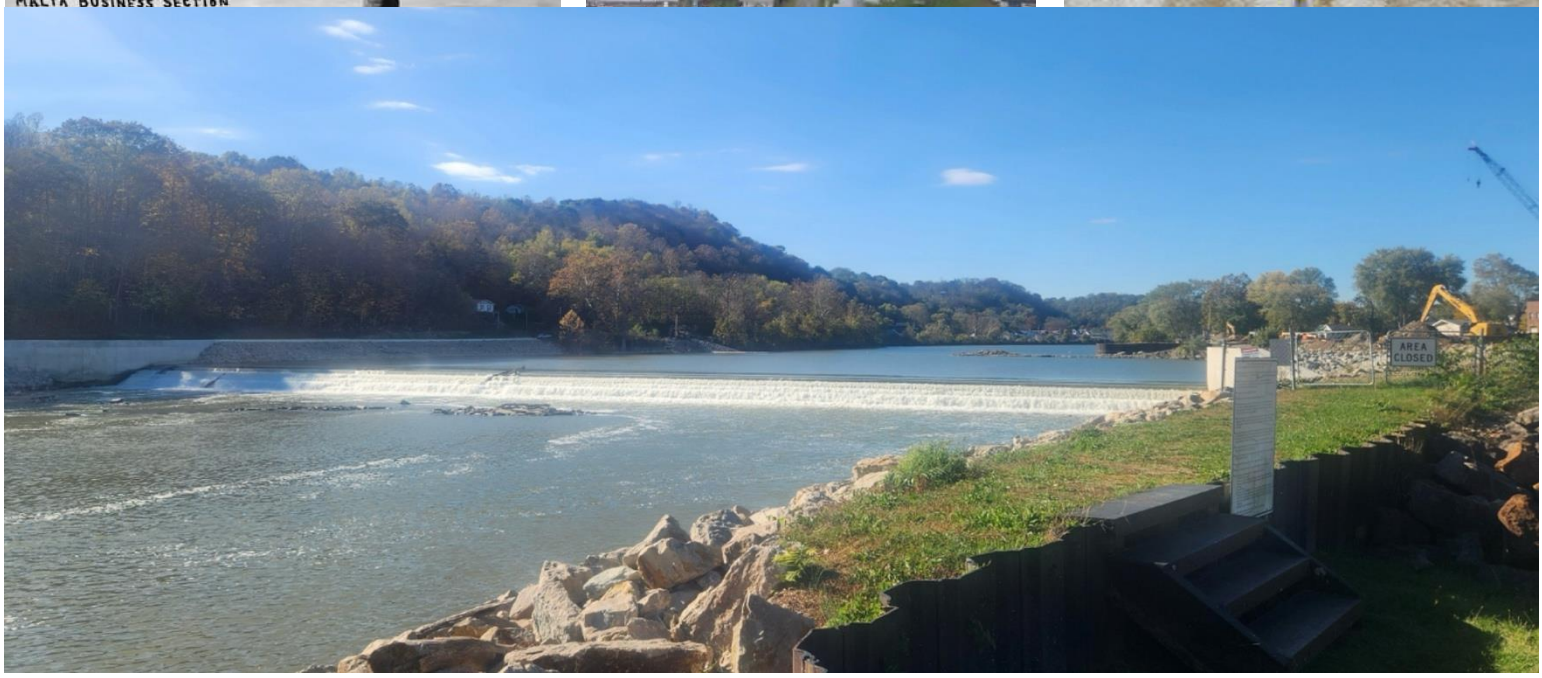
Morgan County, OH
Hazard Mitigation Plan
2026-2030 Updated 2.15.26

Prepared By



RFG ASSOCIATES, INC.

PO Box 2112 Zanesville OH 43702
rob@rfgassociates.net

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The Morgan County Hazard Mitigation Plan is a multi-jurisdictional plan that was created to protect the health, safety and economic interests of County residents and businesses by reducing the impacts of natural disasters through hazard mitigation planning, awareness, and project implementation. The plan serves as the foundation for hazard mitigation activities and actions within Morgan County and its jurisdictions. Implementation of recommendations will reduce the loss of life, destruction of property and economic losses due to natural disasters. The plan provides a path toward continuous, proactive reduction of vulnerability to hazards which result in repetitive and oftentimes severe social, economic, and physical damage. The ideal end state is full integration of hazard mitigation concepts into day-to-day governmental and business functions and management practices. This plan updates the 2021 Hazard Mitigation Plan and covers 2026-2030.

The plan employs a broad perspective in examining multi-hazard mitigation activities and opportunities in the County. Emphasis is placed on hazards which have resulted in threats to the public health, safety and welfare as well as the social, economic and physical fabric of the community. The plan addresses the primary hazards determined to impact the county by the planning team which are: landslides, floods, severe storms (including thunderstorms, windstorms and hail), winter storms (ice and snow storms as well as extreme cold temperatures), wildfires, dam failure, drought and extreme heat. Other identified hazards that impact the county are being mitigated through enhanced public education and awareness activities until additional studies and/or resources can be made available for mitigation actions. Each identified hazard was analyzed from an historical perspective, evaluated for potential future risk and considered for possible mitigative action. The plan also lays out the legal basis for planning and the tools to be used for its implementation.

Section 1: Introduction

1.1 County Profile

Named for revolutionary war officer, Brigadier General Daniel Morgan, Morgan County was platted in 1817 and officially founded March 1, 1819. Morgan County is located in the Appalachian region of Ohio and is the 4th least populated county in Ohio. Adjacent counties include Muskingum, Noble, Washington, Athens and Perry counties. The County boasts excellent recreational opportunities across its 30,000 acres of public recreation lands including camping, canoeing, kayaking, hunting, birding and hiking. It hosts a number of natural resources including Wayne National Forest, Burr Oak State Park, Buckeye and North Country (hiking) Trails, Jessie Owens State Park and Wildlife Area and Wolf Creek Wildlife Area. The County is also home to several historic and cultural features including the Muskingum River Navigation Historic District, Twin City Opera House, Adams Covered Bridge, Big Bottom Massacre Site and the McConnelsville Historic District, to name a few.

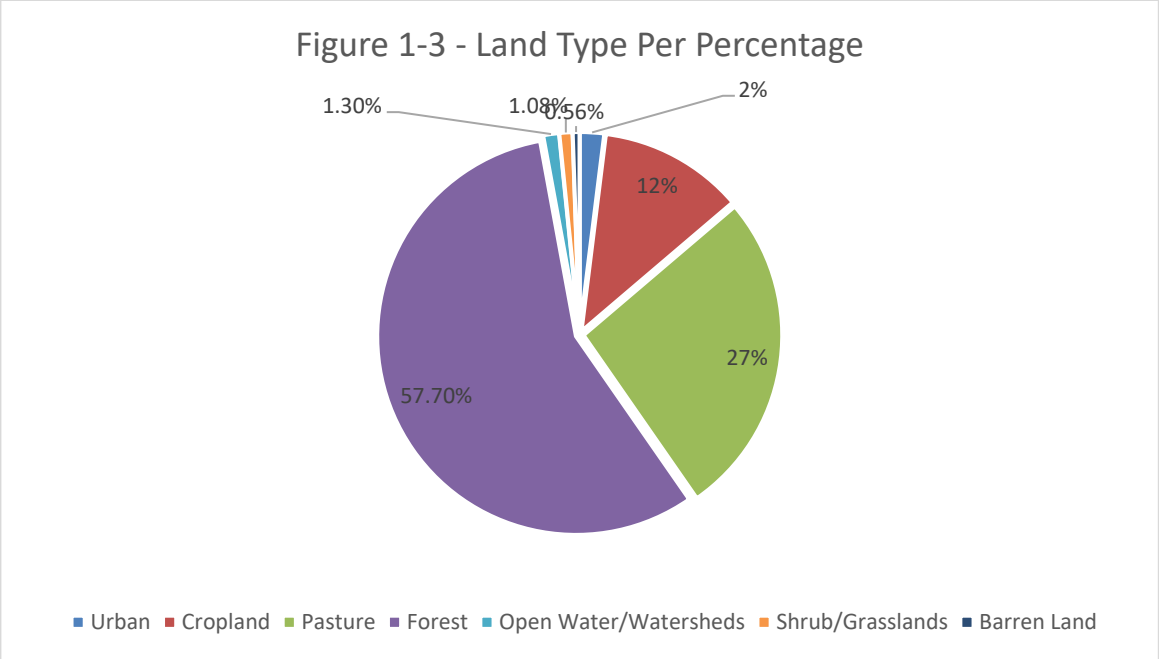
Figure 1.1-
Location Map of Morgan County

Geography

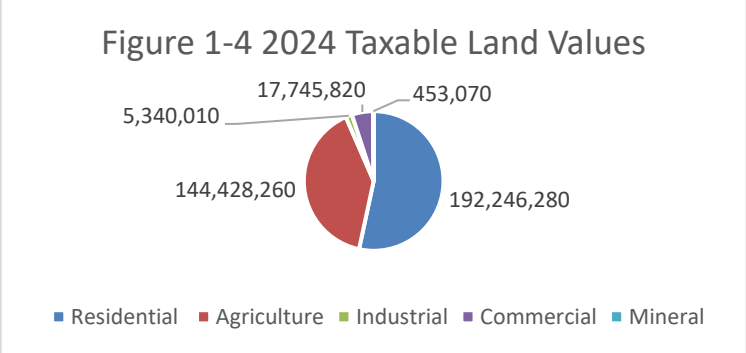
Fig 1.2- Map of Morgan County

Morgan County is located in southeastern Ohio, approximately 70 miles southeast of the City of Columbus and 30 miles south of the City of Zanesville, within the Appalachian Region of Ohio. It is primarily a rural county with 4 incorporated communities: Village of McConnelsville, Village of Malta, Village of Stockport and Village of Chesterhill.

The County has a land area of 422 sq. miles. Land use in the county is approximately 2.0% Urban, 12% Cropland, 27% Pasture, 57.7% Forest, 1.3% Open Water and wetlands, 1.08% shrub/scrub and grasslands and 0.56% barren land as shown in Figure 1.3 below. Elevations in the County vary from 564 feet to 1,335 feet. The County lies in the Appalachian and Allegheny plateaus.



Taxable land values for the county as reported by the Ohio Development Services Agency's County Profiles reveals a total valuation of $360,213,440 with residential values being highest as shown in Figure 1.3



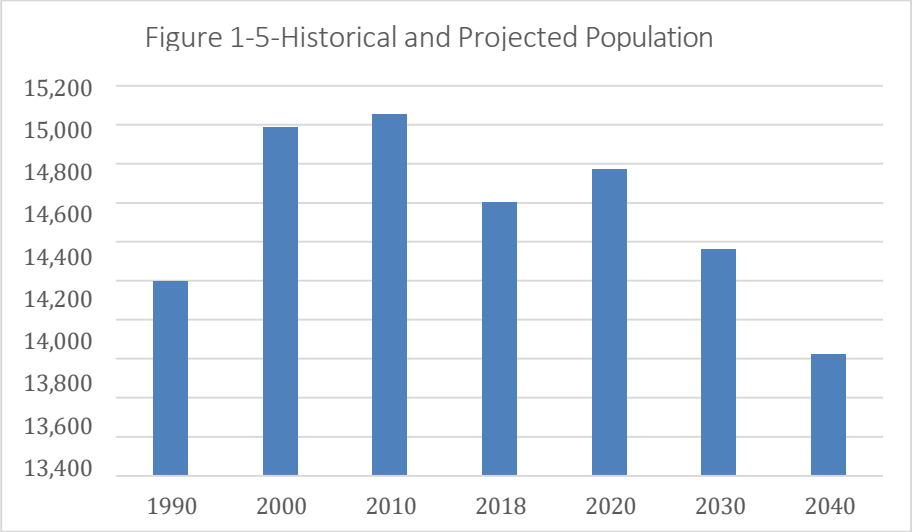
Demographics

Morgan County is the 3rd least populated county in Ohio. Morgan County population is estimated at13,532 in 2024 census data. Of that, approximately 9,229 or 68.0% of the population live within the unincorporated areas of the County, while only 4,303 people or 32.0% live in the municipalities. The County's median age is 44.4, which is slightly older than the State's median age of 39.6. Table 1.1 shows the basic demographic profile for the County.

Table 1.1-Morgan County Demographic Profile (2024)

Land Area	422 square miles
Total Population	13,532
Male	6,786
Female	6,746
Population under 18	2,750
Population over 65	2,977
Percent high school graduate or better	88.5%
Percent Bachelor's degree or higher	14.2%
Median Household Income	$55,971
Individuals below poverty	1,936
Families Below Poverty Level	471
Unemployment Rate	5.5%
White	92%
African American or Black	3%
Hispanic or Latino	1%
Number of Households	5,633
Average household size	2.94
Owner occupied households	77.2%
Median home value	$134,200
Multi-unit structures	3,901
Mobile homes	1,013
Homes built before 1939	26.7%
Median Year built	1956
Median gross rent	$713
Median cost to own	$1000

Population in the county has been trending downwards in recent years with the highest recorded population numbers in 2010 at 15,054. Over the next 30 years population is expected to continue to decline. Figure below shows the historical and projected population for Morgan Coy as reported by ODSA's Office of Research.



Special populations include individuals with disabilities, the elderly, children, non-English speaking individuals, individuals in a nursing home and institutionalized individuals. Special considerations to accommodate these populations in the event of a disaster need to be considered. Table 1.2 shows the percent of population for these special populations.

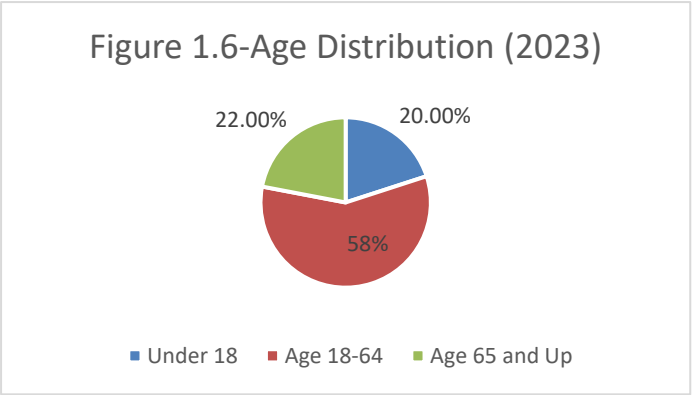
Table 1-2-Special Populations (2023 percent of total population)

Individuals with a disability	13.1%
Elderly (aged 65+)	22.4%
Children (under 18)	29.7%
Non-English speaking	3.8%
Nursing homes (2010)	<1%

Ethnicity

Table 1-3-Total Population by Race

Race	Number	Percent
Caucasian	12,551	91.2
African-American	417	3.1
Native American	14	0.1
Asian	23	0.1
Other	97	0.2
Two or more races	656	4.7
Hispanic or Latino	127	0.9

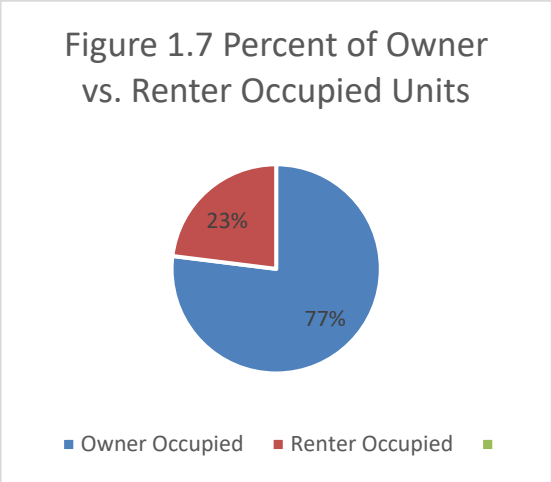


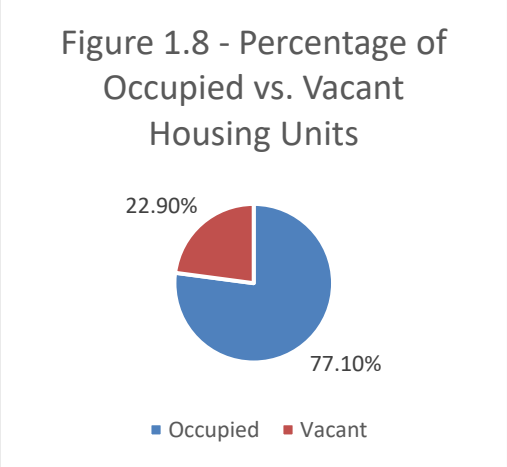
According to the (Ohio) State Hazard Mitigation Plan, the most vulnerable populations after a disaster are children under the age of 5 and individuals over 65 years of age. The percentage of children under the age of 5 in Morgan County is 5.3% and 22% for individuals over 65. Figure 1.6 shows the population distribution by age for Morgan County.

The 2023 Census reveals that 91.2% of the County's population is Caucasian. The second largest ethnic group is two or more races at 4.7%. Hispanic or Latino individuals comprise less than 1% of the overall population as shown in Table 1. 3.

Housing

The 2023 ACS estimates that there are 7,311 housing units in Morgan County with a median value of $134,200. Of these, 5,633 (77.1%) are occupied, resulting in a 22.9% vacancy rate. Of the occupied units, 77.2% are owner occupied and 23.1% are renter occupied.





Housing stock in Morgan County is relatively aged with 66% of its housing being 50 years or older. However, in recent years new home construction has been increasing from 30 units in 2018 to 2,200 units in 2025.

The only special housing facilities located in Morgan County include 2 nursing homes, the county drug and alcohol rehabilitation facility and the County jail. Assisted group housing programs for the County are coordinated by Washington-Morgan Community Action.

Income and Economy

Services and manufacturing comprise the 2 largest employment sectors in Morgan County. Several Census and other statistics help describe the County's population as a labor force. Most of the County's employment opportunities are concentrated in and around the Village of McConnelsville.

Unemployment in Morgan County is shown in Table 1.4, with highest rate over the past 5 years being reported in 2020 at 9.9%. Despite this trend towards decreasing unemployment rates, Morgan County continues to have one of the higher unemployment rates in the State of Ohio as a whole, which was 5.5% in August 2025.

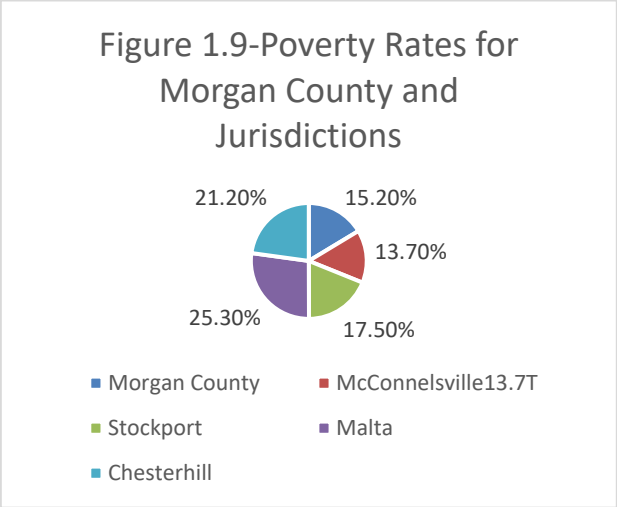
Table 1.4-Unemplyment Percentages for Morgan Co.

	2020	2021	2022	2023	2024	2025
Unemployment Rate	9.9	6.9	5.7	4.9	5.5	5.5

Source: ODSA Ohio County Profiles

According to ODSA's County Profiles, the median household income in Morgan County is $55,971, which is lower than the state median household income of $73,770. Median household incomes for the villages in Morgan County are generally lower than the County income except for Chesterhill which has a reported median household income of $53,125. Figure 1.9 reveals the income distribution for the County.

The poverty rate for Morgan County is 15.2%, which is significantly higher than the state poverty rate of 13.2%. Poverty rates in the villages are generally higher than the county and include McConnelsville at 13.7%, Stockport at 17.5%, Chesterhill at 21.2% and Malta at 25.3%, as shown in Figure 1.9.



Transportation Networks

Roads

Morgan County is served by 7 designated state highways, making up 191 miles of roadway, which are listed below:

State Route 60 is a north-south route that generally follows the Muskingum River through Morgan County until it reaches the Village of McConnelsville. It then traverses in a south-easterly direction through Washington County.

State Route 669 is a north-south route that generally follows the Muskingum River on the west bank between Philo in Muskingum County and the Village of Malta in Morgan County.

State Route 376 generally runs north-south through Morgan County.

State Route 78 is a northeast-southwest route traversing through McConnelsville and Malta and following the eastern edge of the Wayne National Forest in the County.

State Route 37 traverses east to west in the northeastern part of the County into Perry County.

State Route 555 traverses generally north-south from State Route 60 in Muskingum County into Washington County and follows the eastern edge of the Wayne National Forest.

State Route 266 traverses generally east to west from Pennsville, through Stockport to State Route 60.

State Route 377 is generally a north-south route that traverses the County from just south of the Village of Malta into Athens County.

Morgan County also has an extensive county, township and municipal road system, accounting for an additional 730 miles of roadway.

Bridges and Culverts

The County Engineer's office maintains 202 County bridges. In addition, there are 2 State-owned bridges in Morgan County

Morgan County has one general use airport that serves municipal and private uses. It is owned by the Morgan County Airport Authority and is located approximately 3 miles east of the Village of McConnelsville along County Road 5. The airport covers approximately 123 acres and has one 3,500-foot runway with an asphalt surface.

Public Transportation

The County Commissioners own and operate Morgan County Public Transit, a countywide on-demand public transportation system with regular stops in the Village of McConnelsville. The system also offers out-of-county service to several locations including Columbus, Zanesville, Marietta, Athens and New Lexington. In 2023, the Authority served an estimated 1,020 riders and completed over 26,000 trips.

Railroads

There are no railroads serving Morgan County.

Utilities

Electricity: Electrical providers in Morgan County include Guernsey-Muskingum Electric, Washington Co-op and AEP.

Water: Municipal water services are provided by the Villages of Malta, Stockport and Chesterhill. Private water companies in Morgan County include Burr Oak, West Malta Water, Tri County Regional Water and Morgan-Meigs Water Company. The Village of McConnelsville is served by the Village of Malta.

Sewer: Municipal sewer service is provided by the Villages of McConnelsville, Malta, Stockport and Chesterhill.

Natural Gas: Natural gas is provided to the County by Columbia Gas and Tennessee Gas.

Telecommunications: Century Link, Spectrum and Horizon Communications (for school and medical facilities).

Jurisdictions

Morgan County is comprised of 4 villages, 14 Townships, 19 unincorporated communities and 1 Census Designated Place. Below summarizes the demographic information for the individual municipalities. Township and unincorporated community data is reflected in the overall county data.

McConnelsville

The Village of McConnelsville is the largest municipality in the County and operates as the County Seat. Originally named Old Town, McConnelsville was platted in 1817, and named after Robert McConnell, one of the early settlers in the area. During the mid-1800's McConnelsville was a bustling river town, along with

neighboring Malta, which housed dozens of flourishing businesses including, mills, factories, hotels, restaurants and other retailers. It is centrally located along State Routes 60/376/78 and remains the major employment center in Morgan County. McConnelsville also remains as the main art and cultural hub of the County hosts the Dover House Gallery, Twin City Opera House and the Doll House. There is one public school system in Morgan County, and all of its facilities are in McConnelsville. Population in the Village has generally been in decline since 1970. Table 1.5 shows the basic demographic information for McConnelsville.

Table 1.5-McConnelsville Demographic Profile (2024)

Land Area	1.9 square miles
Population	2,197
White	1,920
Black or African American	94
Other	64
Hispanic or Latino	29
Number of Households	858
Persons per household	2.4
Median Household Income	$45,714
Persons below Poverty level	13.7%
Median Age	40

Malta

The Village of Malta is the second largest municipality in the County and is located on the west bank of the Muskingum River, adjacent to McConnelsville. The Village was platted in 1816 and is centrally located along State Routes 376/37/669. The Village, in conjunction with the Village of McConnelsville, hosts the annual Civil War Encampment Days and is home to the historic Rock Hollow School. Population in the Village has generally been in decline since 1970. Table 1.6 shows the basic demographic information for Malta.

