

Jackson County Hazard Mitigation Plan
2022 Edition Plan Element



Bright Walls Mural | Downtown Jackson

Potential Hazards

November 23, 2020 Draft

Natural Hazards

Weather Hazards

1. Hail
2. Lightning
3. Ice Storms and Sleet Storms
4. Snowstorms
5. Severe Wind Events
6. Tornadoes
7. Extreme Temperatures
8. Fog

Hydrological Hazards

9. Flooding
10. Dam Failures
11. Drought

Ecological Hazards

12. Wildfires
13. Invasive Species

Geologic Hazards

14. Earthquakes | Natural Hazards | Geologic Hazards
15. Subsidence | Natural Hazards | Geologic Hazards
16. Space Weather | Natural Hazards | Geologic Hazards
17. Celestial Impacts | Natural Hazards | Geologic Hazards

Technological Hazards

Industrial Hazards

18. Structural Fires
19. Scrap Tire Fires
20. Hazardous Material Incidents
21. Nuclear Power Plant Accidents
22. Transportation Hazardous Material Incidents
23. Petroleum and Natural Gas Pipeline Accidents
24. Oil and Natural Gas Well Accidents

Infrastructure Hazards

25. Infrastructure Failures
26. Energy Emergencies
27. Transportation Accidents

Human-Related Hazards

28. Catastrophic Incidents
29. Civil Disturbances
30. Nuclear Attack
31. Public Health Emergencies
32. Terrorism

Hail | Natural Hazards | Weather Hazards



Source: Mental Floss

Hail is a product of the strong thunderstorms that frequently move across the State. As one of these thunderstorms passes over, hail usually falls near the center of the storm, along with the heaviest rain. Most hailstones range in size from a pea to a golf ball, but hailstones larger than baseballs have occurred with the most severe thunderstorms. Hail forms when strong updrafts within the storm carry water droplets above the freezing level, where they remain suspended and continue to grow larger until the winds cannot support their weight. They finally fall to the ground, battering crops, denting autos, and injuring wildlife and people. Large hail is a characteristic of severe thunderstorms, and it may precede the occurrence of a tornado.

Jackson County Perspective

Hail is an expected annual occurrence, although the size and impact of hail is difficult to predict since it tends to have only a localized impact. Jackson County experiences an average of between 20 to 40 thunderstorm days per year, and expects several severe thunderstorm events to occur each year that are capable of producing damaging hail. Sixty-one (61) recorded incidents of hail storms occurred in the County during the 61-year period from 1958 through 2019. These events have resulted in \$380,000 in property damage and \$225,000 in crop damage. All of the reports of damage have occurred since 1996, which suggests improved reporting rather than a recent increase in hail-storm intensity. Please see Appendix A for a table providing the history of hail events in Jackson County.

Lightning | Natural Hazards | Weather Hazards



Source: AccuWeather

Lightning is a random and unpredictable product of a thunderstorm's tremendous energy. The perception of lightning as a minor hazard lingers despite the fact that it damages many structures as well as killing and injuring more people on average in the United States per year than tornadoes or hurricanes. In terms of property losses from lightning, statistics vary widely according to source. However, conservative estimates of annual lightning-related property damages are several billion dollars per year, and those losses will likely continue to grow as the use of computers and other lightning sensitive electronic components becomes even more prevalent. Since 1996, property damages due to lightning has averaged nearly \$1 million annually across the State.

Jackson County Perspective

Lightning is considered an expected annual occurrence in the County, but with an impact that is difficult to predict and tends to be very localized unless it causes power failures or large fire events to occur. Jackson County experiences an average of between 20 and 40 thunderstorm days per year, any of which may produce damaging lightning strikes. The County expects several severe thunderstorm events to occur each year that are characterized by the production of great amounts of lightning activity, some of which can be expected to produce damage or injuries. Please see Appendix A for a table providing history of lightning events in the County.

