2.2.8 Health Related Emergencies

A public health emergency is any adverse event (natural or human-caused) that compromises the health of the population and has the potential to cause widespread illness.				
RISK HIGHEST HIGH MEDIUM LOW LOWEST	**Period of Occurrence:**	At any time	**Risk Ranking:**	Medium
	Warning Time:	Over 24 hours	**Type of Hazard:**	Natural & Human-Caused
	Probability:	Occasional (May or may not occur in a year)	**Impact:**	Low (Some severe illnesses)
	Disaster Declarations:	DR-4507-OH (2020) EM-3457-OH (2020)		

Hazard Introduction and Overview

A public health emergency exists when the occurrence, or imminent threat of an illness or health condition, caused by bioterrorism, an epidemic or pandemic disease outbreak, or an infectious agent or biological toxin, poses a substantial risk to humans by either causing a significant number of fatalities or permanent or long-term disability. Public health emergencies are defined as much by their health consequences as by their causes and precipitating events. A situation becomes emergent when its health consequences have the potential to overwhelm routine community capabilities to address them. Potential causes of public health emergencies that lead to widespread illnesses include the following.

- Naturally occurring illnesses such as seasonal flu, or human-caused incidents such as the intentional release of anthrax
- Illnesses amongst the public that may cause a larger number of deaths or serious disabilities
- Illnesses resulting from highly infectious agents that are hard to control
- Illnesses resulting from a chemical attack on the public
- Illnesses resulting from the release of nuclear materials
- Other illnesses that can severely impact public health, whether resulting from natural hazards (i.e., drought, floods, invasive species, etc.) or emerging infectious diseases
- The remainder of this profile does not address the following public health emergencies: bioterrorism, chemical attacks, release of nuclear materials, heart disease, or diabetes.

"Since September 11, 2001, and the anthrax attacks that followed, a substantial federal investment has been made to increase our nation's ability to prepare for, and respond to, public health emergencies. Despite anecdotal reports which suggest that progress has been made, it is unclear whether the nation is better prepared to respond to a bioterrorist attack, pandemic influenza, or any other large-scale public health emergency" (Nelson, Lurie, Wasserman, & Zakowski, 2007). Anecdotal evidence from the challenges experienced managing and responding to the Coronavirus Disease of 2019 (COVID-19) pandemic between 2020 and 2023 would suggest that more recent federal dis-investment in public health has harmed the Nation's ability to respond.

In the United States, what is commonly referred to as the opioid epidemic, not for being a contagious or infectious disease, but by acting like one, has grown to alarming proportions. Opioids are drugs primarily used for pain relief; they include legal and illegal substances. Legally prescribed opioids include oxycodone, hydrocodone, and morphine. Illicit drugs include substances such as heroin and fentanyl.

Location and Extent

As the COVID-19 pandemic demonstrated, a public health emergency could occur at any time and simultaneously impact the entire county, the state of Ohio, the Nation, and even the entire world. Although the probability of a public health emergency of that magnitude striking Ashtabula County is relatively low, the associated vulnerability would be very high.

The most probable causes of a public health emergency in the county would be a naturally occurring illness such as seasonal flu, an illness resulting from an emerging highly infectious disease, or illnesses stemming from the occurrence of a natural disaster (i.e., severe drought, significant flooding, etc.). Instances of these illnesses could be small- or large-scale outbreaks, epidemics, or pandemics. According to the Centers for Disease Control and Prevention (CDC), there are three widely accepted "levels" of disease presence (CDC, 2015).

- **Endemic** refers to the baseline level of a particular disease in a population or area. This level is not necessarily the desired level, but the observed level.
- **Epidemic** refers to an increase in the number of cases of a disease above the usual level in that population or area. Epidemics may result from an increase in the disease's virulence, presence of a disease in a new outbreak, enhanced disease transmission, increased susceptibility among exposed persons, or increased exposure to the disease-causing agent. Note that, while the term "epidemic" originally only included infectious diseases, some non-infectious health conditions (such as obesity and opioid misuse) have

reached epidemic status in the United States.

- **Outbreak** carries the same definition of an epidemic but often for a more limited geographic area.
- A **pandemic** refers to an epidemic that has spread over several countries or continents, typically affecting a large number of people.

This hazard profile considers epidemic and pandemic situations, as well as those quick and emergent outbreaks of non-novel diseases (e.g., a norovirus outbreak within a school system) because those situations could strain the capabilities of participating jurisdictions to respond. A declaration of a public health emergency can be made by the Secretary of the U. S. Department of Health and Human Services (USHHS) under Section 319 of the Public Health Service (PHS) Act, if it has been determined that a disease or disorder presents a public health emergency, or a public health emergency, including significant outbreaks of infectious disease or bioterrorist attacks, otherwise exists. The declaration lasts for the duration of the emergency or 90 days but may be extended by the Secretary. While USHHS designations would certainly be those with which this profile is interested, smaller situations may also apply.

The rate of insurance coverage plays a part in the accessibility of healthcare among a population. The majority of residents in Ashtabula County have health insurance. Approximately 91% of residents aged 0 to 64 are insured. This is slightly below the state rate of insured individuals, which is 92.6%. Ohio has a higher rate of insured individual rate than the national average.

Epidemic outbreaks are more probable in densely populated areas, such as the cities of Ashtabula, Conneaut, and Geneva (though other areas with a smaller population may have a higher population density), and especially at facilities containing large numbers of occupants (e.g., multi-unit residential developments, commercial and industrial sites at which a large workforce is employed, nursing homes, hospitals, schools, and large correctional institutions), regardless of location. Figure 2.2.8.1 shows the Census tracts with populations in “institutionalized group quarters” (ATSDR, 2022) identified.

% Persons in Group Qtrs.

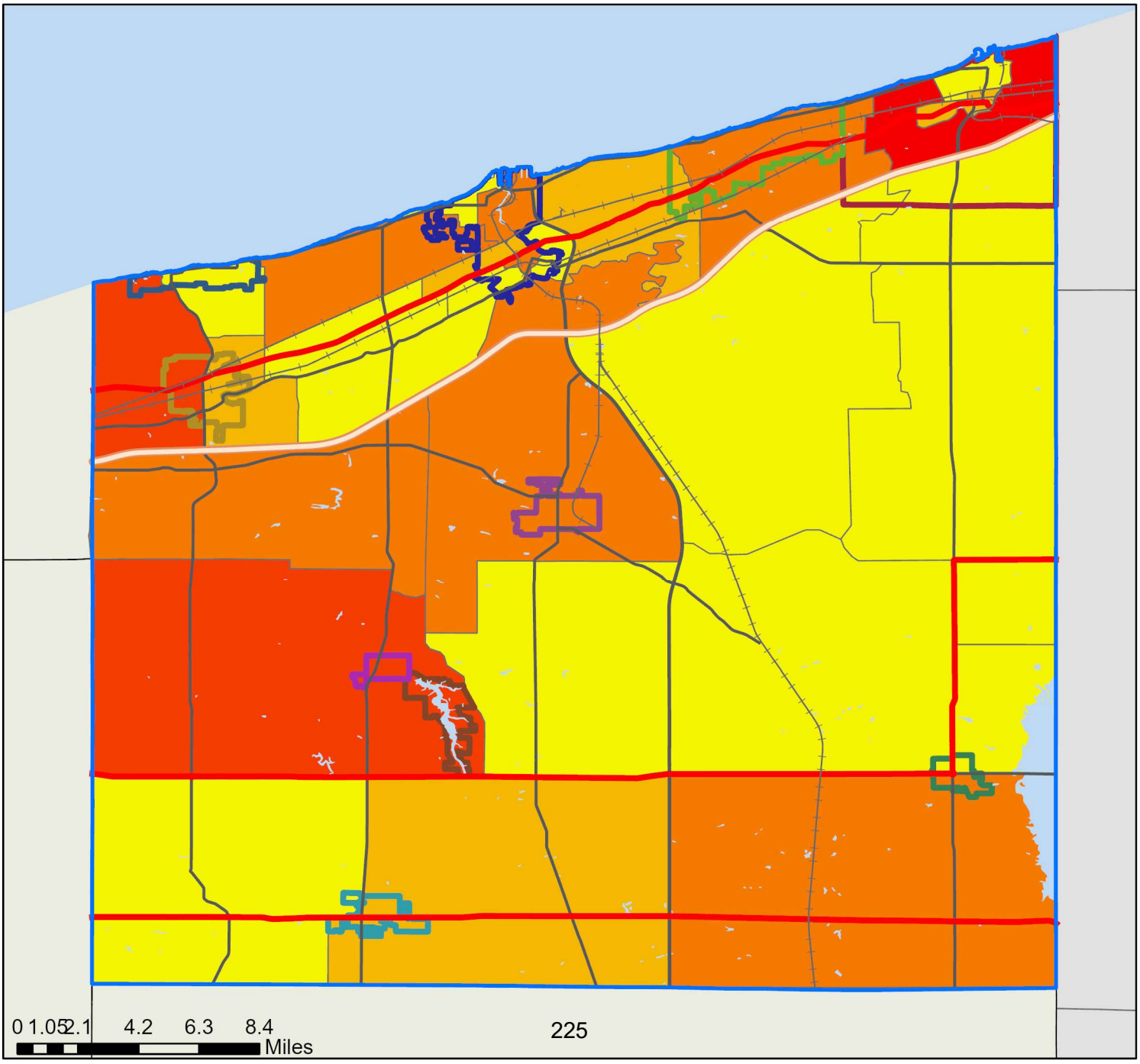
- 0.0
- 0.1 - 1.6
- 1.7 - 3.4
- 3.5 - 7.1
- 7.2 - 38.2

ASHTABULA COUNTY HAZARD MITIGATION PLAN

Figure 2.2.8.1: Pop. Distribution by Group Qtrs.

Data Source(s):
CDC ATSDR SVI (2020)

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



According to the U.S. Department of Health and Human Services (USDHHS), 1.6 million people misused prescription opioids for the first time, and 70,630 people died from overdosing on opioids in 2019. Of these deaths, 14,480 were attributed to overdosing on commonly prescribed opioids. Around 745,000 individuals used heroin, 50,000 for the first time, and about 63,000 deaths were attributed to overdoses of synthetic opioids or heroin, again in 2019 (USDHHS, 2022). The vast majority these opioids (i.e., fentanyl) is being brought into the U.S. by crossing the country's southern border with Mexico (DEA Intelligence Report, 2020). The opioid epidemic has, in some way, reached into the lives of nearly every person in the U.S. This disease does not have a preference for age, class, economic status, or even gender.

The Secretary of Health and Human Services issued a Determination of a Public Health Emergency on October 23, 2017, that has been renewed annually (by subsequent HHS secretaries). Along with overdose fatalities, medical professionals and researchers have linked opioid abuse to increases in other medical conditions, including Hepatitis C, HIV, and neonatal abstinence syndrome.

Although the use of prescription opioids under physician's care has made it possible for some individuals with injuries to return to work, opioids have lowered labor force participation. Federal and state budgets have also been affected by the opioid epidemic as costs for subsidized health insurance, rehabilitation, preventative programs, and child welfare programs have increased. This crisis is a problem that is affecting every state in the nation.

Impacts and Vulnerability

As noted, public health emergencies take on many forms. In these cases, communication among providers, public health officials, and the public is crucial. "Responsibility for the preparedness of a community lies not only with governmental agencies but also with active, engaged, and mobilized community residents, and businesses." (Nelson, Lurie, Wasserman, & Zakowski, 2007). Major concerns during a public health emergency include the ability of local healthcare providers to give medical attention to everyone who becomes ill, and the ability of health officials to identify the source of illness in the population. The cascading effects of public health emergencies can include:

- Illness or death,
- Civil disturbance,
- Distrust of government,
- Supply chain issues,
- Poor water quality, and
- Temporary loss of income.

An epidemic is a contagious disease that attacks many people at the same time. Epidemics can develop with little or no warning and quickly erode the capacity of local medical care providers. The potential impacts of an epidemic include severe illnesses or fatalities, disruption or closing of schools, and the forced closure of businesses and industrial operations. The extent of illness caused by a communicable or infectious disease depends on both the individual infected and the pathogen infecting them. For example, the influenza virus usually circulates from November to March and affects up to 20% of Americans (CDC, 2022b). Unlike seasonal influenza, pandemic strains of the flu virus are easily circulated and affect healthy individuals (see the table below).

Table 2.2.8.1

Seasonal Flu	Flu Pandemic
Outbreaks occur every year, usually in winter.	This occurs only rarely (only five times since 1918).
Caused by influenza viruses that are similar to those already affecting people.	Caused by a new influenza virus that people have not been exposed to before.
Healthy adults are usually not at risk for serious complications.	Healthy adults may be at increased risk for serious complications.
Hospitals and healthcare providers can usually meet public needs.	Hospitals and healthcare providers may be overwhelmed and difficult to access.
The vaccine is available at the beginning of flu season.	A vaccine would probably not be available in the initial stages of a pandemic.
It causes an average of 36,000 deaths each year in the United States.	The number of deaths could be significantly higher. In the 1918 pandemic, approximately 675,000 people died in the United States. The COVID-19 pandemic claimed more than 1,000,000 lives in the United States.
Generally, does not have a severe impact on daily life.	May have a severe impact on daily life, including widespread restrictions on travel, closings of schools and businesses, and cancellation of public events.

Public health emergencies can be exacerbated by the fact that healthcare resources can become scarce during an event. An increased number of cases and a reduced number of caregivers can overload jurisdictional or healthcare system abilities to provide medical attention to everyone who becomes ill. Further, preventative measures, such as vaccinations or prophylactic medication, may be in short supply or unavailable in a novel strain of a virus.

Public health emergencies can last several days, extend into several weeks, and in some cases, they can last for several months or years. The Ashtabula County Health Department has taken many steps to ensure a base level of preparedness for epidemic and pandemic conditions. Since many county residents travel, the possibility exists for novel strains to be introduced to the local population, thus validating epidemic/pandemic planning efforts.

The most probable public health emergencies within the county (i.e., naturally occurring illnesses such as seasonal flu, an emerging highly infectious disease) could affect all land areas and jurisdictions equally, but certain sub-sections of the population may be more negatively impacted than others. Those most vulnerable to public health emergencies include children, the elderly, and individuals with pre-existing medical conditions and chronic illnesses. The following maps illustrate the Census block groups with the highest concentrations of those aged 17 and under (i.e., Figure 2.2.8.2) and those over 65 (i.e., Figure 2.2.8.3).

% Persons 17 & Under

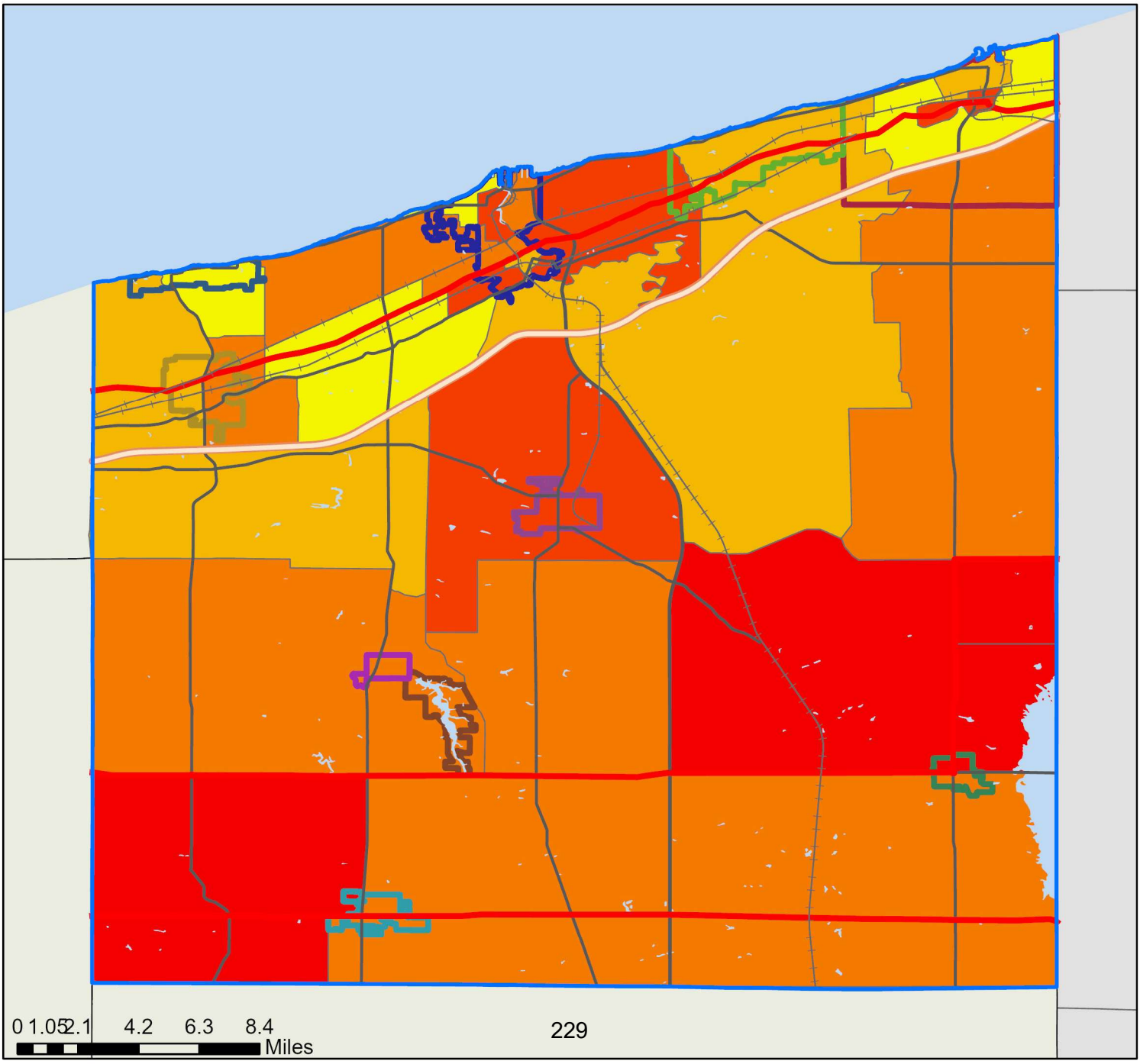
- 12.3 - 16.1
- 16.2 - 18.2
- 18.3 - 22.1
- 22.2 - 30.6
- 30.7 - 56.4

ASHTABULA COUNTY HAZARD MITIGATION PLAN

Figure 2.2.8.2: Persons 17 & Under

Data Source(s):
CDC ATSDR SVI (2020)

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



% Persons 65 & Over

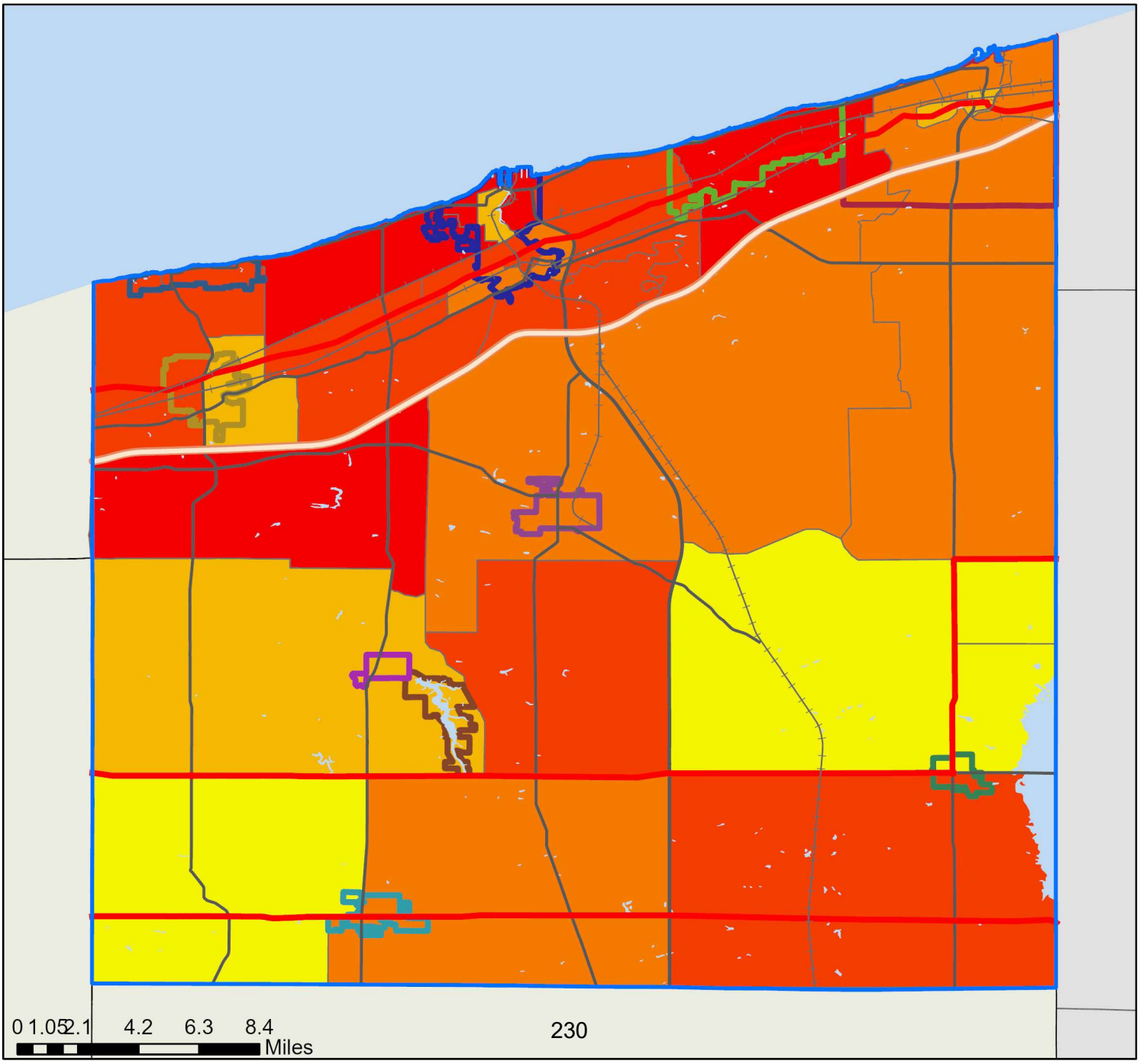
- 6.9 - 10.4
- 10.5 - 16.0
- 16.1 - 19.9
- 20.0 - 22.7
- 22.8 - 26.7

ASHTABULA COUNTY HAZARD MITIGATION PLAN

Figure 2.2.8.3: Persons 65 & Over

Data Source(s):
CDC ATSDR SVI (2020)

DISCLAIMER: Data is meant for use as reference only. Some sources may be intended to be used at national or regional scales and are thus used beyond their original intent for demonstrative purposes.



