. Potential locations for large shelters include Ohio Northern University and the Hardin County Fairgrounds; both are dependent upon external conditions to determine suitability. The university would be best used at a time when students were not living there. The fairgrounds have limited heat and air conditioning and could be very uncomfortable in extreme temperatures. There are questions locally about how well a sheltering service would be received due to changes in culture after the COVID-19 pandemic. People tend to shy away from large gatherings, and stakeholders thought that a mass care shelter may not be well received due to potential disease transmission. On the other hand, there are areas where homes tend to be in very poor repair, and the resiliency to withstand severe storms and wind would be very low; there are also over a thousand mobile homes in the county which are highly vulnerable to storm damage. These conditions would necessitate the operation of shelters, at least in Kenton and perhaps several of the outlying communities. There are few known storm shelters, and many homes do not have basements that would function as a shelter in tornadoes or severe wind. The need for sheltering could exceed capabilities quite easily.

Transportation Community Lifeline

The Hardin County Transportation Guide (https://www.hhwpcac.org/media/5hjivrj2/hardin-county-transportation-guide.pdf) lists several organizations that can assist with transportation for people who are elderly, disabled, or have medical needs. According to this document, in 2016 there were six services are available to help with medical transportation: Hardin County Council on Aging, Hardin County Veterans Services, American Cancer Society, Hardin County Job & Family Services, Not By Choice Outreach, and Mennonite Home Health Services. Not all are wheelchair capable. Kenton Taxi, Love, Inc. of Hardin County, Comfort Keepers, Clymer Medical Transportation, Goodwill Easter Seals, and Smart Start Transportation are available for the general public. Integrity Ambulance provides ambulette service. While this is likely to provide for people with special mobility needs to some extent, this would not suffice for the entire general public. In such a circumstance, for a large-scale evacuation or other need to move the masses, the school districts in Hardin County would likely be summoned into action. The districts would be asked to provide both buses and drivers. The Neighborhoods at Risk study done by Headwaters Economic Research, cited previously, estimates that 8.5% of Hardin County residents do not have their own household vehicle. That would mean approximately 2,600 individuals would need transportation services, including disabled and non-disabled, in a countywide evacuation. That task would equate to approximately 60-65 school busloads of evacuees, assuming those with cars could transport themselves.

Energy Community Lifeline

Power outages are not common in Hardin County, and when they occur are fairly short-lived. Power is provided by American Electric Power (AEP) and Mid-Ohio Energy Cooperative, Inc. An aggressive restoration plan with both companies includes automatic mutual aid between companies for additional personnel and equipment, a consistent assessment and restoration plan development for prioritizing the needs of specific communities to have electricity back on,

and a plan to work with counties to coordinate debris management and road opening for electrical crews to gain access to damaged areas. Hardin County officials communicate with the power companies regularly to maintain and improve this plan.

There is concern about the solar fields in severe and devastating storms. The battery storage is a threat for fire if it is damaged or not stored properly, and some residents are concerned about extreme runoff after rapid, heavy rain and wonder if the runoff contains contamination.

The use of generators is moderately widespread. Most critical facilities have generator options. There are both stationery and portable generators to put into use. In an outage of long duration, this is insufficient to meet community needs for populations with needs for environmental control and the use of medical devices. IN some cases, community centers will need to be established for the purpose of operating medical equipment, charging digital devices, and providing comfort under extreme circumstances.

If the power companies are unable to restore power in a reasonable time frame, Hardin County will endure much discomfort and additional damage or casualty. The most significant obstacle to energy restoration is likely to be the limited ability to manage significant amounts of debris.

Summary of Community Lifelines Assessment

Hardin County is capable of meeting most of its own needs in a disaster of relatively moderate severity for a short period of time. If that disaster involved a high number of casualties, lasted for a week or more, or involved the lack of power for more than two days, Hardin County will struggle. Multiple working fires or hazardous materials spills simultaneously would require the use of outside resources, as would a mass casualty incident. The need to collect damage assessment data for a widespread incident causing severe damage, or the need to shelter large numbers of displaced residents would be a significant challenge to the county and its communities. The county's likelihood receiving state or federal workforce resources is low, and their chance of receiving material resources is moderately low.

2.3.5 Community Resilience

Climate Risk and Resilience

The potential effect of climate change on Hardin County was examined using the Center for Climate Resilience and Decision Science at Argonne National Laboratory website's report generator and data explorer tools were utilized. This Climate Risk and Resilience Portal (ClimRR) tool is a partnership open resource sponsored, in part, by FEMA. This is the science behind the National Risk Index data intended to be used for various kinds of planning across the nation. It provides open access to leading climate datasets to be used in planning efforts, and empowers communities to be proactive in the area of climate change. Since climate change does not affect all communities in the same way, it enables local stakeholders to consider projections as it applies to their particular community. This information is found at https://disgeoportal.egs.anl.gov/ClimRR/.

Kenton/Hardin County Airport was used as the location of analysis for the purpose of this plan. It is centrally located and is one of the sites utilized in the portal. Components of data study

include average annual minimum and maximum temperature at the earth's surface, average seasonal minimum and maximum temperature at the earth's surface, total annual precipitation, consecutive days with no precipitation, degree days (cooling and heating), and average annual wind speed. Projections were developed for mid-century, identified on the table as "2050". Data for the Kenton/Hardin County Airport location is listed in the table below.

Table 2-38: Climate Projection Summary

Assessed climate factor	Historical	Mid-century
Average Annual Minimum Temperature	43.76 (F)	46.90-47.29 (F)
Average Annual Maximum Temperature	60.79	64.04-63.45 (F)
• Average Winter Minimum Temperature • Average Winter Maximum Temperature	27.18 (F) 41.40 (F)	31.23 (F) 44.22 (F)
• Average Spring Minimum Temperature • Average Spring Maximum Temperature	45.07 (F) 62.53 (F)	49.53 (F) 66.90 (F)
• Average Summer Minimum Temperature • Average Summer Maximum Temperature	61.08 (F) 80.69 (F)	66.49 (F) 85.52 (F)
• Average Fall Minimum Temperature • Average Fall Maximum Temperature	46.54 (F) 65.89 (F)	51.42 (F) 69.81 (F)
Total Annual Precipitation	42.44 in.	44.46-46.25 in.
Consecutive Days with no precipitation	29.00 days	21.67 days
Average Annual Wind Speed	7.22 mph	7.19-7.30 mph

Demographic information can establish generalized projections that indicate why the National Risk Index classifies Hardin County resilience as "relatively high". Upon examination of the RAPT data, several factors are identified. Populations considered at high risk, including but not limited to elderly, disabled, low-education levels, unemployed, and uninsured range from a low of 5.07% (unemployed) to a high of 16.07% (elderly). Only 6.03% do not have their own transportation. Two of three households live in a home they own. Less than 1% of households have no religious affiliation, leading one to assume that most residents are part of an organized church and have some sort of support system in place.

Factors that diminish resiliency, according to the RAPT data, include a lack of social/civic organizations, with only 1.9 organizations per 10,000 people, or about 6 significant social/civic organizations in the county. There is only one hospital, and it is a small, rural access hospital.

There is, according to RAPT, a consistent disparity in incomes per household, leading to significantly varied economic stability of individual households. With a rating of 0 to 0.2 using the GINI scale, a national standard for measuring income equity, Hardin County falls in the mid-ranges of disparity. The largest differences in income are shown in the north central census tract that includes Dunkirk, as well as the northern half of Kenton and the Village of Ada, with a rating of .4054 to .4364. Ada, McGuffey and Alger as well as Forest and Patterson area census tracts are rated less varying, with a rating range of .3755 to .4053. The southern half of Kenton and the southeast area of the county are most equitable, with a rating of .3392 to .3754. This statistic is significant in that in order to assist people after disaster with the intent to help all recover, there may be hidden households in need that are not obviously suffering. There may be individuals who appear to be more resilient than they actually are. The higher

the income disparity, the more household-sensitive disaster response must be in order to find those individuals and families that suffer most

2.3.6 Hardin County Vulnerability

Countywide Vulnerability

Hardin County is most concerned about flooding, and most of that comes in the form of flash flooding after rapid and intense rainfall over a short period of time. In some years when temperatures warm up rapidly in February or March, heavy rain can combine with snow melt and ice, adding to the amount of water that needs to drain from Hardin County land. There is also growing concern about flash flooding and surface flooding as rains come faster and harder and more frequently. Ensuring that new impervious surface installation includes adequate water retention and detention devices is more important than ever before.

The worst flooding is generally caused by a precipitation-laden storm that becomes stationary front and lingers for hours over the area, drenching the county, or sections of the county, with constant heavy rain. This kind of incident will dump three to eight inches of rain on the county, and flooding occurs in low-lying areas, in streets and homes where storm sewers are beyond their capacity to carry water away, and in fields and open areas adjacent to waterways. Ditches fill and over-run their banks, rivers become swollen, and properties accumulate water that sits until it can naturally drain away. In many areas, the riverbanks are higher than the fields, so water gets trapped and lays until it evaporates rather than drains. Hardin County sit high on the watersheds in general, so natural drainage is usually fast and effective, but water can linger for several days and cause some non-life-threatening damages to property, infrastructure, and possessions.

In the more populated and developed areas of the county, cars become stranded in parking lots and streets are flooded to the point where cars cannot get through. Some rural roads, due to the rate at which rain falls, are flooded over and impassable. Standing water does damage to berms and pavement or asphalt surfaces, degrading and crumbling over time.

Kenton experiences street flooding, especially in areas near Morningside Drive and the extreme northeast side of the city. This is near schools and other critical structures, and can cause disruption of activities when rain comes hard and fast.