Table 1.6-Malta Demographic Profile (2024)

Land Area	0.34 square miles
Population	548
White	90.7%
Black or African American	2.3%
Other	.5%
Hispanic or Latino	.5%
Number of Households	282
Persons per household	2.41
Median Household Income	$27,838
Persons below Poverty level	25.3%
Median Age	32.9

Stockport

The Village of Stockport was platted in 1839 and was named after a town in England by the local Postmaster, Samuel Beswick. The Village is located approximately 10 miles south of the Village of McConnelsville at the intersection of State Routes 376 and 266 on the west bank of the Muskingum River. The Village has a rich history as a river town and boasts a four-story post office, the Hardware Inn of Stockport and the Stockport Mill. The Mill was built as a grist mill in 1906 and is now a beautifully restored 14-room inn and restaurant. It is located at the Muskingum Lock and Dam #6, where its 2 turbines generate electricity to provide power to the Inn, making it Morgan County's "greenest" hotel. Table 1.7 shows the basic demographic profile for Stockport.

Table 1.7-Stockport Demographic Profile (2024)

Land Area	0.33 square miles
Population	470
White	90%
Black or African American	2%
Other	5%
Hispanic or Latino	3%
Number of Households	238
Persons per household	2.5
Median Household Income	$41,429
Persons below Poverty level	17.1%
Median Age	41.1

Chesterhill

The Village of Chesterhill is located at the intersection of State Routes 377 and 555 in southeast Morgan County. Originally founded by Quakers, the Village was platted in 1834 and is named for Chester County, Pennsylvania where a large number of its first settlers came from. It is home to the Union Hall Theater, Multicultural Genealogical Center and the Chesterhill Produce Auction, which is held weekly from mid-May through October. Population in the Village has generally been declining since 1960. Table 1.8 shows the basic demographic information for Chesterhill.

Table 1.8-Chesterhill Demographic Profile (2024)

Land Area	0.54 square miles
Population	344
White	96%
Black or African American	3%
Other	Less than 1%
Hispanic or Latino	Less than 1%
Number of households	121

Persons per household	2.39
Median Household Income	$53,125
Persons below Poverty level	21.2%
Median Age	28.3

1.2 Planning Process Authority

The Morgan County Hazard Mitigation Plan is a multi-jurisdictional plan that details the natural hazards that threaten Morgan County and its municipalities. The plan fulfills the requirements set forth by the Mitigation Act of 2000 (DMA 2000). This Act requires counties to formulate a hazard mitigation plan in order to be eligible for mitigation funds made available by the Federal Emergency Management Agency (FEMA).

The first Hazard Mitigation Plan for Morgan County was developed in 2007 and subsequently updated in 2013 and 2020. For this 2026 update, a kick-off meeting with potential stakeholders was held on September 23, 2025. The process for the plan development followed by the stakeholder committee is summarized below.

Scope

The Morgan County Hazard Mitigation Plan includes all incorporated and unincorporated areas in the County. The plan addresses all natural hazards identified by the Stakeholder Committee with input from the general public. All hazards that may affect the County and its residents have been analyzed. Hazard mitigation strategies are discussed in terms of general activities and mitigation action items. Responsibility for implementation of strategies is discussed, and possible funding sources are identified. The plan is one of many steps Morgan County may take to protect the welfare of its residents and businesses in order to reduce the long-term risk to human life and property before, during and after a natural disaster occurs.

Plan Development

RFG Associates Inc. (Zanesville OH) met with Morgan County representatives to discuss the planning process, schedule and development of the planning committee in June 2025. The Morgan County EMA Director prepared and sent out the invitations for the kick-off meeting. All meetings were announced via email, on the Morgan Co EMA web site, Morgan Co EMA Facebook page and to the local newspaper, Morgan County Heral

Table 1.9: Hazard Mitigation Plan Update Committee

NAME	POSITION / TITLE	JURISDICTION
Steve Redrup	Director	Morgan County EMA
Jeff Michaels	Director	Morgan County Health Department
Tim Louis	Village Administrator	Village of McConnelsville
Helen Seyfried	Village Council	Village of Chesterhill
Homer Weekly	Village Council	Village of Malta

Dan Dunn	Village Administrator	Village of Stockport
Donna Dixon	Mayor	Village of Chesterhill
Dave Fryfogle	Insurance Agent	State Farm
Marcia Wolf	GIS	Morgan County Engineer's Office
John Telesz	Engineer/Floodplain Administrator	Morgan County Engineer's Office
Jim Fisher	Sheriff	Morgan County
Tom Jenkins	Chief	Village of McConnelsville
Taylor Anderson	Disaster Program Manager	American Red Cross
Tim Smedley	Fire Chief	Chesterhill
Drew Blackburn	Asst, Fire Chief	M and M
Waylon Clark	EMS Captain	M and M EMS
Adam Triplet	Director	Morgan Co Veterans Services
Paige Hay	Safety Coordinator	Muskingum Water Conservancy District
Amber Wilson	Director	Morgan Co Office on Aging
Keith Spare	PIO	LEPC POI
Cecil Mayle	Commissioner	Morgan Co
Hiedi Maxwell	Commissioner	Morgan Co
Steve Best	Commissioner	Morgan Co

Each member of the planning committee participated, or was provided the opportunity, to review and comment on the hazard analysis, risk assessment and vulnerability assessment, the mitigation strategies and the update/revision process in the existing plan. Member comments are integrated into this Plan update, where appropriate.

Additionally, adjacent counties were invited to participate in the planning process. Invitations were sent to: Athens County EMA, Muskingum County EMA, Noble County EMA, Perry County EMA and Washington County EMA announcing the Plan update and representatives were invited to attend and participate in the process. None of these counties were represented.

The first official meeting of the Planning Committee was held on September 23, 2025 at the Morgan County EMA Office. At this meeting, the plan committee reviewed and discussed the Memorandum of Agreement for a Multi-jurisdictional Plan, discussed and approved a community outreach strategy and reviewed the most recent natural hazard event data for the County and its jurisdictions. The committee also reviewed the accomplishments achieved from the prior plan, which actions were no longer relevant and why, and which actions need to migrate to the new plan. This assessment follows.

1.3 Morgan Co Hazard Mitigation Plan
Review of Current/Expiring Plan (2020-2025)

During meeting 2, the Planning Team reviewed each Action Item in the current/expiring plan.
The Consultant color coded each Action as green-completed, yellow-underway, red-not accomplished, and white-included in revised plan.
The location in the revised Action Plan of continuing actions is shown in the "Status" column (x.x).

Status and Accomplishments of Current Morgan Co HMP (2021-2025)
Green-Completed White- continue or ongoing Red-Delete

Goal	Task (Action Item)	Lead	Funding	Status
Morgan County (MCo)				
1. Reduce the negative effects of **erosion** along Muskingum River	1.1 Identify and map areas of unstable soils	County Engineer	Local	Ongoing, provide 3-5 detailed locations in plan update (1.1)
	1.2 Prioritize areas for mitigation and identify/assess potential bank stabilization techniques for financial and technical feasibility	County Engineer	Local, CDBG, FMA, PDA, HMGP, others	Combine with 1.1 (1.1)
2. Reduce the negative effects of **severe storms** on critical facilities	2.1 Assess the feasibility of installing lightning protection devices and other methods (lightning rods, grounding on communications, and other infrastructure)	County Engineer	Local, PDM, CDBG	Continue: Note specific locations in plan update: Courthouse, Sherriff Office, Riecker Bldg. (2.1)
	2.2 Install and maintain surge protection on critical electronic equipment	County Engineer	Local, HMGP	Completed
3. Reduce the	3.1 Plan for and maintain	County	Local	Continue (2.2)

negative effects of **winter weather** events on residents and county facilities	adequate road clearing equipment for snow, ice and debris	Engineer		
	3.2 Work with partners to identify and plan for specific needs of at-risk populations who are vulnerable to long-term power outages	County EMA	Local	Completed AEP adding/ replacing poles and lines for Spectrum expansion co-wide
	3.3 Assess need and feasibility of adding insulation to walls and attics in critical facilities and other govt buildings	County Engineer	Local, HMGP, CDBG	Delete: Not practical or relevant for an HMP
	3.4 Assess need and feasibility of retrofitting public buildings to withstand snow loads to prevent roof collapse	County Engineer	Local, HMGP, CDBG	Delete: Only building of concern is Riecher Bldg. and is being addressed by the Co outside of HMP
	3.5 Continue to provide regular and updated information to the public about dangers of severe winter weather and safety issues with alternative heating sources	County EMA	Local	Partner with IPOD and Hyper reach so Completed, but Ongoing service
4. Reduce the negative effects of **drought and extreme heat**	4.1 Work with partner to develop and implement regulations and/or public education programs related to drought for residents and agriculture	County EMA	Local, other TBD	Delete: This activity is addressed by Farm Service Agency (FSA)
	4.2 Work with partners and local jurisdictions to provide public information about water saving techniques (low flow shower heads, and toilets, fixing leaking plumbing and other water	County EMA	Local	Continue with list of partners (4,1)

	conservation measures)			
	4.3 Work with partners to educate farmers on soil and water conservation practices	County EMA	Local	Continue with list of partners (4.2)
	4.4 Work with partners to identify drought conditions and to monitor precipitation, temperatures, water levels, and soil moisture etc.	County EMA	Local	Delete: Soil and Water has this information with NOAA data
5. Reduce the negative effects of flooding	5.1 Protect and improve natural areas that serve as mitigation features like wetlands and floodplains though the use of regs, land acquisition, conservation easements, and public education	County Floodplain Manager	Local	Continue (5.1)
	5.2 Reduce the impacts of flooding by assessing storm water conveyance capacity and identify potential repairs and improvements	County Engineer	Local, others TBD	Ongoing activity, Continue (5.2)
	5.3 Designate a floodplain manager and/or CRS Coordinator who has/earns Certified Floodplain Manager Certification	County Engineer	Local	Completed New FPM is completing FP Certification
	5.4 Provide enhanced public education/outreach for repetitive loss property owners on incentives to get flood insurance and mitigation protection techniques	County Floodplain Manager	Local	Continue but quantify with Repetitive Loss property details (5.3)
	5.5 Identify and protect water and wastewater	County Floodplain	Local	Continue but specify Malta, McConnelsville and Stockport systems

	facilities in flood prone areas and investigate flood proofing	Manager		(5.4)
	5.6 Conduct mitigation activities for repetitive loss properties by assessing potential for acquisition, demolition, or retrofitting.	County Floodplain Manager	CDBG, FEMA, other	Continue but combine with 5.4 (5.3)
6. Reduce the impacts of all hazards in the County and its jurisdictions	6.1 Reduce response times for safety services during and after hazard events	County EMA	Local	Continue by working to solidify Fire Dept. Mutual Aid Agreements (6.1)
	6.2 Continue enhanced public education and outreach to inform the public of natural hazard dangers and how to implement private mitigation and safety strategies	County EMA	Local	Continue with clearly identified high risk hazards to better inform the public (6.2)
	6.3 Advocate the use of “Code Red” system for public weather notification and other emergencies	County EMA	Local	Completed
	6.4 Identify most at-risk facilities and evaluate potential for mitigation techniques	County Engineer	Local, PDA, HMGP	Continue with identified high risk locations of Riverside Manor, Morgan JHS and HS, and the County EMS Bldg. (6.3)
	6.5 Assess feasibility to relocate or retrofit public buildings in hazard-prone areas	County Engineer	Local, HMPG	Combine with 6.4 (6.3)
	6.6 Assess the use of special tax assessments to discourage building in hazard areas	County Engineer	Local	Delete: No interest or support for special tax assessments
	6.7 Develop GIS system to identify and map hazard areas and events to further	County GIS	Local	Completed

	assess community vulnerability			
7. Reduce the impacts of **dam failure** on the County and its jurisdictions	7.1 Coordinate with dam owners to ensure that regular maintenance and/or rebab of dams is being conducted. Assist with funding applications as needed.	County Engineer	Local, OWDA, HHPD	Continue but rephrase to promote Co EMA/Engineer coordination with ODNR (7.1)
	7.2 Obtain inundation mapping for high hazard potential Class 1 dams	County Engineer/GIS	Local	Completed
	7.3 Coordinate with Class 1 dam owners to develop EEPs as appropriate and provide funding assistance as needed.	County EMA	Local, OWDA, HHPD	Completed EEPs updated in 2024
8. Reduce the impacts of **tornadoes** on the County and its jurisdictions	8.1 Assess the feasibility of installing residential and community safe rooms	County Engineer/EMA	Local, others TBD	Delete Over the next 5 years, no feasible funding or priority need such an undertaking
Village of McConnelsville (Mc)				
Mc1. Reduce the negative impacts of flooding	Mc1.1 Maintain storm sewers and drainage systems to alleviate flooding	Village Administrator	Local, CDBG, OPWC	Ongoing (Mc1.1)
	Mc1.2 Coordinate with the County to protect and enhance natural areas to reduce flooding (clear debris, maintain ditches etc.)	Village Administrator	Local, PDM, CDBG, other	Ongoing, define locations for debris removal (Mc1.2)
	Mc1.3 Coordinate with the county to identify culverts and other storm drainage	Village Administrator	CDBG, Local, PDM	Ongoing, provide more detail in plan update (Mc1.3)

	structures for repair/replacement			
	Mc1.4 Coordinate public information releases with the County on the risks of flooding and private property protection	Village Administrator	Local	Ongoing (Mc1.4)
	Mc1.5 Coordinate with the County to identify the need for flood proofing critical facilities including water and wastewater in the Village	Village Administrator	Local, PDM, FMA, others	Continue (Mc1.5)
	Mc1.6 Conduct mitigate activities for repetitive loss structures by assessing the potential for acquisition/demolition/ retrofitting in flood prone areas	Village Administrator	CDBG, FEMA, others	Continue, clearly identifying repetitive loss structures (Mc1.6)
	Mc1.7 Conduct mitigation activities for repetitive loss structures by assessing the potential for acquisition/demolition/ retrofitting in flood prone areas	Village Administrator	CDBG, FEMA, others	Delete: Repetitive action, Combine with Mc1.6
Mc2. Reduce the negative impacts of severe storms	Mc2.1 Coordinate with the County to assess vulnerable critical facilities to damage from severe weather and identify mitigation potential	Village Administrator	Local, PDM, CDBG	Continue (Mc.2.1)
	Mc2.2 Coordinate with the County to increase public awareness of the risks associated with severe storms	Village Administrator	Local	Ongoing (Mc2.2)
Mc3. Reduce the negative impacts of	Mc3.1 Coordinate with the County Engineer to	Village Administrator	Local	Continue, identify specific locations (Mc3.1)

landslides and erosion	identify areas susceptible to erosion and assess potential bank stabilization options			
Mc4. Reduce the negative effects of multiple hazards	Mc4.1 Coordinate with the County to improve and maintain communications regarding public outreach and emergency messages and facilitate collaboration between first responders during and after hazard events and emergencies	Village Administrator	Local	Ongoing (Mc4.1)
	Mc4.2 Advocate for the use of “Code Red” system for public notification or weather-related events and emergencies	Village Administrator	Local	Combine with Mc4.1 (Mc4.1)
	Mc4.3 Provide and maintain adequate communications equipment for first responders to ensure proper communication during emergencies	Village Administrator	Local, HSGP	Continue, ongoing (Mc4.3)
	Mc4.4 Advocate that property owners purchase adequate property, casualty and flood insurance to help cover the cost of repair and replacement after hazard events	Village Administrator	Local	Continue, ongoing (Mc4.4)
	Mc4.5 Coordinate with the County to implement GIS hazard event tracking system	Village Administrator	Local	Completed Co Engineer has GIS hazard event tracking system
Mc5. Recue the impacts of dam	Mc5.1 Coordinate with the County Engineer and dam	Village Administrator	Local, OWDA,	Delete, responsibility of County EMA and ODNR/Army Corps

failure on residents	owners to ensure that regular maintenance and/or rebab of dams is being conducted. Assist with funding applications as needed		HHPD	
	Mc5.2 Coordinate with Class 1 dam owners to develop EAPs as appropriate and provide funding assistance as needed	Village Administrator	Local, OWDA, HHPD	Delete, responsibility of County EMA and ODNR/Army Corps
Mc6. Reduce the impacts of tornadoes on residents	Mc6.1 Assess feasibility to install residential and community safe rooms	Village Administrator	Local, others TBD	Completed Assessment determined that no location is feasible give the potential cost and likely impact of this action
Village of Malta (M)				
M1. Reduce the negative impact of landslides (road slips) and erosion	M1.1 Coordinate with the County Engineer to identify repair and funding options for thew current road slip on Front Street/County Rd 2	Village Administrator	Local, OPWC, ODOT, HMGP, others	Continue (M1.1)
	M1.2 Coordinate with the County Engineer identify areas susceptible to erosion and assess potential back stabilization options	Village Administrator	Local, HMGP, others	Delete, this is being addressed by the county
M2. Reduce the negative impacts of flooding	M2.1 Manage flooding and protect property through improved maintenance of	Village Administrator	Local, CDBG, OPWC	Ongoing (M2.1)

	storm sewers and drainage systems where it will alleviate flooding			
	M2.2 Coordinate with the County to protect and enhance natural areas to reduce flooding, clear debris from waterways and maintain ditches	Village Administrator	Local, PDM, FMA, CDBG, others	Continue, identify specific locations for debris cleanup (M2.2)
	M2.3 Coordinate with the County to identify culverts and other storm drainage structures for repair/replacement	Village Administrator	CDBG, OPWC, others	Ongoing (M2.3)
	M2.4 Coordinate public information releases with the County on the risks of flooding and private property protection	Village Administrator	Local	Ongoing (M2.4)
	M2.5 Coordinate with the County to identify need for flood proofing critical facilities including water and wastewater facilities	Village Administrator	Local, FMA, others	Continue (M2.5)
	M2.6 Conduct mitigation activities for repetitive loss structures by assessing flood prone properties their potential for acquisition/demolition/ retrofitting	Village Administrator	CDBG, FEMA, others	Completed There is only 1 repetitive loss properties in Malta
M3. Reduce the negative impacts of multiple hazards	M3.1 Ensure that adequate power is available for critical facilities during emergencies by purchasing and installing backup generators at the water treatment plant	Village Administrator	Local, CDBG, OPWC, others	Completed
	M3.2 Coordinate with the County to improve and	Village Administrator	Local	Ongoing (M3.1)

	maintain communications regarding public outreach and emergency messages and facilitate collaboration between first responders during and after hazard events and emergencies			
	M3.3 Advocate for the use of “Code Red” system for public notification or weather-related events and emergencies	Village Administrator	Local	Continue (M3.2)
	M3.4 Provide and maintain adequate communications equipment for first responders to ensure proper communication during emergencies	Village Administrator	Local	Continue (M3.3)
	M3.5 Advocate that property owners purchase adequate property, casualty and flood insurance to help cover the cost of repair and replacement after hazard events	Village Administrator	Local, HSGP	Completed
	M3.6 Coordinate with the County to implement GIS hazard event tracking system	Village Administrator	Local	Completed, Co Engineer has hazard event tracking system
M4 Reduce the impacts of tornadoes on the County and its jurisdictions	M4.1 Assess the feasibility of installing residential and community safe rooms	Village Administrator	Local, others TBD	Continue (M4.1)
Village of Stockport (S)				
S1. Reduce the	S1.1 Coordinate with the	Village	Local, PDM,	Completed

negative effects of severe storms	County to assess vulnerable critical facilities to damage from severe weather and identify mitigation potential	Administrator	DDBG, others	
	S1.2 Coordinate with the County to increase public awareness of the risks associated with severe storms	Village Administrator	Local	Ongoing (S1.1)
	S1.3 Advocate for and implement programs to trim trees, clear ditches and streams of debris and other actions to protect property from storm damage	Village Administrator	Local	Continue, identify specific debris cleanup locations (S1.2)
S2. Reduce the negative impacts of landslides and erosion	S2.1 Coordinate with the County Engineer and township trustees to identify repair options in areas of road slips and wash outs, specifically S. River Rd/CR2	Village Administrator	Local	Continue, try to provide detailed locations in update (S2.1)
	S2.2 Coordinate with the County Engineer and EMA to identify potential sources of funding	Village Administrator	Local, OPWC, ODOT, HMGP, others	Delete, combine with S2.1 above
S3. Reduce Vulnerability to damage from hazard materials spills and incidents	S3.1 Coordinate with the County and other agencies to ensure adequate training of first responders in response and management of hazard materials spills	Village Administrator	Local, other	Ongoing, note engaging Muskingum Co HazMat and other Morgan Co Fire Depts, or mutual aid agreement(s) (S3.1)
	S3.2 Ensure adequate mutual aid agreements are in place for assistance in the event of a spill	Village Administrator	Local	Delete, combine with S3.1 above

	S3.3 Ensure adequate signage is in place to help vehicles hauling hazard materials move through the Village safely and efficiently	Village Administrator	Local, ODOT, others	Ongoing (S3.2)
S4. Reduce the negative effects of multiple hazards	S4.1 Purchase and install emergency backup generators at the Community Center, fire station, and for critical utilities	Village Administrator	Local, CDBG, other	Ongoing (S4.1)
	S4.2 Coordinate with the County to improve and maintain communications regarding public outreach and emergency messages and facilitate collaboration between first responders during and after hazard events	Village Administrator	Local	Ongoing (S4.2)
	S4.3 Advocate for the use of “Code Red” system for public notification or weather-related events and emergencies	Village Administrator	Local	Continue (S4.3)
	S4.4 Provide and maintain adequate communications equipment for first responders to ensure proper communication during emergencies	Village Administrator	Local, HSGP	Continue, ongoing (S4.4)
	S4.5 Advocate that property owners purchase adequate property, casualty and flood insurance to help cover the cost of repair and replacement after hazard events	Village Administrator	Local	Continue (S4.5)

	S4.6 Coordinate with the County to implement GIS hazard event tracking system	Village Administrator	Local	Completed, Co Engineer has hazard event GIS tracking system
S5. Reduce the impact of dam failures on residents	S5.1 Coordinate with dam owners to ensure that regular maintenance and/or rebab of dams is being conducted. Assist with funding applications as needed.	Village Administrator	Local, OWDA, HHPD	Delete, responsibility of Co EMA, Flood Admin, ODNR or Army Corp
	S5.2 Coordinate with Class 1 dam owners to develop EAPs as appropriate and provide funding assistance as needed	Village Administrator	Local, OWDA, HHPD	Delete, responsibility of Co EMA, Flood Admin, ODNR or Army Corp
S6. Reduce the impact of tornadoes on residents	S6.1 Assess feasibility to install residential and community safe rooms	Village Administrator	Local, other TBD	Completed Assessment determined that no central location is feasible give the potential cost and likely impact of this action
S7. Reduce the impact of flooding on residents	S7.1 Conduct mitigation activities for repetitive loss structures by assessing flood prone properties their potential for acquisition/demolition/ retrofitting	Village Administrator	CDBG, FEMA, others	Continue with clear identification of repetitive loss structures to try to mitigate (S7.1)
Village of Chesterhill (C)				
C1. Reduce the negative impacts of excessive heat	C1.1 Provide access to cooling centers during times of extreme heat	Village Administrator	Local, CDBG	Continue with need for generator at Gym shelter (C1.1)
	C1.2 Coordinate with the County to provide public information on location and hours of cooling	Village Administrator	Local	Continue, add use of Facebook and Village website (C1.2)

	center(s)			
	C1.3 Coordinate with the fire department and other partners to identify vulnerable populations and provide information on assistance services including rides to cooling centers	Village Administrator	Local	Continue, ongoing (C1.3)
	C1.4 Work with partners and local jurisdictions to provide public information about water saving techniques (low flow shower heads, and toilets, fixing leaking plumbing and other water conservation measures)	Village Administrator	Local	Completed Ongoing but routine activity
C2. Reduce the negative effects of severe storms	C2.1 Coordinate with the County to assess vulnerable critical facilities to damage from severe weather and identify the potential for mitigation	Village Administrator	Local	Continue, need for generator at Booster Station #1 (C2.1)
	C2.2 Coordinate with the County to increase public awareness of the risks associated with severe storms	Village Administrator Co EMA	Local	Continue, ongoing (C2.2)
	C2.3 Advocate for and implement programs to trim trees, clear ditches and streams of debris and other actions to protect property from storm damage	Village Administrator	Local	Continue, ongoing (C2.3)
C3. Provide and maintain adequate communications equipment for first	C3.1 Coordinate with the County Engineer and township trustees to identify repair options for	Village Administrator	Local	Continue, specifically note Hermann Rd slip for repair (C3.1)

responders to ensure proper communications during emergencies	in areas of road slips and washouts			
	C3.2 Coordinate with the County Engineer and EMA to identify potential sources of funding	Village Administrator	Local, OPWC, ODOT, HMGP, others	Delete and combine with C3.1 above
C4. Reduce the negative effects of multiple hazards	C4.1 Coordinate with the County to improve and maintain communications regarding public outreach and emergency messages and facilitate collaboration between first responders during and after hazard events	Village Administrator	Local	Completed Ongoing but routine activity now
	C4.2 Advocate for the use of "Code Red" system for public notification or weather-related events and emergencies	Village Administrator	Local	Continue, ongoing (C4.1)
	C4.3 Provide and maintain adequate communications equipment for first responders to ensure proper communication during emergencies	Village Administrator	Local, HSGP	Continue, ongoing (C4.2)
	C4.4 Advocate that property owners purchase adequate property, casualty, and flood insurance to help cover costs of replacement and repair after hazard events	Village Administrator	Local	Delete No longer an issue in the Village
	C4.5 Coordinate with the County to implement GIS hazard event tracking system	Village Administrator	Local	Completed Co Engineer has GIS tracking in place

C5. Reduce the impacts of tornadoes on residents	C5.1 Assess feasibility to install residential and community safe rooms	Village Administrator	Local, others TBD	Completed Assessment determined that no central location is feasible give the potential cost and likely impact of this action

On October 28, 2025, the Planning Committee second meeting reviewed and updated the risk assessment from the previous plan. National Oceanic and Atmospheric Administration (NOAA) data and National Risk Assessment (NRI) data were reviewed and local representatives from each jurisdiction provided information on hazards, risks and vulnerabilities of their respective municipalities. The committee identified and ranked hazards based on the following criteria: Probability of future occurrence, Impact, Geographic Extent, Warning Time, and Duration (Hazard Identification Risk Assessment HIRA). The results of this ranking can be found in Section 2 of this report. In addition, each municipality was requested to individually assess what they had achieved from the prior plan, and which actions were still relevant. As of this meeting, only 2 of the 4 municipalities provided this information.