Though age is a known and critical social vulnerability variable for public health situations, others with chronic conditions may find themselves more at risk. During the COVID-19 pandemic, for example, health officials generated long lists of comorbidities that could amplify the effects of COVID-19 infection. The potentially extensive and changing nature (contingent on the disease in question) makes it difficult to definitively list those at extra risk due to chronic conditions.

The impacts of the opioid crisis are numerous, and they range from individual to community levels. Losing loved ones, having children taken away and placed in foster care, worsening financial hardships, turning to prostitution, theft, etc. to pay for drugs, are some of the individual impacts. Strains on local economies and threats to local emergency services and medical officials constitute some of the community effects.

Table 2.2.8.2

Opioid Epidemic Consequence Analysis	
Type of Impact	*Description*
Public/Responder Health & Safety	The hazard manifests within the general population. Residents should be aware of higher crime and how to manage and handle people who exhibit addictive behavior. Having a loved one addicted to opioids may cause financial, physical, and emotional stress. Fires responders can be in danger when responding to overdose incidents due to the nature of unknown drugs and their side effects.
Continuity of Operations	Businesses whose employees suffer from addiction may see reduced productivity, possibly leading to a deficit of available human resources.
Property, Facilities, & Infrastructure	An increase in crime may cause some property damage.
Economic Condition	The opioid epidemic is becoming increasingly costly to residents and governments. Costs include an increase in first-response activities, hospital care, treatment, etc.
Environmental	The environmental impacts of the opioid epidemic are minimal.

Historical Occurrences

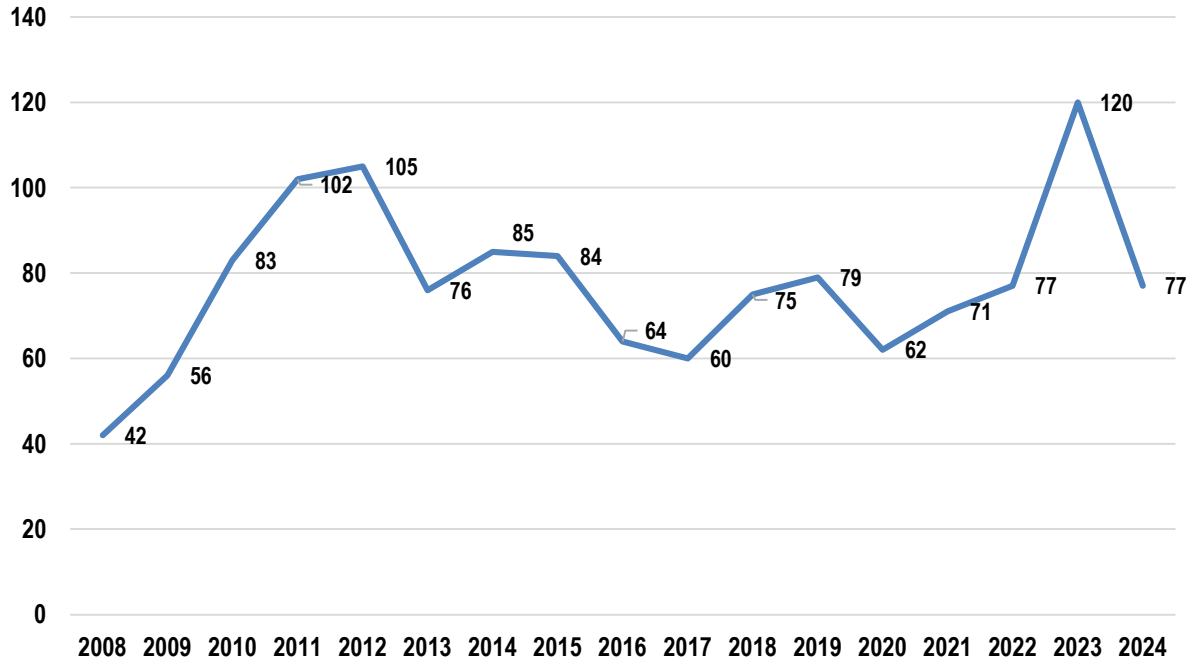
According to the Ashtabula County Health Department and the Ohio Department of Health (ODH), there are outbreaks of infectious disease every year. The county has experienced several outbreaks of influenza and gastroenteritis in long-term care facilities, pertussis associated with schools and daycares, and influenza at schools and correctional facilities. There have also been foodborne outbreaks involving food service establishments and schools. Specific outbreaks listed by either the ODH or the Centers for Disease Control and Prevention (CDC) appear in Table 2.2.8.3 below.

Table 2.2.8.3

Federal and State Outbreaks, 2010-2024		
Year(s)	*Agent*	*Reporting Agency*
2010	*Salmonella*	CDC
2011	*Listeria monocytogenes*	CDC
2012	Meningitis, Fungal	CDC
2012	West Nile Virus	CDC
2012	*E. coli* O145	CDC
2013	Cyclosporiasis	CDC
2013	MERS (Middle East Respiratory Syndrome)	CDC
2014	Ebola virus	CDC
2014-2015	Enterovirus	CDC
2014	Chikungunya virus	CDC
2016-2017	Zika virus	CDC
2017-2018	Hepatitis A	CDC, ODH
2019	Measles	CDC, ODH
2020-2023	Coronavirus Disease 2019 (COVID-19)	CDC, ODH
2024-Present	Dengue	CDC
2025-Present	Measles	CDC, ODH
2025-Present	*Salmonella* (linked to geckos)	CDC
2025-Present	*Salmonella* (linked to backyard poultry)	CDC
2025-Present	*Listeria* (linked to ready-to-eat foods)	CDC
2025-Present	*Salmonella* (linked to eggs)	CDC
2025-Present	*Salmonella* (linked to pistachio cream)	CDC
2025-Present	*Listeria* (linked to chicken fettuccine alfredo meals)	CDC

Planners collected information regarding reported infectious disease cases from the ODH surveillance records within the DataOhio portal (2025). Figure 2.2.8.4 presents a summary of infectious diseases in Ashtabula County between 2008 and 2024. There were 1,318 total cases in Ashtabula County over the 16 year period, approximately 25% (i.e., 330) of which required hospitalization.

Figure 2.2.8.4



Five pandemic influenza events have occurred in the last century. The 1918 Spanish Influenza outbreak remains the worst-case pandemic on record, with the number of deaths dramatically decreasing with each event, with the exception of the recent Corona Virus, 2019 (COVID-19) pandemic.

Table 2.2.8.4

Previous Worldwide Pandemic Events		
Date	*Pandemic Name/Subtype*	*Worldwide Deaths*
1918 – 1920	Spanish Flu / H1N1	50 million
1957 – 1958	Asian Flu / H2N2	1 – 3 million
1968 – 1969	Hong Kong Flu / H3N2	1 million
2009 – 2010	Swine Flu / A/H1N1	25,174
2019 – 2023	Corona Virus 2019 (COVI-19) (SARS)	6.8 million (on-going)

The following narratives seek to provide context for public health emergencies in the county and wider region.

H1N1 Swine Flu Pandemic, 2009

A recent pandemic event was H1N1 (swine flu), discovered in 2009. The CDC monitored the spread of the disease on a near-daily basis. The H1N1 flu was relatively mild for most people, but the virus spread with unprecedented speed; more than 700 schools in the United States closed, and many hospitals quarantined infected individuals. H1N1 was almost entirely responsible for total anomalies resolved as health events for 2009. Ohio reported over 200 cases by late July 2009. Though relatively minor, the H1N1 pandemic was the first event to necessitate activation of many communities' pandemic response plans (following focused efforts to upgrade said plans in the mid-2000s).

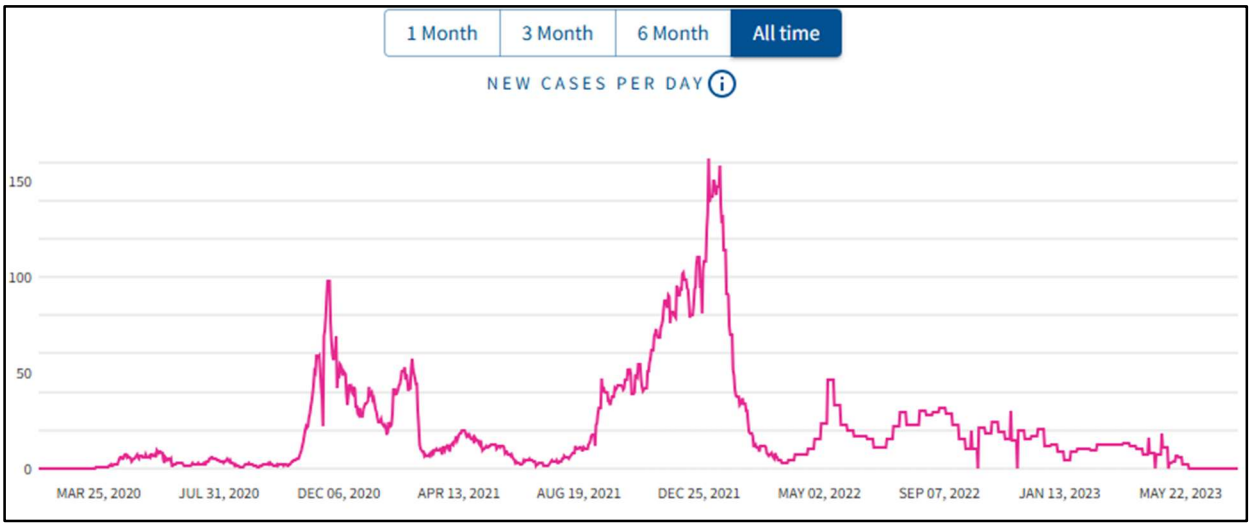
Coronavirus Disease 2019 (COVID-19 / SARS-CoV-2) Pandemic (DR-4507-OH)

The most recent pandemic to impact the United States was the Coronavirus Disease 2019 (COVID-19), which is a Severe Acute Respiratory Syndrome (SARS). The virus is believed to have started spreading as early as 2018, originating from the Wuhan Institute of Virology laboratory in Wuhan, China which experiments with corona viruses. To date, there have been over 778 million confirmed cases of the virus, resulting in over seven million deaths worldwide (WHO, 2025). The virus spread to every country and continent of the world.

The pandemic completely shut-down the entire United States for several months due to stay-at-home and social distancing order, isolation and quarantine mandates, global air travel was restricted for several months, the pandemic had a long-term negative effect on the countries supply-chain. The overall cost of the pandemic on the US economy is in the trillions.

As of July 2023, there were approximately 3.5 million confirmed cases and over 42,000 deaths in Ohio as a result of the pandemic. USA Facts noted a total of 26,559 total reported cases of COVID-19 in Ashtabula County, with 457 deaths (2025). The highest spike in new cases per day occurred in January 2022, as shown in Figure 2.2.8.5 below.

Figure 2.2.8.5

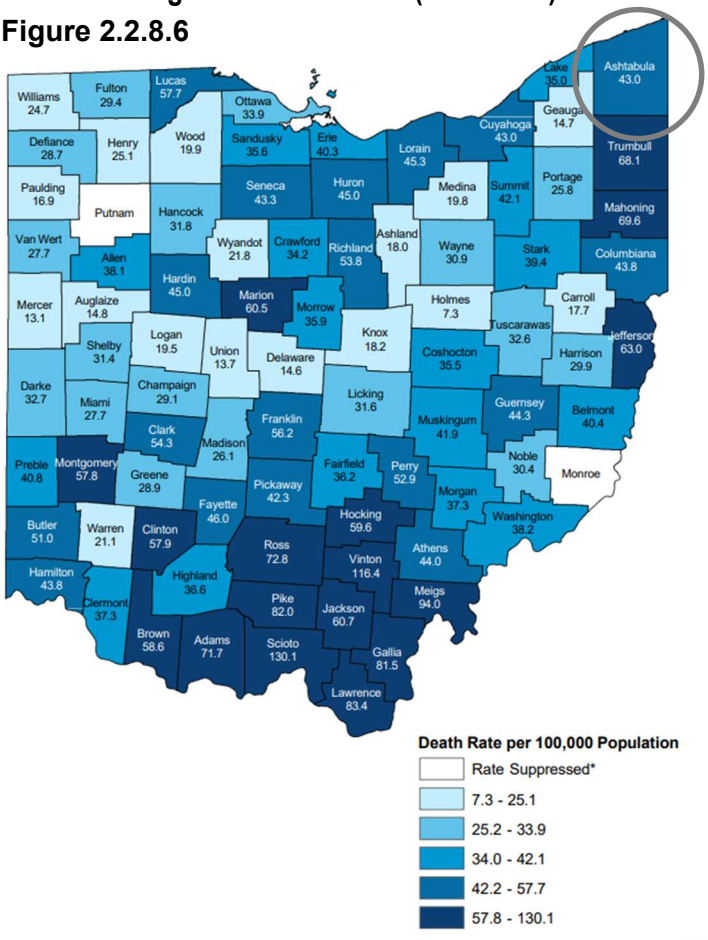


Opioid Crisis of 2017 – Ongoing

The state has seen a substantial increase in opioid overdose deaths over the years, with the rate tripling between 2010 and 2017. The Ohio Department of Health (ODH) maintains a record of unintentional drug overdoses. Illicit fentanyl or fentanyl analogs were involved in 78% of unintentional drug overdose deaths in 2023. Figure 2.2.8.6 illustrates that Ashtabula County's average age-adjusted rate of unintentional drug overdose deaths was 43 per year over the three year period of 2020 to 2023.

Average Rate of Unintentional Drug Overdose Deaths (2020-2023)

Figure 2.2.8.6



Loss and Damages

Losses based on historic epidemics are difficult to estimate. Epidemics rarely affect structures, but because they affect people, the operations of critical facilities, businesses, and other community assets may be impacted. According to a study, seasonal influenza results in a substantial economic impact, estimated, in part, at $16.3 billion in lost earnings (Molinari et al., 2007). By population, Ashtabula County represents 0.028% of the population of the United States. Since seasonal influenza primarily impacts the human population, using the county's composition in the U.S. as a multiplier (i.e., 0.0002849) and applying it to the potential economic impact, lost earnings in the county could reach $4,643,870 each year. Though that number appears high, it equates to approximately $95.36 per year for each person listed by the U.S. Census Bureau as "in civilian labor force (i.e., 48,700)."

Comprehensive estimates of losses associated with the COVID-19 pandemic will inform this discussion in future updates. Still, at the time of this writing, reliable estimates were unavailable. Billings (1997) indicated that the impact of the 1918 pandemic was a 2% drop in the world's gross domestic product. Further, the United States Bureau of Economic Analysis indicates that a community can use its median household income multiplied by its total number of households to determine an approximate Gross Domestic Product (GDP) for its area. As such, the average median household income ($55,507) and number of households (49,519) provided by the Census (U.S. Census Bureau, 2020) estimate a GDP for Ashtabula County of $2,748,651,133. Using the 2% figure, the impact on the county could be as much as $54,973,023.

Future Occurrences

Seasonal influenza activity peaks every winter, generally from December to February (CDC, 2018). These spikes may reach outbreak status, particularly in congregate settings such as nursing homes, detention facilities, and schools. Other bacterial and viral sicknesses, such as the common cold, RSV, hand-foot-mouth disease, etc., may also yield localized (i.e., site-specific) outbreaks. In the United States, the CDC surveils various conditions in concert with state and local public health entities.

"There is a growing concern over illegal immigration increasing the rates of infectious diseases in the United States. Approximately 500,000 legal immigrants and 80,000 refugees come to the United States each year, and an additional estimated 700,000 illegal immigrants have entered annually for the past four years. Legal immigrants and refugees are required to have a medical examination (i.e., skin test, chest x-ray examinations, blood tests, etc.) for migration to the US. Individuals who fail the exam due to certain health-related conditions are not admitted to

the US. Such conditions include drug addiction or communicable diseases of public health significance such as tuberculosis (TB), syphilis, gonorrhea, leprosy, and a changing list of current threats such as polio, cholera, diphtheria, smallpox, or severe acute respiratory syndromes. Illegal immigrants crossing into the United States could bring any of these threats. (Glick, 2015)"

The number of opioid-related deaths will likely continue to rise due to the manufacturing of synthetic opioids. Individuals who had been prescribed medication for injuries or acute pain in the past can substitute these synthetic opioids to feel the same relief or high they felt before. To combat the manufacturing and distribution of these synthetic drugs, Congress passed the Combat Methamphetamine Epidemic Act in 2005, requiring pharmacies to log all purchases of pseudoephedrine, the main ingredient used in methamphetamine. However, most methamphetamines used in the United States are manufactured in Mexico and shipped into the U.S. (NIH, 2019).

Risk Assessment

This section summarizes the vulnerability of Ashtabula County to health related emergencies. The county conducted an online survey for the public to share its thoughts on the hazards listed in this plan. Table 2.2.8.5 presents the results of that survey, specifically regarding health related emergencies.

Table 2.2.8.5

Public Sentiment, Health Related Emergencies					
	Level of Concern				
Hazard	*Not at All*	*Somewhat*	*Concerned*	*Very*	*Total Responses*
HEALTH EMERGENCIES	24 (16.22%)	47 (31.76%)	48 (32.43%)	29 (19.59%)	148
In the past five years, do you remember this hazard occurring in your community?				58 (39.19%)	148
Have you noticed an increase in the occurrences or intensity of this hazard?				56 (37.84%)	148
Have you noticed a decrease in the occurrences or intensity of this hazard?				4 (2.70%)	148

Source: Online Public Survey Results

The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above. The categories in the table appear in Ohio EMA's Mitigation Information Portal (MIP) tool.