Stakeholders expressed concern over debris flows, waterway jams, and other debris placed in the waterways that interfere with natural drainage. There are ice jams every year in some place on the Scioto River, and this causes water to be displaced into fields, roadways, and properties. Years of Emerald Ash Borer issues has weakened the thousands of ash trees, and they now tend to fall into waterways during severe storms. Maple trees are getting so old and so big they are starting to fall in some areas, causing debris in waterways. This debris impedes drainage. Efforts are made to clean waterways, but this is a never-ending task and sometimes the need exceeds the speed with which clearing can occur. The Hardin County Engineer manages a robust ditch maintenance program, actively opening many waterways each year;

however, not all ditches and streams are part of the maintenance program. There is a marked difference between the ditches on the maintenance program and those that are not included.

There are some areas especially prone to damages from excess rainfall and flooding in the townships. In Marion and Roundhead townships, on the west side of the Scioto River, and in the northwest quadrant to McDonald Township there lies a section of land that is very fine muck soil, and it not resistant to flooding in the least. This light and fluffy soil washes away with the least of effort. While it is an excellent soil for root vegetables, it is extremely vulnerable to erosion from high wind or draining water. The soil is so unstable that State Route 195 has been abandoned north of Township Road 120 and along Township Road 110. The berm of the road and the banks of the river have eroded away, and the highway has been deemed to be unsafe and not repairable after years of trying to prevent pavement from crumbling and berms from washing away. Areas of Township Road 110 are under constant repair by the county for the same reasons. There are far fewer roads in the southwest quadrant of the county; this was anecdotally linked to the soil types and instability of roadways due to the muck soils by some local residents. Others said the soils are in only a very small section, and the rest of the property is farmland and pasture not suitable for construction.

Most other areas of rural Hardin County have flood risk similar to most of northwest Ohio. The soils are somewhat heavy with some clay present in most places, so water will pond in low-lying areas and drain slowly. Hardin County is divided almost in half by the St. Lawrence Continental Divide, so some of the drainage in the county heads to the south and on to the Ohio River, and others makes its way to Lake Erie by way of the Maumee Watershed. This means that Hardin County sits at the higher elevations of all those drainage basins and is the first to dry out after heavy storms and precipitation. The water flowing through Hardin County, for the most part, fell somewhere in Hardin County. Therefore, there is no delayed flood effect as farmland up a watershed drains, and there is no surge when that water reaches Hardin County because it doesn't exist. There are some areas, for example in the northern part of the county in Washington and Blanchard Townships where residents claim blocked ditches and waterways filled with debris and dead trees cause water that fell in Hardin County to back up and drain very slowly because it cannot get away once it flows out of Hardin County. However, that constitutes delayed drainage rather than an outside source of water that causes flooding.

Hardin County residents and officials cited risk for hazardous materials spills and releases as their second-most concern, especially in the rural areas where many state highways enable the transport of chemicals across the county. On a highway map, the City of Kenton, centrally located in Hardin County, looks like the center of a star of state highways reaching out in all directions from the city. These highways cross every township in Hardin County. In the big picture, these highways come from metropolitan areas including Ft. Wayne and Indianapolis, Indiana and Ohio cities including Toledo, Columbus and Dayton. They cross through Kenton, traversing the county's townships as they haul chemicals of any and all types. Concerns are present elsewhere in the county; for example, an explosives manufacturer is located in McVitty, south of Patterson on SR 53. The explosives manufactured here are a risk of explosion and injury. There are multiple dangerous chemicals at Ohio Northern University in Ada. The

biology, engineering, pharmacy and forensics departments are but a few that keep and use chemicals in teaching activities and labs. There is slight concern over airplane crashes that might involve chemicals. There have been several small airplane incidents, as well as a helicopter crash. In 1967, a major airliner crashed in Hardin County with 38 fatalities. Crop dusters, gliders, hot air balloons and other aircraft can be a threat if they crash.

There is also a very significant amount of rail in Hardin County. Conrail crosses a section of Dudley Township and all of Hale Township. Conrail also has lines that cut north to south, travelling through Blanchard, Pleasant, Buck and Hale townships. Another line, also owned by Conrail, crosses the northern edge of the county through Liberty, Washington, Blanchard and Jackson Townships. These trains are commercial haulers, and they carry whatever chemicals and substances they are hired to haul. Although haulers are supposed to notify local communities of highly hazardous materials transport through their jurisdiction, recent incidents in Ohio raise the question of whether or not this notification actually occurs. Substances can include gases, liquids and solids, and those chemicals may be flammable, oxidizing, combustible, explosive, corrosive, or toxic. On occasion, there may be nuclear or radiological agents in the cars or tanks, and they might haul organophosphates, biological agents, or metals of various types. In areas where livestock lagoons exist for disposal of manure, some residents are concerned about seepage into nearby soils and water sources.

Highways are rural and two-lane, and that sets them up for excessive vulnerability to high-speed head-on crashes when one driver tries to pass another and fails to identify oncoming traffic. Some sections of state highways dip and drop with the very slightly rolling terrain, hiding oncoming traffic, Amish buggies, pedestrians, and obstructions in the roadway. County roads crisscross these highways across the county, opening the possibility of intersection vehicle accidents at almost any location when a driver runs a stop sign or pulls out in front of a chemical hauler. Accidents on these roads are commonplace, and frequently involved spilled and released chemicals.

The northern portion of Hardin County, including Liberty and Washington Townships, have water wells that are supplied by an aquifer that begins in the Bluffton area along Interstate 75. A deep quarry that feeds that aquifer with rainwater is adjacent to the interstate where thousands of trucks hauling chemicals pass by every day. There is concern in this part of the county about a hazardous materials incident that caused chemicals to leech or run into that quarry contaminating the aquifer.

Several pipelines either already cross Hardin County or are in the process of being installed. These mega-pipelines carry petroleum products and other volatile liquid substances. Townships that have large pipelines owned and operated by major chemical companies include Goshen, Pleasant, Cessna, Marion, McDonald, Lynn, Buck, Dudley, Roundhead, and Taylor Creek.

Pipelines generally carry flammable and combustible chemicals. If excavating operations fail to identify pipelines before digging begins, if valves and switches don't work properly, if a pipeline

breaks or a crack develops, a pipeline emergency ensues. The incidents can be explosive, fire-filled, and toxic to the neighborhoods and populations nearby.

There is some concern over the leeching away of substances disposed of in waste lagoons and landfills. At the landfill, there is a wall constructed to hold leaking liquids from the river; however, it has a vent pipe that releases forming gases. Some are concerned this could somehow leech into the river. The base of the landfill is old and worn, and some question its structural integrity.

Response to this array of hazardous materials portfolio of emergencies requires the development, coordination, and use of a wide variety of resources. Sometimes the consequences of the incidents are extremely difficult to control, and it is nearly impossible to respond and act quickly enough to save lives and prevent damages. The best way to handle chemical emergencies is to prevent them in the first place, and therefore, Hardin County places hazardous materials incidents high on its list of priorities for mitigation.

Third on the Hardin County list of concerns is utility and infrastructure failure. Explained previously, there are sections of roadways with unstable foundations that leads to road deterioration and abandonment. Since transportation and the conveyance of goods and services is the lifeblood of Hardin County, roads are a form of critical infrastructure. Electrical service, heating fuels, and water services are also of great concern. In some areas, the electrical service has been repaired and improved, and in other areas improvements are still needed. The rural areas, populated by livestock farms and rural residences, is dependent upon electrical service for life-sustaining heat, lights, and electricity. Rural communities are dependent upon an adequate water source to supply homes, farms, and businesses. Livestock farms need electricity for automated feeding systems, environmental control in livestock barns and poultry facilities.

Winter storms are concerning to Hardin County townships. Because the rural areas are often populated by livestock farms, some of them Amish, severe winter storms with extended severe cold or heavy snow can be fatal to livestock. Blowing and drifting snow can keep roads covered and impassable, and plows sometimes struggle to keep up with the wind's work. Stakeholders indicated that ice associated with winter storms is often more disruptive and damaging that snow and wind, and that fluctuating temperatures around the freezing point cause multiple issues. Cattle that get stranded away from barns in pastures because of drifting or just depth of the snow, or barns that lack a water supply, are costly incidents for farmers. Clearing roads of snow and ice, especially for the Amish farmers who use horses and buggies for transportation, is very important. Feed for livestock needs to flow into the farms on a daily basis, and products like milk need to flow out every day to area markets. Farm products like milk have a very short shelf life before processing, and storage capabilities on farms are very limited. Therefore, roads must be open and usable regardless of the weather. A combination of salt and grit are used to prepare roads, so there is little environmental threat like used to be associated with the use of road salt. Water tables close to the surface are no longer threatened.

Tornado and wind are the fifth and sixth ranked concerns for Hardin County townships, and severe thunderstorms comes in as the seventh. With a generally flat terrain, there is little protection from wind by the topography. Many wooded areas and tree lines have been removed to increase the farmable acreage, so there is little windbreak to protect or buffer properties from damages. In this part of Ohio, strong straight-line winds can be just as damaging as tornado, so the two hazards are almost equally threatening. Tornadoes are generally of the lower Enhanced Fujita ratings, recently rated as EF-0 and EF-1, but straight-line winds can be as fast as the tornadoes. These both damage buildings, rip off roofs of houses, barns and businesses, and obliterate trees and other vegetation from the landscape. They scatter crop debris, harm woodlands, and move small buildings off foundations. Utility poles and lines come down, roads are blocked with debris, and power is out for days at a time. Thunderstorms can be damaging if they include, as they do in Ohio, high winds, hail, and lightning. It is an infrequent occurrence, but can be damaging when these storms strike. Stakeholders saw an increase in the speed with which thunderstorms strike the county, and as a result anticipate more roof and tree damage. They feel thunderstorms are more frequent, happening instead of a slow, steady rain. The lightning that comes with thunderstorms is particularly threatening to the wind turbines where a strike can bring down a whole turbine and cause fires in the energy-storing batteries.

Earthquake is a slightly lesser concern, even though earthquakes are possible. There is a minor fault line that traverses the western border of Ohio, and mild tremors are felt on occasion. These events are generally very low in magnitude, and the epicenter is closer to Lima than Hardin County. Buildings in Hardin County are, at the highest, three stories in the larger downtown areas of Kenton and Ada. Otherwise, most buildings are one or two stories; there are very few apartment buildings that are higher than three stories. The low density of the population does not necessitate multi-story construction. Earthquakes, if high magnitude, however, could significantly damage houses, businesses, and factories if their effects were widespread and serious.