The third Planning Committee meeting was held on November 18, 2025. At this meeting a draft plan was reviewed and additionally needed information/data was identified to complete the final draft. Additional actions were also discussed and added to the plan based on work/research performed by committee members prior to this meeting.

A fourth meeting was held on January 28, 2026 to review and finalize Action Steps for the revised Morgan Co. MHP. A few additional technical items were requested from the communities to complete the plan.

The final draft Morgan Co Hazard Mitigation Plan update (2026-2030) was presented to the Morgan Co Commissioners on 3/2/2026 in a fully advertised public meeting. Local media was in attendance.

Table 1.11-Plan Participation by Jurisdiction

Jurisdiction	9/23/25	10/28/25	11/18/25	1/ 28 /26
Morgan Co	X	X	X	X
McConnelsville		X	X	X
Malta	X	X		X
Stockport		X		X
Chesterhill	X	X	X	X

*Includes participation by surveys, emails and phone calls

The existing Hazard Mitigation Plan could be viewed at the State of Ohio EMA website at https://sharpp.dps.ohio.gov/OhioSHARPP/Search/Results/LHMPs.aspx?type=county&name=Morgan.
Two public notices announcing the availability of the Plan Update for public review and comment was advertised in the Morgan County Herald on 2/ /2026 and 2/ /2026. A link to the web site draft plan was posted on the Morgan County EMA website and social media as well as all local jurisdictions' and county agencies' websites and social media where available. Presentation on the plan was made to the County Commissioners on March 2, 2026. The comment period lasted for 30 days from 3/3/2026 to 4/2/2026. Printed copies of the Plan Update are available at the County EMA office, County Commissioners' Office, all local jurisdiction offices and the 2 public libraries (McConnelsville and Chesterhill). No comments on the plan were received. Following final federal approval, a copy of the final plan will be made available to all interested parties including all municipalities in Morgan County and neighboring jurisdictions.

1.4 Integration with Existing Plans

Integration with other planning mechanisms is an important factor in the successful implementation of mitigation strategies. Neither the County nor its jurisdictions undertake organized planning activities or development initiatives and there are no planning commissions or boards. Morgan County and its jurisdictions are not zoned. Individual agencies within the county conduct planning as required by state law such as the EMA, County Health Department and local utilities. These initiatives may include standard operations plans, emergency response plans or others deemed necessary. The County EMA will lead the effort to ensure that hazard mitigation is considered across all other planning efforts when or if they are undertaken. The EMA Director will provide information to all local jurisdictions and agencies about hazards, risks and vulnerabilities and promote mitigation planning and its inclusion in plans, procedures, guidelines and priorities.

Below is a list of planning documents that are available in Morgan County:

- Morgan County Hazard Mitigation Plan (2020)
    - This plan provides an update to the 2013 Plan.
- Morgan County Emergency Operations Plan (April 2006, currently being updated)
    - The county will strive to include hazard mitigation actions in its emergency operations plan updates.
- Morgan County Economic Development Strategic Plan (2017)
    - While there is no formal economic development entity in Morgan County, the County Development Office maintains this plan on behalf of the County Commissioners. The County EMA will work with the Development Office to ensure that commercial and industrial expansion does not occur in areas that are vulnerable to disruption or damage from hazards, ensuring resiliency in attracting, expanding and retaining business and industry.
- Morgan County Health Department Emergency Operations Plan
    - The County EMA participates with the local Health Department during its emergency operations planning updates to ensure that hazard mitigation activities are considered when dealing with public health emergencies.
    - Annex H1: Medical Material Dispensing (updated 2/2025) Disaster Preparation and service delivery strategy. Includes emergency declaration process and partnership with EMA.
- Asset Management Plans of all public water systems in the county as required by Ohio EPA.
    - The current hazard mitigation plan considers actions to provide continued utility operations during a hazard event. The County can work with local jurisdictions to ensure these actions are part of their asset management programs. The county can also assist with the development of policies that can protect utilities and other critical infrastructure from the effects of hazards.
- Morgan County and Local Floodplain Regulations
    - Each required entity has formally adopted floodplain regulations by Resolution or Ordinance and update them as new maps are released. The County floodplain manager

and GIS coordinator are part of the County Engineer's office, as such, lenders and developers work with the floodplain manager to ensure compliance with flood prevention regulations while the GIS specialist ensures maps are accurate and up to date. The County EMA can work with the floodplain manager to ensure continued NFIP compliance and provide public information and education.

In addition, the 2024 Ohio State Hazard Mitigation Plan was consulted to assist with background information and hazard identification.

Unlike larger counties in Ohio, Morgan County and its jurisdictions have very limited technical and financial capacity to address hazard mitigation issues.

Considering the low population numbers, a median household income (MHI) of $55,971, which is 24% lower than the Ohio MHI of $73,770, and 15.7% of the population living below poverty level, the County and its jurisdictions do not have much flexibility in financial assets to accomplish mitigation tasks on their own. Below is a summary of their capabilities:

Table 1.11: County and Jurisdiction Hazard Mitigation Capabilities

COMMUNITY	PLANNING COMMISSION	COMPREHENSIVE PLANS	FLOODPLAIN REGULATIONS	BUILDING CODES[1]	ZONING ORDINANCES	CAPITAL BUDGET[2]	PUBLIC WORKS BUDGET[2]
Morgan County	YES	(none)	YES	YES	(none)	(none)	Limited in-kind wages only.
Village of Chesterhill	YES	YES	(none)	(none)	(none)	YES	Limited in-kind wages only.
Village of Malta	(none)	YES	YES	YES	(none)	(none)	YES Front and 2nd drainage
Village of McConnelsville	YES	YES	YES	YES (SEOH Bldg. Dept)	(none)	(none)	Limited in-kind wages only.
Village of Stockport	(none)	YES	(none)	YES	(none)	(none)	Limited in-kind wages only.

[1] All jurisdictions within the state now follow the State Building Code, with construction plans submitted to the Mid-East Ohio Building Department. (Ohio Administrative Code 4101:1.)

2. Budget that would allow the jurisdiction to devote financial resources toward hazard mitigation activities

1.5 Plan Maintenance and Project Monitoring

The planning period for the Morgan County Hazard Mitigation Plan is five years. This planning cycle is consistent with FEMA requirements. The Director of the Morgan County Emergency Management Agency (herein after referred to as "Director") is solely responsible for the maintenance of the Hazard Mitigation

Plan. The Director will facilitate a planning evaluation meeting with members of the Hazard Mitigation Planning Committee as needed, especially during periods following a disaster event, but at least annually. The Director will be responsible for contacting committee members and organizing the evaluation meeting. The meeting will be announced by invitation and advertised in advance by newspaper (Morgan Co Herald), EMA website postings and other social media. The Committee, at a minimum, will consist of the following individuals:

- Morgan County EMA Director
- Morgan County Sheriff or representative
- Morgan Commissioners or representative
- Village of Malta Mayor or representative
- Village of McConnelsville Mayor or representative
- Village of Stockport Mayor or representative
- Village of Chesterhill Mayor or representative
- Morgan County Engineer or representative
- Malta/McConnelsville Fire Department
- Morgan Co Health Department

The Committee will utilize these meetings to evaluate the Hazard Mitigation Plan and how disasters affected their respective jurisdictions during the period. Prior to the annual meeting, the committee members shall review their mitigation sections for any changes needed. Local committee member representatives shall keep a log of natural disasters in their jurisdiction, including financial loss information, if available, to discuss at the annual meeting. After the meeting, the jurisdictions will adopt any changes made to the Plan.

The Director will regularly stay in contact with each jurisdiction to address preparation and education issues regarding hazard events within the County and its municipalities.

The Planning Committee, led by the Director, will also be responsible for updating the Hazard Mitigation Plan before the five-year planning cycle expires. The Planning Committee will be responsible for developing a funding source, procurement of services and preparation of the scope of work for future plans, if necessary.

Continued Public Involvement

Any future Hazard Mitigation Planning Committee meetings will be advertised to the public by local media and public postings. The public is encouraged to attend and participate in any Plan updates. Any community surveys of residents will be utilized as needed as determined by the Director.

Copies of the updated Hazard Mitigation Plan will be available at each municipal office, the Morgan County Commissioners Office and the Morgan County Emergency Management Agency office.

2.1 OVERVIEW

Morgan County is susceptible to hazards, both natural and man-made that impact the County and its jurisdictions. The County has experienced hundreds of events that has resulted in millions of dollars in damage but only limited physical injuries or loss of life. This risk analysis will identify those natural hazards that have affected the county in the past and will likely continue to affect Morgan County and its jurisdictions in the future. According to the FEMA Local Hazard Mitigation Planning Handbook, the steps to conduct a risk analysis include:

1. Hazard Identification of type and extent
2. Identify community assets
3. Analyze risk by evaluating vulnerable assets, describing potential impacts and estimating losses for each hazard identified
4. A summary of each jurisdiction's vulnerability

2.2 Hazard Identification and Prioritization

Morgan County is vulnerable to many hazards that disrupt life and property. Hazards may affect Morgan County throughout the entire year. The County developed a Hazard Risk Assessment, which identified 9 of 15 potential natural hazards that either have affected or may affect Morgan County. These hazards were identified through a process that included planning committee input, public and stakeholder survey input, empirical data, historical occurrences and researching the susceptibility of locations within the County to individual hazards. Identified hazards were ranked and prioritized based on a pre-determined set of criteria. This criterion included location, extent and probability of future occurrence, and the composite score of identified hazards and their respective rankings follows.

Morgan County, Ohio October 2025
Hazard Identification and Risk Assessment (HIRA)
Prioritization Rankings

The information contained in each hazard profile is used to prioritize each hazard. A total priority score was assigned to each hazard type based on a combination of five (5) factors of the natural hazard:

- Probability of future occurrence
- Impact
- Geographical Extent
- Warning Time

- Duration of the potential natural hazard event

Using the nationally recognized Hazard Identification and Risk Assessment (HIRA) methodology, the Planning Team will be scoring of each hazard component, based on a five (5) point scale, was as follows:

Probability of Occurrence

5: The historical records indicate the natural hazard has occurred ten or more times over a one-year period.
4: The historical records indicate the natural hazard has occurred at least ten times over a ten-year period.
3: The historical records indicate the natural hazard has occurred more than one but less than ten times over a ten-year period
2: The historical records indicate the natural hazard has occurred on average one time over a ten-year period
1: The historical records indicate the natural hazard has occurred less than one time over a ten-year period

Impact

5: The occurrence of the natural hazard has in the past resulted in deaths and/or injuries and extensive property damage in the millions of dollars and at least one record from the past that resulted in the declaration of a Federal Disaster. The affected community would need outside assistance to recover from this event. There is a large potential for critical facilities to be affected that could exaggerate the impacts of the event through the community.

4: The occurrence of the natural hazard has not in the past but could in the future result in the deaths and/or injuries and has in the past resulted in extensive property damage in the millions of dollars. The affected community would need outside assistance to recover from this event. There is large potential for critical facilities to be affected that could exaggerate the impacts of the event throughout the community.

3: The future occurrence of the natural hazard could result in deaths and/or injuries, but extensive property damage to only specific areas within the community would be expected.
There is a small potential for critical facilities to be affected. The occurrence likely would require local multi-agency and multi-jurisdictional assistance for recovery.

2: The future occurrence of the natural hazard would not result in deaths and/or injuries, and property damage would be localized and limited. There is a small potential for critical facilities to be affected. The occurrence would be treated as a local emergency and likely would not require multi-agency and multi-jurisdictional assistance for recovery.

1: The occurrence of the natural hazard in the future would not result in deaths and/or injuries, and property damage would be minimal or unlikely. There is no potential for critical facilities to be affected. The occurrence would be treated as a local emergency and would not require multi-agency and multi-jurisdictional assistance for recovery.

Anticipated Geographic Extent

5: The future occurrence of the natural hazard may affect multiple sites in six or more townships, or approximately one-half the entire county.
4: The future occurrence of the natural hazard may affect multiple sites in at least one but less than six townships
3: The future occurrence of the natural hazard may affect individual sites in at least one but less than six townships
2: The future occurrence of the natural hazard may affect multiple sites in one township; however additional townships would not be affected

1: The future occurrence of the natural hazard may affect an individual site in only One Township

Warning Time
5: No warning
4: Limited warning, which allows some personal safety precautions
3: Limited warning which permits some property and personal safety precautions
2: Adequate warning, which allows time to move, secure, or protect property and people.
1: Clear and predicable warning time for everyone, including vulnerable populations to prepared

Duration of the Potential Natural Hazard Event
5: Event duration of more than 1 month
4: Event duration of more than 1 week
3: Event duration of about 1 week
2: Event duration of more than 24 hours
1: Event duration of less than 24 hours

Based on this process, the Planning Committee reviewed historical data from NOAA and NRI and calculated the risk and priorities of the following hazards.

Morgan Co Hazard Identification and Risk Assessment (HIRA) Table 2.1

Hazard	**Probability .3**		**Impact .3**		**Geographic Extent .2**		**Warning Time .1**		**Duration .1**		**Total Score**	**Ranking (1 most risk)**
Flooding	4	1.2	4	1.2	4	.8	2	.2	5	.5	3.9	1
Winter Weather	3	.9	3	.9	5	1.0	4	.4	3	.3	3.5	3
Land Subsidence/Slips/Erosion	3	.9	2	.6	3	.6	2	.2	2	.2	3.1	7
Strong Winds	3	.9	3	.9	5	1.0	4	.4	2	.2	3.4	4
Drought/Extreme Heat	2	.6	1	.3	5	1.0	1	.1	5	.5	2.5	12
Tornado	3	.9	3	.9	3	.6	4	.4	1	.1	2.9	9
Severe Summer Storms incl Hurricanes	3	.9	3	.9	5	1.0	3	.3	2	.2	3.3	6
Wildfires	3	.9	1	.3	3	.6	5	.5	2	.2	2.5	11
Dam Failure	2	.6	3	.9	3	.6	3	.3	3	.3	2.7	10
Invasive Species	4	1.2	2	.6	5	1.0	1	.1	5	.5	3.4	5
Hazmat	3	.9	4	1.2	2	.4	5	.5	1	.1	3.1	8
Epidemic	2	.6	5	1.5	5	1.0	3	.3	5	.5	3.9	2
Earthquakes	1	.3	4	1.2	5	1.0	5	.5	1	.1	3.1	7

The following potential natural hazards were not reviewed and evaluated as follows Table 2.2:

Table 2.2

Hazard	Reason not Included in Risk Evaluation
Avalanche	Morgan Co does not contain any geographic features that could lead to

	this hazard
Coastal Flooding	Morgan Co is inland, and hundreds of miles form an coastal area (Lake Erie + 140 miles, Atlantic Ocean +450 miles)
Tsunami	Morgan Co is not located in a tsunami zone
Volcanic Activity	Morgan Co is not located in an area of volcanic activity

The following hazards have been reviewed and were included in the prior Hazard Mitigation Plan, but are not included in this plan (Table 2.3).

Table 2.3

Hazard	Reason not Included in Hazard Mitigation Plan
Epidemic	Following the COVID 19 epidemic, the Morgan Co Health Department revised their plans. Those plans are referenced herein and that work does not need to be duplicated
Invasive Species	While potentially a natural hazard, the planning committee found no evidence it is a serious issue in the County, and decided they should use their limited time and resources to address more pressing hazards
Earthquakes	While earthquakes are possible hazards for the county, there is no historical evidence (USGA 1776-2007) of any earthquake impacts and the Planning Committee did not believe they could enact any actions that could mitigate such an event. Further, other than a few agricultural buildings, Morgan Co has NO building above 4 stories tall. The Opera House is 3 stories. Structures 6 stories or taller are more at risk due to earthquake caused frequency/wave amplification
HazMat	Hazard Materials (HazMat) events/ incidents are addressed in the Morgan Co Emergency Operations Plan and do not need to be duplicated in this Hazard Mitigation Plan

The top identified hazards were also ranked and identified for each Morgan County's jurisdiction, based on surveys completed by leaders in each community.

Table 2.4-Summary of Prioritized Rankings by Jurisdiction

	Landslides	Severe Summer Storms	Severe Winter Weather	Drought and Extreme	Flooding	High winds	Hailstorm	Erosion	Epidemic	Earthquake	Hazardous Materials	Wildfire	Dam Failure	Mine Subsidence	Tornado	Sink Holes	Invasive Species
McConnelsville			3		1	2											
Malta		3		2	1												

Chesterhill	3	2	1
Stockport	2	1	3

The Planning Committee, based on historical data and stakeholder input, has determined that the natural hazards that have the highest probability of occurrence and the greatest documented impact to people and property are as follows and will be analyzed in detail:

1. Flooding
2. Severe Winter Weather (includes blizzards, heavy snow, cold/chill, extreme cold, ice and hail)
3. Strong winds/Tornadoes
4. Severe Summer Storms (including thunderstorms, hurricanes, strong winds, hail, and heavy rain)
5. Land Subsidence/ Slips/Erosion, specifically road slips
6. Dam Failure
7. Wildfires
8. Drought and Extreme Heat

Individually, these hazards may affect the County and its municipalities in varying degrees of severity, which will be addressed in subsequent sections of the Plan update.

Disaster Declarations and Public Assistance

Morgan County has received 5 federal disaster declarations and financial assistance since 2012 due to natural hazard events. Table 2.5 below summarizes these declarations.

Table 2.5: Federal Disaster Declarations in Morgan County

DR Number	Declaration Date	Incident Type
DR-4507	March 31, 2020	Ohio COVID 19 Pandemic
DR-4447	September 2019	Storms/flooding
DR-4424 Public Assistance:	April 8, 2019	Severe storms, flooding, landslides
DR-4360 Public Assistance:	April 17, 2018	Severe storms, landslides and mudslides
DR-4077	August 20, 2012	Severe storms and straight-line winds

Since 2012, Morgan County has also been included in 10 USDA disaster declarations for crop losses due to natural disasters as shown in Table 2.5 below.

Table 2.5: USDA Disaster Declarations in Morgan County

Designation Number	Declaration Date	Incident Type

	September 2024	Drought (Morgan is 1 of 22 counties)
	May 1, 2020	Contiguous Co. Excessive moisture and rainfall
S-4486	June 25, 2019	Excessive rain and flooding
S-4498	July 25, 2019	Extreme cold, excessive rain, flooding and polar vortex
S-4532	September 6, 2019	Excessive rain and flooding
S-4539	October 4, 2019	Excessive rain and flooding
S-4541	October 3, 2019	Excessive rain and flooding
S-4131	January 1, 2017	Drought (2016)
S-3934	November 18, 2015	Excessive rain, flash flooding, flooding, excessive heat, landslides, mudslides, high winds, hail and lightning
S-3384	September 5, 2012	Drought and excessive heat

Climate Change Impact

Climate change describes a change in the average global or regional climate patterns such as temperature and rainfall, over a long period of time. The Earth's average temperature has risen by 1.5 degrees F and is projected to rise another 0.5-8.5 degrees F over the next 100 years. Even small increases in average temperatures can translate to large and potentially dangerous shifts in climate and weather patterns (https://19january2017snapshot.epa.gov/climatechange/climate-change-basic-information). The County does not consider climate change in and of itself to be a natural hazard, however it is obvious that its impacts are felt due to increasing rain, snow, flooding and extreme temperature events over time.

The following climate change impact information is based on data from First Street
https://firststreet.org/countyMoran County-Ohio/**39115** and
FEMA Climate Mapping for Resilience and Adaption (CMRA)
http://livingatlas.arcgis.com/assessment-tool/explore/details
First Street provides risk assessment data to insurance companies and other risk assessments Organizations.

Heat and Cold Risks Table 2.6
Overall: Moderate heat risk for all Morgan Co Properties

Indicator	**Modeled History (1976-2005)**	**30 Yr. Estimate (2015-2044)**
Annual Days > 90f	17	30-32

Annual Days > 100f	1.3	1.9
Annual days > 125f	0	0
Annual Days temp below 32f	NA	NA
Avg annual total precipitation (inches)	41.3	41.5
Days of Precipitation	199	199

This data suggests an 182% increase, over the next 30 years of temperatures over 90f, and a 46% increase in days over 100f. Average rainfall quantity and days of rain are projected to hold steady over the next 30 years.

Flood Risk

Overall: Major or high risk of flooding for 3,491 of 19,060 properties
(Risk constant over next 30 years)

- 1,750 of 19,060 properties in Special Flood Hazard Areas (Zones A or V)

With steady projected total rain and the number of rainy days steady, flood risk, while high in Morgan Co, will not likely get worse.

Wildfire Risk

Overall: Moderate 13,456 of 19,060 properties at some risk of being affected by wildfire over the next 30 years.

- Residential risk 9,266 of 13,118 homes at risk (in 30 years, all properties at risk)
- Commercial 115 of 411 properties at risk**;**
- Social 13 of 85 properties at risk;
- Infrastructure 17 of 37 properties at risk

Wildfire Historic Loss Data from Ohio Department of Natural Resources (ODNR) Division of Forestry Table 2.7

Year	Wildfire Acreage Burned	Deaths/Injuries	Destroyed Buildings
2020	. 50	0/0	0
2021	14.25	0/0	0
2022	29.60	0/0	1
2023	11.00	0/0	0
2024	7.30	0/0	0
2025	18.50	0/0	0

While wildfires have not caused any significant damage or injuries in Morgan Co historically, computer model projects suggest that more/all of the county's structure will be at risk for wildfire impact over the next 30 years.

Wind Risk

Overall: Minor 0 of 19,060 properties at risk for moderate, major, severe, or extreme wind

Risk. Current wind gusts 51 mph (58mph in 30 years)

With no real current risk of serious wind damage, and a projection of only minor wind speed average gains, future climate impact from winds is still minimal.