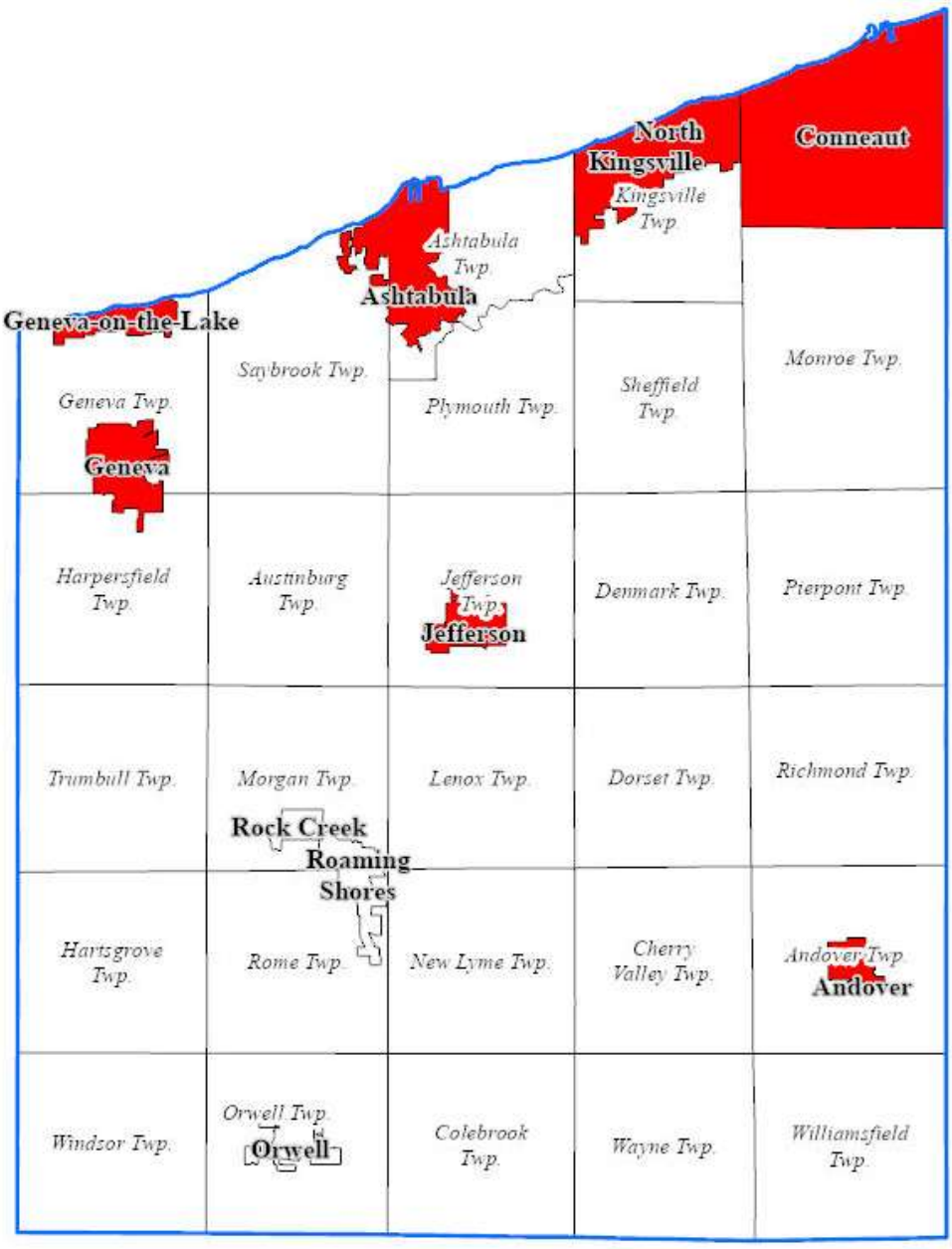
Table 2.2.8.6

Risk Ranking, Health Related Emergencies			
Category	*Points*	*Description*	*Notes*
Frequency	3	Occasional (May or may not occur in a year)	Ashtabula County can expect seasonal outbreak of infectious diseases annually. Even when considering the 2020 COVID-19 pandemic, large-scale situations would nor likely occur every year.
Response	5	More than one month	Significant outbreaks and pandemic operations can extend into months (e.g., H1N1 swine flu pandemic) or years (e.g., COVID-19 pandemic).
Onset	1	Over 24 hours	Though disease onset may be rapid, the development of large-scale impacts develop over time.
Magnitude	4	Catastrophic (More than 50% of land area affected)	Though the term *catastrophic* sounds urgent, in this case, it refers to the reality that the entire county would likely be impacted by (i.e., the entire population could be susceptible to) a public health emergency.
Business	2	One week	Even during the COVID-19 pandemic when businesses shut down, officials worked to identify alternate ways for the population to work, stores to sell their wares, etc. Thus, planners selected "One week" as a planning average.
Human	2	Low (Some severe illnesses)	Though several people may become ill, most recover from communicable diseases.
Property	1	Less than 10% of property affected	The effects of public health emergencies typically impact people not property; thus, planners selected the lowest category for property impacts.
Totals	**18**	**MEDIUM**	

FEMA's *Local Mitigation Planning Handbook* (2023c) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks are more or less prevalent as compared to the rest of the planning area. The following map identifies those multi-jurisdictional risks concerning health related emergencies. Those labels not underlaid by a shaded drop shadow are not more or less at risk of health related emergencies. Those with red drop shadows are more at risk.

Figure 2.2.8.7

Health Related Emergencies Multi-Jurisdictional Risk Map



2.2.9 Invasive Species

Species that are both non-native (or alien) to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm, or harm to human health are considered invasive.				
RISK HIGHEST HIGH MEDIUM LOW LOWEST	**Period of Occurrence:**	Can occur at any time	**Risk Ranking:**	Medium
	Warning Time:	More than 24 hours	**Type of Hazard:**	Natural
	Probability:	Frequent (Will occur during a year)	**Impact:**	Critical (25-50% of land are affected)
	Disaster Declarations:	None		

Hazard Introduction and Overview

The National Wildlife Federation defines invasive species as any living organism, whether amphibian, plant, insect, fish, fungus, bacteria, or even an organism's seeds or eggs, that is not native to an ecosystem and causes harm. Invasive species can harm the environment, the economy, and even human health. In addition, species that can grow and reproduce quickly, spread aggressively, and have potential to cause harm are identified as "invasive."

Human actions are the primary cause of invasive species transfer. There are four main types of invasive species: aquatic species, plants, animals, and microbes (USDA, n.d.).

Without natural predators or controls, invasive, non-native plants are able to spread quickly and force out native plants. Other non-native plants are impacting our wetlands by creating monocultures. Native plant diversity is important for wildlife habitat, as many animals depend on a variety of native plants for food and cover. Ohio has a large number of invasive plants and animals. A description of each type of invasive organism appears below.

Location and Extent

Invasive Terrestrial Plants

Invasive terrestrial plants are those that displace or crowd native plant species, impact wildlife, which relies on native plant communities for food, shelter, and breeding habitat, and for monoculture plant communities, which reduces biological diversity. According to the ODNR, Division of Natural Areas & Preserves, of the approximately 2,300 vascular plant species growing in the wild in Ohio, about 78 percent (78%) are native. The other 22 percent (22%), more than 500 species are not native to Ohio, having been introduced from other states or countries. Most

non-native plants have been introduced for erosion control, horticulture, forage crops, culinary and medicinal use, wildlife foods, and by accident. An infestation can occur anywhere in Ashtabula County. See Table 2.2.9.1 below which outlines the most common invasive terrestrial plant species known to be in Ashtabula County.

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Table 2.2.9.1

Invasive terrestrial plant species – Ashtabula County	
Common Name	*Distribution*
Autumn-Olive: A deciduous shrubs or small trees that grow to a height of 30 feet. Autumn-olive has nitrogen-fixing root nodules, which allow them to adapt to many poor soil types including bare mineral substrates. It is found throughout Ohio, occurring in various open to semi-shaded habitats including old fields, grasslands, barrens, woodlands, savannahs, alvars (limestone prairies), roadsides, reclaimed strip-mined areas, and open disturbed sites.	
Garlic Mustard: A biennial herb that emits a garlic-like odor from crushed leaves. Garlic mustard prefers some shade in mesic upland and floodplain forests, savannas, pastures, lawns, and along fencerows and roadsides. It invades forest edges and progresses into the interior along streams and trails.	
Giant Hogweed Is on the federal and Ohio noxious weed lists making it unlawful to propagate, sell or transport. The weed has the ability to crowd out native plants and its sap can cause severe burns to human skin and temporary and sometimes permanent blindness. This plant, once found exclusively in ornamental gardens, has escaped and become established in rich, moist soils along roadside ditches, stream banks, vacant farmland, and fence and tree lines.	
Japanese Honeysuckle: Japanese honeysuckle is a vine with entire (sometimes lobed), oval-oblong, opposite leaves from 1 ½ -3 inches long. In Ohio, the plants are semi-evergreen with leaves persisting into late winter or early spring. Japanese honeysuckle thrives in disturbed areas such as roadsides, fencerows, forest edges, and forest gaps. Areas of special concern are woodland edges, early successional forests, and riparian corridors. Although preferring sunny areas, both are shade tolerant and can live in marginal habitats until favorable conditions arise.	
Japanese Knotweed An upright, shrub-like, herbaceous perennial that can grow to over 10 feet in height. The plant was introduced from Asia in the late 1800s as an ornamental and used for erosion control and landscape screening. The plant poses a significant threat to riparian areas. It is found along roadsides, low lying areas, utility rights-of-way and along woodland edges and openings. It grown aggressively by extensive rhizome and seed contaminants in fill dirt.	

Invasive terrestrial plant species – Ashtabula County	
Common Name	*Distribution*
Moneywort: Also called pennywort and creeping jenny, moneywort is a member of the primrose family that was once used as an ornamental form of ground cover. It grows close to the ground and forms a thick mat up to two feet long and up to four inches tall. Moneywort spreads rapidly by creeping stems and dispersing seeds. Seeds can be spread by floodwaters or human activity.	
Multiflora Rose: Multiflora rose is a thorny shrub with arching stems (canes). The compound leaves are divided into 5-11 sharply toothed leaflets. Multiflora roses prefer sunny to semi-shaded habitats with well-drained soils but can tolerate a wide range of habitats including mesic upland and flood plain woods, forest edges, old fields, savannas, prairies, fens, roadsides, fencerows, and lawns.	
Purple Loosestrife: Purple loosestrife is an erect perennial with opposite or whorled leaves. The thick taproot supports thirty to fifty stems that can attain a height of 3-6 feet. Purple loosestrife thrives in wetlands, including marshes, fens, wet meadows, stream and riverbanks, lake shores, and ditches. It can also survive in drier conditions.	
Reed Canary Grass: Reed canary grass is a large, coarse grass that attains a height of 2 to 7 feet. The erect, hairless stem supports rough-textured, tapering leaves of 3 ½ to 10 inches long and 1/4 to 3/4 inch wide. Reed canary grass grows best on fertile, moist organic soils in full sun. It can grow in standing water by producing special roots along the submersed portion of the stem. It also grows on dry soils in upland sites and under partial shade.	
Tree of Heaven A fast growing, invasive tree known for its large, compound leaves, foul odor, and ability to outcompete native plants. Native to China, it was introduced to the US in the late 1700s and has since become widespread due to its adaptability and rapid growth. The spotted lanternfly is known to suck sap from the stems and branches of tree of heaven.	

Source: ODNR

The three primary methods of control (mechanical, chemical, and biological) can help abate the spread of these plants, but some methods work better than others.

- ***Mechanical control methods*** involve cutting, digging, burning, or otherwise physically removing the plant. Mechanical control methods are labor-intensive and ultimately unsuccessful at eradicating invasive plants long-term.
- ***Chemical control methods*** involve herbicides that target specific plant species while protecting native species. Some herbicides are non-selective and have the ability to kill or contaminate the surrounding ecosystem.

- ***Biological control methods*** involve introducing natural enemies that destroy the invasive plant species. Care is necessary so that the introduced species does not itself become a problem for the area in which they are introduced.

Invasive Terrestrial Wildlife

Invasive terrestrial wildlife are animals or other organisms that evolved to live on land rather than aquatic habitats; these organisms cause damage to important habitat that other wildlife depends on. In Ohio, the primary invasive terrestrial animal is the feral hog. Originally introduced to the United States in 1539, these animals were once domestic pigs that escaped, bred with Eurasian wild boars, and are now present in 35 states. The greatest concentration of verified populations can be found in the unglaciated region of southeastern Ohio; however, the ODNR has confirmed the presence of feral swine populations in Ashtabula County.

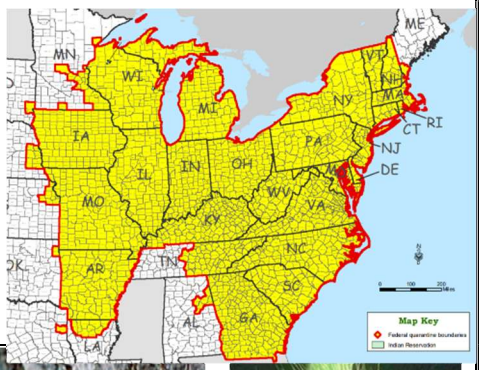
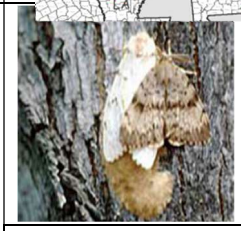
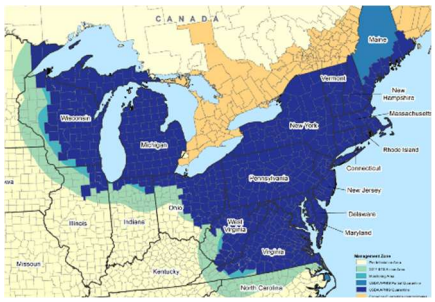
These animals can weigh up to 200 pounds and cause significant damage to crops and property. Litter size varies depending on the lineage of the pig, with descendants of domestic breeds producing up to ten piglets whereas descendants of Eurasian boars produce on average four to five piglets. Each lineage can have up to two litters per year under ideal conditions. Typical control methods for feral hogs include open season hunting, poisons, or trapping.

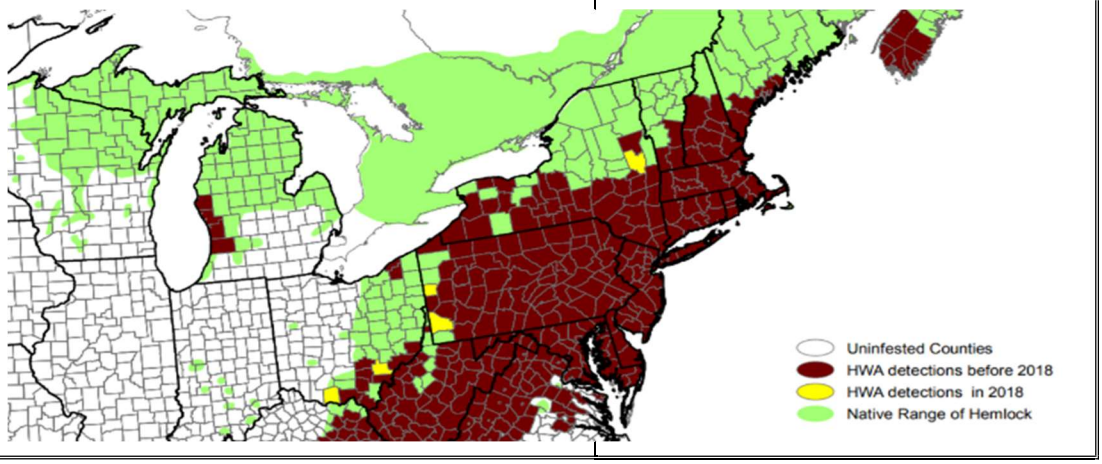
Invasive Insects

Invasive insects and diseases are other tiny organisms that can cause a great deal of damage to plant, forest, and wildlife health. Non-native insects, fungus, and microbes can cause significant damage to forests and other wildlife. The spread of these organisms, such as the emerald ash borer, can be controlled by taking care not transporting firewood long distances. According to the ODNR, Division of Forestry, one of the most invasive insect species in Ohio is the Emerald Ash Borer, which can now be found in all 88 counties in Ohio, and well as six neighboring states and the province of Ontario.

This Asian pest is part of a group of insects known as metallic wood-boring beetles. The Emerald Ash Borer affects all species of native ash found in Ohio. Because North American ash trees did not coexist in association with this pest, they have little or no resistance to its attack. In three to five years, even the healthiest ash tree is unable to survive an attack. Table 2.2.9.2 below presents the most prominent invasive species of insects and diseases in Ohio.

Table 2.2.9.2

Invasive Insects – Ashtabula County	
Common Name	*Description*
Asian Longhorned Beetle: The Asian Longhorned Beetle (ALB) is native to Japan, Korea, and southern China. Experts believe that the beetle "hitchhiked" to the U.S. during the early 1990s in solid wood packing or crating materials on a cargo ship arriving from China. When the eggs hatch, the beetle grubs bore into hardwood trees. Once they mature, they chew exit holes in branches and trunks. The larvae eventually burrow deep enough to damage the living portion of the trunk, ultimately killing the tree.	 
Emerald Ash Borer: The Emerald Ash Borer is a small, wood-boring beetle native to Asia. These beetles affect all species of ash tree by eating the living portion of the tree directly underneath the bark. Adult beetles are dark metallic green and up to half an inch long. Larvae are about an inch long and carve S-shaped tunnels while feeding, which kills the tree. The Emerald Ash Borer has spread across much of the East Coast. As of September 8, 2010, all of Ohio has been quarantined. **Spotted Lanternfly**: Spotted lanternflies, feed on grapevines, hops, and fruit trees, was recently discovered in Ohio, and could become established and spread quickly. In October 2020 adult lanternflies were found outside a business in Jefferson County. Native to Asia, spotted lanternflies were first found in the US in 2014 in Pennsylvania. They typically only travel a radius of about 30 feet, but they can hitchhike to an area, riding on trains, cars, or trucks.	  
Spongy Moth: The spongy moth, native to Europe, Asia, and North Africa, was established in North America in 1869 when they were brought to Massachusetts in an unsuccessful attempt to cross breed them with silkworms. Caterpillars are dark gray or brown and grow to about 2.5 inches long. Adult male moths are gray-brown while female moths are whitish with brown markings. Caterpillars feed on the leaves of trees and cause mass defoliation. The spongy moth has an expansive quarantine zone that encompasses much of Ohio.	  

Invasive Insects – Ashtabula County	
Common Name	*Description*
Hemlock Woolly Adelgid: The hemlock woolly adelgid (HWA) is a small, aphid-like insect that feeds on stored nutrients in young hemlock branches. Young adelgids cover themselves with a white substance until they mature into adults. Adults are black and all females that can lay up to 300 eggs twice a year. Juveniles attach themselves to the tree in one spot for and feed continuously for the rest of their lives, disrupting the flow of nutrients to the rest of the branch. This eventually kills the tree.	  

Source: ODNR

Invasive Aquatic Species

Aquatic invasive species are plants and animals living in and degrading the quality of waterways. In many cases, the spread of these organisms can be abated by taking care to wash recreational water equipment before transportation. Additionally, residents should avoid the release of plants and animals from personal aquariums.

Table 2.2.9.3

Aquatic Invasive Species, Plants – Ashtabula County	
Common Name	*Description*
Eurasian Watermilfoil: A feathery submerged aquatic plant that was sold as an aquarium plant. It forms thick mats that cause harm to shallow areas to lakes and rivers. The plant is very hardy and can survive a wide range of temperatures, still or flowing water, and even under ice. Eurasian Watermilfoil reproduces by fragmentation. Pieces break off and float to new locations or are transported by boats, trailers, and fishing gear.	 

Source: ODNR

Table 2.2.9.4

Aquatic Invasive Species, Invertebrates – Ashtabula County		
Common Name	*Description*	
Asian Clam: Also called the Asiatic clam, pygmy clam, or gold clam, the Asian clam is a small freshwater clam that rarely grow more than an inch in diameter. The shell is typically yellowish green to brown. The clams can be found in streams, rivers, ponds, lakes, and canals, but prefer running waters with a sand or gravel bed. It is capable of self-fertilization and can release up to thousands of young a day that are then spread by currents and human activity The Asian clam was originally introduced to the west coast of the US but has spread to the eastern US. They attach themselves to boating, fishing, and scuba diving equipment and their young can be transferred by buckets or live wells.		
Rusty Crayfish: A large, aggressive crayfish that outcompetes native species. They are typically three to five inches long and are usually grayish green or reddish brown in color. Rusty crayfish are pollution tolerant and prefer areas with adequate cover. They can survive in lakes, ponds, and streams. Rusty crayfish are used as fishing bait and can be accidentally introduced to new areas. They are capable of hybridization, and it is not necessary to have both a male and female rusty crayfish in the same area to begin new invasions.		
Zebra Mussel: Small freshwater mollusks that attach to hard surfaces including other mussels and crayfish. They can be found in lakes, rivers, reservoirs, ponds, and quarries. Zebra mussels require environments rich in calcium to aid in shell production and waters above 50°F to reproduce. Young zebra mussels float for up to five weeks before settling. The control and removal of zebra mussels costs billions of dollars. They have quickly spread across North America and have become one of the most intrusive, prolific, and costly aquatic alien species. Once established in open-water environments, they are virtually impossible to eradicate.		