There is newfound concern that wind turbines could topple in an earthquake, and fires from the energy within the system could be challenging. Batteries that collect the energy are a fire hazard and require special firefighting tactics. Discussions also brought forth the fear of infrastructure collapse, such as communication towers, utility poles, and other distribution systems that are above ground. Those below grade, such as buried power lines, pipelines, water lines and sewer lines, and the manholes, tanks and pumps associated with those systems would be severely damaged, even by a relatively low-magnitude earthquake. There is belief that many miles of local roadways could crumble, or crack with a less severe earthquake, and railroads would incur damages at culverts, bridges, and along rail lines. Underground manure pits on large livestock farms could easily rupture or crack, and seep hazardous substances and infectious materials into the ground. Some of this seepage might reach the shallow aquifers, and in doing so, contaminate the source water supply.

For the potential damage and disruption and the chance of threats to life and property, earthquake was ranked eighth.

Invasive species is a concern for Hardin County, and ranked ninth because of the recent Emerald Ash Borer experience. While the insect damaged and destroyed many, many old ash trees, the damages and clean up caused by dead trees in wind events is the real problem. The dead trees from an invasive species clog waterways as they fall, they have little or no resistance to wind, ice, and snow build up, and they block roads and damage structures when they fall. The invasive species is the cause of excessive debris, and therefore becomes the hazard. Naturalists are currently observing a threat to maple trees in Ohio, another potential threat that will cause excessive debris and damages.

Stakeholders specifically named several invasive species as very concerning. The water hemp is very adaptable to different conditions, and resists herbicides. Palmer amaranth competes with crops for soil nutrients but is, for now, controlled. Kudzo is infesting from the south, and competes for nutrients. The Gypsy Moth feeds on hardwood trees and it managed through the use of insecticides. The Spotted Lanternfly has been identified in Hardin County, and as a leaf hopper, it lays eggs on vessels that traverse wide areas, spreading its existence. The Tree of Heaven infests maple trees and vine crops. Honeydew draws mold and ants. Wild hogs and boars are working their way into the county. Black vultures attack lambs and other small livestock and pets. Beavers are building dams, impeding drainage and blocking the waterways. Coyotes are more prevalent than ever, and pose a life-danger to pets, small children, and small livestock. They are migrating very close to denser populations in cities and villages. Deer are doing extensive crop damage and causing threats to drivers on roadways as they run in front of traffic and get struck down. Red Fox, wolves, and bobcats have been observed, and pose a danger to small livestock, pets, and small children.

Erosion has been reclassified in this plan as “Land Subsidence” which is a more general term and includes a more comprehensive list of threats. This includes both erosion and landslide. Erosion in Hardin County is the blowing away of topsoil, or the washing away of topsoil in rapid surface runoff. It is ranked tenth for the county because the hazard is not present at all locations.

The southern townships, including Roundhead and McDonald, have muck soils and other fine-grained dirt, and erosion is an issue. The wind can blow these soils away when high winds are present, and flooding can wash it away like sediment. In other areas with less drainable clay-type soils, berms of roads and ditch banks can erode in surface flooding, causing the road structure to be compromised and the sediment to wash into ditches and rivers. The sediment eventually clogs the waterways as it drains, and combines with debris to impair the ability of the watershed to clear itself of excess water.

Hardin County has some steep riverbanks where high-flowing water can undercut the outside turns and cause dropping of the soils that are undercut. This causes degradation to roads and properties along the river, and can only be repaired with structural intervention.

Drought is a very low risk because Hardin County has an adequate, but shallow, aquifer supply. There are ponds that are used to supply irrigation systems across the county. Dry spells in Ohio tend to be a few weeks long, and extended periods have diminished precipitation but rarely does it qualify as drought. Temperatures can range in the 90's on the hottest of summer days, but rarely does the consecutive heat index reach dangerous levels for more than a couple days at a time.

Drought does bring with it, even in what is classified as "dry spells", the increased risk of field fires and fire spread. With wide spans of grain crops and forages, homesteads can become endangered as well as farm outbuildings when a field fire does start. Ponds associated with irrigation systems, other farm ponds, and water systems combine to provide water for fire suppression. While the aquifers are shallow, the additional water supplies help compensate when large volumes of water are need to extinguish a large fire. Because the general areas that have adequate vegetation to fuel a field fire are present in the townships, this is considered a county hazard.

Extreme heat could place a burden on electrical supplies. They are concerned about the survival of elderly or medically compromised residents during extreme heat and/or power outages; therefore, the acquisition of alternate power capacity is important. While extreme heat is a threat, it presents itself in the form of a utility failure, and can be present anytime a larger-than-normal burden is placed on the electrical grid. Therefore, this part of the risk is actually considered a part of utility failure.

Dam failure is unlikely in Hardin County. There are no high hazard dams in the county, and only one dam with significant risk. This dam is owned and used by the Village of Mt. Victory and is an up-ground reservoir that supplies their water system. Because Mt. Victory owns it and uses it exclusively, it is the sole responsibility of the village. Hardin County has no jurisdiction over it or responsibility for it. Therefore, dam failure risk is inapplicable to Hardin County. ~~There are two privately owned Class III dams, categorized due to size but on private property with little potential effect on other properties.~~ Hardin County also has no ~~history of dam failure, has no~~ levees, and therefore ranked dam failure as inapplicable. ~~near the bottom of the hazard priority list.~~ ~~A check of the statistics available for dam failure in February 2023 indicated that there is, to date, no recorded dam failure in Hardin County.~~

Climate change is a concern for some in Hardin County, and others are not quite sure of its effects. The county recognizes that climate change is happening and that storms are larger and more severe than in the past. Therefore, their efforts to study and monitor its effects will occur at the county level, at this time. In future years, it is possible that risk will be elevated to a higher priority. Stakeholders who attended recent meetings were more familiar with the effects of climate change, and spoke frequently about changing weather patterns and storm characteristics.

Developing or New Threats

Considerable discussion included thoughts on what new or enhanced threats might be on the horizon in the coming years. Stakeholders spoke of solar field where posts destroy field tile and interrupt drainage patterns that have been structurally established. Invasive weeds find their way under the solar panels where they grow profusely and create a solid, deep root base. High voltage electricity is buried in shallow lines below the surface, at risk for disruption and energy transfer. There are more buried lines, including pipelines, broadband cables, and other utility lines. These are increasingly at risk for being ruptured or damaged, causing release of energy or substances into the environment. There have been incidents where information obtained from "Call Before You Dig" resources has been incorrect. The accuracy and timeliness of recorded information was questioned. Sometimes residents thought there is no mapping of some buried lines.

Meeting participants brought up fears of increased ditch damage if chemicals, including farm chemicals, are disposed of in the waterways or reach them through unintentional releases. They expressed concern about not knowing what fields are tiled, and where tiling systems drain. They mentioned privately installed culverts that eventually grow over and are not identified or maintained, and how this affects natural drainage.

Stakeholders are very concerned over the staffing of public safety services and first responder. Served by a significant volunteer workforce, the county residents realize the supply of willing and qualified workers is diminishing. The introduction of electrically powered vehicles places an additional burden on public safety to understand the mechanics and structures, and to be able to respond to mangled and damaged vehicle incidents.

Discussions led to the fear that there will be increasing threats associated with civil unrest, violence and terrorism if society continues along the current trends. They noted that institutions in the county are not historically prone to civil unrest or violence, but school shootings and other mass violence are happening on a very regular basis across the country. County law enforcement monitors the protest notification network, and Hardin County, to date, is rarely threatened.

New public and private schools, however, will create traffic congestion due to activities and concentration of traffic in a small area. Large businesses or other additions to the area might also create this sort of problem. Increased hauling of hazardous substances could make traffic issues worsen, and crashes become more injurious to involved people.

There is substantial concern over the lack of property maintenance by the railroads, and how that will play out in years to come. Train bridges, culverts, and short sections of track are not well maintained. Debris flow clogs ditches that go underneath railroad tracks, and are not cleared by railroad maintenance crews. There is major concern over blocked crossings for extended periods of time because alternate routing involves long detours. Public safety crews are seriously impacted by these blockages, and are unable to reach callers in an industry-acceptable time frame. Should there be a hazardous materials spill or risk of explosion or air quality contamination, Kenton is especially vulnerable to being unable to reach victims and

accident sites. Even with established alternate routing, southwestern prevailing winds will carry airborne toxins into the downtown and residential areas before responders can reach a site. This is a worsening threat as more and more hazardous substances are hauled on the railroads. Even stations and department headquarters in Kenton would be threatened in an airborne toxic circumstance.

Future threats could be enhanced due to aging infrastructure. While municipalities are taking big steps in improving water treatment and distribution, wastewater collection and treatment, and utility distribution, a break in this work due to financial constraints could actively threaten sustaining services, especially during a major fire or storm.

The increase in the use of electric vehicles is a challenge to volunteer responders who have limited time to train in specialty areas. Solar fields and wind turbines come with special handling instructions for accidents and incidents. It is challenging for volunteer departments to keep up with these developments, especially in light of the burden of recruitment and retention of volunteers in current conditions.

2.3.7 Jurisdictional Vulnerability

While Hardin County has many common factors across the county, each municipality has its own unique vulnerabilities based upon the characteristics of the jurisdiction. Some villages are bedroom communities, while others are a haven of industrial and commercial productivity. Some areas receive more runoff from storms, and therefore have flash flooding when others have none. The following section describes each unique community and how the hazards were ranked, with 1 being the most disruptive and 13 being of least concern.

<u>Ada</u>

The Village of Ada experiences flash flooding when they get three inches of rain in an hour, or they have extended periods of rain consistently over several days without a break in the precipitation. They may have some basement flooding in homes that are low-lying, but most of the streets are designed to take water away from structures. Streets can close for a couple days, and the village is inconvenienced by the precipitation. Ada is high in the Auglaize watershed, so drainage from other areas is not a problem.