Future Growth

Significant population growth is not expected to occur in Morgan County. In general, population in the County and its jurisdictions is relatively stable and has trended toward decline during the past 100 years. In addition, OSDA population projections predict a continued downward trend in total population over the next 20 years as discussed in Section 1. Any potential future growth is anticipated to follow current and historic patterns and is not expected to contribute significantly to the impacts of hazard events in the County.

Critical Facilities

When assessing the impacts of natural disasters, one important factor lies in the vulnerability of critical facilities and their potential for being severely impacted by a disaster. Critical facilities are considered those that provide essential services to the community,

All the critical facilities within Morgan County (schools, hospitals, water treatment plants, airports, police and fire stations, nursing homes, etc.) and any other facility deemed a critical facility for the county are summarized below.

Morgan EMA maintains this information in their Resource Document, which is for government use only.

Ohio Revised Code (ORC) Section 149.433 Exempting Security and Infrastructure Records, requires that sensitive infrastructure information not be made public.

ORC 149.433 states," Security record means any of the following:
(2) Any record assembled, prepared, or marked by a public office or public body to prevent, mitigate, or respond to an act of terrorism.
B (1) Except as otherwise provided in (B) (4) of this Section, a record kept by a public office that is a security record is not a public record under Section 149.43 of the Revised Code and is not subject to mandatory release or disclosed under that section".

The following chart shows a summary of the county and jurisdictional assets identified in Morgan County.

Table 2.8 Summary of Critical Facilities in Morgan County OH

Property	Count
Airports	1
Cultural Resources	14
Dialysis Centers	0
Fire EMS	6
Government Buildings	22
Hospitals	0
Industries	8
Libraries	2
Nursing Homes	2
Police	5
Post Offices	4
Radio/TV	0
Schools	5
Wastewater Plant	3
Water Plant	2
Total Critical Facilities	**74**

Morgan Co EMA maintains details of these critical facilities in their office, which is for government use only.

Ohio Revised Code (ORC) Section 149.433 Exempting Security and Infrastructure Records, requires that sensitive infrastructure information not be made public.

ORC 149.433 states," Security records means any of the following:

(A) Any record assembled, prepared, or marked by a public office or public body to prevent, mitigate, or respond to an act of terrorism.

(B) Except as otherwise provided in (B) (4) of this section, a record kept in a public office that is a security record is not a public record under Section 149.43 of the Revised Code and is not subject to mandatory release or disclosure under that section".

2.3 HAZARD DESCRIPTIONS

2.3.1 Flooding

A flood is an overflow of water from the banks of a river or the shores of lakes and oceans that submerges land that is usually dry, known as the floodplain. Flooding normally occurs due to excessive precipitation and is dependent on many factors, including drainage basin characteristics, antecedent soil moisture conditions, weather patterns, land cover, urbanization, and many others. Flooding is considered the most frequent and costly natural hazard in the United States.

According to the National Severe Storms Laboratory, there are 6 types of floods: riverine, coastal, storm surge, inland and flash flooding. River flooding occurs when water levels rise over the top of riverbanks

due to excessive rain from tropical storm systems, persistent thunderstorms over the same area for an extended period, combined rainfall and snowmelt or an ice jam. A coastal flood is caused by higher-than-average high tide and worsened by heavy rainfall and onshore winds. Storm surge is an abnormal rise in water in coastal areas over and above the regular astronomical tide caused by forces generated from the winds, rains, and low atmospheric pressure of a severe storm, generally a hurricane. Extreme flooding can occur over a large area especially when storm surge coincides with normal high tide. Inland flooding occur when moderate participation lasts over several days, intense precipitation falls over a short period of time or a river overflows because of an ice jam, debris flow or a dam or levee failure. A flash flood is caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours. Flash floods are generally characterized by raging torrents after heavy rains rip through river beds, urban streets or mountain canyons (https://www.nssl.noaa.gov/education/svrwx101/floods/types/). The primary types of flooding that affect Morgan County are flash flooding and riverine.

Location

Morgan County is in 2 watersheds: Muskingum and Hocking Rivers. The County is susceptible to flooding along the paths of the Muskingum River, which flows near the Villages of Malta, McConnelsville and Stockport and often floods the section of State Route 60 that runs adjacent to the river just within the northern corporate limits of McConnelsville. Flooding of Wolf Creek is also often reported to the north of the Village of Chesterhill along the intersection of County Roads 82 and 52. A section of County Road 42 that runs adjacent to Bald Eagle Run, near the Village of Stockport is also often affected by riverine flooding.

Figure 2.1: Morgan County Watersheds

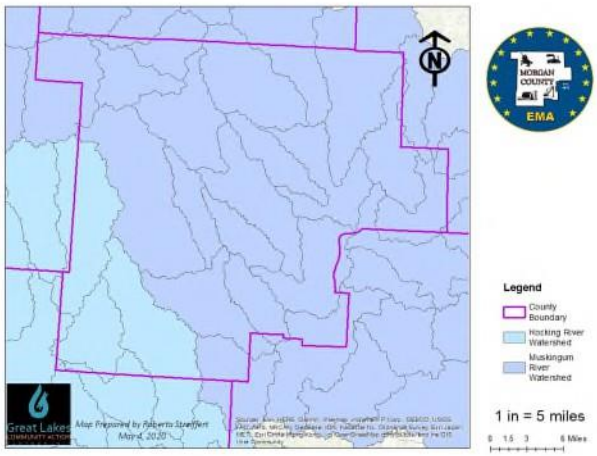
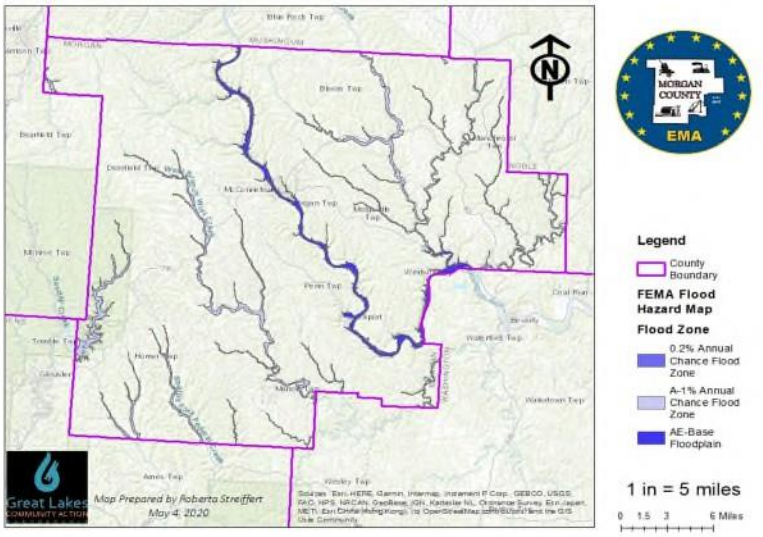


Figure 2.2: FEMA Flood Hazard Map



Morgan County has 62 miles of floodplain associated with the Muskingum River and its tributaries. Areas near the path of the Muskingum River are particularly low-lying areas. The Villages of Stockport and Chesterhill appear to be moderately susceptible to flooding in general terms. However, the Village of McConnelsville, which is in a low-lying area along the Muskingum, appears to be especially susceptible to flooding. The Village of Malta, which also contains many low-lying areas along the river, is also susceptible to the effects of flooding. Many areas in these villages that are repeatedly flooded are above Muskingum Lock and Dam No. 7, which is located just south of

McConnelsville. However, while flooding is a prominent hazard in these villages, the critical facilities located in them, such as the Malta-McConnelsville Fire Department are located above the floodplain.

Morgan County and its jurisdictions participate in the National Flood Insurance Program (NFIP), except for the Village of Chesterhill where no floodplain areas are mapped. Table 2.18 provides the NFIP status for communities in Morgan County based on the Community Status Book dated 6/2/2020. Participation in this program allows for the provision of flood insurance for vulnerable properties in the County.

Table 2.9: NFIP Community Status Report

Community	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Reg-Emer Date	CID
Morgan County	1/10/1975	11/2/1990	9/19/2012	11/2/1990	
McConnelsville	5/17/1974	7/1/1987	9/19/2012	7/1/1987	39115 C0161-164
Malta	4/5/1974	9/1/1987	9/19/2012	9/1/1987	39115 C 0161D/ 0163D
Stockport	8/30/1974	8/1/1987	9/19/2012	8/1/1987	39115 C 0291D
Chesterhill	n/a	n/a	9/19/2012	n/a	

Morgan County has completed its map modernization program as required by NFIP Compliance. Development of floodplain areas in the County are regulated by Resolution # 2012-266 and are based on the state minimum requirements for development. This Resolution regulates any and all new construction within a floodplain in the County. All other jurisdictions within Morgan County have adopted similar regulations. These rules were adopted and are enforced as part of the county's continuing participation in the National Flood Insurance Program. Flood hazard areas within the County (both incorporated and unincorporated) are identified by the Federal Emergency Management Agency (FEMA) from Flood Insurance Studies conducted by the Ohio Department of Natural Resources. Flood Insurance Rate Maps (FIRM) and other flood data form the foundation of these reports.

Educational information for citizens on post-flood disaster activities (cleanup procedures, managing water/food supplies contaminated by flood waters, etc.) are also available from public entities such as the Morgan County Health Department and the Morgan County Emergency Management Agency.

The Morgan County Emergency Management Agency's *Emergency Operations Plan* addresses mitigation activities for flooding from both preventative and response perspectives. Information from the National Weather Service to County citizens is provided through the Morgan County Emergency Management Agency's Emergency and Mass Notification System, local news media, and the National Oceanic and Atmospheric Administration (NOAA) weather radio system.

Additionally, Manufactured Home Park Rules (Chapter 3701-27 of the Ohio Administrative Code) require that all manufactured homes placed within a manufactured home park in a 100-year floodplain after November of 1992 must comply with stipulated blocking requirements. The rules also require that all manufactured homes placed in a manufactured home park after June 1, 1979, must secure the home with tie-downs in accordance with manufacturer's specifications.

High Risk Census Tracts Table 2.10

Based on FEMA HAZUS data (12/7/2021) high risk census tracks for economic loss at different flooding levels:

Census Blocks	$ Damage at 9 ft	$ Damage at 12 ft	$ Damage at 15 ft	$ Damage at 18 ft
391159689003015	3.14m	5.33m	7.48m	9.14m
391159691002023	643k	1.63m	3.37m	5.04m
391159689004026	514k	737k	1.97m	5.13m
399115969003039	163k	702k	1.68m	3.2m
391159689004001	135k	396k	--	--
391159691002006	128k	350k	1.76m	4.47m
391159689001068	135k	336k	--	--
391159689003057	--	--	1.64m	4.18m
391159689004029	--	--	1.25m	--
391159689002022	--	--	--	2.94m

History

The County has a long history of flooding events of 25 and 100-year returns. According to the NOAA Storm Event Record, there have been 42 flooding events in the County from 3/1/1997 to 4/2/2024. Recent events include a strong cold front resulting in strong thunderstorms on 4/2/2024 causing flooding in Durant which resulted in $10,000 worth of damage. A slow-moving cold front on 2/18/2022 produced 2-3 inches of rain in McConnelsville causing sections of State Routes 78, 376 and 669 to close due to high water. Property damages were reported in the amount of $10,000. On 3/20/20 a low pressure system moved into the area that generated showers and thunderstorms resulting in flash flooding around in Malta. This event caused $25,000 in damage. Heavy rains on 8/8/19 2 led to flash flooding in Chesterhill. The event caused $10,000 in damage.

Major flooding events in the County in January and June 1998 resulted in a Presidential Disaster Declaration made on June 28, 1998 from a severe thunderstorm with 3-day rain totals of 6 to 12 inches. The lower Muskingum crested 1 to 2 feet above flood stage from McConnelsville towards its mouth in Washington County. There have been 3 other major flooding events since 1999 as documented by local officials. Two of these events occurred in January 2005, whereby excessive snowmelt caused significant flooding along State Route 60 and one occurred in October 2004. According to the *National Climate Data Center's Storm Events Database*, there were 6 reports of flooding events in Morgan County between October 1, 2006 and July 30, 2012. One event occurred on 1/15/07 in Eagleport. Excessive rains flooded creeks and streams feeding into the swollen Muskingum River causing numerous road closures. No evacuations were required, and flood damage was minimal. In 2008, on 3/4 and 3/19 flooding occurred in Durant and Deavertown. In both events, small stream flooding from excessive rains led to road closures and limited damage. On 5/2/2010, a flood event occurred in Bishopville. Small stream flooding due to excessive rains led to road closures, some small bridges and culverts were washed out causing approximately $15,000 in damage. Two men drowned in Morgan County near the Athens County line when their car was washed away while on a fishing trip. Two flash flood events were reported in Morgan County on 7/3/2011 and 8/25/2011. Both of these events occurred in Bishopville and were caused by heavy rains that fell and caused localized flooding of roads and small streams.

The County has received 3 disaster declarations for flooding.

January 2004 (DR-1507).

Extended rains during the period of January 3-5, 2004 led to high water and flooding in a number of counties across Ohio extending from Hamilton County in the southwest to Jefferson and Columbiana Counties in the northeast. Although the National Weather Service reported that the rain had stopped, rivers rose until cresting occurred on January 11, 2004. When the Muskingum River was near flood stage, the County requested, and received, assistance from Ohio National Guard in evacuating several people, including a dialysis patient transported to a hospital in Zanesville. With closings on SR 376 South of McConnelsville, SR 669, Eagleport to Malta, SR 60 in downtown McConnelsville, SR 78 between McConnelsville and SR 83, County authorities issued a Declaration of Emergency for the situation. A local shelter was opened in Malta following reports of residential damage in areas adjacent to the Muskingum

River. During recovery from this event, Morgan County received public assistance in the amount of $454,010. These funds were used to make road repairs where roads had slipped, to upgrade and repair culverts to improve drainage and to conduct a stream erosion stabilization project.

August-September 2004 (DR-1556).
Remnants of Hurricanes Frances and Ivan crossed Ohio during September 2004, resulting in flooding in eastern Ohio and large amounts of rain to the entire eastern United States. Heavy rain moved into the East-Southeastern portions of the state on September 8 and 9. These rains led to flooding in 15 counties; including Morgan County. Several forecast points within Ohio were either already in flood or forecast to exceed flood stages within two days. Multiple township, county, and state roadways were subject to closings due to high waters.

Flooding occurred at additional points along the Hocking River, Tuscarawas River, Mahoning River, Muskingum River, Cuyahoga River, and Nimishillen Creek. Affected rivers crested in the evening of September 9. In Morgan County, flooding was reported in Deerfield Township, and McConnellsville. A preliminary estimate was made that 39 residential structures were damaged, but none were destroyed.

In McConnelsville, the Muskingum River crested at 13.45 feet. This was the highest level since the 13.8 feet seen back in March 1964. Water rescues were performed by the Ohio Department of Natural Resources and the county sheriff's department. An 85-year-old woman was rescued from her flooded mobile home along the Muskingum River. She did not want to evacuate earlier and had her pets inside. When finally rescued, she was sitting on a chair, with water almost up to her knees. Her feet were swollen. She never recovered from the hypothermia and died several days later. A second crest would occur less than a week later, from additional rain and dam releases. In Morgan County, around 142 homes had minor damage. One furniture store in McConnelsville had flood waters inside. During recovery from this event, Morgan County received public assistance in the amount of $475,686. These funds were used to make road repairs where roads had slipped and to upgrade and repair culverts to improve drainage.

February 2005 (DR-1580).
Snowmelt and widespread precipitation began across Ohio in the evening of January 5, 2005 and continued for a few days. Temperatures in the northern part of the state (in areas north of I-70) were cold enough for freezing rain, sleet and snow. Rain showers, snow showers, or a wintry mix followed the front on January 7. This was due to an upper-level system and associated surface low pressure system, with a warm front that brought more precipitation back into Ohio. This new system moved rapidly through the Ohio Valley and added more precipitation. This latest system had greater effects on the southern part of the state than the last front that passed through the state. Flood watches and warnings were issued for parts of southern Ohio. A mixture of freezing rain, rain, and snow showers was forecast for northern parts of Ohio and a Winter Weather Advisory was issued for west central and northern central Ohio. Accumulations of up to 1 to 2 inches of snow were forecast in the north. A total of 62 Ohio counties were declared in this disaster. ODNR dispatched fast water rescue crews on January 6, 2005 to McConnelsville. It was reported that 10 families need to be evacuated due to rising water. Rescues crews from Cambridge and Alum Creek remained in to assist the McConnelsville Fire Department. ODNR's Team 3 was on scene and at the

Cottonwood trailer park located south of McConnelsville, checking trailers for possible occupants. During recovery from this event, Morgan County received public assistance in the amount of $1,185,036. These funds were used to make road repairs, including resurfacing, to roads damaged from flood waters. Funds were also used to install new culverts and repair and upgrade existing culverts to improve drainage.

Table 2.11-Flooding History (1997-2024)

Event	Total Incidents	Total Property Loss	Total Crop Loss	Total Deaths	Total Injuries
Flash Flooding	14	$985,000	0	0	0
Flood	28	$5,559,000	0	3	0
Total:	42	$6,544,000	0	3	0

Probability of Future Occurrences

Multiple flooding events are an annual occurrence, to varying degrees, in Morgan County.

Vulnerability Assessment and Loss Estimation

Loss estimates were calculated by HAZUS MH based on a 100-year flood event.

General Building Stock

HAZUS estimates that there are 8,272 buildings in the County which have an aggregate total replacement value of $1,459,000,000. Tables 2.20 represents the distribution of the value relative to general occupancy for Morgan County. Tables 2.12 and 2.13 show the distribution of potential property damage for the 100-year and 25-year flood events.

Table 2.12-Building Exposure by Occupancy for Morgan County

Occupancy	Exposure	Percent of Total
Residential	$1,152,454,000	79.0%
Commercial	$135,637,000	9.3%
Industrial	$87,087,000	6.0%
Agricultural	$20,313,000	1.4%
Religion	$27,875,000	1.9%
Government	$11,334,000	0.8%
Education	$24,335,000	1.7%
Total	$1,459,035,000	100%

Table 2.13-Building Exposure by Occupancy for 100-Year Flood

Occupancy	Exposure	Percent of Total
Residential	$591,118,000	83.7%
Commercial	$58,871,000	8.3%
Industrial	$30,715,000	4.3%
Agricultural	$9,161,000	1.3%

Religion	$6,974,000	1.0%
Government	$2,184,000	0.3%
Education	$7,440,000	1.1%
Total	$706,463,000	100%

General Building Stock Damage

HAZUS estimates that approximately 40 buildings will be at least moderately damaged, and 5 buildings will be completely destroyed during the 100-year flood event and 25 buildings will be moderately damaged and 4 buildings will be completely destroyed during the 25-year flood event. No damage to essential facilities are anticipated in either the 25 or 100-year flood scenario.

Debris Generation

HAZUS estimates the number of debris that will be generated by a flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). The distinction is made because of the different types of material handling equipment required to manage the debris.

During the 100-year flood scenario, the model estimates that a total of 4,831 tons of debris will be generated. Of that total, Finishes comprise 1,708 tons (35.3%), Structural comprises 1,659 tons (34.3%) and Foundations comprise 1,463 tons (30.2%). If the debris tonnage is converted to an estimated number of truckloads, it will require 194 truckloads (25 tons/truck) to remove the debris generated by a flood. In the 25-year flood scenario, the model estimates that a total of 3,368 tons of debris will be generated. Of that, finishes accounts for 1.365 tons (41%), Structural accounts for 1,033 tons (31%) and foundation accounts for 969 tons (29%), requiring 135 truckloads at 25 tons/truck to remove the debris generated by the flood event.

Shelter Requirements

HAZUS estimates the number of households that are expected to be displaced in a 100-Year flood event and the associated potential evacuation. HAZUS also estimates those displaced people that will require accommodation in public shelters. Based on the magnitude of the flooding, the following chart shows the number of displaced residents who may need shelter.

Table 2.14 Expected Displacement by flood inundation

9ft Displaced/Need Shelter	12ft Displaced/Need Shelter	15ft Displaced/Need Shelter	18ft Displaced/Need Shelter
20/0	63/0	154/7	257/19

Economic Loss

HAZUS estimates the total economic loss for a flood of this magnitude at 46.94 million dollars, which represents 6.64% of the total replacement value of the building losses, shown below in Table 4.8.

Building losses are broken into 2 categories: direct building losses and business interruption losses. The direct building losses include estimates to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with the inability to operate a business because of the damage sustained by a flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of a flood.

The total building related losses during the 100-year flood scenario are estimated at $31,170,000 and the business interruption losses are estimated at $15,760,000. These losses are summarized (in millions of dollars) in Table 2.15 below:

Table 2.15-Summary of Total Losses, 100 Year Flood

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	16.22	1.28	0.21	0.38	18.09
	Content	6.83	3.95	0.43	1.74	12.96
	Inventory	0.00	0.04	0.05	0.04	0.12
	Subtotal	23.05	5.28	0.69	2.15	31.17
Business Interruption						
	Income	0.01	3.79	0.01	0.60	4.41
	Relocation	4.03	0.55	0.00	0.25	4.83
	Rental Income	1.11	0.44	0.00	0.02	1.57
	Wages	0.02	3.32	0.01	1.60	4.96
	Subtotal	5.17	8.10	0.02	2.48	15.76
ALL	Total	28.22	13.38	0.71	4.63	46.94

The total building related losses during the 25-year flood scenario are estimated at $25,800,000 and the business interruption losses are estimated at $13,700,000. These losses are summarized (in millions of dollars) in Table 2.16 below:

Table 2.16 -Summary of Total Losses, 25 Year Flood

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	12.58	1.18	0.34	0.29	14.39
	Content	5.26	3.75	0.76	1.44	11.21
	Inventory	0.00	0.05	0.12	0.03	0.21
	Subtotal	17.84	4.99	1.23	1.75	25.80
Business Interruption						
	Income	0.00	3.38	0.01	0.52	3.91
	Relocation	3.29	0.50	0.01	0.25	4.05

	Rental Income	0.91	0.39	0.00	0.02	1.32
	Wages	0.01	3.03	0.02	1.37	4.43
	Subtotal	4.21	7.29	0.03	2.17	13.70
ALL	Total	22.05	12.28	1.26	3.92	39.50

Repetitive Loss Structures

The following table lists the properties by jurisdiction in Morgan County that have been identified as repetitive loss structures according to FEMA.