Source: ODNR

Table 2.2.9.5

Aquatic Invasive Species, Fish – Ashtabula County		
Common Name	*Description*	
Common Carp: The common carp is the largest member of the minnow family. It can live up to 50 years and has a voracious appetite. They can grow up to 22 inches long and weigh up to ten pounds, but some can reach 48 inches long and weigh 40 pounds or more. They tend to live in lakes, ponds, and calmer rivers. Common carp can spread through connected bodies of water once they have been established in a waterway. Juvenile carp are used as bait and can be released by anglers or escape into new territories.		
Goldfish: Goldfish are a freshwater species of carp that was originally introduced to North America as an ornamental fish in the 1600s. They can grow up to 23 inches long and weigh almost seven pounds but are typically up to eight inches long and weigh less than a pound. Goldfish prefer muddy water with thick vegetation, but are tolerant to pollution, fluctuating temperatures, and otherwise murky waters. Goldfish are intentionally introduced to lakes, ponds, and fountains as ornamental fish. They are also popular pets and are used as bait. Sometimes these animals are released by owners or anglers without them realizing the potential environmental impact.		
Grass Carp: The grass carp, or white amur, was originally introduced into the ecosystem to control aquatic weed growth. However, these fish voraciously feed on different animals and other plant life. They typically vary between 65-80 pounds. They prefer to live in shallow waters of lakes, ponds, and backwaters. Grass carp are intentionally stocked in private ponds to control aquatic vegetation but only sterilized triploid grass carp can be stocked or owned within Ohio. If they are released or escape into other waterways, they can easily spread into tributaries, waterways, river systems, canals, and dams.		
Round Goby: An invasive species that has significantly impacted Lake Erie since its introduction in the early 1990s. Originating in Eurasia, the Round Goby likely arrived in the Great Lakes via ballast water from cargo ships.		Lake Erie Counties

Source: ODNR

Impacts and Vulnerability

Invasive species pose a significant threat to the ecological, economic, and cultural integrity of Ashtabula County's lands and waters and the communities they support. Controlling them can be complex, expensive, and often continues indefinitely.

Invasive species can harm wildlife in several different ways. When a species enters an ecosystem, it can breed or spread quickly and take over an area if it has no natural predators. Native species may not be able to defend their habitats from the invasive species. Native species may also become prey or have to compete for food. Invasive species can carry disease, prevent native species from reproducing or kill native species offspring (National Wildlife Federation, 2018).

There are also indirect results of an alien species moving into a new habitat. Invasive species can change the food web in an ecosystem by destroying or replacing native food sources. Though a new species may become an optional food source, it may not produce enough to supply the wildlife around it. Some species can completely reconstruct an ecosystem; aggressive plant species can take over ecosystems and replace every plant with a form of itself (National Wildlife Federation, 2018).

Though the tables above list invasive species that directly impact Ashtabula County, many surrounding counties harbor many different animals and plants that could eventually inhabit the area.

Historical Occurrences

Most invasive species have been introduced due to human intervention, whether intentionally or accidentally. Invasive species have been around since the settlers of the 1750's. The movement of people and transportation of goods around the world via airplanes and shipping vessels has made the spread of invasive species more prevalent. The emerald ash borer was introduced in the U.S. in the 1990's from wood packing material from China, first being discovered in lower Michigan, spreading to Ohio, Maryland, Pennsylvania, Northern Indiana, West Virginia, Virginia, and the Chicago area in Illinois. In almost all cases, once an invasive species is introduced, they are a continuous issue due to the difficulty in not only eliminating but also eradicating them from the area.

The spotted lanternfly is an invasive species from China that was accidentally introduced to eastern Pennsylvania in 2014. The insect is commonly spread by trains and cars. Right now, the insect has no native predators; however, one could develop.

Loss and Damages

Invasive species will likely cause no damage to structural assets; however, invasive species can put human health and economies at risk. These organisms can threaten the livelihoods of people who depend on agriculture for financial stability by destroying crops and decreasing the availability of water. Spotted lanternfly are known to feed on a wide variety of plants, including grapevines and can cause significant damage to vineyards. This could result in significant losses to the wine-producing industry in "Ohio Wine Country" throughout the designated Grand River Valley area and proposed Conneaut Creek Valley areas. Over 30 wineries throughout the region feature fine wines produced from vineyards that grow over 65% of Ohio's grapes.

Invasive species can cause significant economic damage to industries like fishing, tourism, and even water treatment facilities by clogging pipes and impacting infrastructure. The estimated annual cost to the Great Lakes region from ship-borne invasive species is upwards of $200 million.

The cost of repairing damages or controlling populations can drain budgets whereas the cost of lost crops can harm farmers. The devastation of ash trees from the emerald ash borer could result in significant increases in fuel for wildfires in Ohio and lead to an increase in vehicular accidents from dead trees falling into roadways.

The following table lists estimated adverse economic impacts and management expenditures of selected invasive species. "Actual" estimates represent known or modeled adverse impacts or costs related to current infestations. "Projected" estimates represent anticipated adverse impacts or costs if an invasive species is unmanaged and spreads or becomes established in an area where the species is not currently found.

Table 2.2.9.6

Invasive Species – Adverse Economic Impacts & Management Expenditures			
Invasive Species	*Impacted Sectors*	*Estimated Adverse Economic Impacts*	*Estimated Management Expenditures*
Asian Carps 	Fisheries, Recreation, Tourism	**Projected:** $2.4 billion over ten years (Great Lakes recreational fishery); $102 million over ten years (Great Lakes commercial fishery if grass carp become widespread)	**Actual:** $58 million in 2017 for Asian carps (Ohio and Upper Mississippi River Basins)
Feral Swine 	Agriculture, Infrastructure, Livestock	**Actual:** $190 million in 2014 (Crop production losses across 10 states); $40 million in 2017 (livestock damages across 13 states)	Not available
Emerald Ash Borer 	Agriculture, Electric Power, Forestry	**Actual:** $60 million per year (timber losses, nationwide); $380 million per year (residential property value losses, nationwide), especially in Midwestern States	**Projected:** $10.7 billion over ten years (nationwide, given a projected expansion of emerald ash borer from its distribution in 2009)

Future Occurrences

With the increase in global trade and travel, the probability of new and unexpected species arriving in Ohio will continue to grow. Legislation is in place around the world in an attempt to control the migration of unwanted species between ecosystems. It is certain that new wanted and unwanted species will arrive in Ohio. The importance of controlling the integrity of existing ecosystems will require ongoing state, national and international efforts to avoid unwanted infestations. To this end, the Ohio Administrative Code has been updated in 2023 to make the sale, propagation, distribution, and dissemination of 61 invasive species illegal.

Ships are a major contributor to the introduction of invasive species into Lake Erie and the surrounding areas, including Ashtabula County. Large cargo ships use ballast water to maintain stability. This water, taken on in one port, can contain a variety of aquatic organisms. When the ship discharges its ballast water in another port, like those in the Great Lakes, it can release these foreign species into the new environment. Some infamous invasive species introduced to the Great Lakes via ballast water include zebra mussels, quagga mussels, and round gobies. While ballast water is a primary concern, invasive species can also enter through other means, such as hitching rides on boat hulls, propellers, or other equipment. The St. Lawrence Seaway also opened up the Great Lakes to direct ocean-going shipping which has increase the risk of introducing invasive species.

Warmer temperatures can allow existing invasive species to expand their range into habitat that is currently too cool" (USGS, 2023). "The increase in temperatures, rainfall, humidity, and drought can facilitate the spread and establishment of invasive species. Research suggest that invasive species take advantage of the earlier spring warmup by sprouting and leafing out before the native species do. This gives them an advantage by allowing them to monopolize the soil space, nutrients, and sunlight to outcompete native species and create monocultures" (NAISMA, 2023).

Mitigation efforts for all types of invasive species should be closely coordinated with the Ohio Division of Forestry and the Ohio Department of Agriculture. Current practices by these organizations, including quarantining infested areas, have shown as in the case of the spongy moth to be very successful. Some infested areas have also begun spraying crops or infested foliage to prevent further infestation. This has also proven to be very successful.

Risk Assessment

This section summarizes the vulnerability of Ashtabula County to invasive species. The county conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding invasive species.

Table 2.2.9.7

Public Sentiment, Invasive Species					
	Level of Concern				
Hazard	*Not at All*	*Somewhat*	*Concerned*	*Very*	*Total Responses*
INVASIVE SPECIES	47 (31.76%)	52 (35.14%)	42 (28.38%)	7 (4.73%)	148
In the past five years, do you remember this hazard occurring in your community?				36 (24.32%)	148
Have you noticed an increase in the occurrences or intensity of this hazard?				41 (27.70%)	148
Have you noticed a decrease in the occurrences or intensity of this hazard?				2 (1.35%)	148

Source: Online Public Survey Results

Table 2.2.9.8 assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above. The categories in the table appear in Ohio EMA's Mitigation Information Portal (MIP) tool.

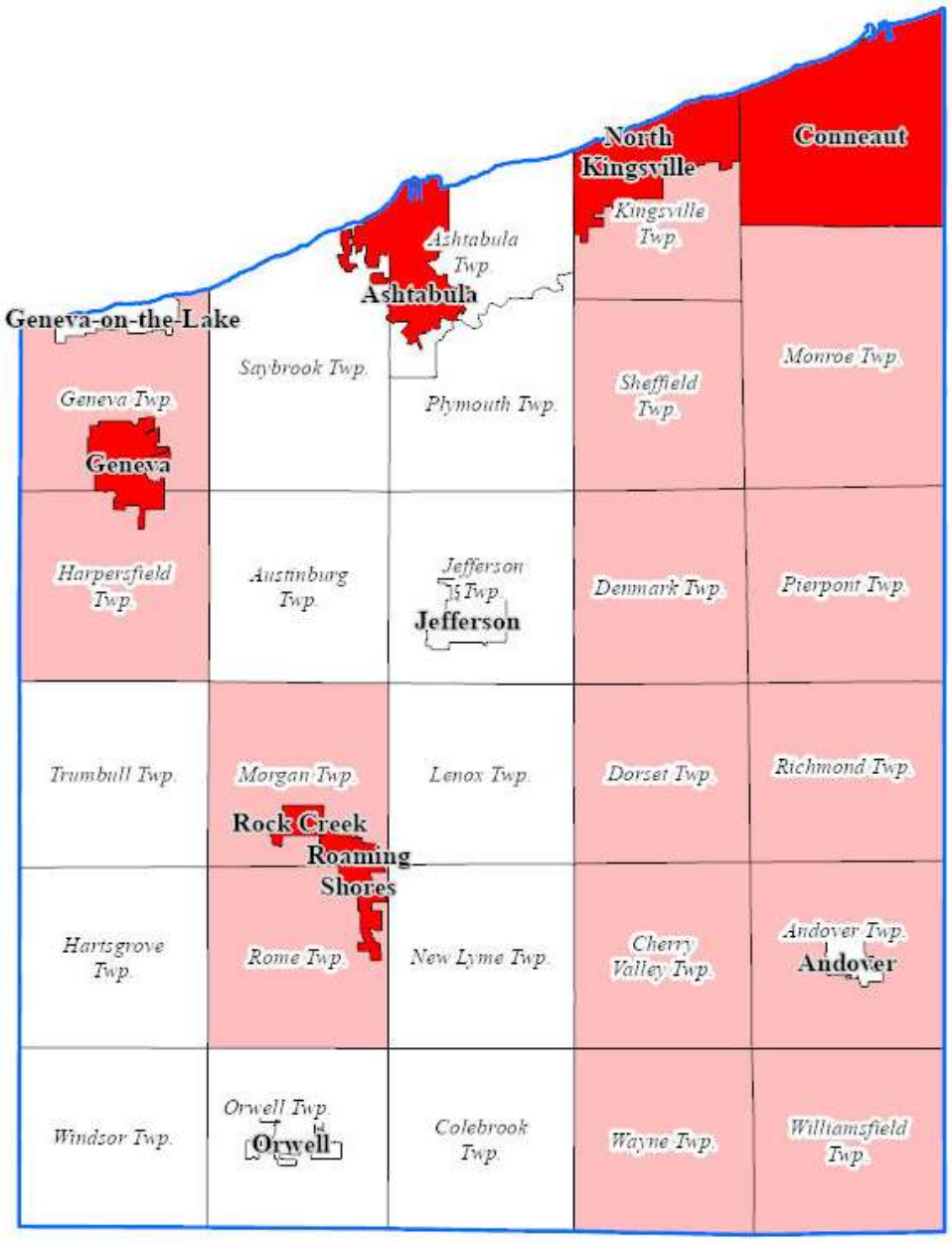
Table 2.2.9.8

Risk Ranking, Invasive Species			
Category	*Points*	*Description*	*Notes*
Frequency	5	Frequent (Will occur during a year)	There are 25 known species of invasive organisms in Ashtabula County. With the increase in global trade and travel, the probability of new and unexpected species arriving in Ohio will continue to grow.
Response	5	More than a month	Response measures put in place to control or eliminate the spread of invasive species are complex and often continue indefinitely .
Onset	1	More than 24 hours	Once introduced to a new area, invasive species need time to become established.
Magnitude	3	Critical (25-50% land area affected)	Over time, certain invasive species can spread to large areas, or the entirety of the county.
Business	4	More than 30 days	The wine-producing industry could be significantly impacted by the spotted lanternfly. The estimated annual cost to the Great Lakes region from ship-borne invasive species is upwards of $200 million.
Human	1	Minimum (Minor injuries)	Invasive species can impact human health by acting as disease vectors, causing allergic reactions, or physical harm through bites, stings, or toxins.
Property	1	10% property affected	Certain invasive plants (i.e., Japanese Knotweed) can spread aggressively and damage property infrastructure like foundations and pipes. They can also cause less productive agricultural areas.
Totals	**20**	**MEDIUM**	

FEMA's *Local Mitigation Planning Handbook* (2023c) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks are more or less prevalent as compared to the rest of the planning area. The following map identifies those multi-jurisdictional risks concerning invasive species. Those labels not underlaid by a shaded drop shadow are not more or less at risk of invasive species. Those with red drop shadows are more at risk.

Figure 2.2.9.1

Invasive Species Multi-Jurisdictional Risk Map



2.2.10 Severe Thunderstorm

A severe thunderstorm is one that produces a tornado, winds in excess of 58 miles per hour, or hail one inch in diameter or larger. These storms are accompanied by lightning.				
RISK HIGHEST HIGH MEDIUM LOW LOWEST	**Period of Occurrence:**	At any time, typically during late spring and summer months	**Risk Ranking:**	Medium
	Warning Time:	12-24 hours	**Type of Hazard:**	Natural
	Probability:	Frequent (Will occur during a year)	**Impact:**	> 50% of land area affected)
	Disaster Declarations:	DR-266-OH (1969) DR-345-OH (1972 Agnes) DR-377-OH (1973) DR-738-OH (1985)		DR-1556-OH (2004) DR-1656-OH (2006) DR-3346-OH (2012) DR-4098-OH (2013 Ike)

Hazard Introduction and Overview

A thunderstorm is a local storm that is produced by a cumulonimbus cloud, accompanied by lightning and thunder, often accompanied by gusty winds, heavy rain, and occasionally by hail, and sometimes can be violent at the surface (NWS, n.d.). Table 2.2.10.1 defines the different types of thunderstorms.

Table 2.2.10.1

Types of Thunderstorms				
Type	*Description*	*Duration*	*Wind Speeds*	*Associated Hazards*
Single Cell	Uncommon	20 - 30 minutes	N/A	• Non-damaging hail • Microbursts • Weak tornadoes
Multi Cell	Common, organized cluster of two or more single cells.	Each cell lasts approximately 20 minutes	Downbursts of up to 80 mph	• Heavy rainfall • Downbursts • Hail • Weak tornadoes
Mesoscale Convective System (MCS)	Well organized system of thunderstorms	Up to 12 hours or more	55 mph or more	• Torrential rainfalls • Derechos • Tornadoes
Squall Lines	May extend over 250 to 500 miles and 10 to 20 miles wide	Individual cells last from 30 to 60 minutes		• Significant rain after the storm • Derechos
Super Cells	Most dangerous storms, visible with Doppler radars	1 - 6 hours	Updrafts and downdrafts of more than 100 mph	• Tornadoes • Hail

Sources: IS-271 Anticipating Hazardous Weather and Community Risk; Keller & DeVecchio, 2015

A thunderstorm that produces a tornado, winds of at least 58 mph (50 knots), and/or hail at least one inch (1") in diameter is a severe thunderstorm (NWS, 2009). Thunderstorm-associated natural hazards include lightning, hail, heavy rain, damaging winds, and tornadoes. This profile includes descriptions on thunderstorm winds, lightning, and hail; Section 2.2.13 describes tornadoes associated with thunderstorms. Thunderstorms are a seasonal hazard and can be expected to occur every year. According to the NWS the most active thunderstorm season in Ohio is late spring and early summer.

Because the potential damage severe winds and tornadoes cause and the difference in mitigation actions relating to the hazard, this profile does not include a detailed description of them. Furthermore, the IS-271 FEMA course *Anticipating Hazardous Weather and Community Risk* describes thunderstorms and tornadoes separately.

- **Lightning**: Lightning is a naturally occurring giant spark of electricity between the atmosphere and the ground. In the initial stages of development, air acts as an insulator between the positive and negative charges in the cloud and between the cloud and the ground; however, when the differences in the charges becomes too great, this insulating capacity of the air breaks down, and there is a rapid discharge of electricity known as lightning (NWS). Individual lightning strikes occur with no warning and kill between 75 and 100 Americans every year (Haddow, Bullock, & Coppola, 2014, p. 51.) Lighting can reach a significant distance from a storm, up to 25 miles according to the National Severe Storms Library (NSSL). While lightning is a common occurrence and can be seen in most thunderstorms, only about 20% of the lighting observed in a storm will strike the ground.
- **Hail**: Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into balls of ice; the drops of ice can move upwards and downwards within the draft and become larger. When the hailstone is heavy enough, it will fall to the ground (NSSL, n.d.). Hailstones less than one inch in diameter typically fall to the ground at nine to 25 mph. Hailstones typically associated with severe thunderstorms (i.e., 1” to 1 3/4” in diameter) can fall to the ground at 40 mph. In 1986, Jonathan Webb, a member of the Tornado and Storm Research Organization (TORRO) in England, developed the TORRO Hailstorm Intensity Scale as a way to measure and categorize hailstorms (Voss Law Firm, n.d.), see Table 2.2.10.2 below.

Table 2.2.10.2

TORRO Hailstorm Intensity Scale				
Intensity		*Hail Diameter (in)*	*Typical Damage*	*Example Size Description*
H0	Hard Hail	Up to 0.33	No damage.	Pea
H1	Potentially Damaging	0.33 – 0.60	Slight general damage to plants and crops.	Mothball
H2	Significant	0.60 – 0.80	Significant damage to fruit, crops, vegetation.	Marble, Grape, Dime
H3	Severe	0.80 – 1.2	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored.	Walnut, Nickel to Quarter
H4	Severe	1.2 – 1.6	Widespread glass damage, vehicle bodywork damage.	Pigeon's egg > squash ball
H5	Destructive	1.6 – 2.0	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries.	Golf ball > Pullet's egg
H6	Destructive	2.0 – 2.4	Bodywork of grounded aircraft dented, brick walls pitted.	Hen's egg
H7	Destructive	2.4 – 3.0	Severe roof damage, risk of serious injuries.	Tennis ball > Cricket ball
H8	Destructive	3.0 – 3.5	(Severest recorded in the British Isles) Severe damage to aircraft bodywork.	Large orange > Soft ball
H9	Super Hailstorms	3.5 – 4.0	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open.	Grapefruit
H10	Super Hailstorms	4.0+	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open.	Melon

Severe wind includes non-tornadic winds from thunderstorms. There are six types of severe wind: straight-line wind, downbursts, macrobursts, microbursts, gust fronts, and Derechos.

- **Straight-line Wind:** Straight-line wind is a term used to define any thunderstorm wind not associated with rotation, used mainly to differentiate from tornadic winds.
- **Downburst:** Downburst is the general term for all localized strong wind events caused by a strong downdraft within a thunderstorm.
- **Macroburst:** An outward burst of strong winds at or near the surface with a diameter larger than 2.5 miles that occurs when a strong downdraft reaches the surface.
- **Microburst:** A small, concentrated downburst that produces an outward burst of strong winds near the surfaced. Microburst are small and short-lived, with a diameter less than 2.5 miles and lasting only 5-10 minutes.