Ada officials are concerned about hazardous materials spills due to rail and highway traffic through the village. Ohio Northern University is located in the village, and that brings school-year residents to the village that expands the concern for housing and survival services should an evacuation be necessary because of a spill or release. The Conrail tracks pass very close to the municipal building, portions of the Ohio Northern University campus, and Grass Creek. It also passes through multiple residential neighborhoods. On campus, rail tracks pass very close to residential areas, campus operations areas, athletic fields, and classroom buildings. It is common for ethanol and other hazardous substances to be carried on these trains. A derailment would cause potential physical damage as well as exposure to vapors, runoff, or explosions caused by the incident. There is a significant amount of hazardous substances present in science laboratories and maintenance facilities at the college. Between staff and

students, there are approximately 3,700 people potentially on campus, not including visitors. They are also concerned that a hazardous spill on Interstate 75 near Bluffton could contaminate a quarry on the east side of the roadway. That quarry is a supply source connected to the aquifer that supplies water to the Village of Ada. Contamination could be disastrous when considering water supply. There are anhydrous ammonia storage tanks in Ada, and this poses a release risk of respiratory injury and death should this toxic, irritating gas be accidentally released. Because the highways that go through the village are two-lane and there are intersections, officials are concerned about vehicle accidents involving hazardous materials haulers. A train derailment on the tracks that go through the center of the village could also be very difficult to manage because of evacuation of the college as well as the residents and businesses.

While extreme heat and drought are not a concern, the overload on power systems during extended extreme heat could place a burden on the power grid. They are concerned about the survival of elderly or medically compromised residents during extreme heat and/or power outages; therefore, the acquisition of alternate power capacity is important. This is considered utility failure; drought and extreme heat are not considered a hazard.

Wind events, thunderstorms, winter storms, and tornado are of moderate concern. Ada is unprotected, being built on an area of flat terrain. However, the area is nicely covered with deciduous trees and evergreens, making infestation a concern after dealing with the Emerald Ash Borer in the past several years. While many trees remain, they have lost many that became bothersome debris in windstorms of recent time.

Ada is less concerned about water supply; the aquifer is robust so long as it is not contaminated by a hazardous spill. Planning group representatives did not recall any time when water was not abundant, even during dry spells and extremely hot weather. With so many college student residents and elderly, they are concerned about power failure, natural and propane gas interruptions, and other utility and infrastructure failures due to windstorms and ice or snow.

Officials have no concern over dam failure because there are no major dams. They spend little time concerned about earthquakes because the risk is low and history tells them an earthquake would be very mild. They are beginning to consider climate change, but were neutral on its effect on Ada at this time. They did recognize that storms have changed in characteristics, including frequency, severity, and duration. There is more rainfall that comes down faster, and it causes flash flooding and surface flooding, and drainage is not able to keep up with the demand.

Socially, Ada has no hospital but does have an urgent care center. There are no specialty centers. There is one long-term care facility, Vancrest of Ada Assisted Living facility. Ada-Liberty Township Fire Department is located on the north side of the village, and the Police Department is located on West Buckeye Avenue. There are two churches, one public school, and one college. The Ada Power Plant is on the southwest corner of the village and the wastewater treatment plant is on Grassy Run on the east side of the village.

The National Risk Index rates Ada as "relatively low" in social vulnerability. The Climate and Economic Justice screening tool does not list Ada as disadvantaged, meeting burden thresholds or meeting socioeconomic thresholds. The only marker identified on this site relevant to Ada is the percent of residents who possess less than a high school diploma is rated at 11%.

Discussions indicated that Ada's stakeholder social and resiliency concerns are similar to that of Hardin County. There are gaps in volunteer capacities due to numbers of people and percentage working outside the village during workdays; resources are limited and population is not high enough to garner significant mutual aid or government support in a widespread incident. The college is a highly populated area of highly capable individuals who may have few financial and physical resources, and therefore need additional help. The average age is increasing as young adults move away for career reasons, leaving older family members in the village without assistance.

Alger

Alger is mostly concerned about its open exposure to the elements without the protection of any hills or valleys to break the harsh winds or storms that hit the area. This little village of a few hundred residences experiences flooding of its street and the state highway that passes through the center of town when precipitation is heavy, fast, and constant. Two inches of rain in an hour can cause serious flooding, including the village hall. They report that every few years they have at least one incident of flash-flooded streets and the highway, and a few houses are minimally impacted. Their limited budget, due to size, makes it difficult to maintain infrastructure and do any improvements, not to mention the cost of ongoing maintenance. They experience high amounts of sedimentation in tiles and catch basins.

Winds, rotational or straight-line, can rip roofs apart and damage siding of buildings quite easily in Alger. Trees and other vegetation can be ripped apart, and debris becomes problematic after severe winds. Because the village has no protection, any severe wind, thunderstorm, tornado or blizzard can severely damage and isolate them from the rest of the county. Invasive Emerald Ash Borer has taken trees, weakening them and causing them to fall under the stress of storms, but they feel that most of these trees have already been eliminated. They see no new invasive species on the horizon. The have some vulnerability to power outages. They are concerned about the survival of elderly or medically compromised residents during extreme heat and/or power outages; therefore, the acquisition of alternate power capacity is important.

Alger suffers from isolation and lack of local resources. They are far enough from Kenton and other area cities that vehicles are needed to travel there for groceries, health care, and other necessities. A quarter of the population lacks smart phone access, and utility costs are more expensive than 92% of all other households, according to the RAPT tool kit. Alger residents spend more time and effort in transportation needs than 95% of other communities, per RAPT, and 14% of the residents have education at less than a high school graduation level. However, the area is not considered disadvantaged, so none of the programs available for those problems are available to Alger residents.

Officials in Alger are concerned about hazardous materials spills because Ohio 235 runs through town, and trucks often carry chemicals. There are two major pipelines that run through or very close to the village. They are somewhat concerned about damaged berms wash away with heavy rainfall and sidewalks and driveways are easily damaged. ~~The muck soils of Hardin County are close to Alger, so erosion is damaging where those soils are present, both from a washing away perspective and a wind damage situation. Ditch cleaning would help the water drain more efficiently in the village.~~ Alger is dependent upon utilities and can easily be isolated when power is out or supplies are interrupted. They work diligently to have generator power available to them to keep their village up and running when utilities are adversely affected by storms.

There are no ditches or waterways in Alger so deteriorating banks are not an issue. Erosion and land subsidence were considered irrelevant.

Alger rated dam failure as not applicable because there are no high-risk dams that would affect the village. Alger does not rank earthquake as a risk of concern.

Alger rated drought and extreme heat as not applicable because there is little incidence of any extended heat waves, and drought has little applicability to Alger. Power outages are the real threat, and is considered under utility failure.

Dunkirk

The Village of Dunkirk is prone to flash flooding that fills the streets, including State Route 68 as it passes through town, and gets into some homes and basements. The north end of town is especially vulnerable, and officials feel that blocked waterways north of the village exacerbate the flooding. Some of the berms on streets and highways can wash away with heavy downpours. The area is very flat terrain, and the littlest blockages of ditches and streams can cause water to pond and pool, and stand for periods of time on properties in Dunkirk.

Severe storms – wind, tornado, and thunderstorms – can cause lots of damage to structures. There is little protection in the flat terrain, and the Emerald Ash Borer has taken enough of the trees that vegetation no longer provides any protection. Trees become debris to be managed in these severe wind and rain events. There is moderate concern over sedimentation and erosion as water drains, roadways clear, and streets return to pre-storm conditions.

Dunkirk officials are concerned about the management of debris after storms, mostly due to the Emerald Ash Borer damage. They want to prevent future infestations, and they work to be able to manage the debris from trees when necessary.

Officials are concerned about hazardous materials spills and releases as SR 68 barrels through town, and trucks are prone to travel above speed limits and pose dangers to village traffic. Anhydrous ammonia storage tanks in Dunkirk pose a risk of release, creating a toxic and irritant environment for village residents that is very dangerous. Conrail tracks mean that a train

derailment is possible, and the tracks travel through the center of the business district in addition to several residential areas. A spill or release from either trucks or trains would affect all the residences quite easily, making a mass evacuation a reality without much effort. Dunkirk is home to intersecting rail lines where potential high-speed collisions could occur.

There is slight concern about earthquake due to the roads, railroads, and utility structures that could be damaged; however, there is no mitigation efforts to be taken to decrease damages other than to be aware of changing risk through monitoring of incidents.

Dunkirk, much like other small villages in Hardin County, does not meet the threshold for being considered disadvantaged. They fare better than some of their neighbors in the RAPT tool because they don't meet any single criteria for disadvantaged status. They are closer to Findlay and Kenton than many other communities, and as such, are not as isolated. There are relatively high numbers of elderly, disabled and economically disadvantaged who are residents of Dunkirk. There is a higher-than-average income disparity indication among residents, so recovery programs may be very necessary.

Dunkirk rated dam failure as inapplicable due to the lack of high-risk dams. They were also not very concerned about drought and extreme heat as the village does not have a strong history of any severe incidents in the past. They are concerned about the survival of elderly or medically compromised residents during extreme heat and/or power outages; therefore, the acquisition of alternate power capacity is important. This is a utility failure hazard and action.

Forest

This village is located in the far northeast corner of Hardin County, and its most concerning problem is flash flooding. Two inches of rain will cause serious runoff back up due to blocked ditches to the north and west of the village. Being near the juncture of three sub-watersheds in the Blanchard River Watershed, ditches are small and winding compared to other areas in the county. Fallen trees, sediment, and other blockages can have a disastrous effect when precipitation must drain. Representatives in meetings felt that participation in conservancy groups would be helpful because much of the blocked area is not in Hardin County.

There are no ditches or waterways in Forest so deteriorating banks and eroding soils in Forest are not an issue. Erosion and land subsidence were considered irrelevant.