Table 2.17-Repetitive Loss Structures

Community	Mitigated	NFIP Insured	Occupancy	Rated Flood Zone	Total Payments	Average Payment	Total Losses
Morgan Co*	NO	NO	Single Fam	X	$23,744	$11,872	2
Morgan Co*	YES	NO	Single Fam	AE	$204,087	$51,022	4
Malta	NO	NO	Single Fam		$3,414	$1,707	2
McConnelsville	NO	NO	Condo	AE	$24,497	$8,166	3
McConnelsville	NO	YES	Single Fam	A	$17,251	$8,760	2
McConnelsville	NO	YES	Commercial	AE	$60,304	$20,101	3
Morgan Co	NO	NO	Single Fam		$3,803	$1,902	2
Morgan Co	NO	NO	Single Fam		$21,774	$7,258	3
Morgan Co	NO	NO	Single Fam		$15,280	$5,093	3
Morgan Co	NO	NO	Single Fam	AE	$41,443	$13,814	3
Morgan Co	NO	NO	Single Fam	AE	$33,546	$11,182	3
Morgan Co	NO	NO	Single Fam	AE	$39,968	$19,984	2
Morgan Co	NO	YES	Single Fam	A	$63,257	$21,086	3
Morgan Co	NO	YES	Single Fam	AE	$25,611	$12,806	2
Morgan Co	YES	NO	Single Fam	AE	$38,942	$12,981	3
Morgan Co	NO	NO	Single Fam	AE	$17,487	$8.744	2
Morgan Co	NO	NO	Single Fam	X	$40,982	$20,491	2
Morgan Co	NO	YES	Single Fam	AE	$24,824	$12,412	2
Morgan Co	NO	NO	Single Fam	AE	$36,432	$18,216	2
Morgan Co	YES	NO	Single Fam		$29,549	$14,774	2
Morgan Co	NO	NO	Single Fam	AE	$22,844	$11,422	2
Morgan Co	NO	NO	Single Fam	X	$13,741	$6,871	2
Morgan Co	NO	NO	Single Fam	AE	$73,354	$36,677	2
				TOTAL:	$876,405	$337,340	56

*Indicates a severe repetitive loss structure

Communities that are participating in the National Flood Insurance Program (NFIP) are required to adopt and enforce regulations and codes that apply to new development in Special Flood Hazard Areas (SFHAs). These local floodplain

management regulations must contain, at a minimum, NFIP requirements and standards that apply not only to new structures, but also to existing structures which are Substantially Improved (SI), or Substantially Damaged (SD) from any cause, whether natural or human-induced hazards. According to 44 CFR 59.1, Substantial improvement means any reconstruction, rehabilitation, addition or other improvement to a structure, the total cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement. Likewise, substantial damage means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. SI/SD requirements are also triggered when any combination of costs to repair and improvements to a structure in an SFHA equals or exceeds 50 percent of the structure's market value (excluding land value). Enforcing the SI/SD requirements is a very important part of a community's floodplain management responsibilities. The purpose of the SI/SD requirements is to protect the property owner's investment and safety, and, over time, to reduce the total number of buildings that are exposed to flood damage, thus reducing the burden on taxpayers through the payment of disaster assistance. SD/SI requirements are enforced by the local floodplain administrator and monitored by the Ohio Department of Natural Resources (ODNR) Floodplain Management Program during Community Assistance Visits. If a local floodplain administrator is overwhelmed by the number of SD/SI inspections after a large event, ODNR has developed a network of building code officials that are trained in conducting SD/SI field determinations. Help with SD/SI inspections can be requested through the county emergency management agency director. For more information regarding Substantial Improvement and Substantial Damage, please refer to FEMA's Substantial Improvement/ Substantial Damage Desk Reference, P-758 or contact the ODNR Floodplain Management Program.

2.3.2 Land Subsidence/ Slips/Erosion

According to the US Geologic Service (USGS), a landslide is defined as the "*movement of a mass of rock, debris or earth down a slope…under the influence of gravity"*. The term includes a wide range of ground movement, such as rock falls, deep failure of slope, slips and shallow debris flows. Landslides are influenced by human activity (mining, urbanization, railroads, deforestation and highways) as well as natural factors such as geology, precipitation and topography.

According to the Ohio Department of Natural Resources-Division of Geologic Survey, there are three types of landslides that occur in Ohio:

Rotational Slumps: this type of landslide is characterized by the movement of a mass of weak rock or sediment as a block unit along a curved plane. These slumps are the largest type of landslide in Ohio generally moving hundreds of thousands of cubic yards of material and extending for hundreds of feet. The crown or head consists of one or more scarps that form a stair-step pattern. The upper portion of these blocks are typically rotated backwards, forming depressions along which water can accumulate creating small ponds or swampy areas. The toe or downslope end of the slump is a fan-shaped, bulging mass of material characterized by radial ridges and cracks. Rotational slumps generally develop slowly and require several months or years to reach stability.

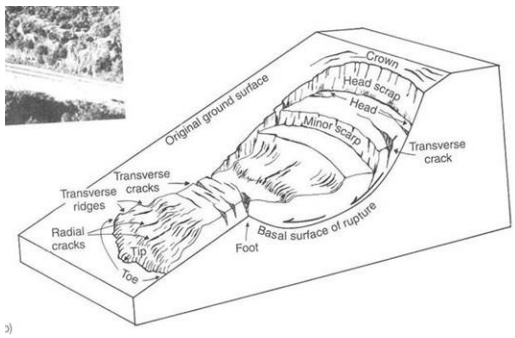
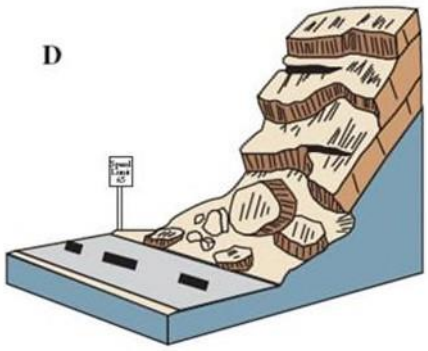


Figure 2.3-Rotational Slump
Source: www.people.uwec.edu

Earthflows: an earthflow involves a weathered mass of rock or sediment that flows down slope as a jumbled mass, forming a hummocky topography of ridges and swales. They are the most common form of landslide in Ohio, and most are generally small in size. They are most common in weathered surface materials and do not necessarily indicate weak rock. They are also common in unconsolidated glacial sediments. The movement of earthflows are quite slow.

Figure 2.4-Rockfall



Source: http://pubs.usgs.gov/fs/2004/3072/

Rock-falls: a natural process of cliff and hillside erosion that consists of the rapid movement of large rock fragments and earth materials. These materials suddenly become detached from a cliff or steep hillside, traveling downslope in a free fall and/or rolling, bounding or sliding manner. They can be a major hazard and threat to life, property and infrastructure. In Ohio, most rock-falls involve massive beds of sandstone or limestone where surface water seeps into joints and cracks in the rock increasing the weight of the rocks and causing expansion of the joints when the water freezes, thus prying rock from the main cliff. Weak and easily eroded clay or shale underneath the bed is also a contributing factor in a rock-fall.

According to ODNR, several geologic conditions contribute to landslides in Ohio. The presence of one or more of these conditions may indicate the potential for landslide hazards.

Steep slopes: all landslides move downslope under the force of gravity. Therefore, steep slopes, bluffs or cliffs are a requirement for the development of a landslide.

Jointed rocks: fractures in rocks allow surface moisture to penetrate the rock and weaken it. During periods of cold weather, this moisture freezes and causes the rock to be pried apart along the joint.

Fine-grained, permeable rock or sediment: these materials are particularly susceptible to landslides because large

amounts of moisture can easily enter the rock or sediment, causing an increase in weight, reduction of bonding strength and dissolution of grain-cementing materials.

Clay or shale subject to lubrication: ground water penetrating these materials can lead to loss of binding strength between individual mineral grains leading to lubrication between the rock and underlying clay or shale promoting failure of the slope.

Large amounts of water: periods of heavy rain or excess snowmelt can saturate the zone above the normal water level and cause a landslide.

In addition to the above geologic conditions, a triggering mechanism is required to initiate downslope movement. Events or circumstances that commonly trigger landslides in Ohio include:

Vibrations: human-induced vibrations such as those from blasting or heavy truck traffic can trigger a landslide in some circumstances. Vibrations from earthquakes can also trigger landslides although none have been documented in Ohio.

Over-steepened slope: undercutting of a slope by a stream or other human construction activities can disturb the equilibrium of a stable slope and cause it to fail.

Increased weight on a slope: the addition of large amounts of fill, construction of a building or other structure or an unusual increase in precipitation can trigger a landslide.

Removal of vegetation: cutting of trees or other vegetation on landslide-prone slopes can trigger failure as the roots tend to hold rock and sediment in place and soak up excess moisture.

Erosion

Erosion is a geologic process by which soil and rock particles are worn away and transported somewhere else by gravity or a moving agent such as wind, water or ice. The physical movement of rock and soil by gravity is called mass-wasting and include processes such as soil creep, rocks-falls, landslips and mudflows as described in detail above. Wind erosion is a serious problem in dry parts of the country, removing soil from farmland and covering large areas and towns with sand and dust. A strong breeze can easily pick up dry dust and fine sand whereby the lightest particles are swirled up into the air and can be carried hundreds of miles. Small pebbles can be moved along the sand in a process called creep. Erosion by water is the major agent of erosion, particularly in Ohio. Rainfall, rivers, floods, lakes and the ocean carry away millions of tons of sediment every day worldwide. Rainfall produces 4 types of erosion including splash erosion-the impact of a falling raindrop which can scatter tiny soil particles; sheet erosion-erosion by run-off; rill erosion-erosion that takes place as run-off develops into discrete streams; and gully erosion-soil particles are transported through large channels, for a brief period of time during rainfall events or snowmelts. Fluvial or river erosion occurs in several ways: abrasion or corrosion is where boulders or stones wear away the river bed and its banks; attrition is when sediment particles knock against the bed or each other and break becoming more rounded and smaller as they move down river; hydraulic action is when the force of fast moving water hits the bed and banks and forces water and air into cracks in the bedrock, causing the river bed to weaken; and solution or corrosion is where acidic water dissolves rocks such as chalk or limestone.

Coastal erosion occurs where ice erosion occurs in one of two forms, the movement of glaciers or thawing processes.

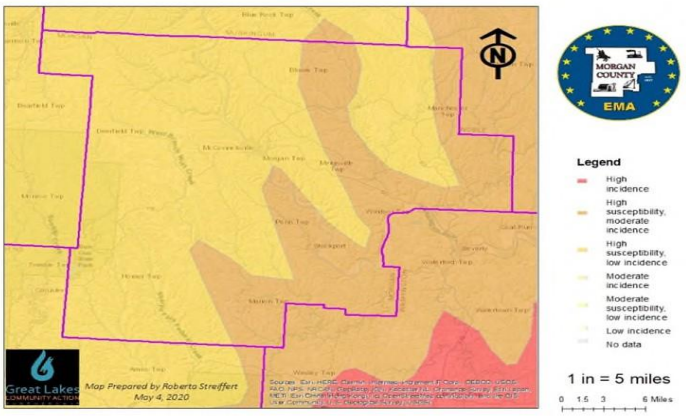


Figure 2.5: USGS Landslide Incidence and Susceptibility

Location

Morgan County is located in an area of high relief and is subject to landslides and erosion, particularly, road slips. The south and east portions of the County, generally paralleling the Muskingum River are more susceptible to landslides because of highway excavation, steep slopes and flooding incidents. Susceptibility to landslides is defined as the probable degree of response of the areal rocks and soils to natural or artificial cutting or loading of slopes or anomalously high precipitation. According to the United States Geologic Survey (USGS), *Landslide Incidence and Susceptibility Overview Map of the Conterminous United States*, Morgan County has a rating of high susceptibility with low to moderate incidence of landslides (see Figure 2.5 above).

The primary hazards associated with landslides in Morgan County are road slips and river erosion due primarily to flooding and heavy rains. These events are an annual occurrence in Morgan County and have been increasing in recent years, causing more damage than the county and its jurisdictions can feasibly repair on their own. Landslides and rock falls primarily damage state and local roads and can impede traffic creating concerns about the movement of emergency vehicles or the ability to evacuate people if necessary. River erosion is most significant around Malta and McConnelsville.

The entire County is subject to landslides, in all census tracts in the county.

The Villages of Malta and McConnelsville appear to be most susceptible to landslides due primarily to the movement of people and traffic in the area. Many structures in the Villages are located on relatively flat ground near steep slopes on land that is subject to slippage and or flooding. Areas along State Route 78 in McConnelsville are especially vulnerable to natural land subsidence. The Villages of Chesterhill and Stockport also report multiple road slips along area roadways. In addition, survey respondents reported increasing road slips in the County as a priority hazard of concern. Warning signs alerting motorists to the potential for slippage have been placed in appropriate locations in the County. Large landslides, carrying lots of debris and causing significant structural damage are not historically known to occur in the County.

Past Occurrences

Rock-falls and road slips are an annual occurrence in Morgan County with some events causing significant damage and inconvenience to residents. Most recently, Morgan County was included in a state disaster declaration (DR-4424) issued on April 8, 2019 for severe storms, flooding and landslides that impacted southern and southeastern counties in Ohio from February 5-13, 2019. The County received a total of $595,902.45 in disaster assistance as shown in Table 2.6.

Table 2.18-Morgan County Disaster Assistance (DR4424)

Jurisdiction	Total Eligible Projects	Total Obligated
County Engineer	13	$354,517.25
Bloom Twp	3	$19,886.37
Center Twp	2	$40,242.30
Morgan Twp	2	$34,161.91
Windsor Twp	4	$81,222.50
York Twp	2	$58,500.32
Marion Twp	2	$7,371.80

The Morgan County Herald reported on February 27, 2019 that State Route 376 was closed due to landslides in the area as a result of these rain events. The landslide was the largest the area has ever experienced measuring 600 feet long and 900 feet from the road to the top of the landslide. The road between McConnelsville and Stockport was closed for an extended period of time as continued land movement and large boulders moving at the top of the hill created a safety issue. The asphalt had cracked across the entire width of the road and was moving toward the Muskingum River. This road closure significantly impacts both the movement of students to and from the local junior high and high schools and is the main route to Riverside Landings nursing home and several county offices. The detour added approximately 30 minutes in commute time each way for students and significantly reduced emergency services response time. Repairs were made and the road re-opened in July 2020. The estimated cost of repairs is $7,845,225.

Table 2.18-Morgan County Disaster Assistance (DR-4360)

Jurisdiction	Total Eligible Projects	Total Obligated
County Engineer	14	$ 1,859,598.87
Homer Twp	3	$ 48,522.21
Marion Twp	6	$ 145,846.19

On April 17, 2018, Morgan County was included in a state disaster declaration (DR-4360) for severe storms, flooding, mudslides and landslides that occurred between February 14-25, 2018 that impacted southern and southeastern Ohio. The County received $2,053,967.27 in disaster assistance as shown in Table 2.7.

On August 9, 2017, the Ohio Department of Transportation (ODOT) began a landslide repair project on State Route 607 between State Route 60 and State Route 78 in Morgan County, closing approximately 500 feet of road. The slip was excavated and replaced with new embankment, dump rock and asphalt. The total cost of the repair is not available and took approximately 6 weeks to complete.

ODOT currently reports a landslide remediation project along another stretch of State Route 376 is slated to begin Summer 2020. The project will repair a landslide along the roadway where a large section of pavement in the southbound lane has broken and slid down the steep embankment forcing traffic down to one lane. Repair will consist of the installation of a wall and pavement and guardrail repair. The project is located at approximately mile marker 12.9 north of the Village of McConnelsville and is estimated to cost $1,170,000.

Figure 2.6-Photo taken from ODOT's Environmental Review documentation *found at:* https://www.transportation.ohio.gov/wps/portal/gov/odot/projects/projects/107255

Probability of Future Events

According to ODOT's Geohazards Landslide Inventory Map (dated 3/10/2020), which reveals the number and rating of moderately and highly rated landslides impacting Ohio's roadways, Morgan County is ranked in the top 2 counties of the most impacted roads with 1,033 total landslides. The County is moderately ranked for rockfalls, with 125 events. Based on data available from ODOT and the USGS discussed previously, as well as local historical information, the probability of the County experiencing a landslide event in any given year is nearly 100%.

The ODNR Division of Geological Survey informed the Planning Team in January 2026, that they do not have complete landslide or slip records for Morgan County, but that such research is underway. They were asked to focus on landslides and slips along the Muskingum River and its major tributaries in the county, as well as along major roadways in the county. They will provide this more detailed information to the Morgan Co EMA Office and the Morgan Co Engineer once their modeling is completed and vetted by the department. Resulting, the 2010 data sited above is the most recent data available.

Vulnerability Analysis

Landslides are natural hazards that have the potential to cause significant structural damage. Historically damage associated with landslides in Morgan County have been confined to roads and associated underground utilities and is the only reliable information we have to assess vulnerability. There have been no known structural damage, injuries or loss of life associated with landslides. Economic impacts associated with road closures due to landslides are not significant as detours allow for the continued movement of people and freight in the county. The primary concern of these road closures are associated with the provision of efficient emergency services to vulnerable populations and potential need for evacuations.

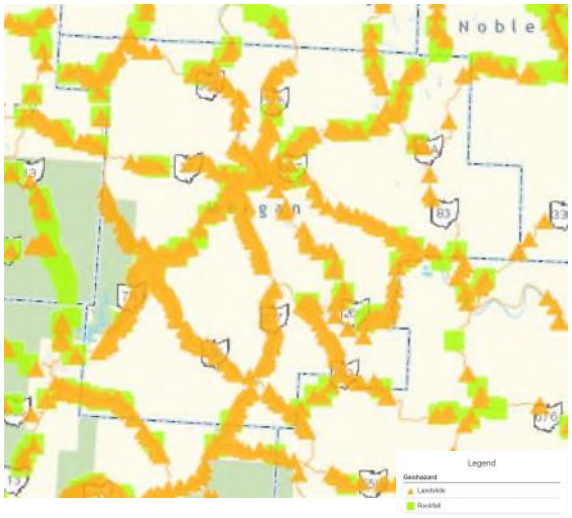


Figure 2.7: ODOT Geohazards Landslide Inventory Map

*Source: https://gis.dot.state.oh.us/tims/Map/Geotech*populations in the County. Based on the known damage that have occurred over the last 5 years, the county could encounter damage from $1,000,000 to potentially $4,000,000 during any given event.

2.3.3 Severe Summer Storms

Severe storms likely to affect Morgan County include hailstorms, windstorms, heavy rains, and severe thunderstorms. These events typically affect several individual locations during one event. Serious injury or death can occur during severe storms due to its effect on motor vehicle accidents, wind damage or other cascading effects. A severe storm may also result in moderate damage to private property and public facilities.

Thunderstorms

A severe thunderstorm is the result of a violent form of convection wherein cold, upper air falls and warm, moist air rises. As the warm air rises, cumulonimbus clouds can develop and turn into severe thunderstorms with strong winds, lightning, heavy rain and hail. Such storms can cause damage from wind, hail, heavy rainfall (including flooding) and/or lightning strikes. Thunderstorms are generally a seasonal hazard and can be expected to occur every year. According to the National Weather Service, the most active thunderstorm season in Ohio is late spring and early summer.

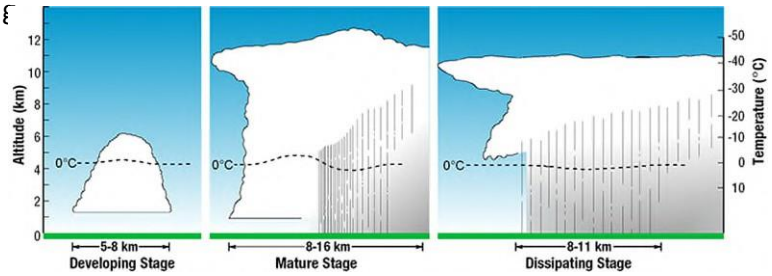


Illustration from The National Severe Storms Laboratory at https://www.nssl.noaa.gov/education/svrwx101/thunderstorms/

Figure 2.8: Formation of Severe Thunderstorms

There are 3 stages in the life cycle of a thunderstorm: Developing, Mature and Dissipating as shown in Figure 2.8. During the developing stage cumulus clouds are pushed upwards by a rising column of air (updraft). There is little to no rain during this phase but there may be occasional lightning.

Thunderstorms enter the mature stage when the updraft continues to feed the storm and precipitation begins to fall creating a downdraft. As the downdraft and rain-cooled air moves out along the ground it forms a front or gusty line of winds. This is the stage where hail, heavy rain, frequent lightning, strong winds and tornados are most likely to develop. Eventually, a large amount of precipitation is produced and the updraft is overcome by the downdraft beginning the dissipation stage. On the ground, the front moves out a long distance from the storm and cuts off the warm moist air that was feeding the thunderstorm. At this point, rainfall begins to decrease but lightning remains a danger (https://www.nssl.noaa.gov/education/svrwx101/thunderstorms/).

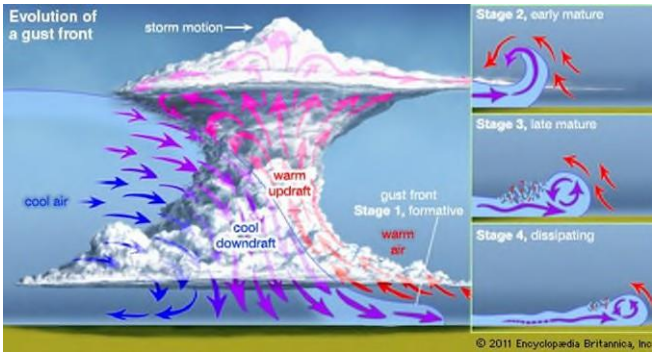


Figure 2.9: Development of a gust front from a thunderstorm
Source: *www.britannica.com/science/windstorm*

Lightning

Lightning is a natural occurrence of electricity of very short duration and high voltage between a cloud and the ground and is a key component of thunderstorms. It is often accompanied by a bright flash and thunder. Tall objects such as trees, skyscrapers, utility poles and mountains are commonly struck by lightning, but lightning can also strike at ground-level, depending on where the electrical charges accumulate in the atmosphere.

Hail

Hail is a type of precipitation made of frozen rain which falls in showers from cumulonimbus clouds. The precipitation is made of hailstones or hard pellets of snow and ice that can vary in size from ¼ inch diameter (pea-sized) to 4 ½ inches (grapefruit-sized). If the air temperature close to the ground is warm, the hail can partially melt creating sleet or freezing rains. Hail is typically associated with severe thunderstorms and/or severe winter storms. Hail can be very damaging to property, particularly cars and can be deadly to people and livestock. Hail that covers roadways is especially hazardous to drivers and pedestrians by creating an icy roadway much like winter weather events.

Strong Winds

A windstorm is a storm marked by high winds or violent gusts, sometimes called wind shears or microbursts but with little or no rain. Extreme windstorm events are associated with hurricanes, severe thunderstorms and derechos-a widespread, long-lived, straight-line windstorm associated with a land-based, fast-moving

group of severe thunderstorms. Sustained wind speeds during a windstorm typically exceed 34 mph, generating much higher wind gusts. Windstorms may last for a few minutes when caused by downbursts from thunderstorms or they may last for hours to several days when they result from large-scale weather systems, caused by either large differences in atmospheric pressure across a region or strong jet stream winds overhead. Severe weather is frequently the cause of long-lasting windstorms as these low-pressure systems have large horizontal pressure differences and are always accompanied by strong jet-stream winds.

Severe storms are generally measured in terms of wind speeds, rainfall amounts or hail stone size and often occur simultaneously or in quick succession. A storm is considered severe if wind speeds reach 58 mph and/or produce hail that is 1-inch in diameter or greater or if funnel clouds and/or tornados are produced. Rainfall rates greater than 2-inches per hour are also used to indicate severe storms. Heavy rains associated with severe storms primarily contribute to flooding which is discussed below.

Location

Severe storms can affect all areas and jurisdictions of Morgan County, often striking multiple individual areas at the same time and can vary in intensity and type. For instance, a severe storm can produce thunderstorms in one area of the County with heavy rain and lightning, while at the same time, producing hail or high winds in another.

Past Occurrences

Severe storms including thunderstorms and windstorms are an annual occurrence in Morgan County. According to the *National Climate Data Center's (NCDC) Storm Events Database*, 144 severe storm events have been reported for Morgan County between September 1950 and September 2025, as shown in Table 2.8. There were 90 thunderstorm events, many of which included high winds and lightning. Reported damage include downed trees and utility lines causing blocked roads and power outages. Limited real property loss has been reported. No injuries or deaths have been reported.

Table 2.19: Summary of Severe Storm History (1950-2025)

Event	Total Incidents	Total Damage	Crop Loss	Total Deaths	Total Injuries
Thunderstorms	90	$905,250	None	0	0
Windstorms	25	$88,500	None reported	0	0
Hail Storms	29	$1,000	None reported	0	0
Lightning	0	$0.00	None reported	0	0
Total:	144	$994,8750	$40,073	0	0

Since the most recent plan update, 1 windstorm has been reported by the *NCDC Storm Events Database* in Morgan County. In 2013 there were 3 severe weather events reported, 2 of which produced

thunderstorms and high winds and 1 produced hail. Property damages were reported in the amount of $25,000. In 2014, there were 3 severe storms, 1 produced 1-inch hailstones, 1 produced a thunderstorm with 50 knot winds and 1 produced a windstorm with gusts up to 60 mph. Reported damage included downed trees and power outages in the amount of $12,000. In 2016, 8 severe weather events were reported. There were 2 windstorms, 2 hailstorms and 4 thunderstorms with high winds. Property damage for all events was $37,000.