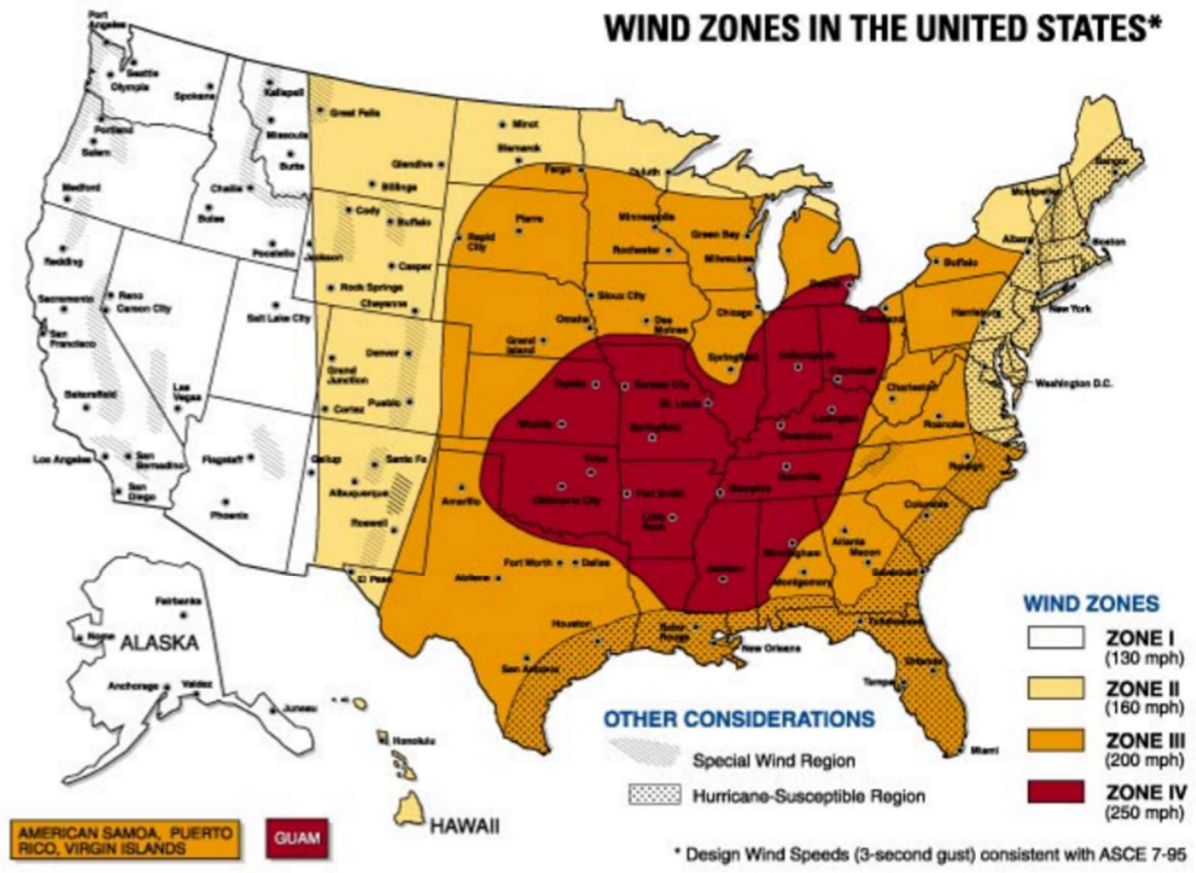
- **Gust Front:** The leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. It is characterized by a wind shift, temperature drop, and gusty winds ahead of a thunderstorm.
- **Derecho:** A widespread, long-lived windstorm associated with a band of rapidly moving showers or thunderstorms. A typical derecho consists of numerous microbursts and downbursts. An event with wind speeds of at least 58mph and a diameter of 240 miles is a derecho.

Location and Extent

Severe thunderstorms and associated hail and lightning are hazards that can affect all areas and jurisdictions of the county. Ashtabula, as well as surrounding counties, is at similar risk of exposure to severe thunderstorms. Severe thunderstorms have the potential of lasting seconds (i.e., lightning), a few minutes (i.e., tornadoes), several hours (i.e., thunderstorms, hailstorms, etc.), or even days (i.e., high winds).

The wind is a commonplace phenomenon across the globe. Wind events can impact several jurisdictions at the same time, with varying duration and severity. All of Ashtabula County is at an equal risk of experiencing severe wind. FEMA's wind zone map classifies wind zones in the United States. As shown in Figure 2.2.10.1 below, the state of Ohio is primarily in Zone IV; however, the northeast corner of Ohio including Ashtabula County lies within a Zone III area. Buildings located in a Zone III area should be constructed to withstand three-second gusts of up to 200 mph.

Figure 2.2.10.1



The Beaufort Wind Scale measures wind. This scale characterizes wind using a 0-12 metric based on observation rather than exact measurements. Table 2.2.10.3 outlines the scale in detail.

Table 2.2.10.3

Beaufort Wind Scale					
Force	*Wind Speed*		*Description*	*Appearance of Wind Effects*	
	Knots	*MPH*		*On Water*	*On Land*
0	>1	>1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	4-7	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	8-12	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended

Beaufort Wind Scale					
Force	*Wind Speed*		*Description*	*Appearance of Wind Effects*	
	Knots	*MPH*		*On Water*	*On Land*
4	11-16	13-18	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	19-24	Fresh Breeze	Moderate waves 4-8 ft. taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	25-31	Strong Breeze	Larger waves 8-13 ft., whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	32-38	Near Gale	Sea heaps up, waves 13-19 ft., white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	39-46	Gale	Moderately high (18-25 ft.) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Twigs breaking off trees, generally impedes progress
9	41-47	47-54	Strong Gale	High waves (23-32 ft.), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	55-63	Storm	Very high waves (29-41 ft.) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	64-72	Violent Storm	Exceptionally high (37-52 ft.) waves, foam patches cover sea, visibility more reduced	N/A
12	64+	72+	Hurricane	Air filled with foam, waves over 45 ft., sea completely white with driving spray, visibility greatly reduced	N/A

Impacts and Vulnerability

There are many impacts of severe thunderstorms. Here are a few listed under each category.

- **Lightning:** Can cause injury and even death. In some cases, lightning is known to cause fires in structures and open land or forests.
- **Hailstorms:** Can cause injury to humans and animals if directly exposed, damage to vegetation and infrastructure.
- **Thunderstorm Winds:** Causes respiratory illnesses, damage to the vegetation (fallen trees), and can cause damage to infrastructure due to flying debris.

The impacts of severe thunderstorms can include widespread property damage, injuries, and even fatalities. Hailstones can be the most damaging part of a severe thunderstorm, inflicting injuries and destroying crops like a giant pummeling machine. Hailstone damage is often confined to automobiles and crops; however, structural damage is a possibility in the form of broken windows, damaged gutters, HVAC systems, and siding. Table 2.2.10.4 outlines the typical impacts of a hailstorm.

Table 2.2.10.4

Intensity (TORRO Scale)	Typical Damage Impacts
H0	No Damage
H1	Slight damage to plants, crops
H2	Significant damage to fruit, crops, vegetation
H3	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Widespread glass damage, vehicle bodywork damage
H5	The wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Bodywork of grounded aircraft dented, brick walls pitted
H7	Severe roof damage, risk of serious injuries
H8	Severe damage to aircraft bodywork
H9	Extensive structural damage. Risk of severe or fatal injuries to persons caught in the open
H10	Extensive structural damage. Risk of severe or fatal injuries to persons caught in the open

In some cases, lightning has caused fires in structures and open land or forests. A bolt of lightning reaches a temperature of 50,000 degrees Fahrenheit in a split second. Ohio averages four deaths and 15 injuries per year as a result of lightning. Individual lightning strikes occur with no warning and kill between 75 and 100 Americans every year (Haddow, Bullock, & Coppola, 2014, pg.51.) Heavy rains can damage vegetation and infrastructure and cause flash flooding. Recently, some of the most damaging impacts of severe thunderstorms have been the cascading effects of long-duration power outages.

Severe wind events can cause a variety of secondary and tertiary hazard events. In addition to damaging roofs and other home finishing's, wind can cause damage to trees that may interrupt power service or block roadways. Such damages could be widespread and severe, potentially overwhelming the capacity of local responders to address the situation.

As with all hazards, severe thunderstorms can also affect the mental health of the population causing anxiety, panic attacks, and post-traumatic stress. Vulnerable populations can include those who are unable to evacuate during a severe weather event, those with health issues that may be exacerbated, as well as children and elderly adults. If poor populations are unable to

obtain necessary shelter during an event, they will be at higher risk and may be more vulnerable to the effects of that event.

Historical Occurrences

According to the National Oceanic and Atmospheric Administration's (NOAAs) National Centers for Environmental Information (NCEI) Storm Events Database, Ashtabula County has experienced 226 thunderstorm/wind events since 1962. This rate is an average of 3.65 severe thunderstorm wind events per year. Thunderstorm winds accounted for 75% of the total events and accounted for the most property damage at approximately $5 million. Table 2.2.10.5 summarizes those incidents.

Table 2.2.10.5

Historical Severe Thunderstorm Occurrences									
Thunderstorm Winds (1962 to 2024)									
Total Events	*Areas Affected*	*Area w/ Most Events*	*Avg. Events / Year*	*Wind Speeds*		*Injuries*	*Fatalities*	*Damages*	
				Avg.	Highest			Property	Crop
226	46	Ashtabula City (10%)	3.65	50 kts.	75 kts.	2	2	$5M	$13K
Most thunderstorm events in one year = 13 in 1994						Most common months = June, July, and August			
Hail (1972 to 2024)									
Total Events	*Areas Affected*	*Area w/ Most Events*	*Avg. Events / Year*	*Hail Size*		*Injuries*	*Fatalities*	*Damages*	
				Avg.	*Largest*			*Property*	*Crop*
70	26	Ashtabula City (19%)	1.35	0.75"	1.75"	0	0	$325K	$0
Most hail events in one year = 5 each in 2002, 2004, and 2011						Number of events with property damage = 20			
Lightning (1996 to 2024)									
Total Events	*Areas Affected*	*Area w/ Most Events*	*Avg. Events / Year*			*Injuries*	*Fatalities*	*Damages*	
								Property	*Crop*
7	6	Geneva (29%)	0.25			4	0	$307K	$0
Most lightning events in one year = 3 in 1996									

Source: NOAA – NCEI, Storm Event Database

Countywide Severe Thunderstorm – October 4, 2000

Thunderstorm winds estimated at 60 to 70 mph caused considerable damage across Ashtabula County. Several hundred trees and 55 power poles fell. Representatives reported widespread damage in Ashtabula, Pierpont, Andover, Jefferson, and Geneva-on-the-Lake. Major damage occurred at a campground just north of Andover, where five homes were severely

damaged by fallen trees. Over 50 trees fell at the campground. This event resulted in approximately $1 million in reported property damage.

Wayne Township Hailstorm – June 25, 2009

Low pressure located over eastern Canada was nearly stationary. During the afternoon of June 25th, a trough of low pressure swung south across the Great Lakes region. This feature, combined with warm and humid air at the surface, caused showers and thunderstorms to develop by mid-afternoon. Thunderstorms continued across the entire region during the evening hours, with many becoming severe. Local officials observed golf-ball sized hail in Wayne Township. This hailstorm resulted in approximately $75,000 in reported property damage.

New Lyme & Rome Townships Lightning – June 28, 2005

On June 28, 2005, at approximately 6:00 p.m., lightning struck an oil well storage tank in New Lyme Township. A second oil well was struck by lightning at 6:54 p.m. in Rome Township. Fires resulted from both of these strikes. Oil was spilled at both sites as a result, and cleanup crews had to be dispatched to contain the spills. This event resulted in $100,000 in reported property damage.

Loss and Damages

Severe thunderstorm wind events have resulted in approximately $5,013,000 in reported property and crop damages over a 62-year period in Ashtabula County. The average loss associated with these events was $22,181 per event; therefore, $22,181 can serve as a severe thunderstorm wind loss estimate. As implied above, hailstorms result in substantially fewer losses than severe thunderstorm winds. For hailstorms, the 70 hail events that have occurred in Ashtabula County have caused approximately $325,000 worth of damages. As such, an average loss from hail events is $4,643. And for lightning, the seven events that have occurred, have resulted in approximately $307,000 in reported property damages, thus an average loss from lightning is $43,857 per event.

Information obtained from FEMA's National Risk Index (NRI) was utilized to assess severe thunderstorm impacts (i.e., hail, lightning, and strong winds) for each participating jurisdiction.

Table 2.2.10.6

Ashtabula County Hail NRI Exposure / Expected Annual Loss Estimates							
Census Tract	*Exposure (Buildings*	*Exposure (Pop)*	*Exposure (Ag)*	*EAL (Buildings)*	*EAL (Pop Equivalence)*	*EAL (Ag)*	*EAL (Total)*
39007000101	$965,550,693	4,653	$331,040	$1,488	$265	$41	$1,794
39007000102	$587,019,605	3,130	$0	$840	$172	$0	$1,012
39007000103	$781,775,010	3,527	$53	$1,119	$193	$0	$1,312
39007000200	$821,551,454	4,344	$719,500	$2,156	$440	$150	$2,746
39007000300	$1,170,998,835	2,093	$228,068	$3,390	$232	$49	$3,672
39007000400	$355,036,289	1,681	$62	$1,028	$187	$0	$1,215
39007000500	$785,413,231	4,082	$311	$2,274	$453	$0	$2,727
39007000601	$766,740,248	2,582	$124	$2,220	$287	$0	$2,507
39007000602	$430,650,007	3,294	$0	$1,247	$366	$0	$1,612
39007000603	$936,976,341	4,058	$279,328	$2,713	$450	$60	$3,223
39007000701	$655,457,629	3,036	$3,774	$1,898	$337	$1	$2,236
39007000702	$727,947,298	2,836	$984,267	$2,108	$315	$212	$2,634
39007000703	$574,938,746	3,631	$6,681	$1,665	$403	$1	$2,069
39007000704	$800,449,400	3,793	$431,894	$2,318	$421	$93	$2,831
39007000801	$602,774,693	1,346	$38,399	$1,745	$149	$8	$1,903
39007000802	$981,159,687	4,912	$217,507	$2,841	$545	$47	$3,433
39007000900	$978,569,872	4,473	$425,785	$2,833	$496	$92	$3,421
39007001001	$1,087,864,044	5,597	$4,573,905	$3,150	$621	$984	$4,755
39007001002	$944,294,311	3,397	$3,475,901	$2,734	$377	$748	$3,859
39007001101	$297,755,602	1,852	$4,603,043	$862	$206	$990	$2,058
39007001102	$1,309,514,375	6,133	$4,320,472	$3,792	$681	$929	$5,401
39007001201	$517,064,612	3,497	$5,940,413	$1,497	$388	$1,278	$3,163
39007001202	$523,009,188	3,327	$6,686,645	$1,491	$364	$1,423	$3,277
39007001301	$716,258,778	3,622	$11,125,056	$2,034	$394	$2,368	$4,797
39007001303	$461,664,520	2,835	$8,209,829	$1,337	$315	$1,766	$3,417
39007001304	$361,745,758	979	$1,052,741	$1,047	$109	$226	$1,382
39007001401	$532,474,010	4,119	$3,962,437	$1,648	$497	$923	$3,068
39007001402	$885,882,483	4,689	$8,798,263	$2,591	$528	$1,927	$5,045
Grand Total	**$20,560,536,719**	**97,518**	**$66,415,498**	**$56,064**	**$10,191**	**$14,314**	**$80,569**

Table 2.2.10.7

Ashtabula County Lightning NRI Exposure / Expected Annual Loss Estimates					
Census Tract	*Exposure (Buildings)*	*Exposure (Pop)*	*EAL (Buildings)*	*EAL (Pop Equivalence)*	*EAL (Total)*
39007000101	$965,550,693	4,653	$571	$8,581	$9,151
39007000102	$587,019,605	3,130	$327	$5,495	$5,822
39007000103	$781,775,010	3,527	$460	$6,524	$6,984
39007000200	$821,551,454	4,344	$507	$8,448	$8,956

Ashtabula County Lightning NRI Exposure / Expected Annual Loss Estimates					
Census Tract	*Exposure (Buildings)*	*Exposure (Pop)*	*EAL (Buildings)*	*EAL (Pop Equivalence)*	*EAL (Total)*
39007000300	$1,170,998,835	2,093	$709	$4,140	$4,850
39007000400	$355,036,289	1,681	$193	$2,913	$3,106
39007000500	$785,413,231	4,082	$486	$7,976	$8,461
39007000601	$766,740,248	2,582	$404	$4,291	$4,696
39007000602	$430,650,007	3,294	$227	$5,479	$5,706
39007000603	$936,976,341	4,058	$509	$6,938	$7,447
39007000701	$655,457,629	3,036	$372	$5,471	$5,843
39007000702	$727,947,298	2,836	$452	$5,591	$6,043
39007000703	$574,938,746	3,631	$344	$6,850	$7,194
39007000704	$800,449,400	3,793	$493	$7,327	$7,820
39007000801	$602,774,693	1,346	$350	$2,501	$2,851
39007000802	$981,159,687	4,912	$654	$10,248	$10,903
39007000900	$978,569,872	4,473	$620	$8,974	$9,595
39007001001	$1,087,864,044	5,597	$853	$13,751	$14,605
39007001002	$944,294,311	3,397	$648	$7,344	$7,991
39007001101	$297,755,602	1,852	$247	$4,806	$5,052
39007001102	$1,309,514,375	6,133	$1,001	$14,615	$15,616
39007001201	$517,064,612	3,497	$394	$8,423	$8,816
39007001202	$523,009,188	3,327	$395	$7,973	$8,367
39007001301	$716,258,778	3,622	$585	$9,340	$9,925
39007001303	$461,664,520	2,835	$386	$7,504	$7,890
39007001304	$361,745,758	979	$290	$2,521	$2,811
39007001401	$532,474,010	4,119	$396	$9,615	$10,011
39007001402	$885,882,483	4,689	$685	$11,618	$12,303
Grand Total	**$20,560,536,719**	**97,518**	**$13,557**	**$205,257**	**$218,814**

Table 2.2.10.8

Ashtabula County Strong Winds NRI Exposure / Expected Annual Loss Estimates						
Census Tract	*Exposure (Buildings)*	*Exposure (Pop)*	*Exposure (Ag)*	*EAL (Buildings)*	*EAL (Pop Equivalence)*	*EAL (Ag)*
39007000101	$965,550,693	4,653	$331,040	$4,639	$4,036	$4
39007000102	$587,019,605	3,130	$0	$2,671	$2,639	$0
39007000103	$781,775,010	3,527	$53	$3,557	$2,973	$0
39007000200	$821,551,454	4,344	$719,500	$6,008	$5,922	$14
39007000300	$1,170,998,835	2,093	$228,068	$9,297	$3,078	$5
39007000400	$355,036,289	1,681	$62	$2,819	$2,472	$0
39007000500	$785,413,231	4,082	$311	$6,235	$6,004	$0
39007000601	$766,740,248	2,582	$124	$6,087	$3,798	$0
39007000602	$430,650,007	3,294	$0	$3,419	$4,845	$0
39007000603	$936,976,341	4,058	$279,328	$7,439	$5,969	$6
39007000701	$655,457,629	3,036	$3,774	$5,204	$4,465	$0
39007000702	$727,947,298	2,836	$984,267	$5,779	$4,171	$20
39007000703	$574,938,746	3,631	$6,681	$4,565	$5,341	$0

Ashtabula County Strong Winds NRI Exposure / Expected Annual Loss Estimates						
Census Tract	*Exposure (Buildings)*	*Exposure (Pop)*	*Exposure (Ag)*	*EAL (Buildings)*	*EAL (Pop Equivalence)*	*EAL (Ag)*
39007000704	$800,449,400	3,793	$431,894	$6,355	$5,579	$9
39007000801	$602,774,693	1,346	$38,399	$4,785	$1,980	$1
39007000802	$981,159,687	4,912	$217,507	$7,790	$7,225	$4
39007000900	$978,569,872	4,473	$425,785	$7,769	$6,579	$9
39007001001	$1,087,864,044	5,597	$4,573,905	$8,637	$8,232	$94
39007001002	$944,294,311	3,397	$3,475,901	$7,497	$4,996	$71
39007001101	$297,755,602	1,852	$4,603,043	$2,364	$2,724	$94
39007001102	$1,309,514,375	6,133	$4,320,472	$10,396	$9,021	$89
39007001201	$517,064,612	3,497	$5,940,413	$4,105	$5,143	$122
39007001202	$523,009,188	3,327	$6,686,645	$4,098	$4,831	$136
39007001301	$716,258,778	3,622	$11,125,056	$5,697	$5,337	$228
39007001303	$461,664,520	2,835	$8,209,829	$3,665	$4,170	$168
39007001304	$361,745,758	979	$1,052,741	$2,872	$1,440	$22
39007001401	$532,474,010	4,119	$3,962,437	$4,527	$6,601	$88
39007001402	$885,882,483	4,689	$8,798,263	$7,106	$6,998	$184
Grand Total	**$20,560,536,719**	**97,518**	**$66,415,498**	**$155,380**	**$136,568**	**$1,368**

Source: USDHS/FEMA – The National Risk Index, Version 1.19

Future Occurrences

Severe thunderstorms may impact infrastructure systems like the power grid and stormwater management features. High winds can affect electricity distribution systems, and as those systems age, they may be more prone to the effects of said weather. Thus, future severe thunderstorms may be accompanied by more frequent (and longer-duration) power outages. Additionally, more intense precipitation compounded by the rapid gathering of increased runoff may strain the ability of aging dams to perform as designed.