Severe storms – thunderstorms, tornadoes, and blizzards – are disruptive and damaging to the residents of Forest. There is little to block the wind, and when it races across the flat fields of northern Hardin County, damages can be extensive. Buildings are damaged as roofs come off and siding is damaged, and everything is out in the lightning-vulnerable open terrain. Winds rip properties apart, snow drifts block roads and highways, and hail shreds farm crops as they mature.

Forest sits at the intersection of state highways #37 and #53. Both are highly travelled by trucks carrying hazardous substances. As the highways make ninety-degree turns and intersections

are controlled by stop signs, one truck violating right-of-way rules can cause the spill or release of hazardous chemicals amid residences, businesses, and food service. They try to work with the local and state highway departments to enhance signage and avoid crashes.

Forest officials are concerned about infrastructure, including water distribution systems, storm sewers, and electrical power lines. They fear extended power outages, and have tried to acquire alternate sources like generators over the past few years. They are concerned about the survival of elderly or medically compromised residents during extreme heat and/or power outages; therefore, the acquisition of alternate power capacity is important. Limited funding makes improvements to utilities and infrastructure difficult. They work with the county officials and power companies on a regular basis to harden electrical service and make it more resilient but more work is necessary. They did not rate drought and extreme heat as an applicable threat because there is so little incidence of this happening, and the real threat is a power outage.

Forest fears are rounded out by some worries about communications systems. They lack adequate funding to maintain new statewide radio systems, and they can end up communicating during disasters on non-universal frequencies and various bands. Warning systems are not countywide, and inconsistencies in these systems leave gaps in notifications according to village representatives. While some improvements have been made to towers and transmission equipment, Forest public safety representatives feel there are still gaps and holes in the system, making Forest residents and services vulnerable to a lack of information when it is most necessary.

Forest residents face challenges with transportation because they are so far from cities and villages. Their residents spend more time and energy on transportation than 90% of others, according to RAPT. They lack in-town resources, and are oftentimes isolated from other municipalities. Sitting at the outer skirts of Hardin County, their sources of goods and services often come from outside Hardin County, yet their county government is based in Kenton.

Forest rated dam failure as inapplicable because there are no high-risk dams in the area, and eliminated earthquake due to the low vulnerability of any infrastructure or buildings to earthquake damages. They did not rate invasive species as a high risk because the roadways that come through the village are state highways and therefore the responsibility of the State of Ohio, not the village. Private property is the responsibility of homeowners; therefore, they did not see increasing debris due to an invasive species as a problem.

<u>Kenton</u>

This city is the county seat of Hardin County. With paid staff to carry out emergency response, the city still has concerns about their capability to manage significant disasters and storms because of deteriorating infrastructure, lack of adequate equipment, and inconsistencies in resources. All this is caused by budgetary constraints and higher-than-normal demands for services. Several recent infrastructure projects have achieved significant improvement in water treatment and distribution as well as streets, and sanitary sewer collection and treatment. While improvements are still needed, the progress is significant. There are concerns about the

quality of housing in the city, with a strong emphasis upon the quality and state of repair of rental properties. Many rental properties have health and safety issues, and landlords do not proactively maintain these properties. With rental property at a premium, there are waiting lists for rentals. Without building and rental property codes, the city is hard pressed to engage in improvement of properties that are not owner-occupied. Kenton officials want to consider building codes, rental property registration, and better authority to declare uninhabitable properties as unusable. More separation of business use from residential is likely desirable. They feel commercial code inspection is adequate, but the basis upon which to require proper maintenance does not exist.

Kenton's primary concern is hazardous materials spills or releases through vehicular accidents or train derailments. Several state highways come from all directions around Kenton, linking Indiana cities to Columbus and Dayton, and providing routes between Toledo and other northwest Ohio cities and Lake Erie ports and cities to the south of Kenton. Six state highways (31, 53, 67, 68, 292, 309) pass through parts of Kenton as they enter on one side and leave on another, and all pass directly through the small and congested downtown city square. Semi-trucks and tankers make multiple turns as they wind through Kenton in route to their destinations, carrying all kinds of chemicals, hazardous substances, and delicate cargo. Some destinations are local where manufacturing and industry utilize or produce chemicals. Phenol is of particular concern because waterfowl have died in a pond near a factory that uses this chemical.

Railroads cross the city too. The old Erie Lackawanna Railroad and the CCC and St. Louis Railroad now operate as Conrail, and these tracks wind through the downtown, crossing and following the Scioto River as it makes its way through the center of the business district. Tracks exit and go east, west, and south out of Kenton. City officials and county counterparts are all concerned about spills, leaks, and releases and how the chemical exposures would affect the residents and workers in the city. A spill that involved the environmental release of toxic, poison, or irritating gases, or a situation where a liquid converted to gas and caused the risk of explosion, the entire core of Kenton would be threatened, business and residential districts alike. Many of these trains carry ethanol, grain, and corn oil, but other hazardous substances as well.

Kenton officials are concerned about wind and tornado because roofs, siding and other parts of buildings are damaged by the winds common to the city. Trees and other debris, airborne from the winds, damage much property when severe storms hit. With the number of rental properties that are not maintained well, this is a tremendous concern for city officials. There is still concern about invasive species as the Emerald Ash Borer has devastated the ash trees, making them into storm debris and a mechanism of structural damage. Weakened trees still stand, and fall at a faster rate in wind and severe storms. Debris management is a challenge. Winter storms can cause ice and snow to form on trees, further stressing their resiliency and causing them to fall. Wind blows snow onto streets and blocks access to many areas when winds kick up. All severe storms cause additional maintenance work that is often costly and time consuming. There are no storm shelters in Kenton, and this concerns officials. The mobile

homes in the city have no alternative protection during severe wind and rain. They are concerned about the survival of elderly or medically compromised residents during extreme heat and/or power outages; therefore, the acquisition of alternate power capacity is important.

Flash flooding is common in Kenton, but its duration is usually fairly short. Basements and low-lying residences can get water in living spaces when rain comes fast and hard. Two to three inches of rain can cause flooding if it comes quickly. Water-blocked streets and highways can make access problematic, and services can be interrupted. Street flooding is generally short-lived, lasting less than half a day, but while it is there, the problems are plenty. The trucks and trains moving through town as fast as possible can be impaired by unexpected ponding water, and accidents can happen. Sometimes these storms are accompanied by ice and snow melt, making roads a bit more treacherous for a short period of time.

There is great concern about utilities and infrastructure in Kenton. The water system is old and in poor repair, and its design does not allow for grid separation and isolation of water main breaks and other problems. The entire water supply must be shut down for any significant problem, and this leaves the entire city without water. Having adequate water pressure for structure fires, especially when specific weak lines are drawn from, is a serious concern of fire officials. There are not enough fire hydrants to feed the number of pumpers that would be necessary for a working fire in the downtown, cited as one example. Other utilities need additional hardening, alternate sources for back up when needed, and improvements to harden the service. City officials are working hard to meet these demands, but budgetary constraints make the task daunting and difficult.

Emergency communications are problematic for the city. As various departments use different frequencies and bands during emergencies, the city tries to be the central communication point and provide a resource to coordinate countywide efforts. Sometimes they lack the ability for everyone to communicate with each other. Towers are not strong enough or high enough, not everyone is able to adopt the MARCCS radios, and not all departments can readily talk to each other. This makes coordinated response and mutual aid difficult. As small departments, collaborative response is a necessary component of handling emergencies, and improvements to communication and warning systems is needed. More warning sirens are needed as well, completing the communication loop between responders and citizens.

The Scioto River runs through the middle of Kenton, but is not viewed as a major threat. In the recent past, it was dredged, widened and straightened. The waterway is almost never filled to its top. Most residents and officials cannot remember it ever leaving its banks.

Kenton’s concern about earthquake is attached to their emphasis upon infrastructure improvements. Utility distribution lines and treatment plants could be affected, and transportation infrastructure could be negatively impacted. However, there is no mitigation to be done for this, but instead simply maintaining an awareness of current tremors and quakes that might contribute to instability in the Kenton jurisdiction is the sole action at this time.

Drought and extreme heat were not considered applicable because the likelihood of any significant incident is low. Water supplies are ample and fire service is dependable even under those conditions. The threat is a power outage due to overburdening the electrical grid.

Kenton rated dam failure as inapplicable due to the lack of any high-risk dams in the area.

McGuffey

This village of five hundred residents sits on Ohio 195 just before the highway was abandoned by the State of Ohio and turned back to Hardin County due to instability and deterioration because of the muck soil base. This village is concerned that heavy precipitation will cause severe flooding, closing the highway and streets, and cutting them off from resources and suppliers. New flood maps will increase the areas considered floodplain, and some residents may find flood insurance force-placed by their mortgage holders. Their storm sewers are in bad repair, and budgetary constraints make it difficult to implement improvements. Newer development of commercial property has made drainage worse because the water from those areas is more than the current storm sewers can handle, creating additional flash flooding. They have been able to identify collapsed areas of the sewer system of old clay tile, but have not been able to replace or repair many of these problem areas. The east side of the village floods easily because the storm sewers have collapsed and the village does not have the money to replace this entire section. The north side of town floods just as easily.

There are no ditches or waterways in McGuffey so deteriorating waterway banks are not an issue. Erosion and land subsidence were considered irrelevant.

The village also sees alternate power sources as a problem, and needs to improve its generator capability to sustain critical services. They currently have only one generator available to them when needed. Their concern is any kind of severe storm that causes power outages, excess precipitation, loss of utilities, or a great deal of debris, although the area under village responsibility that would experience high amounts of debris is low. Isolation can occur easily and communication with county resources can be difficult if the village is physically cut off from other areas. They are concerned about the survival of elderly or medically compromised residents during extreme heat and/or power outages; therefore, the acquisition of alternate power capacity is important. This is, however, considered a utility failure threat, not a drought and extreme heat threat because the incidence of that happening is very, very low.