A cold front moved through the evening of April 2, 2016 bringing strong winds with gusts of 45-55 mph. The event caused $25,000 in damage due to fallen trees and limbs and blown debris that blocked roads. On 7/15/16 thunderstorms that developed ahead of a cold front produced 1.5-inch hail in Morgan County, cracking the windshield of a vehicle. Five severe thunderstorms generating winds up to 50 knots were reported in 2017 causing $6,500 in damage due to downed trees. In 2018 6 severe weather events moved into Morgan County producing showers and thunderstorms. Four of these events also produced 1-inch hail stones. Damage due to downed trees totaled $3,000 from these events. In 2019, 11 severe weather events were reported in Morgan County producing thunderstorms and strong winds. One event produced hail. The most significant event occurred on 2/24/19 when a warm front lifted northward into Ohio on 2/23/19 producing widespread showers and isolated thunderstorms due to the close proximity of an approaching cold front. Local reports of 1-1.5 inches of rain had fallen between the evening of the 23rd and the morning of the 24th. Behind the cold front, very gusty winds developed with most areas seeing gusts of 40-50 knots. Combined with soggy ground, these winds led to power outages due to downed trees and power lines. Thousands of customers lost power and it took several days for all service to be restored. Damage from this event were reported at $25,000.

Morgan County has received 2 federal disaster declarations for severe weather:

April-May 2011 (DR-4002).
On April 19 and 20, high winds, tornadoes and hail caused at least $43 million in insured losses, with more than 8,100 claims filed to date in Ohio. Then, from April 22 to April 28, the outbreak of storms affecting Ohio caused at least $80 million in insured losses with 15,500 claims statewide. After a storm-ridden first quarter, Ohioans faced another round of storms in May that caused even more extensive losses. Statewide preliminary estimates find that insurance companies racked up losses totaling $322-400 million from the May 20-26 storms. According to the Ohio Insurance Institute this is the third costliest natural disaster to hit the state in recent times, behind the April 3-4, 1974 Xenia tornado super-outbreak and the September 14, 2008 Hurricane Ike windstorm. The same system responsible for the intense May 22 EF-5 tornado in Joplin, Mo., caused extensive damage as it moved through Ohio. At least nine tornadoes were confirmed in Ohio from May 23-26, including five EF-1 tornadoes with maximum winds between 90-105 mph. Widespread rain, hail and damaging winds were reported throughout the state. According to FEMA, Morgan County received public assistance in the amount of $256,045. State reports indicate that $125,000 went to the County Engineer for Category C (road structure repairs and replacement, drainage, earthwork, bridge inspections, repair and replacement) work and a total of $175,000 went to Center, Marion, Morgan and Malta Townships for similar civil engineering work.

June-July 2011 (DR-4077).

A line of fast-moving severe thunderstorms with powerful winds swept through the state in the late afternoon of June 29, 2012 leaving widespread damage, down utility poles and electric wires, leaving thousands without electricity. Winds up to 80 miles per hour were reported by the National Weather Service in certain areas. Extreme heat, combined with prolonged power outages created a great concern for residents, especially the elderly and medically fragile populations. State reports indicate that Morgan County received public assistance in the amount of $57,602 that went was intended for Category B work (emergency protective measures) for debris removal. This derecho event caused heavy crop damage but no other structural damage or injuries were reported. The Muskingum-Morgan Farm Services Agency reports that 23 applicants received $40,073 for debris removal associated with this storm.

Probability of Future Occurrences

According to the *NOAA Storm Events Database*, there have been 144 severe storms of various types in Morgan County since 1950. These events include severe thunderstorms, high winds, heavy rains, lightning and hail. Multiple severe storm events occur in the county on annual basis.

Vulnerability Assessment and Loss Estimation

Much of the damage associated with severe thunderstorms include downed power lines, fallen trees and other debris that cause structural damage. During the past 5 years, storm damage totaled just over $867,000 or $124,000 annually. In addition, damage to buildings and contents is also potentially high, due primarily to power surges associated with lightning strikes. Using HAZUS property values as estimates, the potential building exposure for the county is shown in Table 2.20.

Table 2.20-Building Exposure by Occupancy for Morgan County-Thunderstorms

Building Type	Number of Structures	Value
Residential	3,234	$48,890,000
Non-Residential	1,024	$5,316,4000
Critical Facilities	25	$11,587,000
TOTAL:	4,282	$113,641,000

Hailstorms are a significant hazard throughout all of Morgan County. However, these events have historically caused little to no structural damage to the county's assets, except for a possible broken window, dented automobile or damaged heating and cooling equipment. Table 2.21 shows the potential for structural damage in the event of hailstorms.

Table 2.21-Building Exposure by Occupancy for Morgan County-Hailstorms

Building Type	Number of Structures	Value
Residential	809	$25,711,000
Non-Residential	257	$13,417,000
Critical Facilities	6	$8,800,000
TOTAL:	1,071	$47,928,000

Actual damage associated with windstorms during the past 7 years have totaled $140,000 or $20,000 annually and included downed trees and power lines and power outages.

2.3.4 Severe Winter Weather

A winter storm is a weather event in which a combination of heavy snow, blowing snow and or dangerous wind chills affect an area. These storms can also produce high winds, sleet and ice. There are several types of winter storms including blizzards, ice storms, lake effect storms and snow squalls. Morgan County can be impacted by winter storms in varying degrees from late fall to early spring.

A blizzard is a dangerous winter storm that includes a combination of blowing snow and wind gusts of 35 mph or more resulting in low visibilities. Sustained winds and visibilities of ¼ mile or less for at least 3 hours are required for an event to be considered a blizzard. Heavy snowfall and severe cold often accompany blizzards, but they are not required.

Lake effect storms form as cold, dry air masses move over the Great Lakes region, picking up moisture as it moves across the lakes. The heavy, wet air produces heavy snowfalls in areas generally to the south and east of the Lakes.

Snow squalls are brief, intensive snow showers generally accompanied by strong, gusty winds and significant snow accumulations.

Other forms of winter precipitation that can cause hazardous conditions include snow (flurries, showers or blowing snow), sleet and freezing rain and ice. A significant accumulation of freezing rain over several hours is considered an ice storm.

Winter storms are typically measured by the amount of precipitation (i.e. snowfall, freezing rain and ice), associated winds and extreme cold temperatures. Snowfall in excess of 6-inches is typically considered disruptive. Heavy showers of freezing rain and ice are one of the most dangerous types of winter storms, as little as 0.04 inches of freezing rain can paralyze a region making driving extremely hazardous, downing trees and damaging utility lines.

Location

A severe winter storm can affect the entire county at the same time, bringing virtually all County operations to a stand-still. Due to the rural nature of the region, Morgan County is highly vulnerable to the wide-ranging effects of snowstorms, blizzards, ice storms, and severe cold snaps. This type of hazard creates a difficult emergency response effort due to adverse road conditions, which impede or prohibit vehicle movement.

The higher elevations of the county appear to be more susceptible to severe winter storms. Driving is treacherous during winter storms as roadways freeze and become covered with snow and slush. During

severe winter storms, heavy snow may cause property damage and power outages. Also, the adverse driving conditions may lead to additional property damage and injuries due to accidents. Roads are sometimes blocked, stranding some rural residents from the incorporated areas where medical and other emergency services are centered.

Past Occurrences

Research indicates that winter storms are the third leading weather threat in Ohio. The storms of 1950 and 1978 were of a duration that required extensive mass sheltering and statewide emergency response and recovery efforts. A total of 269 winter storms from 1923-1994 have been classified as severe, resulting in 2 Disaster Declarations for the state and county.

Great Blizzard of 78: January 26-28, 1978 (EM-3055)

The entire state of Ohio received a Presidential Disaster Declaration during 1978 due to severe blizzard conditions. This event occurred in January 1978, closing homes and businesses for a week and caused the deaths of 51 people, making it one of the deadliest winter storms in Ohio history. Beginning on January 26th, the storm produced heavy snow fall and hurricane-like wind gusts of 50-70 mph creating bitter cold temperatures and drifting snow across the entire state of Ohio, ending January 28th. Public assistance funds across the state totaled $3,546,669.

February-March 2003 (DR-1453).

The February 2003 snow and ice storms that hammered several states from the Mid-Atlantic to New England resulted in preliminary insured losses of about $20 million in Ohio. According to Property Claims Service of the Ohio Insurance Institute, this was part of three winter storms during the first quarter of 2003 that blanketed 15 states, causing $1.3 billion in insured losses. Federal funds were awarded to Morgan County for public assistance in the amount of $559,241. These funds were used to reimburse the county for equipment, labor and materials associated with snow removal from that event.

According to the NOAA Storm Event Record, 81 severe winter weather events have been reported in Morgan County since 1950 as summarized in Table 2.11 below:

Table 2.11: Summary of Winter Weather (1950-2025)

Event	Total Incidents	Total Property Loss	Injuries	Death	Crop Loss
Extreme Cold/Wind Chill	28	$76,000	0	0	0
Frost/Freeze	4	None reported	0	0	0
Heavy Snow	23	$10,000	0	0	0

Ice Storm	4	$5000	0	0	0
Winter Storm	18	$20,000	0	0	0
Winter Weather	19	None reported	0	0	0
Total:	96	$111,000	0	0	0

Local officials reported a storm event in 2004, whereby 16 inches of snow fell, affecting the entire County. Another storm event in January 2009, where approximately 1-inch ice covered the ground and extreme cold temperatures affected the entire county leading to power outages in the extremely rural areas of the county that lasted for several days. Another reported storm event occurred in January 2012 when an ice storm came through the area, covering many areas of the County in ½-inch of ice and again caused power outages that lasted for several days. No damage were reported during any of these events.

Probability of Future Occurrences

Multiple winter weather events, in varying degrees, are an annual occurrence affecting Morgan County and its jurisdictions.

Vulnerability Assessment and Loss Estimation

Damage because of winter storms often is associated with snow and ice weight, leading to the downing of trees and utility poles, roof damage, power outages, etc. as well as those associated with hazardous driving conditions. Extreme cold temperatures and blizzard conditions can lead to personal injuries such as hypothermia, frostbite or even death. These events have not historically caused wide-spread property damage in Morgan County but have caused significant disruption to daily life due to repeated power outages and treacherous road conditions.

Based on reported data, real property damage are low, averaging $4,609 per year due to winter weather events. Based on the HAZUS property values for the county, the total building exposure for the county is shown in Table 2.22 below:

Table 2.22: Building Exposure by Occupancy for Morgan County-Severe Winter Storm

Building Type	Number of Structures	Value	Percent of Total
Residential	2,731	$470,246,000	80.9%
Non-Residential	564	$99,168,000	16.8%
Critical Facilities	81	$25,929,000	2.4%
TOTAL	3,376	$595,343,000	100.0%

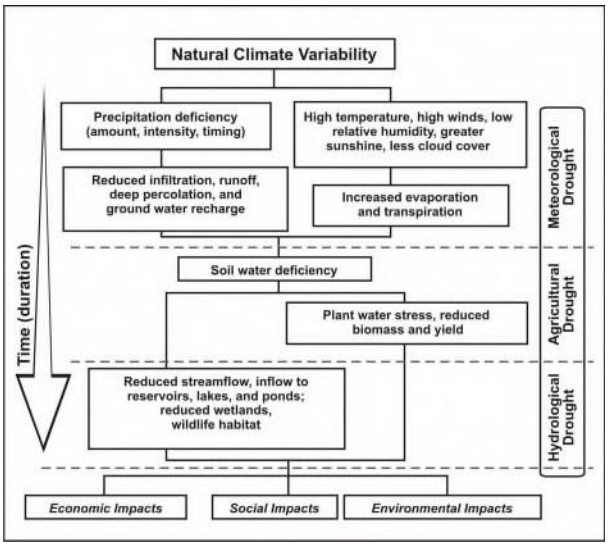
2.3.5 Drought and Extreme Heat

Drought occurs when there is below-average precipitation over an extended period, affecting hydrological and agricultural concerns. Drought is equally as likely to occur in one area of the county as any other. The effects of drought vary greatly depending on several factors including land use (agricultural production vs. urbanization), economy (how dependent is the community on agricultural production), geology (presence of aquifers or ground water sources that limit well production) and water source (public water systems vs. private wells or cisterns), (Ohio State Hazard Mitigation Plan, p. 2-168).

There are generally 4 types of droughts: meteorological, hydrological, agricultural, and socio-economic. Hydrological and agricultural droughts are most common in Morgan County, often occurring simultaneously.

Meteorological drought is the departure of precipitation from normal that causes two other types of droughts that negatively affect an area. Hydrological drought occurs when below average amounts of precipitation affect the water table, potentially affecting drinking water supplies. Agricultural drought occurs when there is not enough soil moisture to support crop growth or good pasture conditions. Socioeconomic drought considers the impact of other drought conditions on the supply and demand of some goods such as fruits, vegetables, and grains. Socioeconomic drought occurs when the demand for these goods exceeds the supply because of a weather-related deficit in water supply (www.weather.gov). Figure 2.10 shows the drought cycle and the relationship between the different types of droughts.

Figure 2.10: Drought Cycle



Source: https://drought.unl.edu/Education/DroughtIn-depth/TypesofDrought.aspx

Drought is typically measured using the Palmer Drought Severity Index (PDSI). The PDSI was developed by meteorologist Wayne Palmer in 1965 and is a measurement of dryness based on recent precipitation and temperature. The index is based on a supply and demand model of soil moisture, considering more than just temperature and precipitation at a specific location. The index has proven effective in determining long-term drought but is less reliable in determining short-term drought conditions (*Source: https://en.wikipedia.org/wiki/Palmer_drought_index)*. The PDSI is used by State and Federal agencies to determine the need for drought relief programs. See Table 2.23 for the PDSI Classifications.

Table 2.23-Palmer Drought Severity Index (PDSI) Classification

4.0 or more	Extremely wet
3.0 to 3.99	Very wet

2.0 to 2.99	Moderately wet
1.0 to 1.99	Slightly wet
0.5 to 0.99	Incipient wet spell
0.49 to -0.49	Near normal
-0.5 to -0.99	Incipient dry spell
-1.0 to -1.99	Mild drought
-2.0 to -2.99	Moderate drought
-3.0 to -3.99	Severe drought
-4.0 or less	Extreme drought

Extreme Heat

Extreme heat is defined as temperatures hovering 10 degrees or more above the average high for a region that lasts for several weeks. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a dome of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions can provoke dust storms and low visibility. Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought is a very dangerous situation.

Extreme heat can have devastating consequences. It is difficult to quantify the exact total number of deaths associated with a heat wave as there are several other health risks to individuals associated with exposure to excessive heat, particularly in vulnerable populations such as the homeless, children, the elderly and those who work under extreme conditions. Table 2.24 below defines these risks and some of the symptoms associated with each health risk.

Table 2.24-Health Risks associated with Extreme Heat Conditions

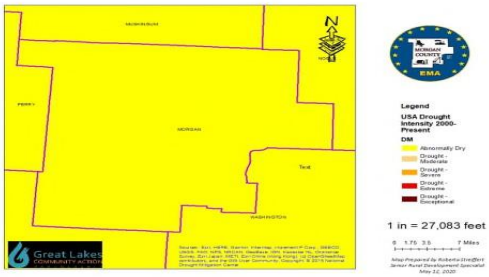
Health Hazard	Symptoms
Sunburn	Redness and pain. In severe cases: swelling of skin, blisters, fevers, and headaches.
Dehydration	Excessive thirst, dry lips and slightly dry mucous membranes
Heat Cramps	Painful spasms, usually in muscles of legs and abdomen and possible heavy sweating
Heat Exhaustion	Heavy sweating; weakness; cold, pale and clammy skin; possible fainting and vomiting
Heat Stroke	High body temperature (104^{o}F or higher), hot and dry skin, rapid and strong pulse, and possible coma

Agricultural losses to crops and livestock would primarily be affected during periods of drought and adverse health conditions in individuals are primarily associated with extreme heat conditions.

Location

Drought and extreme heat can affect all of Morgan County. **(2010-Present)**

Figure 2.11-USDA Drought Intensity Map



History

All areas of Morgan County are equally susceptible to drought conditions during the summer and autumn months due to the significant lack of rainfall and/or other precipitation. These drought conditions often affect local farmers, both commercial and family farmers as well as local water supplies where wells can run dry and rivers

run low resulting in a reduction of public water supplies. According to the USDA Drought Intensity Map shown in Figure 2.10, Morgan County has been in a period of abnormally dry conditions since 2010 as reported by the National Drought Mitigation Center. Extended widespread droughts and extreme heat conditions are infrequent in Morgan County; however, brief local events are common and can be severe in some cases.

According to the NOAA Storm Events Database, Morgan County has suffered 9 events of drought between 1950 and 2025 and 18 events of heat and extreme heat conditions, as summarized in Table 2.16 below. Twelve of the extreme heat conditions occurred during the months of January –March where unseasonably warm weather conditions, lasting several days spread across the county. Much higher-than-average temperatures were recorded, reaching into the 80's for several days in some cases, but did not reach dangerous conditions that would affect individuals. No injuries or deaths were reported because of any of these events. No other damage or crop losses were reported.

Table 2.25: Summary of Drought and Extreme Heat (1950-2025)

Event	Total Incidents	Total Property Loss	Injuries	Deaths	Crop Loss
Heat/Extreme Heat	18	None reported	0	0	0
Drought	9	None reported	0	0	0
Total:	27	-	0	0	0

Two long-term droughts affecting almost all the United States also impacted Morgan County. 1988-1989 North American Drought.

The drought of the late 1980's 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 which killed around 4,800 to 17,000 people across the United States and also killed livestock across the country. One particular reason that the Drought of 1989 became very damaging was that farmers might have farmed on land which was marginally arable. Another reason was the pumping of groundwater near the depletion mark. The Drought of 1989 destroyed crops almost nationwide, residents' lawns went brown and water restrictions were declared many cities. This drought was catastrophic for multiple reasons; it continued across the Midwest States and North Plains States during 1989, not officially ending until 1990.

2012 North American Drought

The 2012-2013 North American drought is an expansion of the 2010–2012 United States drought which began in the spring of 2012, when the lack of snow in the United States caused very little snow melt to absorb into the soil. The drought includes most of the US and included Ohio. Among many counties, Morgan County was designated with moderate drought conditions by mid-June. It has been equaled to similar effects as the droughts in the 1930s and 1950s but it had not been in place as long. However, the drought inflicted catastrophic economic ramifications. In most measures, the drought has exceeded the 1988-1989 North American drought, which is the most recent comparable drought.

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

According to the US Department of Agriculture Farm Service Agency in Zanesville, Ohio, Morgan County suffered considerable losses in 2012 due to excessive heat and drought that affected all crops. None of this data is noted in the NOAA-NCEI data base. In conjunction with the drought, damage was sustained due to the June 29th Derecho event, sometimes caused by meteorological conditions that generate droughts. Through the Farm Service Agency, Emergency Cost Share funding for farmers, there were 23 applicants that received $77,971 in cost share assistance ranging from 50% to 75% of incurred costs. For the Derecho event, 23 applicants received $40,073 in cost share assistance for approximately 60% of incurred costs. Tables 2.26 and 2.27 below summarize the crop and fruit and vegetable production damage reported by the Farm Service Agency:

Table 2.26-2012 Crop Losses

CROP	LOSS RANGE	ACREAGE
Hay	75% of normal to 20% with the average of 45% of normal	18,000
Pasture	75% of normal to 20% with the average of 45% of normal	2,500
Corn	Up to 95%	12,000
Soybean	10%	5,000

Table 2.27-2012 Fruit and Vegetable Losses

FRUITS & VEGETABLES	LOSS RANGE	ACREAGE
Apples	50%	75
Peaches	90%	35
Plums	100%	35
Pears	95%	15
Raspberries & Blackberries	75%	15
Strawberries	0%	10
Vegetables	55%	350

2020 USDA Drought Disaster. 22 Ohio counties, including Morgan Co, were declared drought in fall 2020. Data?

Probability of Future Events

The probability of future droughts is difficult to predict and is rarely the result of a single cause. Seasons of drought and extreme heat can potentially occur during any particular year when climatic conditions are conducive and can affect all areas of Morgan County leading to agricultural losses and decreases in municipal and local water supplies. Heat waves are generally increasing in frequency and severity because of climate change and Morgan County can expect this trend to continue. While these impacts are difficult to predict, the FEMA Climate Mapping for Resilience and Adaptation (CMRA) predicts that the average number of days per year where the temperature is over 90 degrees will increase from 17 (baseline) to 30-32 days over the next 30 years. Days over 100 degrees will increase from 1.3 to 1.9 (46% increase).

http://livingatlas.arcgis.com/assessmemt-tool/explore/details

Vulnerability Assessment and Loss Estimation

Morgan County and its jurisdictions are susceptible to the effects of drought and extreme heat in varying degrees. Extreme heat conditions can exacerbate other types of disasters such as drought and wildfires. Financial losses to structures are not generally associated with drought and extreme heat conditions, however, the loss of crops and livestock are. Definitive financial losses are not readily available. However, the Muskingum-Morgan Farm Services Agency reports that 23 applicants received $77,971 in cost share assistance in 2012 related to crop losses. Anything more recent

Health-related effects to both humans and animals are also difficult to project and quantify. Extreme heat is becoming one of the leading causes of weather-related deaths in the United States. In addition, other heat related illnesses can exacerbate health problems in vulnerable populations, particularly the homeless, elderly, and low-income individuals that may have limited ability for cooling. Hot days are also associated with increases in cardiovascular and respiratory complications as well as kidney disease. In extreme temperatures, air quality is also affected as hot and sunny days can increase ozone levels in the atmosphere and the increased use of air conditioning requires more electricity which can emit other types of air pollution including particulates.

Drought and extreme heat conditions are mitigated through the Morgan County Health Department's public education and other informational releases. There are also several cooling centers available throughout the County for at-risk populations during extreme heat conditions. The Morgan County Health Department reports that no injuries, illnesses, or fatalities have been reported due to extreme heat and drought conditions.

2.3.6 Strong Winds and Tornadoes

The National Weather Service defines a tornado as a violently rotating column of air touching the ground attached to the base of a thunderstorm. A tornado is not necessarily visible; however, low pressure caused by high wind speeds and rapid rotation usually cause water vapor in the air to condense into cloud droplets, resulting in the formation of a visible funnel clouds. If these funnel clouds reach the ground, tornados will form, but not all funnel clouds evolve into tornados, sometimes making it difficult to tell the difference.

Tornados generally come from a class of thunderstorms known as supercells containing mesocyclones-an area of organized wind rotation a few miles up in the atmosphere. These storms can also include very heavy rain, frequent lightning, strong winds, and hail. Tornados follow a recognizable life cycle.

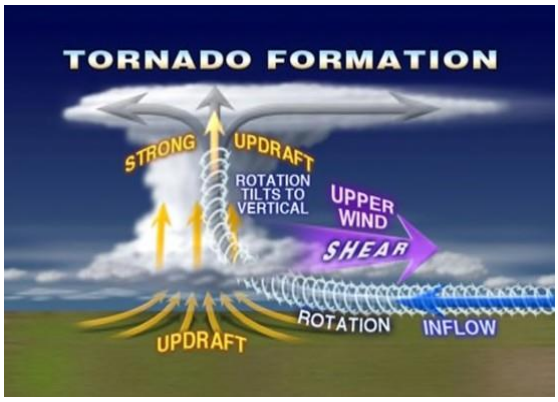


Fig 2.12

www.mfhstornadoinfo.weebly.com/life-cycle.html

The next phase is the formation phase where the rotating cloud base lowers, becoming a funnel, that kicks up dust and debris as it reaches the ground. As the warm air feeding the tornado grows, it reaches the mature stage, lasting a few minutes to more than an hour and causes the most damage. Finally, the tornado enters the dissipation stage where the downdraft feeding the storm wraps around, choking off the air supply, weakening and ending the tornado. The dissipation phase generally only lasts a few minutes.

Tornado magnitude is measured using the Enhanced Fujita (EF) scale. The scale rates the intensity of tornados based on the damage they cause on a level of EF 0 to EF 5. The Enhanced Fujita scale replaces

the Fujita scale that was developed by Theodore Fujita in 1971, being revised to better align wind speeds more closely with associated storm damage as shown in Table 2.25.