According to the USEPA, annual precipitation in most of Ohio has increased since the first half of the 20th century, “and precipitation from extremely heavy rainstorms in the eastern United States increased by more than 25 percent since 1958” USEPA, 2016). The USEPA anticipates continued increases in average annual precipitation as well as in the frequency of heavy downpours.

Ashtabula County includes communities that range from very rural to more urban. In the rural areas with fewer impervious surfaces, the natural features will manage increased precipitation differently than the more urbanized areas. Increased runoff will be a countywide concern, but in the rural areas, the natural features will absorb more of the water than in the urban areas with more land covered by impervious materials.

Risk Assessment

This section summarizes the vulnerability of Ashtabula County to severe thunderstorms. The county conducted an online survey for the public to share its thoughts on the hazards listed in this plan. The following table presents the results of that survey, specifically regarding severe thunderstorms to include hail and lightning.

Table 2.2.10.9

Public Sentiment, Severe Thunderstorm					
	Level of Concern				
Hazard	*Not at All*	*Somewhat*	*Concerned*	*Very*	*Total Responses*
SEVERE THUNDERSTORM	4 (2.70%)	48 (32.43%)	61 (41.22%)	35 (23.65%)	148
In the past five years, do you remember this hazard occurring in your community?				128 (86.49%)	148
Have you noticed an increase in the occurrences or intensity of this hazard?				69 (46.62%)	148
Have you noticed a decrease in the occurrences or intensity of this hazard?				1 (0.68%)	148

Source: Online Public Survey Results

The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above. The categories in the table appear in Ohio EMA's Mitigation Information Portal (MIP) tool.

Table 2.2.10.10

Risk Ranking, Severe Thunderstorm			
Category	*Points*	*Description*	*Notes*
Frequency	5	Frequent (Will occur during a year)	There have been 303 severe thunderstorms events (including hail and lightning) since 1962, a 62-year period, for an average of 4.9 incidents per year.
Response	2	One day	The average loss for each type of incident is less than $45,000 (i.e., lightning), suggesting minimal damage and minimal need for response.
Onset	2	12-24 hours	NWS officials forecast severe weather events at least 12 hours in advance.
Magnitude	5	>50% land area affected	The entire county is susceptible to severe thunderstorms and hailstorms; the hazard can occur anywhere.
Business	2	One week	Businesses would not typically close for a thunderstorm event. Damages from a significant storm may cause a short (one week or less) disruption of services.
Human	2	Low (Some injuries)	Of the 303 recorded incidents, a total of six injuries and two fatalities were reported. While injury and death are possible, it is unlikely that severe thunderstorms would cause significant human injuries.

Risk Ranking, Severe Thunderstorm			
Category	*Points*	*Description*	*Notes*
Property	2	10-25% of property affected	Though impacting large land areas, severe thunderstorm events often result in minimal property damage (when considering it at a countywide level).
Totals	**20**	**MEDIUM**	

FEMA's *Local Mitigation Planning Handbook* (2023c) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks are more or less prevalent as compared to the rest of the planning area. The probability and severity of severe thunderstorm impacts are equal across the entirety of Ashtabula County; no jurisdiction is more or less at risk.

When consulting resources such as FEMA's National Risk Index (2023), there is only marginal fluctuation amongst the Census tracks in the county for hail and lightning. As such, there is no image identifying jurisdictional fluctuation because all participating jurisdictions are assumed to be at similar risk of severe summer weather.

2.2.11 Severe Winter Weather

Severe winter weather includes blizzards, heavy snow fall, blowing snow, ice storms, and dangerous wind chills that could threaten life or property.				
RISK HIGHEST HIGH MEDIUM LOW LOWEST	**Period of Occurrence:**	Typically during the winter months	**Risk Ranking:**	High
	Warning Time:	Over 24 hours	**Type of Hazard:**	Natural
	Probability:	Frequent (Will occur during a year)	**Impact:**	Critical (25-50% land area affected)
	Disaster Declarations:	EM-3029-OH (1977) EM-3055-OH (1978) DR-1580-OH (2004) EM-3198-OH (2005) EM-3286-OH (2008)		USDA FSA S3253 (2012) USDA FSA S3385 (2012) USDA FSA S3744 (2014) USDA FSA S4220 (2017)

Hazard Introduction and Overview

During the winter, there are many instances of cold weather, snow, and storms. This profile considers only those winter storms that are damaging enough to be considered *severe*. These include NOAA-labeled winter storms, heavy snow, lake-effect snow, blizzards, and ice storms.

- **Winter Storms:** A winter storm is a combination of heavy snow, blowing snow, and dangerous wind chills.
- **Heavy Snow:** Heavy snow refers to snowfall accumulating to four inches (4”) or more in 12 hours or less, or snowfall accumulating to six inches (6”) or more in 24 hours or less.
- **Lake-Effect Snowstorms:** Lake-effect snow is a weather phenomenon where cold, dry air moves over a relatively warmer lake, picking up moisture and heat, then rising and causing heavy snowfall, typically in bands, on the downwind (leeward) shores. This occurs most frequently during the late fall and winter when large bodies of water like the Great Lakes remain unfrozen while the surrounding air is much colder.
- **Blizzards**: A blizzard is a dangerous winter storm that is a combination of blowing snow and wind, which results in very low visibility often referred to as whiteouts. Heavy snowfall and severe cold usually accompany blizzards, but not always. Sometimes strong winds can pick up fallen snow, creating a ground blizzard. A Blizzard is a winter storm which produces the following conditions for three hours or longer: (1) sustained winds or frequent gusts of 35 mph or greater, and (2) falling and/or blowing snow reducing visibility frequently to less than ¼ mile, on a widespread or localized basis.

- **Ice Storms**: Ice storms are prolonged periods of freezing rain where ice can accumulate on cold surfaces (Keller & DeVecchio, 2015). Ice storms result in the accumulation of at least 0.25'' of ice on exposed surfaces. It can create hazardous driving and walking conditions, and tree branches and power lines can easily snap under the weight of the ice.

The different routes these storms can take are called storm tracks; storm tracks are named for geographic origin or the direction of the prevailing winds (e.g., Alberta Clipper, and Nor'easter).

Alberta Clippers are winter "storms that often form over the providence of Alberta, Canada, east of the Rocky Mountains" (Rice, 2015). Typically, this type of storm moves quickly to the southeast across the northern Plains and finally to the Atlantic Coast. These storms usually are drier and have less snow but extremely cold temperatures.

A Nor'easter is a storm along the East Coast of the U.S., so called because the winds over the coastal area are generally progressing northeastward and typically attain maximum intensity near New England and the Maritime Provinces of Canada. These storms may occur at any time of year but are most frequent and most violent between September and April. They nearly always bring precipitation in the form of heavy rain or snow, as well as winds of gale force, rough seas, and, occasionally, coastal flooding to the affected regions. The warm waters of the Gulf Stream help keep the coastal waters relatively mild during the winter, which in turn helps warm the cold winter air over the water. This difference in temperature between the warm air over the water and cold Arctic air over the land is the fuel that feeds Nor'easters (NWS, n.d.).

In the winter months, weather patterns continue throughout the area; these can generate storms. However, three elements that must be present to generate a winter storm (NSSL, n.d.).

- **Cold Air**: Below freezing temperatures in the clouds and near the ground are necessary to make snow and ice.
- **Lift**: Something to raise the moist air to form clouds and cause precipitation. An example of a lift is warm air colliding with cold air and being forced to rise over the cold dome. The boundary between the warm and cold air masses is called a front. Another example of a lift is air flowing up a mountainside.
- **Moisture**: To form clouds and precipitation. Air blowing across a body of water, such as a large lake or the ocean, is an excellent source of moisture.

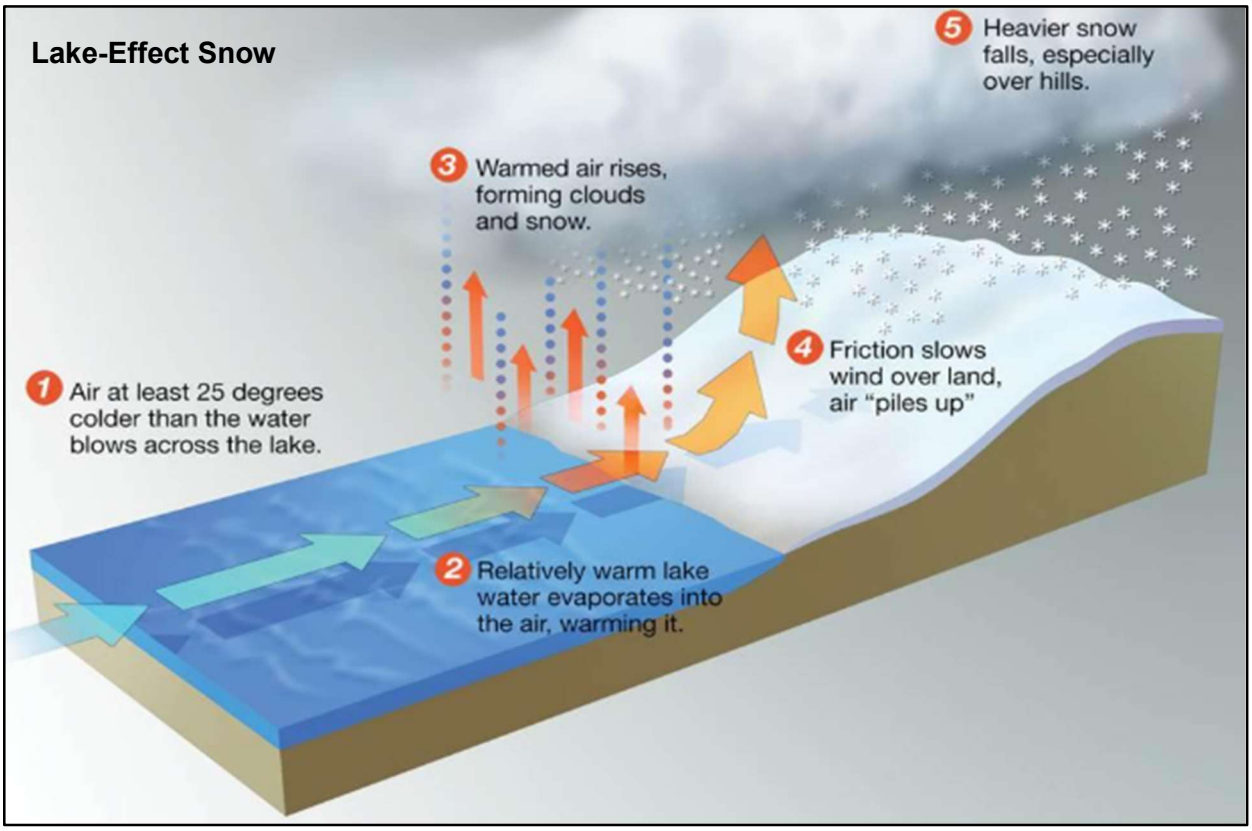
Location and Extent

Higher snowfall totals for the northeastern portion of Ohio can be attributed to the lake-effect snows caused by the area's proximity to Lake Erie. Lake, Geauga, and Ashtabula counties make up part of the Southeastern Lake Erie Snowbelt and can see greater than eight feet of snowfall in a given year. Lake-effect snowfall intensity is affected by:

- The contrast between the lake and air temperatures,
- The distance air has traveled over water, known as the fetch, and
- The regional weather conditions, a snowstorm's maximum penetration inland will generally be greatest during late autumn/early winter and shortest during the late winter.

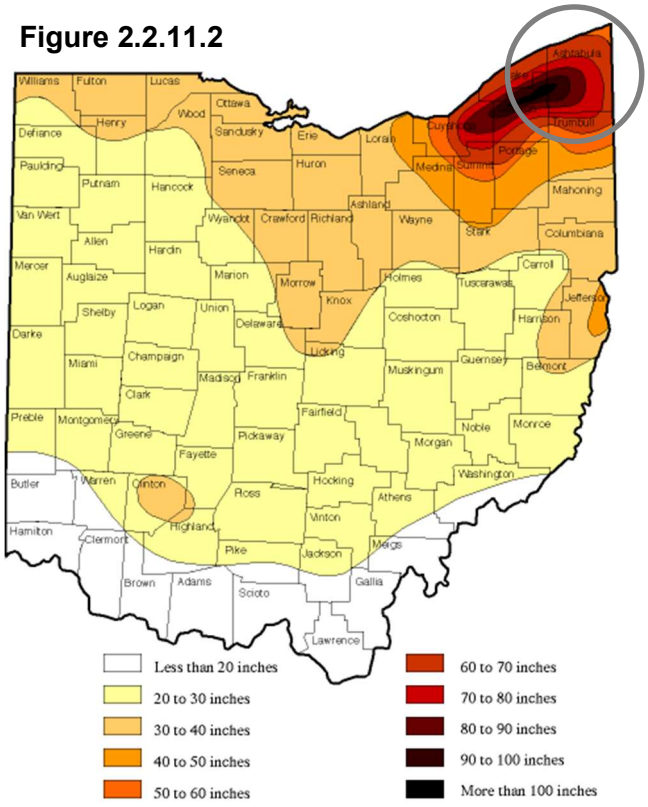
Lake-effect snowstorms have been known to cause continuous snowfall for as long as 48 hours over a sharply defined region. One single, intense local storm cell can yield as much as 48 inches of light density snow in 24 hours or less. Consequently, snowfalls can vary greatly, with areas of deep snowfall adjacent to areas with relatively little snow. Oftentimes areas north of I-90 in Ashtabula County will experience heavy snow, while areas south of I-90 receive light snow.

Figure 2.2.11.1



The image below (Figure 2.2.11.2), obtained from the Ohio Department of Transportation, illustrates that Ashtabula County experiences a wide range of annual snowfall rates, from 50 to 60 inches in northeast portion of Conneaut, to over 100 inches near Geneva and Harpersfield Township. As can be seen, the northeast corner of Ohio including Ashtabula County receives significantly more snow than the rest of the state. As mentioned above, this is attributed to the lake-effect snows caused by the area's proximity to Lake Erie

Figure 2.2.11.2



Source: Ohio Department of Transportation

A severe winter storm could affect the entire county at the same time, virtually bringing all county operations to a standstill. This type of hazard creates a difficult emergency response effort; adverse road conditions can impede or prohibit all vehicle movement, including emergency response vehicles.

Severe winter weather can affect several jurisdictions simultaneously, yet with varying severity and duration. There is no widely used scale to classify snowstorms, but Paul Kocin and Louis Uccellini from the National Weather Service (NWS) developed the Northeast Snowfall Impact Scale (NESIS). The NESIS characterizes and ranks high-impact Northeastern snowstorms from "notable" to "extreme."

The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus, NESIS indicates a storm's societal impacts. This scale was developed because of the impact Northeast snowstorms can have on the rest of the country in terms of transportation and economic impact. NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The aerial distribution of snowfall and population information combine in an equation that calculates a NESIS score which varies from around one for smaller storms to over ten for extreme storms. The raw score is then converted into one of the five NESIS categories (NOAA, n.d.), see Table 2.2.11.1 below.

Table 2.2.11.1

Northeast Snowfall Impact Scale (NESIS)		
Category	*NESIS Value*	*Description*
1	1.0-2.499	Notable
2	2.5-3.99	Significant
3	4.0-5.99	Major
4	6.0-9.99	Crippling
5	10.0+	Extreme

Source: National Weather Service

Impacts and Vulnerability

While the residents of Ashtabula County are accustomed to handling winter storm events, occasional extreme events can make conditions dangerous and disruptive. The most prevalent impacts of heavy accumulations of ice are slippery roads and walkways that lead to vehicle and pedestrian accidents. Severe winter storms create treacherous driving conditions, according to a *FEMA Winter Storm Fact Sheet*, the leading cause of fatalities during winter storms is from automobile or other transportation accidents.

According to the NSSL (n.d.), most deaths from winter storms are not directly related to the storm itself; people die in traffic accidents on icy roads, of heart attacks while shoveling snow, or of hypothermia from prolonged exposure to cold. During severe winter storms, everyone is potentially at risk; particularly those stranded in their vehicle or outside during the storm. Recent observations show that of injuries related to ice and snow, about 70% occur in automobiles, about 25% are people caught out in the storm, and the majority of victims are males over 40 years old. Of injuries related to exposure to cold, 50% are people over 60 years old, over 75% are males, and about 20% occur in the home.

Heavy snow can result in property damage from roof collapses. The most vulnerable structures to roof collapse include those with large-span roofs, those that are poorly built or are dilapidated. Approximately 30% of the residential structures in Ashtabula County were constructed in 1939 or earlier (Ohio Development Services Agency, 2024). Extreme cold temperatures can cause waterlines to freeze and bust.

Ice accumulation can topple power lines, utility poles, and communication towers causing electrical power to be lost, which for several means a loss of a critical home heating source (see Table 2.2.11.2 below). The resultant disruption in communication and utility services can last several days while utility companies repair extensive damage. Even minimal ice accumulation can pose a serious threat to motorists and pedestrians. Bridges and overpasses are particularly dangerous, as they freeze before other surfaces (NWS, n.d.).

Table 2.2.11.2

Occupied Housing Units Heating Fuels – Ashtabula County		
Heating Fuel Type	*Number*	*Percent*
Utility Gas	22,713	58.9%
Bottled, tank or LP	2,540	6.6%
Electricity	7,914	20.5%
Fuel Oil, kerosene	2,204	5.7%
Coal or wood	2,371	6.2%
Solar Energy, other	708	1.8%
No fuel used	99	0.3%

Source: Ohio Development Services Agency, 2024

Health hazards generated from severe winter storms include frostbite and hypothermia. Frostbite is a severe reaction to cold exposure that can permanently damage its victims. A loss of feeling and a white or pale appearance in the victim's fingers, toes, nose, and ear lobes are symptoms of frostbite. Hypothermia is a condition brought on when the body temperature drops to less than 55 degrees Fahrenheit. Symptoms of hypothermia include uncontrollable shivering, slow speech, memory lapses, frequent stumbling, drowsiness, and exhaustion.

Historical Occurrences

According to NOAAs National Centers for Environmental Information (NCEI) Storm Events Database, there has been 173 winter weather events in Ashtabula County since 1996. These events are summarized by category in Table 2.2.11.3 below.

Table 2.2.11.3

Historical Severe Winter Weather Occurrences – Ashtabula County								
ICE STORM (2005 to 2024)								
Total Events	*Areas Affected*	*Area w/ Most Events*	*Avg. Events / Year*		*Injuries*	*Fatalities*	*Damages*	
							Property	*Crop*
2	CW[1]	N/A	0.11		0	0	$435k	$0
Most Ice Accumulation = 3/4 inches in 2005								
HEAVY SNOW (1996 to 2024)								
Total Events	*Areas Affected*	*Area w/ Most Events*	*Avg. Events / Year*	*Snow Depth*		*Injuries*	*Fatalities*	*Damages*	
				Avg.	*Highest*			*Property*	*Crop*
60	CW	Northern Portion	2.14	13”	67”	0	0	$6.8M	$0
Most heavy snow events in one year = 11 events in 2000						Most common months = January & December			
LAKE-EFFECT SNOW (2006 to 2024)								
Total Events	*Areas Affected*	*Month w/ Most Events*	*Avg. Events / Year*		*Injuries*	*Fatalities*	*Damages*	
							Property	Crop
48	Lakeshore Areas	January & December	2.67		0	0	$8.8M	$0
Most lake-effect snow events in one year = 5 each in 2007 & 2016								
WINTER STORM (1999 to 2024)								
Total Events	*Areas Affected*	*Month w/ Most Events*	*Avg. Events / Year*		*Injuries*	*Fatalities*	*Damages*	
							Property	*Crop*
53	CW	Jan/Feb/Dec	2.12		2	0	$18.7M	$0
Most winter storms in one year = 5 each in 2005 & 2008								
EXTREME COLD (2002 to 2024)								
Total Events	*Areas Affected*	*Month w/ Most Events*	*Avg. Events / Year*	*Temperatures*		*Injuries*	*Fatalities*	*Damages*	
				Avg.	*Lowest*			*Property*	*Crop*
10	CW	January	0.45	-11	-15	0	0	$2M	$2M
Most extreme cold events in one year = 2									
173	**Northern Portion**	**N/A**	**Avg. Events / Year = 1.50**			**2**	**0**	**$36.7M**	**$2M**

Source: NCEI Storm Event Database 1 CW = Countywide

Countywide Heavy Snow – November 1996

Heavy lake-effect snow occurred over a seven day period. Total storm accumulations measured 48 inches in the Village of Jefferson. The storm wreaked havoc on power and telephone lines. Cleveland Electric Illuminating estimated 185,000 customers were without power, some for several days. Dozens of emergency shelters were opened for people without electricity and schools throughout northeast Ohio were closed.