Socially, McGuffey has a higher rate of poverty than some other communities, and they are further away from healthcare than others. Over a quarter of their population does not have a smart phone. They are somewhat isolated from more populated areas with more services directly available to those who need help.

McGuffey rated dam failure as inapplicable due to the lack of high-risk dams in the village. They are also not concerned about earthquake damage potential, and rate that hazard as inapplicable. They rated invasive species damages as not applicable, although storm damage to

trees was a concern in the context of power resiliency. Most of the expected damages would be caused by wind, not weakened trees.

Mount Victory

This village of slightly over 600 residents sits on the southern side of Hardin County where Conrail tracks and Wildcat Creek cross, making the village vulnerable to hazardous materials spills and flooding. Because the village is distant from other populated areas, isolation due to severe storms and utility outages is highly likely, and they are concerned about communications, supplies and necessities, and emergency response. Any wind event could easily take down the many trees in the picturesque landscape, causing excessive debris and damages to residences and small businesses. Thunderstorms, tornadoes, and blizzards can cut them off from the rest of the county, take out utilities and suppliers, and damage homes and other buildings. There is little protection that occurs naturally because they are in a fairly flat and open section of the county. Village officials realize that there needs to be in-house sustainability due to their location and vulnerabilities, and they are working diligently to establish redundant supply lines, improved utility distribution systems, and alternate power. They are concerned about the survival of elderly or medically compromised residents during extreme heat and/or power outages; therefore, the acquisition of alternate power capacity is important. While drought and extreme heat is not considered the primary threat for this issue, utility failure is the root hazard.

Residents in Mt. Victory are likely to have a higher income than other areas in Hardin County, and they have less disparity in income between various population groups and genders. Almost two of three residents do not identify with a particular church, and unemployment numbers are very low for Mt. Victory residents. Mount Victory is the owner of Hardin County's only nationally identified dam that does not have an approved Emergency Action Plan. While the likelihood of catastrophic damages due to failure of this lagoon is not anticipated, the significant hazard potential designation has caused the village to prioritize work with ODNR to create an EAP for the structure. Their only concern as an outcome of earthquake is the potential damage it may have on the reservoir that is already in poor condition.

Patterson

Patterson is a tiny village in the northeast corner of Hardin County, very close to Forest. The village is out in the open, at a crossroads in a very rural part of Hardin County. Budgets are small and it is difficult for Patterson officials to address all the things residents need. They are most concerned about flooding because the area is low-lying and it does flood, especially during heavy precipitation, snow melt, and when storms stall out and hang over the area for extended periods of time. Wind, tornado, and thunderstorms are frequent, and homes are not protected by any wooded areas or valleys, so damages can be extreme.

Sitting at the crossroads of Ohio 81 and Ohio 53, Patterson officials are worried about hazardous materials spills and releases. Conrail tracks go through nearby Forest, and Patterson is within an evacuation zone if a train carrying chemicals were to derail for any reason. Because the village is so small, they are worried that utilities will be interrupted and they will be too

small for timely repair priorities, so they are concerned about sustenance during extended power outages.

Storm water management and water quality issues are difficult for Patterson due to the limited village budgets. They attempt to work with other jurisdictions to the fullest extent, but infrastructure repairs and maintenance can easily consume their entire annual budget. As winter storms, floods, or windstorms isolate the small village, their concern is sustainment of critical resources like water supply, electricity, and access to food and other needed items. There are no ditches or waterways in Patterson so deteriorating banks are not an issue. Erosion and land subsidence were considered irrelevant.

Patterson representatives also identified additional generators and better sheltering options as needs for the village. They have previously attempted to address these issues but funding could not be identified and secured; the concern is still valid. They are concerned about the survival of elderly or medically compromised residents during extreme heat and/or power outages; therefore, the acquisition of alternate power capacity is important. This threat is considered to be part of utility failure. Drought and extreme heat are so rare that it was not considered a relevant threat.

Patterson is so small that a disaster would quickly overwhelm its resources. Residents have difficulty being resilient when needed services are so difficult to provide, and the village struggles to provide even the most basic service to its residents. Patterson often relies upon its neighbors to help, especially when storms hit and do extensive damage.

Patterson did not rate dam failure as applicable due to the lack of any high-risk dams in the village. Earthquake is also not applicable due to lack of damage potential and susceptible infrastructure. They did not rate invasive species as a significant risk due to a lack of heavy vegetation under the management of the village, or roadways to maintain amid a high-debris circumstance.

Ridgeway

Ridgeway is home to just over 200 residents. They live where Hardin and Logan counties meet, and chose to participate in the Hardin County plan because the watershed drains to the north and into Hardin County. The Conrail tracks are in Hardin County, and most of the residences are in Hardin County. There are intersecting rail lines in Ridgeway, and those pose the chance of a collision which could be devastating to nearby homes and businesses.

Ridgeway is prone to flash flooding as rain comes hard and fast, and gravitational drainage cannot keep up with the precipitation. There are tiles that aid in drainage, but many are old and broken and in need of repair. Most flooding ends up in low-lying properties, yards, and a few basements. Some of the ditches around the village are on county maintenance plans, and therefore generally are in good condition and make drainage work as well as can be. They rated invasive species as non-applicable due to a lack of village-maintained vulnerable property.

Hazardous materials incidents concern Ridgeway. Approximately thirty-two trains enter and leave Ridgeway on any given day, and a thousand semi-trucks travel through the village. Many trains and trucks haul chemicals. With a volunteer fire department to respond, officials are concerned about daytime incidents that would occur while firefighters are out of town at their fulltime jobs.

Severe storms of all kinds are problematic because debris management is difficult for the small village, and power outages can be very inconvenient. Although since the storms in 2008 and 2012, the electrical service has been improved, there is still concern about utility failure. Shelters, generators, and alternate suppliers are very important to this town's sustainability. They are concerned about the survival of elderly or medically compromised residents during extreme heat and/or power outages; therefore, the acquisition of alternate power capacity is important. This is a utility failure threat; drought and extreme heat are not considered the root threat to an electrical outage caused by demand in excess of system capacity.

Ridgeway is a resilient village with hard-working residents, many of whom work out of town and travel a significant distance to work. Assistance during the work day is scant, and people are often not home when storms strike. Ridgeway did not rank earthquake as an applicable hazard due to low history and very limited vulnerability to any damages.

The following chart is a summary of the hazard rankings by jurisdiction. Hazards that are marked "N/A" are not applicable to that jurisdiction.

Table 2-39: Jurisdictional Vulnerability

Hazard	Hardin County	Ada	Alger	Dunkirk	Forest	Kenton	McGuffey	Mount Victory	Patterson	Ridgeway
~~Climate Change~~	~~12~~	~~10~~	~~10~~	~~12~~	~~10~~	~~12~~	~~10~~	~~13~~	~~10~~	~~11~~
Dam Failure	NA	NA	NA	NA	NA	NA	NA	9	NA	NA
Drought/Extreme Heat	11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Earthquake	10	N/A	N/A	10	N/A	9	N/A	12	N/A	N/A
Erosion/Land Subsidence	9	N/A	N/A	7	N/A	10	N/A	8	N/A	8
Flood	1	1	1	1	1	5	1	2	1	1
Hazardous Materials Incident	2	2	6	5	5	1	7	1	5	2
Invasive Species	8	5	N/A	9	N/A	8	N/A	N/A	N/A	N/A
Severe Thunderstorm	7	6	4	3	2	3	4	5	4	3
Tornado	5	4	3	4	4	4	5	6	3	6
Utility/Infrastructure Failure	3	8	7	6	6	6	2	3	6	7
Windstorm	6	3	2	2	3	2	3	4	2	4
Winter Storm	4	7	5	8	7	7	6	7	7	5

2.4 RISK ANALYSIS

To estimate disaster losses, a damage profile that considers the potential impact and loss from each hazard was developed. Climate changes were considered, although these changes will be gradual and not significantly escalated in the coming five years for which this plan is valid. However, changes due to climatic modification were included in all sections. This information helps determine Hardin County's vulnerability to each specific hazard.

2.4.1 Dam Failure Damage Profile

There is no history of dam failure in Hardin County, and the likelihood is low. Of nineteen ODNR-identified dams, sixteen are unclassified privately owned dams on private property. They are maintained by the property owners, are classified by ODNR as "other", and are the responsibility of the property owner. Of the remaining three dams, two are Class III dams on private property with only the farmstead buildings nearby. Damages due to a failure would impact only the property owner. The third dam, a Class II dam, is the Mt. Victory Sewage Lagoon. This lagoon is outside the village to the northeast. The elevation of the lagoon rim is three feet higher than the elevation of three homes approximately 500 feet from the lagoon. The remaining perimeter of the lagoon is farmland and pasture. It is unlikely that a failure of the lagoon through over-topping or flooding would have significant effect on the homes to the southwest. Therefore, the mitigation committee members felt that dam failure has negligible likelihood of causing damage in Hardin County. However, this dam is listed differently on the National Dam Inventory, and is given a "significant" hazard potential rating.

There are no high hazard potential dams (HHPD) in Hardin County, according to the National Inventory of Dams. According to this database, the Mt. Victory Lagoon poses a "significant" potential hazard to the area. It was inspected in November 2020 and its condition is listed as "satisfactory".

This dam/lagoon does not currently have an Emergency Action Plan. In order to meet HHPD requirements, the Village of Mt. Victory has added the goal of working with regulators at the ODNR Dam Safety Program to develop an EAP for the lagoon. An approved EAP would facilitate comprehensive and thorough assessment of potential damages, mitigation of any of those potential damages, involvement of any affected landowners in the development of the EAP, and minimization of negative impact of potential structural failure.

The Mt. Victory lagoon is the only dam/levee hazard in the county with significant or higher hazard potential, and the only one without an approved EAP. The party responsible for developing an EAP is the structure owner, the Village of Mt. Victory. This EAP development will facilitate meeting all HHPD requirements. It will definitively identify potentially vulnerable property from damages should a breach ever occur, because this structure is considered a "significant" (but not "high") hazard potential. By assigning this responsibility to the owner of the structure, they will have the ability to identify and secure any funding necessary to improve the property, and well as responsibility for maintaining the structure.