Table 2.25-Enhanced Fujita Scale

EF Scale	Wind Speed	Typical Damage
0	65-85 mph	Minor damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow rooted trees pushed over.
1	86-100 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 from well-constructed houses; foundations of frame houses 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; tree debarked; heavy cars lifted off the ground and thrown; structures with weak foundations are badly damaged.
4	166-200 mph	Devastating damage. Well-constructed and whole frame houses completely leveled; some frame houses may be swept away; cars and other large objects thrown and small missiles generated.
5	>200 mph	Incredible damage. Well-built frame houses with foundations swept clean of debris; steel-reinforced concrete structures are critically damaged; tall buildings collapse or have severe structural deformations; cars, trucks and trains can be thrown up to 1 mile.

Figure 2.13: FEMA Wind Zones in the U.S

Local History

Ohio is located on the eastern edge of what is commonly known as “tornado alley”. The frequency of tornado activity varies greatly depending on which county you are in. The counties of Wood, Van Wert,

Lorain, Richland and Franklin see the most frequent tornados.

Tornados in Morgan County are virtually non-existent having only 1 recorded incidents since 1950; however, this wind zone places Morgan County in a category that could experience devastating tornados with wind speeds up to 250 mph, which indicates that significant damage will be sustained to structures with solid foundations. While limited mountainous terrain in Morgan County often serves to break up tornados that form and touch down, tornados could occur in the flat open areas of the County.

The first confirmed tornado in Morgan County since 1950 occurred on 9/16/2010 in Rose Farm on the western edge of the County. A tornado that touched down in eastern Perry County continued into western Morgan County, where it dissipated. Several downed trees and large branches were found on McKinley Street, 3 houses suffered minor damage and 1 vehicle was destroyed. Electricity was out for over 24 hours in the area. This tornado was categorized as an EF 0 and caused approximately $60,000 in damage. Prior to 1950, only one other tornado was reported in Morgan County in June of 1928. Details and loss estimated from that event are not known.

Location

Tornados can impact almost any location in the county, and lack of past events provides no details or expectations for the location of a future event.

Probability of Future Occurrences

Tornados are non-spatial hazards and can occur whenever and wherever conditions are favorable and can affect all areas and jurisdictions of the County. They tend to occur primarily during the spring and summer but can develop at any time of the year. Because of these characteristics, it is difficult to predict the exact risk to Morgan County and its jurisdictions. Based on historical data, tornados are not a significant hazard in the County and extensive damage and/or injuries would not be anticipated.

Vulnerability Assessment and Loss Estimation

While tornados can cause significant damage to structural assets, it is almost impossible to predict vulnerability and damage due to the inherent characteristics of how and when tornados develop. Based on past events, tornados in Morgan County tend to strike in flatter, rural areas of the County limiting exposure to structural damage and injuries or fatalities. Based on historical data, future tornado events are unlikely, but possible.

2.3.7 Dam Failure

A dam failure occurs when the barrier constructed across a waterway fails or otherwise does not obstruct or retain the flow of water, which can rapidly result in a large area of completely inundated land.

Dams are man-made structures designed to obstruct or restrain waters that may cause flooding downstream. These structures are generally made with concrete or earthen material. The failure of these

dams often results in a flooding event. Dams are classified by 2 conditions, height, and storage. Dams are classified 1 thru 4 based on the combination of height and storage as shown in Table 2.26 below. Class I dams provide the highest potential for significant loss of life and structural damage to high value properties including residential, industrial and public utilities in the event of failure and will be the only classification that will be analyzed further. According to the Ohio Department of Natural Resources (ODNR), Class I dams are identified as *"dams having a total storage volume greater than five thousand acre-feet or a height of greater than sixty feet shall be placed in class I. A dam shall be placed in class I when sudden failure of the dam would result in one of the following conditions: (a) Probable loss of human life and (b) Structural collapse of at least one residence or one commercial or industrial business."*

Table 2.26-Ohio and Federal Dam Classification Systems

Ohio Dam Classification	Description	Corresponding Federal Classification
Class I	Probable loss of life, serious hazard to health, structural damage to high value property (i.e. homes, industries, major public utilities)	High
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.	Significant
Class III	Damage to low value, non-residential structures, local roads, agricultural crops and Livestock	Significant
Class IV	Losses restricted mainly to the dam	Low

Source: http://water.ohiodnr.gov/safety/dam-safety

According to the Ohio State Hazard Mitigation Plan, there are 68 dams in Morgan County including 4-Class I dams, 10-Class II and 3-Class III dams. The remaining dams are unclassified.

Location

According the ODNR's Dam Locator Map, there are 4 Class I dams, 10 Class II dams and 3 Class III dams in Morgan County. Two of the Class I dams are located in the northwest corner of the county and are owned by the Village of Crooksville, another one in the northeast corner of the county and the last one near the Village of Stockport. Class II dams in the county are generally located in the northeast portion of county within the American Electric Power (AEP) ReCreation Land. These impoundments are a result of historical strip-mining activities and currently used for recreation and tailings. The land is managed in conjunction with the Ohio Department of Natural resources, Division of Wildlife. There are 3 dams located in the Muskingum River that are owned by ODNR and used for recreation and hydroelectric power generation. None of these dams are owned by Morgan County or its jurisdictions, complicating options to effectively implement mitigation strategies. The inventory of Class I-III dams from ODNR is shown in Table 2.34 below.

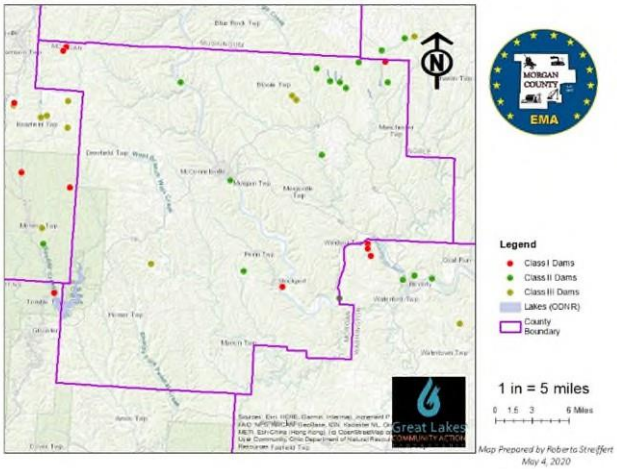


Figure 2.18-ODNR Dam Locator Map

Source: https://gis2.ohiodnr.gov/MapViewer/?config=ohiodams

Table 2.27-Inventory of Dams in Morgan County

NAME	Class	OWNER	LOCATION	AFFECTED AREA	PURPOSE
Crooksville Reservoir Dam No. 1	I	Village of Crooksville	Northwest corner of Morgan County approximately 18 miles north west of McConnelsville	Dry Run	Recreation
Crooksville Reservoir Dam No. 2	I	Village of Crooksville	Northwest corner of Morgan County approximately 18 miles north west of McConnelsville	Dry Run	Recreation
Stockport Mill Country Inn Water Power Project (Muskingum River Lock and Dam No 6)	I	ODNR	West end of Lock 6 on Muskingum River in the Village of Stockport	Muskingum River	Hydroelectric power generation

Ohio Power Company Pond MM-62	I	American Electric Power	Approximately 1 mile northeast of the Windy Hill Campground, off SR 83 and Lincoln Hwy	Northeastern Morgan County	Limited Recreation-light camping and fishing
Halley Pond Dam	II	Private	Approximately 3 miles north west of the Village of Stockport along State Route 266.	Tributary to Aldridge Run (Wolf Creek)	Physical, cultural and historic feature
Muskingum River Lock and Dam No.7	II	ODNR, Division of Parks and Recreation	Southwest side of Village of McConnelsville	Muskingum River	Recreation
Muskingum River Lock and Dam No. 8	II	ODNR, Division of Parks and Recreation	Approximately 7 mile north of McConnelsville along State Route 60	Muskingum River	Recreation
Ohio Power Company Pond MMV-11 Dam	II	American Electric Power	Approximately 15 miles south and east of McConnelsville adjacent to State Route 60	Tributary to Meigs Creek	Tailings
Horse Run No. 1 Dam MB-42	II	American Electric Power	Approximately adjacent to Sand Hollow Campgrounds on the northwest side, 0.5 miles east of SR 284 and TR 944	Northeastern Morgan County	Limited Recreation-light camping and fishing
Ohio Power Company Pond MM-52	II	American Electric Power	Approximately 2 miles southeast of Sawmill Road Campground	Northeastern Morgan County	Limited Recreation-light camping and fishing
Ohio Power Company Pond MB-46	II	American Electric Power	Approximately 1.25 miles west of Windy Hill Campground	Northeastern Morgan County	Limited Recreation-light camping and fishing
Horse Run No. 3 Dam MB-40	II	American Electric Power	Approximately 0.75 miles east of Sand Hollow Campground	Northeastern Morgan County	Limited Recreation-light camping and fishing

Ohio Power Company Pond MB 165	II	American Electric Power	Approximately 1.25 miles southeast of Sand Hollow Campground and 0.50 miles west of Hook Lake Campground	Northeastern Morgan County	Limited Recreation-light camping and fishing
Ohio Power Company Pond MB 115	II	American Electric Power	Approximately 1.25 miles northwest of Sand Hollow Campground	Northeastern Morgan County	Limited Recreation-light camping and fishing
Comstock Pond Dam	III	Private	Approximately 10 miles south west of McConnelsville	Tributary to West Branch Wolf Creek	
Ohio Power Company Pond MB-141 Dam	III	American Electric Power	Located on Weaver's Haul Road, approximately 10 miles north east of McConnelsville along State Route 78 to County Road 952	Tributary to Mans Fork	Tailings
Ohio Power Company Pond MB-144 Pond	III	American Electric Power	Located on Weaver's Hull Rd, approximately 9 miles north and east of McConnelsville off of State Route 78	Tributary to Mans Fork	Tailings

Of these dams, 2 are located adjacent to municipal areas, Muskingum Lock and Dam No. 7 outside of McConnelsville and Muskingum Lock and Dam No. 6 located at Stockport. Failure of either of these dams would not necessarily affect these villages as surface water in the County flows generally south-southeast. Therefore, areas south of each of these communities would likely be impacted which are not densely populated, limiting structural damage and injuries.

Dam # 7 in McConnelsville is undergoing a complete reconstruction which will be completed in early 2026. There are discussions about upgrading Dam #6 in Stockport, but no plans or project schedule are finalized.

Several of these dams are located within the AEP ReCreation area, which encompasses approximately 54,000 acres in northeastern Morgan County. No homes, critical facilities or other sensitive structures are in this area. Flooding would be the likely outcome in the event of a dam failure. In terms of losses that might occur as the result of a dam failure, the percentage of parcels and associated values are negligible in comparison with the entire County.

Local History

According to the Ohio State Hazard Mitigation Plan, there is one documented dam failure in Morgan County. This incident occurred in 1950 when the Wolf Creek Dam failed due to heavy rains and flooding. Downstream damage was reported in terms of roads being washed away but it is difficult to discern if the damage were a direct result of flooding caused by the dam failure or the heavy rains. Two other incidents were reported by local officials. In 1950, the Crooksville Reservoir #1 was noted as probably overtopping with no down-stream damage reported. In 1984, a slide was noted in the downstream slope in Crooksville Reservoir #2. The slide was repaired, and no damage was reported. No other incidents or damage have been reported.

Probability of Future Occurrences

The likelihood of a dam failure occurring in Morgan County is unlikely, but possible.

Vulnerability Assessment and Loss Estimation

According to ODNR, key dams along the Muskingum River Parkway in Morgan County are in the following condition:

- Muskingum River Lock/Dam #6-Stockport Class 1: Satisfactory condition
- Muskingum River Lock/Dam #7-McConnelsville Class 2: Poor condition (was removed in 2024 for new Lock 7 dam)
- Muskingum River Lock/Dam #8-Rokeby Class 2: Poor condition
- Muskingum River Lock/Dam #9 Class 2: Poor condition
- Muskingum River Lock/Dam #10 Class 2: Poor condition
- Muskingum River Lock/Dam #11 Class 2: Fair condition

ODNR Dam Safety USACE NID list

The following information was provided in January 2026 from the Ohio Department of Natural Resources (ODNR) Division of Water Resources.

Table 2.28 Dams with Approved EAPs

Dam	Hazard Class	EAP Approval Date	Most Recent Inspection
Horse Run 9515-001	II	12/9/2014	10/23/2023
Horse Run 9515-002	II	12/14/2009	12/8/2011
Davis Pond	II	12/6/2013	11/7/2023
Muskingum at Stockport	I	5/6/2021	11/23/2023
Horse Run 9515-004	II	6/28/2024	10/25/2023
Ohio Power 9515-019	III	6/28/2024	10/23/2025
Ohio Power 9515-020	Exempt	12/2/2018	10/29/2018
Ohio Power 9515-021	Exempt	12/9/2014	12/6/2023
Appalachianv9515-023	II	12/9/2014	10/23/2023

Ohio Power 9515-027	Exempt	12/9/2014	10/13/2019
Ohio Power	IV	12/9/2014	12/9/2014
McConnelsville-9516-011 Muskingum River	II	5/6/2021	10/30/2023
Muskingum 9517-003	II Rokeby #8	5/6/2021	10/30/2023

Dams without Approved EAPs

Dam	Hazard Class	Most Recent Inspection	Reason for no EAP
Comstock	II	12/6/2023	
Halley Pond	II	12/6/2023	No plan
Horse Run 9515-024	III	4/16/2013	No plan/Abandon
Ohio Power 9516-007	III	10/23/2023	
Ohio Power 9516-008	III	10/23/2023	
Ohio Power 9615-001	II	10/26/2023	
Ohio Power 9615-021	I	10/4/2018	Abandon
Crooksville 9620-002	I	10/7/2018	No plan/Abandon
Crooksville 9620-003	I	10/7/2018	No plan/Abandon

Vulnerability and losses are difficult to estimate because there has only been 1 reported incident of a dam failure since 1950. Loss estimates from this event are not known, but there were some reported infrastructure losses due to the washing away of roads, but no loss of critical infrastructure.

The likeliest effect of a dam failure would be flooding. Class I dams, characterized as "high hazard potential" dams, would be expected to cause the most significant down-stream damage, including injuries or loss of life.

Three of the 4 Class I dams in the area are located in remote areas of northwestern (Ohio Power Company Pond) and northeastern (Crooksville Reservoir 1 & 2) Morgan County which is not densely populated.

Significant structural damage or injuries would not be anticipated in the event of a failure.

Failure of Muskingum Lock and Dam #6 in Stockport would likely result in downstream flooding, away from the Village and other densely populated areas. Significant structural damage or injuries would not be anticipated.

The Muskingum Lock and Dam No. 8 is located along the Muskingum River north of the Villages of McConnelsville and Malta. If this dam failed, the Villages could expect some minor flooding. The Village

of Stockport is located downstream of Muskingum Lock and Dam #7. If the dam were to fail, the likely impact would be river flooding in Stockport.

The remaining Class II and III dams in the County are located primarily in recreation and rural areas where only limited transient populations are located and are sufficiently isolated from municipal areas where no residential, non-residential or critical facilities are located, no structural losses are anticipated in the event of a dam failure.

2.3.8 Wildfires

A wildfire is an uncontrolled, unplanned fire spreading through vegetative fuels, exposing and possibly consuming structures and typically occurring in rural and other natural areas. They often begin unnoticed, spread quickly, and are usually signaled by dense smoke that fills the area for miles around. Vegetation, grasses, brush, and trees fuel wildfires. There are 2 major causes of wildfires: natural (dry climates, lightning, volcanic eruption) and human-caused (arson, power-line arcs, discarded cigarettes and sparks from equipment or campfires).

According to the 2024 Ohio State Hazard Mitigation Plan, an average of 1,000 wildfires burn up to 6,000 acres of forest and grassland within ODNR's Division of Wildlife Protection Area. This area includes all 200,000 acres of Ohio's 21 State Forests as well as privately owned lands within the district.

Location **Figure 2.14**

ODNR Division of Forestry's Expanded Forest Fire Protection Area

Morgan County is included in ODNR's Forest Resource Strategy (2020-2030). Strategy 2.2.2 calls for efforts to "Reduce wildfire damage", and the ODNR State Wildlife ActionPlan. According to the Ohio Division of Forestry, there are several factors that can contribute to the start of wildfires in Morgan County including arson, equipment fires, campfires, and lightning. Morgan County contains a great deal of forestland, with several recreational campsites and other attractions in designated areas such as the AEP ReCreation Area, Burr Oak State Park, and the Wolf Creek Wildlife Area, which is a 3,638-acre wildlife area that lies nine (9) miles southwest of McConnelsville on State Route 78. Campfires, coupled with large numbers of visitors and a large proportion of trees, make wildfires a potential hazard for Morgan County.

According to the Ohio State Hazard Mitigation Plan, Morgan County is part of Region 3, representing the highest risk of wildfires in the state, due primarily to the abundant forest areas and grasslands. Population distribution and socio-cultural aspects are also cited as reasons for increased risk of wildfires in this region.

Areas such as Burr Oak State Park and the Wolf Creek Wildlife Area are particularly susceptible to wildfires, as discussed above. However, none of the municipal areas appear to be at a significantly higher risk of

wildfires than the majority of Morgan County.

Local History

According to data compiled by ODNR, Division of Wildlife, Table 2.28 shows the extent and impact of wildfires in Morgan Co from 2020 through 2025.

Year	Acres burned	Deaths /Injuries	Structures destroyed
2020	.5	0/0	0
2021	14.25	0/0	0
2022	29.6	0/0	1
2023	11.0	0/0	0
2024	7.3	0/0	0
2025	18.5	0/0	0
Totals	**81.15**	**0/0**	**1**

Table 2.28 Morgan Co Wildfires 2020-2025

Additional local data provided from the M&M Fire Department showed the following brush fire acreage Burns from 2016 to 2025.

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Acres Burned	10	6	4	1	4	3	4	1	23	11

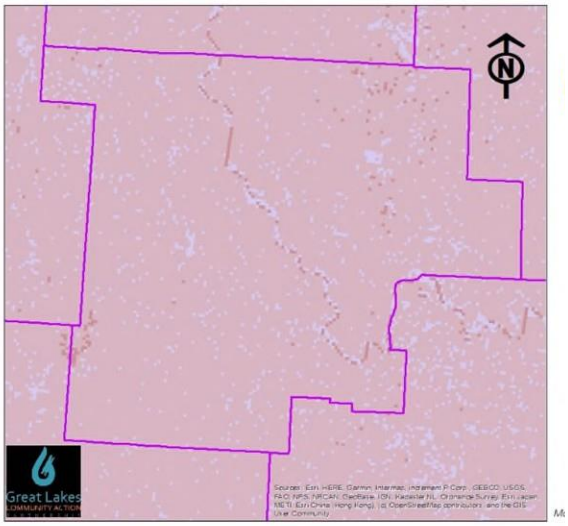
Probability of Future Occurrences

Wildfires are an annual event in Morgan County. Based on the above historical documentation, the county can anticipate a few wildfires per year, with an average of 13.5 acres impacted.

Vulnerability and Loss Estimation

According to USDA's Wildfire Hazard Potential Map (see Figure 2.14), Morgan County is rated as having a very-low to low potential for wildfires. However, this can change quickly with climatic conditions. A prolonged period of drought and high heat may dry up many areas of the county and add them to the amount of fuel for a potentially destructive wildfire. Long-term climate change is also expected to impact these conditions that exacerbate wildfires.

Figure 2.14-USDA Wildfire Hazard Potential Ma



Morgan County falls into the classes of Ag land and hardwood in regard to fuel types. Both classes are considered to be low hazards in terms of wildfires.

Morgan County is susceptible to wildfires due to the abundance of agricultural, forest and open areas in the county. Wildfires are an annual occurrence in the county but have historically not consumed much land or property and there are no documented deaths or injuries. Members of the volunteer fire departments confirm that small brush fires are a common occurrence during the dry summer months, in what is typically known as the "burning season." These small brush fires are usually handled by local fire departments and often do not cause damage to structures. However, the threat is present that these brush fires could burn out of control and consume many structures, as well as a portion of the nearly 14,000 acres of forestland that exists in Morgan County.

Wildfires can start anywhere in the county when conditions are favorable. Due to this unpredictable nature, it is hard to assess vulnerability and estimate losses. However, if a small wildfire were to burn out of control and into a populated area, there is the potential to cause significant structural damage, injury and possible death. The Planning Committee does not consider wildfires to be a significant hazard in the County as any wildfires in the county are handled by local fire departments without incidents and will not consider additional mitigative measures at this time. Again, based on the 5-year data above, wildfires will not have a significant impact on public safety, loss of life or injury, or property damage.

3.1 Overview

According to FEMA's Local Hazard Mitigation Planning Handbook all communities must develop a mitigation strategy that outlines how the community will accomplish the goals of the plan and reduce losses identified in the risk assessment. FEMA identifies 4 types of mitigation actions as follows: local plans and regulations, structure and infrastructure projects, natural systems management, and education and awareness programs. During the development of the mitigation strategy the Planning Committee considered the following:

- Identified applicable mitigation goals and strategies based on stakeholder participation including the public interest surveys.
- Mitigation strategies focused on those actions that addressed specific risks and vulnerabilities in each jurisdiction, keeping in mind the inherent limitations for planning and financing mitigation activities county-wide.
- Reviewed the progress of the previously adopted mitigation goals and action plans and re-evaluated those strategies based upon the updated information from the risk assessment and vulnerability assessment for each hazard.
- The committee members were reminded to view their strategies in light of the likelihood of a hazard occurrence in their jurisdictions, the extent of the occurrence and the impact of those hazards on their jurisdictions.
- Members were asked to provide feedback regarding completion, addition and deletion of action items and other hazard mitigation projects.
- Strategies were prioritized based on an assessment of the social, technical, administrative, political, legal, economic and environmental feasibility of each individual jurisdiction.

The mitigation strategy is comprised of 3 main components as outlined in the *FEMA Local Mitigation Planning Handbook:*

- Goals: general guidelines that describe what the community wants to achieve, generally these are broad policy statements that represent the vision for reducing or avoiding losses from hazard impacts
- Objectives: identifies the specific strategy to achieve stated goals. Unlike goals, objectives are specific and measurable.
- Actions: the specific actions to achieve stated goals and objectives. Actions are prioritized in an action plan that prioritizes action steps, identifies responsible parties as well necessary resources to implement a specific action item.

Risk Priorities

The Hazard Identification and Risk Assessment identified 13 hazards that are likely to impact Morgan

County for this plan. The assessment considered the cause and effects of the identified hazards including the frequency and severity of past events and the damage that could occur should an event impact the county or its jurisdictions. As a result, the planning committee determined that the primary eight (8) hazards affecting the county include Flooding, Severe Summer Storms, Land subsidence/Slips/Erosion, Severe Winter Weather, Drought/Extreme Heat, Strong Winds/Tornadoes, Dam Failure and Wildfires.

Given the limited planning, financial and technical resources to conduct mitigation activities, the Planning Committee will focus its mitigation efforts on those hazards that strike most frequently, cause the most damage, are not covered by other local plans, and can be prevented or lessened through feasible mitigation activities. The planning team focused on prioritizing those activities that could realistically be accomplished and would result in actual reduction in potential and real losses. The remaining hazards will not be considered until such time as additional studies are developed, and resources can be made available for mitigative action other than the implementation of enhanced public education and awareness programs that cover "multiple hazards".

Since the primary hazards affect the County in its entirety, and none of the local jurisdictions administer zoning or building codes and do not have planning commissions or the financial resources to devote to mitigation activities, mitigation actions will be undertaken primarily as a County-wide effort. Local jurisdictions will coordinate mitigation efforts with county agencies and provide support and resources as appropriate.