Thousands of trees fell or were damaged during the storm. The ground was already saturated at the beginning of the storm, causing shallow-rooted trees to topple. Some trees still had their leaves, and the extra weight of the snow caused many limbs to fall. Most cities used 15

percent of their snow removal budgets and called the National Guard to help clear snow from roads and the roofs of buildings.

Hundreds of homes, garages, carports, barns, and commercial buildings had roofs that collapsed or were severely damaged. In Ashtabula County, the roof of the Methodist Church in Geneva caved in, and in the City of Ashtabula, the roofs of a nursery and a warehouse collapsed. In Conneaut, officials rescued four women from their car after it became stuck in the snow on railroad tracks on the Mill Street Conrail crossing. A train demolished the car, but no one was injured.

Countywide Severe Winter Storms – December 2004 to January 2005 (DR-1580-OH)

A low pressure system moved into the northeast across the Ohio Valley. Cold west to northwest winds behind the low caused lake-effect snow showers to develop in Northeast Ohio. This activity began during the predawn hours of the 16th and continued through midday on the 17th. The heaviest fell during the late afternoon and evening hours of the 16th when visibilities at times were near zero. Accumulations ranged from 6 to 8 inches in southern Ashtabula. This storm system affected four additional counties to the previous storm and caused an approximate $106,901,000 in property damage. As a result of this event, Ohio counties received a total of $7,948,685.48 in public assistance funds.

Alberta Clipper Snow Event – January to February 2005 (EM-3198-OH):

An Alberta Clipper passed to the north of Lake Erie during the evening hours of November 23rd. An arctic cold front trailing this low swept east across Ohio by the early morning hours of the 24th. Cold northwest winds behind this front caused lake-effect snow showers to develop. These bands quickly intensified, and visibilities in some areas were less than one-quarter mile. Northwest winds gusting in excess of 30 mph accompanied the snow and caused considerable blowing and drifting. Snowfall totals of 6 to 9 inches were reported in Ashtabula Counties by sunset on the 24th.

After midnight on the 25th, an upper-level disturbance rotated through the region. This caused a new round of lake effect snow showers to develop. This activity diminished during the afternoon of the 25th after another 6 to 9 inches of snow had fallen. Two-day totals for this event exceed a foot of snow in many locations. A peak of 14 inches was measured in Hartsgrove (Ashtabula County). This storm system affected four additional counties to the previous storm and caused an approximate $5,475,000 in property damage. As a result of this event, Ohio counties received a total of $1,447,217.85 in public assistance funds.

Northern Portion Christmas Day Lake-Effect Snow – December 24th-27th, 2017

An area of low pressure moved across the upper Ohio Valley on December 24 and moved into western Pennsylvania during the evening hours. Very cold westerly winds behind the front caused lake-effect snow showers to develop, with the snow beginning in northern Ashtabula County during the evening of the 24th. The snow picked up in intensity on Christmas Day, with moderate to heavy snow and continuing into the 26th. During most of 25th and 26th, the snow showers remained in the northern third of Ashtabula County, with the greatest accumulations near and along Interstate 90 across the northeast end of the county.

The snow began to diminish during the late evening hours of December 26 but did not taper to flurries until the afternoon of December 27. Snowfall totals for the 72 hours (beginning on the evening of the 24th through late day on the 27th) ranged from more than three feet in northeastern Ashtabula County to over a foot across eastern Lake County.

Officials reported dozens of accidents. Southwest to west winds gusted to as much as 35 mph during this event causing periodic whiteout conditions. Holiday traffic was severely hampered, as accidents forced the closure of Interstate 90 and other roads. Clean-up from this storm took several days.

In Ashtabula County, officials reported a peak three-day snowfall total of 39.3 inches at Conneaut, with 32.8 inches just to the south in North Kingsville. Other totals from the county included 32.5 inches at Ashtabula, 31.3 inches in Monroe Township, 19.5 inches in Kellogsville, and 16.6 inches in Geneva.

Northern Portion Thanksgiving Lake-Effect Snow – November 28th-30th, 2024

A prolonged, crippling, and in some places historic lake-effect snow event took place across the Northeast Ohio snowbelt to end November and start December in 2024. The event ramped up overnight November 28th and 29th with a band of snowfall rates up to three inches (3”) per hour. Lake-effect snow lifted northeast and out of the area into the day on November 30th. This provided a 12 to 24 hour break in the snow before activity returned December 1st.

The first portion of this event led to significant impacts across extreme northeastern Ohio. I-90 was closed for nearly a day across parts of Ashtabula County, with many other roads experiencing difficult to impassible conditions. Many accidents were reported, and some cars became stranded in the snow. The Ashtabula County sheriff closed all roadways in the northern half of the county to non-essential travel early in the morning on November 30th. Ashtabula County, along with some municipalities, declared a state of emergency due to the snow event.

The heavy weight of 5.5 feet of snow (i.e., 67") caused a major roof collapse at the Lakeside High School in Saybrook Township, the facility was only 17 years old.

Lakeside High School in Saybrook Township, roof collapse – December 1, 2024

Loss and Damages

Severe winter weather events have resulted in a total of $38.7 million in reported property and crop damage over 28 years in Ashtabula County, creating an annual average damage estimate per event of approximately $1.4 million. These likely underestimates damage caused to infrastructure.

Information obtained from FEMA's National Risk Index (NRI) was utilized to assess severe winter weather impacts (i.e., ice storms, winter weather & cold waves) for each participating jurisdiction.

Table 2.2.11.4

Ashtabula County Ice Storm NRI Exposure / Expected Annual Loss Estimates					
Census Tract	*Exposure (Buildings)*	*Exposure (Population)*	*EAL (Buildings)*	*EAL (Pop Equivalence)*	*EAL Total*
39007000101	$965,550,693	4,653	$2,575	$4,843	$7,418
39007000102	$587,019,605	3,130	$1,581	$3,274	$4,854
39007000103	$780,739,073	3,524	$2,102	$3,685	$5,787
39007000200	$821,551,454	4,344	$1,984	$4,068	$6,052
39007000300	$1,170,998,835	2,093	$2,755	$1,913	$4,667
39007000400	$355,036,289	1,681	$835	$1,536	$2,371
39007000500	$785,413,231	4,082	$1,848	$3,730	$5,578
39007000601	$763,336,991	2,556	$1,796	$2,336	$4,132
39007000602	$425,086,163	3,251	$1,000	$2,970	$3,970
39007000603	$927,026,389	4,016	$2,181	$3,670	$5,851
39007000701	$655,457,629	3,036	$1,542	$2,774	$4,316
39007000702	$727,947,298	2,836	$1,712	$2,591	$4,304
39007000703	$574,938,746	3,631	$1,352	$3,318	$4,670
39007000704	$800,449,400	3,793	$1,883	$3,466	$5,349
39007000801	$602,207,717	1,344	$1,417	$1,228	$2,644
39007000802	$981,159,687	4,912	$2,308	$4,488	$6,797
39007000900	$978,191,960	4,468	$2,301	$4,083	$6,384
39007001001	$1,087,864,044	5,597	$2,559	$5,114	$7,673
39007001002	$944,294,311	3,397	$2,221	$3,104	$5,325
39007001101	$297,755,602	1,852	$700	$1,692	$2,393
39007001102	$1,309,514,375	6,133	$3,080	$5,604	$8,685
39007001201	$517,064,612	3,497	$1,216	$3,195	$4,412
39007001202	$522,971,316	3,327	$1,236	$3,053	$4,289
39007001301	$716,258,778	3,622	$1,707	$3,353	$5,059
39007001303	$461,664,520	2,835	$1,086	$2,591	$3,677
39007001304	$361,745,758	979	$851	$895	$1,746
39007001401	$532,474,010	4,119	$1,200	$3,563	$4,762
39007001402	$885,882,483	4,689	$2,071	$4,247	$6,318
Grant Total	**$20,539,600,969**	**97,397**	**$49,098**	**$90,385**	**$139,484**

Source: USDHS/FEMA – The National Risk Index, Version 1.19

Table 2.2.11.5

Ashtabula County Winter Weather NRI Exposure / Expected Annual Loss Estimates							
Census Tract	*Exposure (Buildings)*	*Exposure (Pop)*	*Exposure (Ag)*	*EAL (Buildings)*	*EAL (Pop Equivalence)*	*EAL (Ag)*	*EAL (Total)*
39007000101	$965,550,693	4,653	$331,040	$12,577	$1,417	$4	$13,999
39007000102	$587,019,605	3,130	$0	$7,626	$953	$0	$8,579
39007000103	$781,775,010	3,527	$53	$10,185	$1,075	$0	$11,260
39007000200	$821,551,454	4,344	$719,500	$10,735	$1,327	$9	$12,072
39007000300	$1,170,998,835	2,093	$228,068	$15,274	$641	$3	$15,918
39007000400	$355,036,289	1,681	$62	$4,468	$511	$0	$4,979
39007000500	$785,413,231	4,082	$311	$10,232	$1,244	$0	$11,476
39007000601	$766,740,248	2,582	$124	$9,955	$787	$0	$10,742
39007000602	$430,650,007	3,294	$0	$5,605	$1,003	$0	$6,608
39007000603	$936,976,341	4,058	$279,328	$12,203	$1,236	$4	$13,443
39007000701	$655,457,629	3,036	$3,774	$8,539	$925	$0	$9,464
39007000702	$727,947,298	2,836	$984,267	$9,797	$903	$14	$10,714
39007000703	$574,938,746	3,631	$6,681	$7,490	$1,106	$0	$8,597
39007000704	$800,449,400	3,793	$431,894	$10,695	$1,189	$6	$11,891
39007000801	$602,774,693	1,346	$38,399	$7,850	$410	$0	$8,261
39007000802	$981,159,687	4,912	$217,507	$13,314	$1,536	$3	$14,853
39007000900	$978,569,872	4,473	$425,785	$12,911	$1,387	$6	$14,304
39007001001	$1,087,864,044	5,597	$4,573,905	$15,588	$1,875	$65	$17,529
39007001002	$944,294,311	3,397	$3,475,901	$13,532	$1,138	$49	$14,720
39007001101	$297,755,602	1,852	$4,603,043	$4,267	$621	$65	$4,953
39007001102	$1,309,514,375	6,133	$4,320,472	$18,766	$2,055	$61	$20,883
39007001201	$517,064,612	3,497	$5,940,413	$7,409	$1,172	$84	$8,665
39007001202	$523,009,188	3,327	$6,686,645	$7,488	$1,114	$95	$8,696
39007001301	$716,258,778	3,622	$11,125,056	$10,264	$1,214	$158	$11,635
39007001303	$461,664,520	2,835	$8,209,829	$6,615	$950	$116	$7,682
39007001304	$361,745,758	979	$1,052,741	$5,184	$328	$15	$5,527
39007001401	$532,474,010	4,119	$3,962,437	$7,629	$1,380	$56	$9,065
39007001402	$885,882,483	4,689	$8,798,263	$12,695	$1,571	$125	$14,391
Grand Total	**$20,560,536,719**	**97,518**	**$66,415,498**	**$278,896**	**$31,070**	**$940**	**$310,905**

Source: USDHS/FEMA – The National Risk Index, Version 1.19

Table 2.2.11.6

Ashtabula County Cold Wave NRI Exposure / Expected Annual Loss Estimates							
Census Tract	*Exposure (Buildings)*	*Exposure (Pop)*	*Exposure (Ag)*	*EAL (Buildings)*	*EAL (Pop Equivalence)*	*EAL (Ag)*	*EAL (Total)*
39007000101	$965,550,693	4,653	$331,040	$108	$79,664	$62	$79,833
39007000102	$587,019,605	3,130	$0	$65	$53,555	$0	$53,620
39007000103	$781,775,010	3,527	$53	$87	$60,394	$0	$60,481
39007000200	$821,551,454	4,344	$719,500	$92	$74,360	$134	$74,585
39007000300	$1,170,998,835	2,093	$228,068	$131	$35,838	$42	$36,011
39007000400	$355,036,289	1,681	$62	$38	$28,727	$0	$28,765
39007000500	$785,413,231	4,082	$311	$88	$69,897	$0	$69,985
39007000601	$766,740,248	2,582	$124	$85	$44,203	$0	$44,288
39007000602	$430,650,007	3,294	$0	$48	$56,388	$0	$56,436
39007000603	$936,976,341	4,058	$279,328	$105	$69,468	$52	$69,625
39007000701	$655,457,629	3,036	$3,774	$73	$51,986	$1	$52,060
39007000702	$727,947,298	2,836	$984,267	$81	$48,561	$183	$48,826
39007000703	$574,938,746	3,631	$6,681	$64	$62,174	$1	$62,240
39007000704	$800,449,400	3,793	$431,894	$89	$64,948	$80	$65,118
39007000801	$602,774,693	1,346	$38,399	$67	$23,046	$7	$23,120
39007000802	$981,159,687	4,912	$217,507	$110	$84,109	$40	$84,259
39007000900	$978,569,872	4,473	$425,785	$109	$76,592	$79	$76,781
39007001001	$1,087,864,044	5,597	$4,573,905	$121	$95,822	$851	$96,794
39007001002	$944,294,311	3,397	$3,475,901	$105	$58,163	$647	$58,915
39007001101	$297,755,602	1,852	$4,603,043	$33	$31,712	$856	$32,602
39007001102	$1,309,514,375	6,133	$4,320,472	$146	$105,017	$804	$105,967
39007001201	$517,064,612	3,497	$5,940,413	$58	$59,880	$1,105	$61,043
39007001202	$523,009,188	3,327	$6,686,645	$58	$56,965	$1,244	$58,267
39007001301	$716,258,778	3,622	$11,125,056	$80	$62,015	$2,070	$64,165
39007001303	$461,664,520	2,835	$8,209,829	$52	$48,541	$1,527	$50,119
39007001304	$361,745,758	979	$1,052,741	$40	$16,764	$196	$17,000
39007001401	$532,474,010	4,119	$3,962,437	$59	$70,514	$737	$71,311
39007001402	$885,882,483	4,689	$8,798,263	$99	$80,287	$1,637	$82,022
Grant Total	**$20,560,536,719**	**97,518**	**$66,415,498**	**$2,293**	**$1,669,590**	**$12,357**	**$1,684,240**

Source: USDHS/FEMA – The National Risk Index, Version 1.19

Future Occurrences

The “snowbelt region” of Northeast Ohio which includes Ashtabula County is likely to continue to experience various forms of severe winter weather, particularly during the late fall and early winter months. While specific forecasts for future lake-effect snow events in northeastern Ohio are difficult to pinpoint, research suggests that time periods when lake surface temperatures are warmer and the lake has reduced ice cover can lead to increased evaporation and potentially more intense lake-effect snow events.

Risk Assessment

This section summarizes the vulnerability of Ashtabula County to severe winter weather. The county conducted an online survey for the public to share its thoughts on the hazards listed in this plan. Table 2.2.11.7presents the results of that survey, specifically regarding severe winter weather.

Table 2.2.11.7

Public Sentiment, Severe Winter Weather					
	Level of Concern				
Hazard	*Not at All*	*Somewhat*	*Concerned*	*Very*	*Total Responses*
WINTER WEATHER	4 (2.70%)	30 (20.27%)	68 (45.95%)	46 (31.08%)	148
In the past five years, do you remember this hazard occurring in your community?				131 (88.51%)	148
Have you noticed an increase in the occurrences or intensity of this hazard?				83 (56.08%)	148
Have you noticed a decrease in the occurrences or intensity of this hazard?				4 (2.70%)	148

Source: Online Public Survey Results

The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above. The categories in the table appear in Ohio EMA's Mitigation Information Portal (MIP) tool.

Table 2.2.11.8

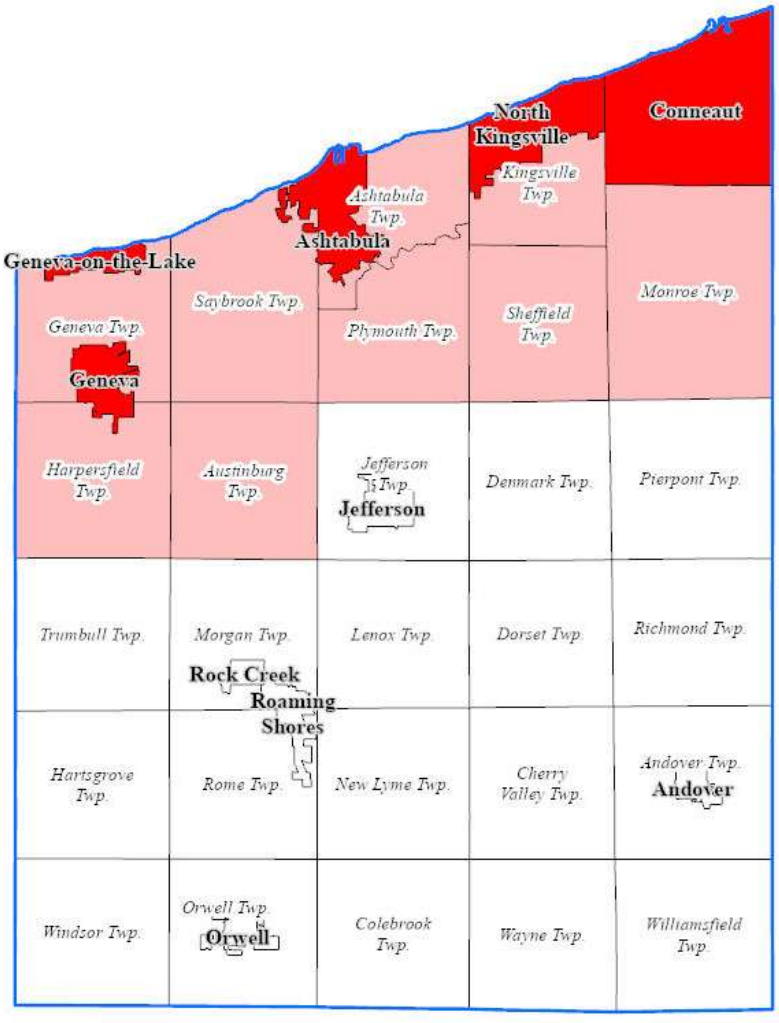
Risk Ranking, Severe Winter Weather			
Category	*Points*	*Description*	*Notes*
Frequency	5	Frequent (Will occur during a year)	Since 1996, the NOAA NCEI Strom Event Database lists 173 winter weather events, for an average of six events per year.
Response	3	One week	The impacts of significant winter storms can linger for up to a week.
Onset	1	Over 24 hours	Weather forecasting officials typically predict the onset of severe winter weather at least 24 hours in advance
Magnitude	5	More than 50% of land area affected	Severe winter weather events typically affect large portions of the county simultaneously.
Business	2	One week	Businesses may be required to close for up to one week due to poor road conditions and not being able to get to the business.
Human	3	Medium (Multiple severe injuries)	Several people could be injured in vehicle accidents, and /or suffer heart attacks while shoveling snow.

Risk Ranking, Severe Winter Weather			
Category	*Points*	*Description*	*Notes*
Property	3	25-50% of property affected	Heavy snow and ice can damage a significant amount of property and critical infrastructure.
Totals	**22**	**HIGH**	

FEMA's *Local Mitigation Planning Handbook* (2023c) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks are more or less prevalent as compared to the rest of the planning area. The following map identifies those multi-jurisdictional risks concerning severe winter weather. Those labels not underlaid by a shaded drop shadow are not more or less at risk. Those with red drop shadows are more at risk.

Figure 2.2.11.3

Severe Winter Weather Multi-Jurisdictional Risk Map



2.2.12 Terrorism / Civil Disturbance

Terrorism is the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives. Civil disturbances include active assailants, bomb threats, and riots.				
RISK HIGHEST HIGH MEDIUM LOW LOWEST	**Period of Occurrence:**	At any time	**Risk Ranking:**	Low
	Warning Time:	No warning	**Type of Hazard:**	Human-Caused
	Probability:	Remote (Unlikely to occur in a year)	**Impact:**	Localized (Less than 10% of land are affected)
	Disaster Declarations:	None		

Hazard Introduction and Overview

"Acts of terrorism include threats of terrorism; assassinations; kidnappings; hijackings; bomb threats and bombings; cyber-attacks (computer-based); and the use of chemical, biological, nuclear, and radiological weapons. High-risk targets for acts of terrorism include but are not limited to military and civilian governmental facilities, international airports, large cities, and high-profile landmarks. Terrorists might also target large public gatherings, water and food supplies, utilities, and financial centers. Further, terrorists are capable of spreading fear by sending explosives or chemical and biological agents through the mail." (*Source: USDHS FEMA*)

International terrorism involves violent, criminal acts committed by individuals and/or groups who are inspired by, or associated with, designated foreign terrorist organizations or nations. Domestic terrorism involves violent, criminal acts committed by individuals and/or groups to further ideological goals stemming from domestic influences, such as those of a political, religious, social, racial, or environmental nature.