2.4.2 Drought/Extreme Heat Damage Profile

Hardin County rarely experiences drought or extreme heat conditions. The region, like the rest of Ohio, occasionally suffers from slight, short-lived dry spells, periods of decreased precipitation, and/or brief heat waves characterized by extremely high temperatures of over 90 degrees during the growing season. With a moderate humid continental climate, the region does not turn arid at any time. There is no history of extended droughts or prolonged heat waves that would impact human life or cause physical property damage. The county's greatest vulnerability to drought is a reduction in crop yields. There is no history of reduced yields for an extended, multi-year period. Reduced yields for a single growing season do occur on occasion as a result of precipitation patterns or late planting and/or harvest due to excessive rainfall.

For the purpose of loss estimates, the major cash grain crops and livestock that constitute the majority of Hardin County's agriculture production were considered. While most farmers purchase crop insurance for all crops, including grain, it is not possible to determine if all crops in Hardin County are insured. Table 2-40 identifies anticipated loss from a drought, assuming total crop loss conditions for the most prevalent crops produced in the county; data was compiled based on information from the USDA National Agriculture Statistics Service; the 2021 report is based upon 2017 data. Some data points are unavailable, and others have been redacted from the report to protect confidential financial information for a single producer in the county. This occurs with cattle and calves, poultry and eggs, and vegetable cash receipts and census numbers.

Table 2-40: Drought/Extreme Heat Vulnerability Assessment

Commodity	Acres Harvested	Cash Receipts	Livestock Counts	Cash Receipts
Corn	82,000	50,950,000		
Wheat	8,600	3,015,000		
Soybeans	121,900	49,525,000		
Vegetables	Not Listed	Data Protected		
Fruit and Berries	Not Listed	31,000		
Nursery & Greenhouse	Not Listed	1.493.000		
Acreage not in production or not listed	49,244			
Hogs/Pigs			Not Listed	26,416,000
Cattle/Calves			13,600	Data Protected
Sheep/Lambs/Goats			Not Listed	98,000
Poultry and Eggs			Not Listed	Data Protected
Data Protected Values		206,222		91,132,000

2.4.3 Earthquake Damage Profile

Earthquakes are geologically possibly but not common in Hardin County. There is no documented evidence of an earthquake occurring in the county. Adjacent counties, including Allen and Logan, have experienced several minor earthquakes in that past, although these have all been very minor and none have occurred in more than twenty years. As such, there is little

data to support committing extensive resources to earthquake-proofing buildings and other structures.

In the unlikely event that an earthquake struck Hardin County, the two major pipelines that cross the county would be of concern for leaks, releases, and explosion. Utility poles would likely topple, and foundations would be compromised or significantly damaged, making the structure on top unstable. Roads, bridges, and culverts would likely be damaged and perhaps impassable. Underground utilities like water distribution lines and natural gas lines would be damaged in a severe earthquake. Resulting debris management would be difficult, at best.

Because of the high cost of implementing mitigation strategies relative to the low risk for earthquake, the planning team did not identify any mitigation strategies. As they arrived at this decision, the planning team did review projected loss estimates for a 5.0 magnitude earthquake with an epicenter in Kenton. These estimates, generated by the HAZUS loss estimation tool, helped the committee make an informed decision of Hardin County's earthquake risk. Table 2-41 includes the vulnerability analysis made available to the committee; a detailed explanation of potential earthquake damage in Hardin County is included in Appendix A.

Table 2-41: Earthquake Scenario Vulnerability Analysis

Building Type	Number of Buildings	Percentage	Exposure ($1000)
Residential	2,359	25.17%	$927,290
Non-Residential	1,154	30.44%	$454,638
Critical Facilities	78	5.10%	$30,227
Totals	***3,591***		***$1,412,155***

2.4.4 Erosion Damage Profile

Erosion in Hardin County is the consequence of either flash flooding or high wind. It does not occur independently. Flash flooding causes berms to wash away on several local roadways along the Scioto River in the areas where muck soils are present. The washing away destroys the foundation of roads and the roads have to be repaired or abandoned. One state highway section has been abandoned due to the depth of muck soils and deterioration of the road's surface due to the erosion of the soil under it and along the berms. This short section of road is along the riverbank, and between the steep slope, the narrow berm, and the muck soils, the Ohio Department of Transportation and the Hardin County Engineer determined the best solution was to close that short section of roadway.

Erosion due to wind occurs in the same area where there are muck soils. The surface of the soil blows around during wind storms, and there is a powdery gray cast to the horizon due to the presence of fine soil in the air. There is no quantifiable loss to this kind of erosion according to local input and little way to avoid it. At some times of the year the erosion is minimized by the presence of vegetation and crop cover. There was no evidence of production loss attributable to erosion claimed in discussions with county residents. The muck soils do not constitute a large area in Hardin County, and are limited to a small area where Cessa, Lynn, McDonald, and

Marion Townships come together. The area is approximately 18 square miles out of 467 total in the county, or about 3% of the county; however, that 3% is not exclusively muck soil. The land in this area is used exclusively for farming, and crops include various root crops like onions, carrots, and other tubers.

Due to the flat terrain in Hardin County, other soils are vulnerable to erosion from wind. There was no crop loss attributed to erosion, however, because farmers have implemented conservation actions to prevent damaging erosion. They have used sod strips, windbreaks, conservation tillage, and cover crops to minimize erosion across the county. These are highly effective methods to save topsoil from erosion with the exception of the muck soils described above.

2.4.5 Flood Damage Profile

Flood damage in Hardin County could is generally very minor. Damage does not generally occur to residential and non-residential structures, although it is possible. This damage to could include single-family homes, multi-unit residential buildings, manufactured homes, and congregate living facilities. Non-residential damages could potentially occur to buildings used for manufacturing, product handling, transportation, warehousing, retail, business, and industry along with the capital equipment and inventory associated with those uses. Impacted agricultural structures could include barns used for livestock, equipment, workspace, and commodity storage, as well as the contents of those buildings. The contents of agricultural buildings would typically constitute business assets such as production animals, equipment, and machinery. At-risk critical facilities could include government, nonprofit, and educational institutions such as fire stations, police stations, hospitals, offices, schools, maintenance buildings, and the capital contents of those structures. Damage within the affected structures could include standing water in basements and/or first floors and damage to all contents on these floors, including flooring materials, walls, furniture, and other contents. Hazardous chemicals are also a risk for residents and first responders as substances spill or leak into floodwater.

In addition to these damages, floodwaters could also cause roads and streets to flood, requiring jurisdiction officials to close roads for safety reasons. This restricts travel across the county, which in turn impacts businesses and commerce as goods are unable to be delivered, customers cannot reach stores, and employees are unable to travel to work. This period of business shutdown is generally confined to floodplain areas and lasts for only a few hours after the rainfall event ends. Over time, however, these events can cause damage to the roadway, requiring jurisdictions to expend additional funds on repair and replacement.

To analyze Hardin County's vulnerability to flood damage, a 100-year flood event was simulated using the HAZUS loss estimation tool. Table 2-42 includes the projected exposure to this hazard for residential, non-residential, and critical buildings. Additional data on the impact of a 100-year flood on Hardin County can be found in Appendix A. This information is based upon the HAZUS run for a 100-year flood that was developed on 12-13-2022. Critical facilities include government buildings, educational institutions, and church property.

Table 2-42: 100-Year Flood Scenario Total Exposure by Occupancy

Building Type	Percent of Total	Approximate #	Exposure ($1000)
Residential	63.8%	9,374	$3,684,112
Non-Residential	25.8%	3,790	$1,493,555
Critical Facilities	10.4%	1,529	$592,682
Totals	***100%***	***14,693***	***$5,770,349***

2.4.6 Invasive Species Damage Profile

Hardin County, and all of Ohio, is rich with all kinds of trees in addition to the trees affected so seriously by the Emerald Ash Borer. There are maples of every sort, birch, oak, and ash trees. There is also other vegetation, along waterways, in landscaping, along roadways and highways, and in areas of natural habitat like parks and recreational areas. When strong winds occur, diseased trees can fall, becoming storm debris and falling onto homes, cars and trucks, businesses, and anything else in the way. They fall into rivers and streams, impede drainage, and fill waterways with excessive dead debris. Any infestation, of insects or other infectious agents, will cause extreme destruction of these areas. The lakes and streams that carry fish and other aquatic life can be endangered by either plant or animal infestations such as Asian carp or zebra mussels.

Trees are not the only invasive species that affects Hardin County. A long list of what is commonly referred to as "weeds" grow in fields, landscaping, and other properties, and choke out the purposeful plantings by absorbing the water and nutrients in the soil, thereby preventing the desired plantings from getting what they need to grow and thrive. These weeds reduce yields in farm fields and lower the quality of the plants. These unplanted and unwanted plants invade landscaping, and frequently are irritants that cause skin and respiratory reactions in the people exposed. In many cases, these weeds have extremely deep and resilient root systems, and require strong herbicides to impede their growth. The use of herbicides worsens the harmful runoff from property, and contributes to the water quality concerns in general.

Unwanted and harmful animals are invasive species as well. Beavers clog waterways and their dams prevent rivers and streams from flowing, and thus draining productive farm land and occupied neighborhoods after heavy rain. Coyotes and other predatory animals are a threat to family pets and small children as they prey on them for food when there are so many of their kind that they must search out food. These animals that inflict harm upon developed communities and homesteads as part of their survival are oftentimes too numerous to exist off the land they occupy, and become a dangerous nuisance to the community as they are driven out of woodlands by development.

This damage done by invasive species is difficult to quantify because it does not generally affect structures. Cost is incurred for the removal and disposal of contaminated trees and vegetation, repair of property where fallen trees do damage; cleaning and dredging of waterways that are filled with debris; cleaning of bodies of water; and repair of infrastructure damaged by the

infestation. These are expensive tasks, and when done by government providers or large contractors who respond to emergent needs for service, the response can be extremely high, totally hundreds of thousands of dollars for each and every jurisdiction. The value of lost use of property or the injury to pets and children is difficult to quantify.