3.2 Mitigation Goals and Strategies

This section identifies the prioritized mitigation goals and strategies for each jurisdiction and includes action type, lead agency, timelines and potential funding for each action. The mitigation actions were developed in accordance with the following types of mitigation strategies (in no particular order): 1) regulatory and planning; 2) property protection; 3) natural resource protection; 4) structure and infrastructure projects; and 5) public education and awareness as described in FEMA's Hazard Mitigation Ideas resource guide. The lead agency is the entity tasked with ensuring that local officials look for opportunities to implement strategies over the 5-year planning period. The timeline is the timeframe in which individual strategies should be implemented, however based on the availability of funding or changes in priorities as other critical projects emerge may impact the proposed timelines. Several funding sources may be used to undertake hazard mitigation activities depending on the type of project. Some of those sources include: Community Development Block Grant (CDBG), Flood Mitigation Assistance Grant (FMA), Pre-disaster Mitigation Grant (PDM), Severe Repetitive Loss Grant (SRL), Hazard Mitigation Grant Program (HMGP), Repetitive Flood Claims Program (RFC), and Homeland Security Grant Program (HSGP). Some of these federal programs may see significant changes and potential funding reductions under the current federal administration. O D N R , OPWC Clean Ohio, OPWC Infrastructure grants and a number of grants offered through the Muskingum Water Conservancy District (MWCD), may also be useful. Morgan County will need to coordinate with the Morgan County EMA and/or Development Office to assess eligibility for funding.

Planning team members and representatives from local jurisdictions worked collaboratively to develop the

goals and strategies. RFG Associates Inc. drafted a list of strategies based on stakeholder input and presented them to the planning committee and other interested parties. Mitigation actions were developed

to be the most feasible and the most beneficial to hazard reduction. Table 3.2.1 identify the goals and strategies of each jurisdiction in Morgan County. Strategy priorities are defined by their task number. Many are similar, but not identical across the County. Based on individual community characteristics and disaster history, the prioritization of hazards and priority mitigation strategies varied.

Priority mitigation projects will only be implemented if the maximum benefits outweigh the associated costs of the proposed projects. The Planning Committee performed a general assessment of each mitigation measure that might require FEMA funding.

Cost-benefit analysis of each mitigation activity is rated as 1) good cost/benefit, 2) fair cost/benefit and 3) poor cost/benefit. Further, project implementation will be subject to the availability of FEMA grants and other sources of funds as well as local resources. Projects that are determined to be infeasible during this detailed review will be re-evaluated by the Planning Committee for re-scheduling or deletion.

3.2.1 Morgan County Hazard Mitigation Plan 2026-2030

Morgan County, OH Mitigation Action Plan Matrix

The following chart shows ___Goals and __ Action Items which are intended to address and mitigate loss of property and life due to natural hazards in Morgan County, over the next five (5) years 2026-2030.

Priority Projects were determined by the Planning Team, and all Action Items are ranked based on critical need to implement: 1 Highest Priority 1-2 years; 2 Important Priority 1-3 years; 3 Priority 2-3 years; 4 Medium Priority 3-4 years; and 5 Low Priority 4-5 years.

Financial Feasibility was also determined and approved by the Planning Team. Each Action Item was rated on a scale of 1) good cost/benefit, 2) fair cost/benefit and 3) poor cost/benefit

Goal	Priority/ Financial Feasibility	Action Item	Start/ End Dates	Responsible Party (key)	Resources (Source/ Est. Budget	Target Jurisdiction and Comments
Morgan Co (MCo)		**Morgan Co HMP 2/15/26 update**				
MCo1. Reduce the negative effects of **Land Subsidence** along Muskingum River	**1/1**	MCo 1.1 Identify and map areas of unstable soils and identify/assess potential bank stabilization techniques for financial and technical feasibility (1.1)	2026-27	County Engineer US Geological Society	Local, CDBG, FMA, PDA, HMGP, others	SR 266, South River Rd, Ogg Rd County-Wide
MCo2. Reduce the negative effects of **Summer Storms** on critical facilities	**3/1**	MCo 2.1 Assess the feasibility of installing lightning protection devices and other methods (lightning rods, grounding on communications, and other infrastructure) at 1. Co Courthouse, 2. Riecker Bldg., and 3. Sherriff Office (2.1)	2027-29	County Commissioners	Local, HMGP	McConnelsville
MCo3. Reduce the negative effects of **Winter Weather** events on residents and county facilities.	**2/1**	MCo 3.1 Plan for and maintain adequate road clearing equipment for snow, ice, and debris (3.1)	2026-28	County Engineer	Local	Chesterhill Snow Plow County-wide Snow loading/hauling equipment
	1/1	MCo 3.2 Continue to provide regular and updated information to the public about dangers of severe winter weather and safety issues with alternative heating sources via new EMA website, Facebook Hyper Reach, water bill mailings, and links to Village websites/outreach (3.5)	2026-27	Co EMA Director	Local	County-Wide

Goal	Priority/ Financial Feasibility	Action Item	Start/ End Dates	Responsible Party (key)	Resources (Source/ Est. Budget	Target Jurisdiction and Comments
	2/2	MCo 3.3 Address Ice Dams and Ice Flows, via debris remove efforts to reduce winter weather folding events (NEW)	2026-28	Co EMA Director County Engineer		County-Wide
	2/1	MCo 3.4 Improve tree removal and tree maintenance along all county and township roads to improve winter snow and ice removal safety and efficiency (NEW)	2026-28	Co EMA Director Co Engineer Township Trustees		County-Wide
MCo4. Reduce the negative effects of **Drought and Extreme Heat**	**2/1**	MCo4.1 Work with partners and local jurisdictions to provide public information about water saving techniques (low flow shower heads, and toilets, fixing leaking plumbing and other water conservation measures) EMA website, links to Village websites and outreach (4.2)	2026-28	Co EMA Director Village Mayors/ Administrators	Local	McConnelsville Malta Stockport Chesterhill
	3/1	MCo 4.2 Work with partners to educate farmers on soil and water conservation practices (4.3)	2027-29	Co EMA Soil and Water Conservation Musk Watershed Conservancy Dist. (MWCD) FFA groups	Local MWCD Cover Crop grants	County-Wide
	1/1	MCo 4.3 Deploy 2 equipped emergency trailers with heating and cooling functions and mobile medical facilities to Chesterhill, and 1 mobile unit based at the EMA (NEW)	2026-27	Co EMA Director	Local, OEMA, FEMA	County-wide Chesterhill

Goal	**Priority/ Financial Feasibility**	**Action Item**	**Start/ End Dates**	**Responsible Party (key)**	**Resources (Source/ Est. Budget**	**Target Jurisdiction and Comments**
MCo5. Reduce the negative effects of **Flooding**	**4/2**	MCo 5.1 Protect and improve natural areas that serve as mitigation features like wetlands and floodplains though the use of regs, land acquisition, conservation easements, and public education (5.1)	2028-29	Co Floodplain Manager FEMA MWCD	Local MWCD PWM and Steam Cleanup grants OPWC Issue 1 grants	County-Wide
	3/2	MCo 5.2 Reduce the impacts of flooding by assessing storm water conveyance capacity, areas for debris cleanup and identify potential repairs and improvements (NEW and 5.2)	2027-29	County Floodplain Manager	Local, OPWC, ARC	Stockport Willams Bridge Rd: Chesterhill, Tributaries to Muskingum River
	2/1	MCo 5.3 Provide enhanced public education/outreach for repetitive loss property owners on incentives to get flood insurance and mitigation protection techniques and conduct mitigation activities for repetitive loss properties by assessing potential for acquisition, demolition, or retrofitting. (5.4)	2026-28	Co Floodplain Manager Village Mayors/ Administrators	Local, HMPG, FEMA, CDBG, others TBD	McConnelsville Malta Stockport County-Wide
	4/2	MCo 5.4 Identify and protect water and wastewater facilities in flood prone areas and investigate flood proofing. (5.5)	2028-29	County Floodplain Manager/ County Engineer	MWCD PWM and Steam cleanup grants	Malta McConnelsville Stockport Chesterhill

Goal	Priority/ Financial Feasibility	Action Item	Start/ End Dates	Responsible Party (key)	Resources (Source/ Est. Budget	Target Jurisdiction and Comments
MCo6. Reduce the impact of **All Hazards** in the County and its jurisdictions	**2/1**	MCo 6.1 Reduce response times for safety services during and after hazard events Via upgraded 911 dispatch, and interoperable communications upgrades (NEW and 6.1)	2026-28	Co EMA Director Fire and Police Chiefs	Local	Malta McConnelsville Stockport Chesterhill County-Wide
	1/1	MCo 6.2 Continue enhanced public education and outreach to inform the public of natural hazard dangers and how to implement private mitigation and safety strategies via new EMA website, Facebook, and links to Village websites and outreach (6.2)	2026-27	Co EMA Director	Local	Malta McConnelsville Stockport Chesterhill County-Wide
	2/2	MCo 6.3 Evaluate potential for mitigation techniques at high-risk locations including Riverside Landing Nursing Home (+/-120 beds), Morgan JHS and HS, and the Co EMS Bldg. (6.4)	2026-28	County Engineer Co Floodplain Manager	Local, PDA, HMGP	McConnelsville
	1/1	MCo 6.4 Increase the use of new Hyper Reach alert program. Add QR code. Currently 4,000 of +14,000 residents have signed up. Goals: increase to 7,500 by 12/26 and to 10,000 by 12/28 (NEW)	3/2026-12/2028 Then ongoing	Co EMA Director	Local	County-wide
	2/2	MCo 6.5 Investigate warming/cooling stations to be created at area libraries and in Pennsville (NEW)	2026-28	Co EMA Director	Local	County-wide
MCo7. Reduce the impacts of **Dam Failure** on the County and its jurisdictions	**5/2**	MCo 7.1 Coordinate with ODNR and dam owners to ensure that regular maintenance and/or rebab of dams is being conducted. Assist with funding applications as needed. (7.1)	2029-30	County Engineer and Co EMA Director	Local, OWDA, HHPD	County-wide

Goal	Priority/ Financial Feasibility	Action Item	Start/ End Dates	Responsible Party (key)	Resources (Source/ Est. Budget	Target Jurisdiction and Comments
MCo 8. Reduce the impacts of **Wildfires** on the County and its jurisdictions	**3/1**	MCo 8.1 Educate the community about the dangers and safer practices for open burning and better awareness of required burning bans using social media and notices with utility bills (NEW)	2027-29	Co EMA Director Fire Chiefs	Local, Ohio EMA	Malta McConnelsville Stockport Chesterhill
Village of McConnelsville (Mc)						
Mc1 Reduce the negative impacts of **flooding**	**1/1**	Mc1.1 Maintain storm sewers and drainage systems to alleviate flooding (Mc1.1)	2026-27	Village Administrator	Local, CDBG, OPWC	McConnelsville
	3/2	Mc1.2 Coordinate with the county to protect and enhance natural areas to reduce flooding (clear debris, maintain ditches etc.) (Mc1.2)	2027-29	Village Administrator	Local, PDM, CDBG, other	McConnelsville
	2/2	Mc1.3 Coordinate with the County to identify culverts and other storm drainage structures for replacement/repair (Mc1.3)	2026-28	Village Administrator	CDBG, Local, PDM	McConnelsville

Goal	Priority/ Financial Feasibility	Action Item	Start/ End Dates	Responsible Party (key)	Resources (Source/ Est. Budget	Target Jurisdiction and Comments
	3/1	Mc1.4 Coordinate public information releases with the County on flood risks and private property protection (Mc1.4)	2027-29	Village Administrator	Local	McConnelsville
	4/1	Mc1.5 Coordinate with the County to identify the need for flood proofing critical facilities including water and wastewater in the Village (1.5)	2028-29	Village Administrator	Local, PDM, FMA, other	McConnelsville
	4/2	Mc1.6 Conduct mitigation activities for repetitive loss structures by assessing potential acquisition/demolition (1.6)	2028-29	Village Administrator	CDBG, FEMA, other	McConnelsville
Mc2 Reduce the negative impacts of **severe storms**	**3/1**	Mc2.1 Coordinate with the County to assess vulnerable critical facilities for mitigation potential (Mc2.1) (3) generators for waste water system	2027-29	Village Administrator	**Local**	McConnelsville
	1/1	Mc2.2 Coordinate with the County to increase public awareness of the risks associated with severe storms (Mc2.2)	2026-27	Village Administrator	**Local**	McConnelsville

Goal	**Priority/ Financial Feasibility**	**Action Item**	**Start/ End Dates**	**Responsible Party (key)**	**Resources (Source/ Est. Budget**	**Target Jurisdiction and Comments**
Mc3 Reduce the negative impacts of **landslides and erosion**	**2/1**	Mc3.1 Coordinate with the County to identify and address susceptible areas to erosion and assess potential bank stabilization options (Mc3.1) East Bell Ave	2026-28	Village Administrator	Local	McConnelsville
Mc4 Reduce the negative impacts of **multiple hazards**	**1/1**	Mc4.1 Coordinate communications with the County and promote the use of the Hyper Reach system for public notification of weather-related events or emergencies (Mc4.1 and Mc4.2)	2026-27	Village Administrator	Local	McConnelsville
	2/2	Mc4.2 Provide and maintain adequate communications equipment for first responders (Mc4.3)	2026-28	Village Administrator	OEMA, State Fire Marshal, Local	McConnelsville
	4/1	Mc4.3 Encourage property owners to purchase adequate property, casualty, and flood insurance for disaster event restoration (Mc4.4)	2028-29	Village Administrator	Local	McConnelsville

Goal	**Priority/ Financial Feasibility**	**Action Item**	**Start/ End Dates**	**Responsible Party (key)**	**Resources (Source/ Est. Budget**	**Target Jurisdiction and Comments**
Village of Malta (M)						
M1 Reduce the negative impacts of **landslides (road slips) and erosion**	**1/1**	M1.1 Complete the repair to the road slip at Front Street/County Rd 2 (M1)	Complete by 12/26	Village Administrator	OPWC	Malta
M2 Reduce the negative impacts of **flooding**	**2/1**	M2.1 Improve maintenance on storm sewers and drainage systems (M2.1)	2026-28	Village Administrator	OEMA. OPWC, Local	Malta
	3/2	M2.2 Coordinate with the County to protect and enhance natural areas including debris clearing and ditch maintenance (M2.2)	2027-29	Village Administrator	TBD	Malta
	2/1	M2.3 Coordinate with the County to identify culverts and other structures for replacement/repair (M2.3)	2026-28	Village Administrator	OPWC, State of Ohio, Local	Malta
	1/1	M2.4 Coordinate with the County for public information releases on the risks of flooding and private property protection (M2.4)	2026-27	Village Administrator	Local	Malta

Goal	Priority/ Financial Feasibility	Action Item	Start/ End Dates	Responsible Party (key)	Resources (Source/ Est. Budget	Target Jurisdiction and Comments
	2/1	M2.5 Coordinate with the County to identify flood proofing of critical facilities including water and wastewater (M2.5)	2026-28	Village Administrator	Local	Malta
M3 Reduce the impact of **multiple hazards**	**1/1**	M3.1 Coordinate with the County to improve public outreach communications and emergency messaging	2026-27	Village Administrator	Local	Malta
	1/2	M3.2 Promote the use of the Hyper Reach system for public notification or weather-related events and emergencies (M3.3)	2026-27	Village Administrator	Local	Malta
	2/2	M3.3 Maintain adequate communications equipment for first responders for hazard events or emergencies (M3.4)	2026-28	Village Administrator	OEMA, State Fire Marshal, Local	Malta
M4 Reduce the impacts of **tornadoes and high winds**	**5/3**	M4.1 Assess the feasibility of installing residential and community safe rooms (M4.1)	2029-30	Village Administrator	Local	Malta

Goal	Priority/ Financial Feasibility	Action Item	Start/ End Dates	Responsible Party (key)	Resources (Source/ Est. Budget	Target Jurisdiction and Comments
Village of Chesterhill (C)						
C1 Reduce the negative impacts of **excessive heat**	**2/1**	C1.1 Provide access to cooling centers during times of extreme heat, and secure a Generator for the Gym shelter (C1.1)	2026-28	Village Administrator	Local, CDBG	Chesterhill
	1/1	C1.2 Coordinate with the County to provide public information on location and hours of cooling center(s) using Facebook, County EMA website, and the Village website (C1.2)	2026-27	Village Administrator	Local	Chesterhill
	1/1	C1.3 Coordinate with the fire department and other partners to identify vulnerable populations and provide information on assistance services including rides to cooling centers (C1.3)	2026-27	Village Administrator Fire Chief	Local	Chesterhill
C2. Reduce the negative effects of **severe storms**	**2/1**	C2.1 Coordinate with the County to assess vulnerable critical facilities to damage from severe weather and identify the potential for mitigation, including a generator for Booster Station #1 (C2.1) and Water Tower (NEW)	2026-28	Village Administrator	Local	Chesterhill

Goal	Priority/ Financial Feasibility	Action Item	Start/ End Dates	Responsible Party (key)	Resources (Source/ Est. Budget	Target Jurisdiction and Comments
	1/1	C2.2 Coordinate with the County to increase public awareness of the risks associated with severe storms. (C2.2)	2026-27	Village Administrator Co EMA Director	Local	Chesterhill
	3/1	C2.3 Advocate for and implement programs to trim trees, clear ditches and streams of debris and other actions to protect property from storm damage. (C2.3)	2027-29	Village Administrator	Local	Chesterhill
C3. Provide and maintain adequate communications equipment for first responders to ensure proper communication during emergencies	**3/2**	C3.1 Coordinate with the County Engineer and township trustees to identify repair options and funding sources for in areas of road slips and washouts. Specifically work to repair slip on Hermann Rd (C3.1 and C3.2)	2027-29	Fire Chief	Local. OPWC, CDBG, HMGP, other	Chesterhill
C4. Reduce the negative effects of multiple hazards	**1/1**	C4.1 Advocate for the use of the Hyper Reach system for public notification or weather-related events and emergencies (C4.2)	2026-27	Village Administrator Co EMA Director	Local	Chesterhill
	2/2	C4.2 Provide and maintain adequate communications equipment for first responders to ensure proper communication during emergencies. (C4.3)	2026-28	Fire and Police Chiefs	State Fire Marshall, OEMA, HSGP, Local	Chesterhill

Goal	Priority/ Financial Feasibility	Action Item	Start/ End Dates	Responsible Party (key)	Resources (Source/ Est. Budget	Target Jurisdiction and Comments
Village of Stockport (S)						
S1 Reduce the negative effects of **severe storms**	**1/1**	S1.1 Coordinate with the County increase public awareness of the risks associated with severe storms (S1.2)	2026-27	Village Administrator or Mayor	Local, PDM, DDBG, other	Stockport
	3/1	S1.2 Advocate for and implement programs to trim trees and remove debris from streams and ditches (S1.3)	2027-29	Village Administrator or Mayor	Local	Stockport
S2 Reduce the negative impacts of **landslides and erosion**	**1/2**	S2.1 Engineer, secure funding, and implement repairs for road slips and wash outs, specifically S River Rd at CR2 (S2.1)	2026-27	County Engineer	OPWC, ODOT, HMGP, Local	Stockport
S3 Reduce vulnerability to damage from **hazard material spills and incidents**	**2/1**	S3.1 Coordinate with the County and other agencies to provide adequate training for first responders and engage Muskingum Co HazMat and other Morgan Co fire/EMS in Mutual Aid Agreements (S3.1 and S3.2)	2026-28	Village Administrator or Mayor	Local, OEMA, fire departments	Stockport
	1/1	S3.2 Ensure adequate mutual aid agreements are in place for assistance in every spill event (S3.2)	2026-27	Village Administrator or Mayor	Local	Stockport County-wide

Goal	Priority/ Financial Feasibility	Action Item	Start/ End Dates	Responsible Party (key)	Resources (Source/ Est. Budget	Target Jurisdiction and Comments
S4 Reduce the negative effects of **multiple hazards**	**2/1**	S4.1 Secure funding and install backup generators at the Community Center, fire station, and 1 mobile generator. (S4.1)	**2026-28**	Village Administrator or Mayor or Fire Chief		Stockport
	1/1	S4.2 Coordinate with the County to improve public outreach communications and emergency messaging (S4.2)		Village Administrator or Mayor		Stockport
	1/1	S4.3 Advocate for residents/business signup for the Hyper Reach system, for public information and weather-related events and emergencies (S4.3)		Village Administrator or Mayor	Local	Stockport
	2/2	S4.4 Coordinate with the county to provide and maintain adequate communications equipment for first responders to ensure proper communication during emergencies. (S4.4)		Fire Chief	OEMA, State Fire Marshall, Local	Stockport

Goal	Priority/ Financial Feasibility	Action Item	Start/ End Dates	Responsible Party (key)	Resources (Source/ Est. Budget	Target Jurisdiction and Comments
	2/1	S4.5 Encourage property owners to purchase adequate property, casualty, and flood insurance for disaster event restoration (S4.5)		Village Administrator or Mayor	Local	Stockport
S5 Reduce the impact of **dam failures** on residents	**3/2**	S5.1 Coordinate with dam owners to ensure regular maintenance and/or rehab of dams is being conducted. Assist with funding as needed. (S5.1)		Village Administrator or Mayor	OWDA, HHPD, Local	Stockport
	4/1	S5.2 Coordinate with Class 1 dam owners to assure EAPs are developed and kept up-to-date. Provie funding assistance as needed. (S5.2)		Village Administrator or Mayor	OWDA, HHPD, Local	Stockport
S6 Reduce the impact of **tornadoes** on residents	**5/3**	S6.1 Assess the feasibility of installing residential and community safe rooms (S6.1)		Village Administrator or Mayor	TBD, Local	Stockport
S7 Reduce the impact of **flooding** on residents	**4/2**	S7.1 Conduct mitigation activities on repetitive loss structures by assessing flood prone properties for their potential of acquisition, demolition, or retrofitting (S7.1)		Village Administrator or Mayor	CDBG, FEMA, Other	Stockport

Implementation

This mitigation strategy was developed as part of a multi-jurisdictional hazard mitigation plan. That being said, the responsibility for plan implementation lies with each individual jurisdiction. The actions included in the individual county and municipalities' mitigation strategy are designed to address the vulnerabilities identified during the risk assessment and include measures that may include structural projects and non- structural activities such as planning and regulatory activities as well as public education and outreach initiatives designed to protect property and reduce risk to residents.

Due to the limited financial and technical capacity of the county and its municipalities, the identified strategies are general actions that could be taken to help reduce the negative impact of natural and human caused disasters. Morgan County's villages will likely need to coordinate with County agencies such as the EMA, Engineer's office and Development office in order to convert an action item into a specific project that is technically and financially feasible.

The Morgan County EMA is the entity that is responsible for monitoring plan implementation as described in Section 1.4.

4.1 Overview

Plan adoption is the final step of the mitigation planning process. Morgan County followed all formal planning processes for state and federal plan review and approval as well as local jurisdiction adoption. This section outlines the plan approval process and identifies the relevant dates of plan approval, adoption and expiration.

4.2 Federal and State Plan Approval

After extensive review by the Planning Team, local jurisdictions and the general public, the Mitigation Plan was submitted to Ohio Emergency Management Agency's Mitigation Branch on / /2026. The Ohio EMA provided comments on the plan on / /2026 and / /2026. The County EMA and RFG Associates Inc. incorporated recommendations and revisions from the State EMA and prepared the plan for submission for review and final approval. Conditional plan approval, pending adoption of the plan, was issued on / /2026.

4.3 Local Adoption

After the conditional plan approval was received from FEMA, the Morgan County EMA initiated the local plan adoption process, which began with formal adoption of the plan by the Morgan County Commissioners. Following adoption by the county, all incorporated communities were asked to formally adopt the plan through local legislative action. A sample resolution was provided to each community to assist in this process. Each jurisdiction formally adopted the plan by resolution as shown on Table 4.1 below. A copy of the adoption resolutions for each Village is included in Appendix H.

Table 4.1-Local Plan Adoption

Jurisdiction	Date of Adoption
Morgan County	
Village of McConnelsville	
Village of Malta	
Village of Stockport	
Village of Chesterhill	

Upon adoption by the county, FEMA issued final plan approval on / /2026. The completed plan was uploaded on Ohio EMA's (SHARRP) portal on / /2026.

4.4 Plan Expiration

The Morgan County Hazard Mitigation Plan will expire 5 years from the date of FEMA approval which is / /2030. The plan maintenance process will proceed during the 5-year period as described in Section 1.4 of this report.

End of Morgan County HMP