According to the FBI, the terrorism threat has continued to evolve since the September 11, 2001, attacks. The threat landscape has expanded considerably, international terrorism remains a serious threat, and domestic terrorism also remains persistent overall. Several factors have contributed to the evolution of the terrorism threat on both the international and domestic fronts, such as:

- **Lone Offenders:** Terrorist threats have evolved from large-group conspiracies toward lone-offender attacks. These individuals often radicalize online and mobilize to violence quickly. Without a clear group affiliation or guidance, lone offenders are challenging to identify, investigate, and disrupt.
- **Internet and Social Media:** International and domestic violent extremists have developed an extensive presence on the Internet through messaging platforms and online images, videos, and publications. These facilitate the groups' ability to radicalize and recruit individuals who are receptive to extremists messaging.

Social media has also allowed both international and domestic terrorists to gain unprecedented, virtual access to people living in the United States in an effort to enable homeland attacks. The Islamic State of Iraq and ash-Sham (ISIS), in particular, encourages sympathizers to carry out simple attacks wherever they are located.

There is no single cause of acts of violence or terrorism; there are typically non-rational, complicated, intertwined, series of reasons that results in violence. In his article *Causes of Terrorism* (2011), Nick Grothaus lays out the most common causes cited by leaders in the field of counterterrorism. These categories may apply to other types of violence not related to terrorism.

- **Ethno-Nationalism:** The desire of a population to break away from a government or ruling power and create a state of their own.
- **Alienation/Discrimination:** Individuals or groups face discrimination leading to further feelings of isolation. These people may become jaded towards society and feel excluded.
- **Religion:** Religion as a part of terrorism has been mainly attributed to Islamic fundamentalism although other religions have also had involvement in terrorist activities. (Post, 2007, pp. 211-212).
- **Socio-Economic Status:** Individuals and groups may be driven by a sense of relative depravation and lack of upward mobility within society.
- **Political Grievances:** A lack of political inclusiveness or grievances against a certain political order may cause individuals to join or create terrorist groups.

***NOTE:** Throughout the remainder of this profile, terrorism will be discussed generally. This profile does not include any information on any threats that have been received, or specific listings of potential targets in Ashtabula County, etc.

Anecdotally, the nation has seen an upswing in violent acts, and it is beneficial to profile types of violence and the potential impacts they could have in Ashtabula County. Civil disturbances, for this plan, encompass those acts that law enforcement does not consider routine, including the following topics.

- **Active Assailant**: "An active assailant is an armed person(s) who uses any type of weapon to inflict serious harm and/or deadly physical force on others in public and continues to do so while having access to additional victims. Examples of active assailant attacks include an active shooter incident, mass stabbings, explosives, vehicle-as-a-weapon, fire-as-a-weapon, and so forth. (These are also known as active shooter events, hostile incidents, mass violence attacks, rampage violence, spree killings, and so forth.)" (North Carolina Active Assailant and Active Shooter Work Group, 2017).
- **Bomb Threat**: An actual or rumored threat of a bomb. Perpetrators often call-in bomb threats to an office or person to disrupt normal business and activities, and these threats do not usually involve a bomb. Nonetheless, every bomb threat must be considered real until authorities investigate and determine it is safe (Ohio State University, n.d.)
- **Riots**: Group protests that become or have the potential to become violent. A riot is a violent offense against public order involving three or more people; it involves a gathering of persons for an illegal purpose. It is the most elementary form of collective violence, and it is also referred to as "social unrest." Riots can include such events as gang violence, coups, rebellions, and revolutions (Encyclopedia Britannica, 2018).

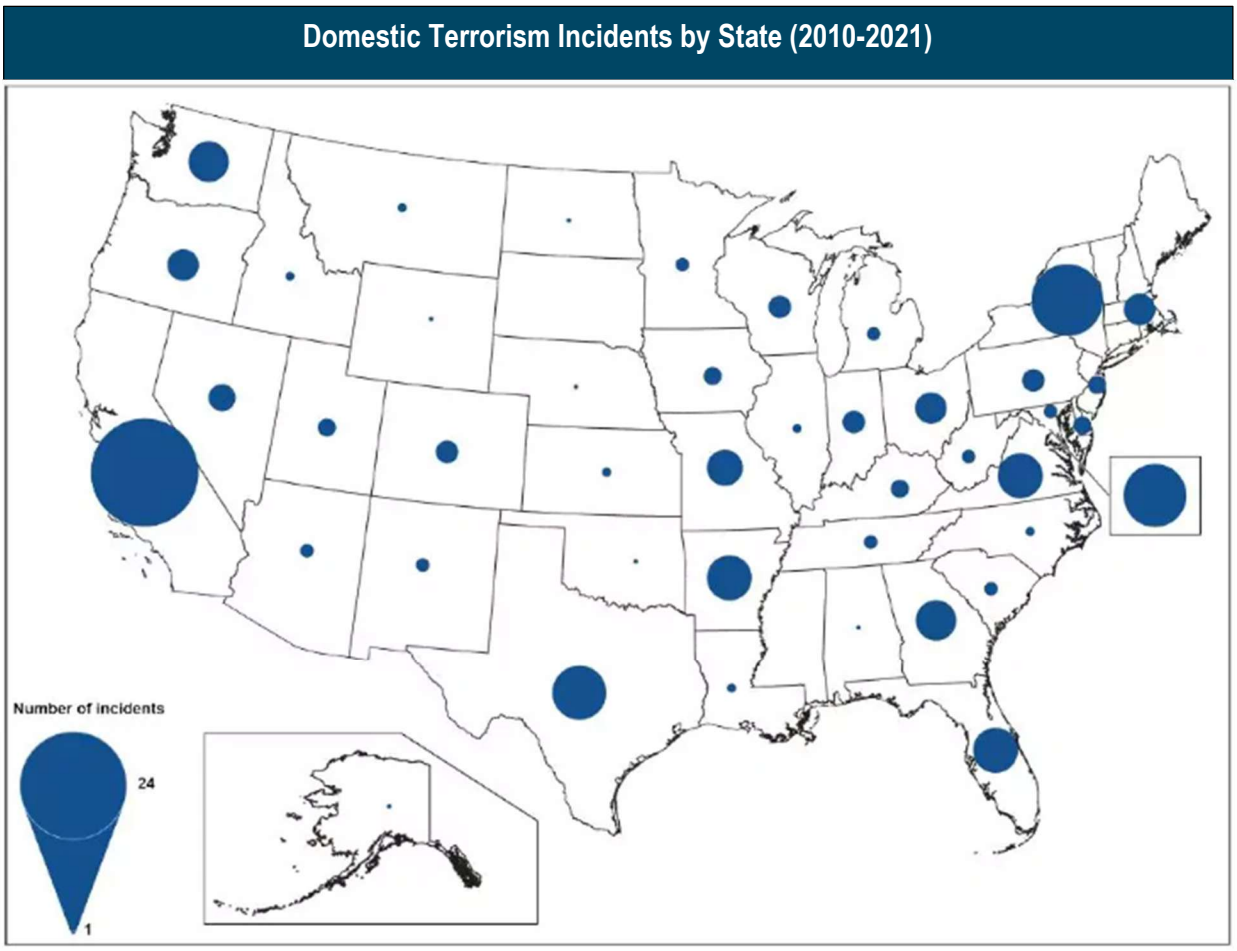
Location and Extent

Ashtabula County does contain what could be considered "targets." In general, governmental, educational, power generation, and industrial facilities could be considered *targets*, but such a consideration usually has more to do with other circumstances surrounding the facility than the facility's identification as a governmental, educational, power generation, or industrial facility. Due to the high unpredictability of terrorist acts, any location could be a target of an attack. The extent of damages or impact from an attack is also unpredictable.

Terrorism is not always accomplished on a "grand scale," as is the case with international terrorists who are attempting to coerce the federal government. Ashtabula County is more likely to experience what is known as "domestic terrorism." Domestic terrorism can involve disgruntled employees (in the case of large industrial plants), upset citizens (at government facilities), etc. Domestic terrorists may often only intend to harm a single individual or a small group of individuals, but the threat of their actions can be highly disruptive.

According to the U.S. Department of Homeland Security there were 231 incidents (i.e., attacks or plots) that met the definition of domestic terrorism between 2010 and 2021. They occurred across the United States, but the greatest number of incidents occurred in states with major metropolitan areas (see Figure 2.2.12.1 below).

Figure 2.2.12.1



Source: GAO analysis of DHS Counterterrorism Mission Center Data

Any location or community asset can be the target of violence or civil disturbance. Historically, there have been violent acts at malls, schools, universities, workplaces, government buildings, and places of worship. The location itself, or the people inside could be the intended target. Bomb threat targets are similar. Typically, the incident is limited to a specific location or building. Riots are not typically location-targeted events and generally occur in the streets of a city or village; they can be localized to just one city block or spread in pockets nationwide.

Due to the high unpredictability of violent acts, any location could be a target. The extent of damages or impact from an attack is also unpredictable. However, there may be areas or types of locations that may be more prone to attacks. For example, based on the information for Ohio, five incidents of active shooters have been in educational facilities, four at commerce locations or places of business, and one at a residence.

Impacts and Vulnerability

Symbolically, an implemented act of terrorism would erode the feeling of security that the region enjoys. It would also likely result in a loss of faith in local decision makers and public safety officials. A loss of public support, especially in the public safety and emergency services sectors, could affect agency operating budgets, personnel recruitment, etc., thus adversely affecting the level of service that could be provided in subsequent years.

The most obvious effects of a terrorist incident would be economic. Infrastructure, including "hard" infrastructure such as facilities and systems, but also "soft" infrastructure such as people could be diminished or destroyed. Any loss of tax base and employment would be extremely hard for the county to overcome.

Survivors of violence will most likely experience common stress reactions lasting several days to a few weeks. These reactions can include the following:

- **Emotional Reactions:** Shock, fear, grief, anger, guilt, shame, helplessness, numbness, sadness.
- **Cognitive Reactions:** Confusion, indecisiveness, worry, shortened attention span, trouble concentrating.
- **Physical Reactions:** Tension, fatigue, edginess, insomnia, body aches, easily startled, tachycardia, nausea, loss of appetite.
- **Interpersonal Reactions:** distrust, conflict, withdrawal, irritability, loss of intimacy, feeling abandoned.

Some individuals may experience severe stress symptoms following a violent incident. Individuals experiencing the following are at a higher risk for posttraumatic stress disorder:

- **Intrusive Re-Experiencing:** Terrifying memories, nightmares, and flashbacks.
- **Extreme Emotional Numbing:** Inability to feel emotions, feeling empty.
- **Extreme Attempts to Avoid Disturbing Memories:** Such as through substance abuse.
- **Hyperarousal:** Panic attacks, rage, extreme irritability, intense agitation, acting out with violence.

- **Severe Anxiety:** Debilitating worry, extreme helplessness, compulsions, or obsessions.
- **Severe Depression:** Loss of ability to feel hope, pleasure, or interest; feeling worthless, suicidal ideations or intent.
- **Dissociation:** Fragmented thoughts, spaced out, unaware of surroundings, amnesia (National Center for PTSD, 2018).

Historical Occurrences

There are no documented occurrences of terrorism, domestic or international, within the borders of Ashtabula County. There have been 10 active shooter incidents in Ohio from 2000 to 2017, as outlined in an FBI report; one of these incidents occurred in Andover Village.

Table 2.2.12.1

Active Shooter Incidents in Ohio (2000-2017)						
City/Town	*Date*	*Event*	*Type*	*Killed*	*Wounded*	*Description*
Cleveland	5/9/2003	Case Western Reserve University	Education	1	2	A male, 62, armed with a rifle and a handgun, began shooting in the Weatherhead School of Management building at Case Western Reserve University in Cleveland, Ohio. The shooter was wounded during an exchange of gunfire with police.
Andover	8/19/2003	Andover Industries	Commerce	1	2	A male, 32, armed with four handguns, began shooting in the Andover Industries facility in Andover, Ohio, after his boss threatened to fire him. The shooter committed suicide before police arrived.
West Chester	11/6/2003	Watkins Motor Lines	Commerce	2	3	A male, 50, armed with two handguns, began shooting in the offices of Watkins Motor Lines in West Chester, Ohio. He had been employed by the Atlanta, Georgia, office of Watkins Motor Lines until he resigned in 2001. The shooter was apprehended by police in Indiana later that day.
Toledo	1/26/2005	Daimler Chrysler's Toledo	Commerce	1	2	A male, 54, armed with a shotgun, returned from his lunch break and began shooting in Daimler Chrysler's Toledo North Assembly plant in Toledo, Ohio. He took a woman hostage before beginning to shoot at his co-workers. The shooter committed suicide before police arrived.
Perrysburg	8/8/2007	Liberty Trans.	Commerce	2	0	A male, 43, armed with at least two handguns and two rifles, began shooting at his co-workers in the Liberty Transportation facility in Perrysburg, Ohio. He had just been fired. The shooter fled

Active Shooter Incidents in Ohio (2000-2017)						
City/Town	*Date*	*Event*	*Type*	*Killed*	*Wounded*	*Description*
						the scene and was apprehended by police two hours later.
Cleveland	10/10/2007	Success Tech Academy	Education	0	4	A male, 14, armed with two handguns, began shooting in Success Tech Academy in Cleveland, Ohio. The shooter committed suicide before police arrived.
Columbus	3/9/2010	OSU, Maintenance Building	Education	1	1	A male, armed with two handguns, began shooting in the maintenance building at The Ohio State University in Columbus, Ohio. He had just been fired for allegedly lying on his job application. The shooter committed suicide before police arrived.
Copley Township	8/7/2011	Copley Township	Residence	7	1	A male, 51, armed with two handguns, began shooting in a neighborhood in Copley Township, Ohio, where many of his girlfriend's family members were present. Seven people were killed; his girlfriend was wounded. The shooter was killed by police.
Chardon	2/27/2012	Chardon High School	Education	3	3	A male, 17, armed with a handgun, began shooting in the cafeteria at Chardon High School in Chardon, Ohio. The shooter was chased out of the building by a school coach. The shooter was apprehended by police near the school.
Middletown	2/29/2016	Madison High School	Education	0	4	A male, 14, armed with a handgun, allegedly began shooting in the cafeteria of Madison Junior/Senior High School in Middletown, Ohio. He shot two students before fleeing the building. four students were wounded (two from shrapnel). The shooter was apprehended near the school by law enforcement officers.

Source: FBI

Violence is usually caused by the "crowd psychology," when in a crowd an individual is more likely to act like others, which means a few looking to engage violent behavior can sway a large group to act violently (Sarkis, 2011). Not all protests end in violence; the majority of protesting is peaceful. The following table lists recent protests that occurred peacefully in Ashtabula County.

Table 2.2.12.2

Protests in Ashtabula County (2006-2024)	
Date	*Description*
N/A (Yearly)	Animal rights activists concerned with the treatment of a circus elephant protest a local Medieval Faire
September 2006	Conneaut man protested Ashtabula Police Department
March 2011	Hundreds of union workers rallied in Jefferson as one of 17 rallies held throughout the state; the rallies occurred in support of unions
October 2011	"Protest" to further departmental cuts by one employee (part of nationwide "occupy" protests)
October 2016	Protests at a 2016 presidential campaign rally
November 2016	School officials protest additional graduation tests for high school students

Loss and Damages

A large-scale terrorist event could cripple the county. The effects of a terrorist incident are not only monetary; they are often emotional and symbolic. Several of the communities throughout the county are rural and small. Any Mass Casualty Incident (MCI) would take an emotional toll on the affected and nearby communities.

Estimating the economic impact of terrorism and civil disturbance events is difficult. Initial impacts can be the immediate costs for a response to the event and business closures in the vicinity. The full economic impact could include long-term costs, emotional costs, etc. A large-scale event could significantly affect industry and government as well as privately-owned infrastructure. A terrorist incident involving wastewater, drinking water, or chemical facilities could have long-term environmental effects. The potential losses due to these variables make it difficult to quantify the cost of repair or replacement of infrastructure.

Future Occurrences

According to the U.S. Government Accountability Office domestic terrorism is on the rise in the U.S. All but eight states across the U.S. experienced at least one incident of domestic terrorism between 2010 and 2021. Over the last 10 years, domestic terrorism-related investigations have grown by 357%.

There is concern over illegal immigration at the U.S. Southwest border and the growing number of individuals on the terrorist watchlist entering the United States. According to statistics obtained from the House Committee on Homeland Security "the number of individuals apprehended illegally crossing the U.S. Southwest border found to be on the terrorist watchlist has increased 2,500 percent (2,500%) from 2017 to 2023, this percentage does not include got-a-ways. The Department of Homeland Security (DHS) Secretary and U.S. Customs and Border Protection (CBP) sources have confirmed over 1.7 million known got-a-ways at the Southwest border. In Fiscal Year 2023, CBP arrested 35,433 illegal aliens with criminal convictions

nationwide, in addition, 294 illegal aliens on the terrorist watchlist have been apprehended between ports of entry on the Southwest border since the beginning of 2021, and those are only individuals Border Patrol agents have caught" (Homeland Security Committee, 2023).

During the House Committee on Homeland Security's annual Worldwide Threats hearing, the FBI Director confirmed the national security threat posed by the growing number of got-a-ways at the Southwest border.

Recent developments and ongoing efforts that have contributed to decrease the risk of terrorism in Ashtabula County including the creation of the Crime Enforcement Agency of Ashtabula County (CEAAC) which collects data on potential threat sites and groups, supplementing local enforcement efforts, and acting as a point of contact for federal and state intelligence agencies. Ohio's Intelligence Liaison Officer (ILO) Program fosters intelligence collaboration at the local, state, and regional levels, building relationships with local representatives who report to the Ohio Fusion Center Network (OFCN), which is responsible for analysis, sharing, and dissemination of intelligence.

Risk Assessment

This section summarizes the vulnerability of Ashtabula County to terrorism and civil disturbance. The county conducted an online survey for the public to share its thoughts on the hazards listed in this plan. Table 2.2.12.3 presents the results of that survey.

Table 2.2.12.3

Public Sentiment, Terrorism / Civil Disturbance					
	Level of Concern				
Hazard	*Not at All*	*Somewhat*	*Concerned*	*Very*	*Total Responses*
TERRORISM	38 (25.68%)	48 (32.43%)	43 (29.05%)	19 (12.84%)	148
In the past five years, do you remember this hazard occurring in your community?				11 (7.43%)	148
Have you noticed an increase in the occurrences or intensity of this hazard?				37 (25.0%)	148
Have you noticed a decrease in the occurrences or intensity of this hazard?				3 (2.03%)	148

Source: Online Public Survey Results

The following table assigns point totals based on the methodology identified in Section 2.2: Describe Hazards above. The categories in the table appear in Ohio EMA's Mitigation Information Portal (MIP) tool.

Table 2.2.12.4

Risk Ranking, Terrorism / Civil Disturbance			
Category	*Points*	*Description*	*Notes*
Frequency	2	Remote (Unlikely to occur in a year)	Because the occurrence of this hazard is based on human-activity it is difficult to determine the frequency. Planners based frequency on past occurrences. There are no documented occurrences of international or domestic terrorist events in the county, and instances of civil disturbances or rare.
Response	3	One week	Based on impacts from events that have occurred within proximity of the county, a response of one week would be most likely.
Onset	5	No warning	Terrorist attacks and civil disturbances are not typically proceeded with a warning.
Magnitude	1	Localized (< 10% land area affected)	An attack or incident in the county would most likely be localized or targeted towards a specific location rather than widespread.
Business	1	One day	Based on impacts from previous events that have occurred in similar areas, businesses would only be affected for one day.
Human	2	Low (Some injuries)	The magnitude of events that have occurred in similar areas have resulted in a very limited number of injuries or fatalities.
Property	1	Less than 10% of property affected	An event within the county would most likely be on a specific, single target or location, rather than a widespread event.
Totals	**15**	**LOW**	

FEMA's *Local Mitigation Planning Handbook* (2023c) directs entities compiling multi-jurisdictional plans to identify any jurisdictions within the planning area for which the identified risks are more or less prevalent as compared to the rest of the planning area. The following map identifies those multi-jurisdictional risks concerning terrorism and civil disturbance. Those labels not underlaid by a shaded drop shadow are not more or less at risk. Those with red drop shadows are more at risk.

Figure 2.2.12.2

Terrorism Multi-Jurisdictional Risk Map