2.4.7 Severe Thunderstorm Damage Profile

Thunderstorms are a common hazard in Hardin County; the combination of hail, lightning, precipitation, and wind caused by thunderstorms can inflict damage across any area of the county. While thunderstorms are common, they are typically more of an inconvenience than a severely damaging incident. A rare lightning bolt may destroy an electrical transformer, strike a building, cause a fire, or hit a tree and damage something the tree falls on. Rarely are people stranded outside during severe lightning and at risk for electrocution although it is possible. It does not happen frequently because shelter is relatively available at a moment's notice. Most lightning caused electrocutions that occur in Ohio take place on a golf course where people cannot seek shelter rapidly, or on a work or recreation site in a remote area.

Hail is an occasionally a component of these storms, potentially damaging vehicles, roofs, and building siding. Hail usually comes in bursts and has a localized area of impact, so the overall damages are not extensive in spite of specific property damage being serious. More severe damage, including loss of property, and life is certainly possible, but statistics indicate the frequency with which that happens is extremely low.

Damaging straight-line winds from microbursts and downbursts can be a part of severe thunderstorms. These high winds can do as much damage as a tornado, comparatively measured in a fashion similar to the EF tornado scale. The only difference is that the wind is not rotational. The wind does, however, flatten crops, houses, and other structures; totally obliterate trees and other vegetation; and cause destruction to homes and other buildings. Straight-line winds can devastate a community. When thunderstorms are accompanied by tornadoes, damage from the tornadoes is likely to be more significant than that caused by the thunderstorm, i.e., the rain, hail, and lightning.

Table 2-43: Severe Thunderstorm Scenario Vulnerability Analysis

Building Type	Number of Buildings	Exposure ($1000)
Residential	441	$173,153
Non-Residential	159	$812,352
Critical Facilities	44	$208,220
Totals	***643***	***$1,194,225***

2.4.8 Tornado Damage Profile

Tornadoes can occur anywhere in Hardin County and each jurisdiction is universally vulnerable to tornado damage. Because of the relatively flat to slightly rolling terrain, there is little change in elevation or landscape that would cause a tornado to slow down or break apart. However, tornadoes in Ohio do not reach a magnitude that compares to "Tornado Alley" in the mid-west; they tend to break apart before they widen and strengthen. Tornadoes rated as EF 3 or EF 4 are extremely rare in Ohio. When Hardin County does experience a tornado event, the

magnitude is typically an EF 1 incident with moderate damage limited to a small geographical area.

In Hardin County, there are approximately 1,236 mobile homes. This accounts for 9.4% of the residential structures in the county. Mobile homes are more vulnerable to wind damage because they are less secured to the ground than buildings with foundations, have no basement or sub-terrain level, and are lighter weight and made of less wind resistant material than constructed homes. Mobile homes are scattered throughout the county, either individually located or within a mobile home park. The vulnerability does not change dependent on the location.

Other residential properties are generally constructed using wood, concrete, brick, and stone. Many homes are older and were constructed using limestone and other masonry materials. These homes are built on traditional foundations with basements or crawl spaces. Some newer homes are concrete slab construction without basements or crawl spaces. These homes are most prone to superficial damage, roof damage, and trees falling on them during tornadoes and severe windstorms. On occasion a rural home with propane gas or heating oil for fuel will be found, and that propane or fuel oil tank may be at risk for damage during tornado or high wind.

Commercial buildings are constructed of concrete, brick, concrete block, stone, and wood. They are generally built on concrete slabs with structural support trusses and pitched roof construction to facilitate snow and ice melt and runoff. Flat roof buildings such as shopping centers and big-box type retail stores are susceptible to heavy snow in blizzard conditions; there is no identifiable history of roof collapse incidents due to snow or ice.

The incidence of tornadoes in Hardin County is infrequent. Tornado warnings are issued occasionally throughout the year, most often in the spring or early summer, as cold and warm fronts clash, creating turbulent weather. Tornadoes are possible in the late winter, a situation that has occurred in Hardin County twice.

Property damage from tornadoes in Hardin County has historically been very minor, such as damaged roofs, gutters and downspouts, siding and window damage, downed trees, and the occasional complete destruction of a whole building. Mobile homes are damaged or destroyed in the most serious outbreaks, and vehicles can be tossed from one spot to another. Outbuildings, barns, and storage buildings can be damaged because these structures are less resistant to wind damage and are frequently built on concrete slabs or dirt foundations. Many outbuildings are of a pole building construction, and are susceptible to wind damage. At any given time, there are many vehicles on the road in Hardin County, and those vehicles are subject not only to damages to the vehicle, but also injury and death of the occupants.

Table 2-44: Tornado Scenario Vulnerability Analysis

Building Type	Number of Buildings	Exposure ($1000)
Residential	176	$69,998
Non-Residential	64	$25,390

Critical Facilities	17	$65,195
Total	***257***	***$160,583***

2.4.9 Wind Storm Damage Profile

Hardin County has experienced one notable high wind event in recent years. In September 2008, Hurricane Ike impacted Ohio as a post-tropical windstorm; Hardin County suffered power outages and property damage. The southwest and central regions of Ohio were most seriously affected by this windstorm, but west central Ohio was also within the impact zone. Power lines were downed and utility outages occurred, although in far lower numbers than the hardest hit areas of southern Ohio. In general, wind incidents are possible in Hardin County. Damages would be similar to that of a tornado incident, as previously described but may be slightly more widespread and involve more acreage of farm crops.

Wind incidents are somewhat frequent across Ohio although the county has only experienced one such event in recent years. When they do occur, they will typically damage trees, which lead to obstructed roadways and downed power lines. Crop damage and destruction is also a concern. When high winds damage young and maturing crops, yields can be significantly reduced, which negatively impacts the county's economy.

Table 2-45: Wind Storm Scenario Vulnerability Analysis

Building Type	Number of Buildings	Exposure ($1000)
Residential	353	$139,996
Non-Residential	127	$50,781
Critical Facilities	35	$13,632
Totals	***515***	***$204,409***

2.4.10 Winter Storm Damage Profile

Winter storms can potentially cause damage in every jurisdiction in Hardin County. Heavy snowfall, ice, blowing and drifting snow, and hazardous road conditions can occur anywhere. In winter storm events with significant amounts of ice, heavy snowfall, or high winds, the potential for power outages makes the entire population vulnerable. In most neighborhoods, electric lines are above ground and susceptible to damage. In a few newly developed neighborhoods, utility lines are buried but this affects a very small percentage of the population. Major supply lines are above ground as they enter Hardin County from the generation plants; therefore, power to the substations is vulnerable to wind and heavy snow and ice even if the residential lines are not. A power outage from a winter storm or blizzard is highly likely.

The loss estimates for winter storms are relatively low in spite of the recent and memorable winter seasons. There is no identifiable history of property loss due to snow pack, avalanche, or other winter storm related cause. Reasonably anticipated losses from winter storms would include content loss such as food and perishables due to power interruptions. Losses in anything but an unusual, unpredictable incident would not include structures or infrastructure.

Table 2-46: Winter Storm Scenario Vulnerability Analysis

Building Type	Number of Buildings	Exposure ($1000)
Residential	35	$136,312
Non-Residential	13	$50,781
Critical Facilities	3	$5,926
Totals	***51***	***$193,019***

2.4.11 Countywide Risk Analysis

Based on this hazard and vulnerability information, Hardin County has risk for damage from a variety of disasters. To determine the county's 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 2-47 describes the overall scale used to score each hazard. Table 2-48 provides details on scale used to measure magnitude. The composite scores for each hazard and their respective rank are identified in table 2-49.

As hazards are assessed, the difficulty lies in negating the preference for recency, and in prioritizing the long-term analysis of threats. There were some changes in the ranking as threats were discussed, as comparted to the discussion five years ago. The definition change for invasive species to include pests and wild animals led to a more robust discussion than before. Invasive species are more than Emerald Ash Borer, the effects of which were acutely felt five years ago. As those trees have come down and are diminishing in their impact on people, attention shifted to other species listed on state references. Earthquake stayed nearly the same, losing a point to invasive species, because should a strong quake occur, damage to infrastructure would be severe. The opinion about probability is still consistent with earthquake being a very low concern. As rains have come harder and temperatures have fluctuated more, and as data that is applicable to Hardin County and its residents becomes more available, discussions led to the elevation of climate change threats. The inclusion of social vulnerability and community resilience was discussed, but the rankings of the hazards did not take into account those factors. The stakeholders continued to evaluate threats based upon the traditional emergency management factors that are definitively measurable and comparable in a numeric methodology.

Table 2-47 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					

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 a community has before each hazard occurs.

- 1 = More than 24 hours
- 2 = 12-24 hours
- 3 = 6-12 hours
- 4 = Less than 6 hours

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 Hardin County.

Table 2-48: 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

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

Table 2-49: County-wide Risk Assessment

Hazard	Frequency	Response Duration	Speed of Onset	Magnitude	Business Impact	Human Impact	Property Impact	Score	Rank
Flood	4	4	4	3	3	1	3	22	1
Hazardous Material Spill	5	3	4	3	2	3	1	21	2
Utility & Infrastructure Failure	4	2	4	4	2	1	3	20	3
Severe Winter Storm	5	3	3	3	2	1	2	19	4
Tornado	3	5	4	1	2	2	1	18	5
Windstorm	5	3	3	2	1	1	2	17	6
Severe Thunderstorm	5	2	3	2	1	1	2	16	7
Invasive Species	3	5	1	3	1	1	1	15	8
Earthquake	1	4	4	1	1	1	1	13	9
Erosion	5	3	1	1	2	0	1	12	10
Climate Change	2	4	1	1	1	1	1	11	11
Drought/Extreme Heat	3	1	1	0	1	1	2	9	12
Dam Failure (Mt. Victory only)	0	1	2	1	0	0	0	4	13