Michigan Lightning Related Deaths and Injuries 1959 – 2005

	Deaths	Injuries
Open fields & recreation areas	29%	34%
Unspecified locations	19%	37%
Under a tree	26%	15%
Communications equipment & heavy equipment/machinery	6%	6%
Water related (boating, fishing, swimming, etc.)	11%	4%
Golf Course	10%	5%

Ice Storms and Sleet Storms | Natural Hazards | Weather Hazards



Source: Wikipedia

Although this plan combines the reporting on ice storms and sleet storms, they are two separate phenomena. People sometimes incorrectly refer to ice storms as sleet storms. Ice storms are the result of cold rain that freezes on contact with the surface, coating the ground, trees, buildings, overhead wires and other exposed objects with ice, sometimes causing extensive damage. When electric lines are downed, households may be without power for several days, resulting in significant economic loss and disruption of essential services in affected communities. Sleet consists of small, already-frozen rain drops (ice pellets) that bounce when hitting the ground or other objects. These small pellets of ice then accumulate on surfaces, causing potential harm to transportation and electrical systems. Sleet does not stick to trees and wires as freezing rain does, but sleet in sufficient depth does cause hazardous driving conditions.

Jackson County Perspective

Ice storm and sleet storm damage is more likely to occur in southern Michigan than in the northern portions of the State. Climate change effects seem likely to cause an increase in the number of ice storm and sleet storm events, especially in southern Michigan. There were 4 reports of ice storm/freezing rain events in the County between 1996 and 2017. These storms resulted in property damage estimated at \$243,342,000 Statewide including \$1,030,000 directly attributable to Jackson County. Please see Appendix A for a table providing history of ice storms and sleet storms in the County.

Past Presidential Declarations

- Date: 3/20-27/1976 | incident(s): *Ice storm and Tornadoes* | area: *Jackson and 28 other counties* | declaration: *Major Disaster*
- Date: 4/5/1972 | incident(s): *Snowstorm and Freezing Rain* | area: *Jackson and 8 other counties* | declaration: *Major Disaster*

Past Gubernatorial Declaration

- 1/15/1985 | Ice storm | Disaster (Emergency)

Snowstorms | Natural Hazards | Weather Hazards



Source: East Idaho News

Blizzards are the most dramatic and perilous of all snowstorms, characterized by low temperatures and strong winds (35+ miles per hour) bearing enormous amounts of snow. Most of the snow accompanies a blizzard in the form of fine, powdery particles that are wind-blown in quantities that, at times, reduces visibility to only a few feet. Blizzards have the potential to result in property damage and loss of life. Just the cost of clearing the snow can be enormous, and such storms may result in loss and disruption of essential services in affected communities. During the winter months in recent years, snowfall events have increased in intensity.

Jackson County Perspective

Snowstorms are a common occurrence in the winter months in the County. Fifty-three (53) snowstorm and winter storm events were reported in Jackson County from 1996 and 2017. Vehicular crashes are more likely to occur, especially along the I-94 and US-127 corridors, during snowstorms. Schools and some business can close, depending on the nature and severity of the storms, causing a disruption to daily life. If there are power-outages, residents may also have to seek out warming shelters. The snowstorms that have affected the County have resulted in a total of \$1,225,000 in property damages. Please see Appendix A for the history of snowstorms in Jackson County from 1993-2020.

Past Presidential Declarations

- Date: 12/11-31/2000 | incident(s): *Blizzard and Snowstorm* | area: *Jackson and 38 other counties* | declaration: *Emergency*
- Date: 1/2-15/1999 | incident(s): *Blizzard and Snowstorm* | area: *Jackson and 30 other counties* | declaration: *Emergency*
- Date: 1/26-27/1978 | incident(s): *Blizzard and Snowstorm* | area: *Jackson and all 82 other counties* | declaration: *Emergency**
- Date: 4/5/1972 | incident(s): *Snowstorm and Freezing Rain* | area: *Jackson and 8 other counties* | declaration: *Major Disaster*

Past Gubernatorial Declaration

- Date: 1/26/78 | incident(s): *Blizzard and Snowstorm* | area: *Jackson and all other 82 counties* | declaration: *Disaster**

* Also a Gubernatorial/Presidential Declaration

Severe Wind Events | Natural Hazards | Weather Hazards



Source: Storm Assist

Severe winds have occasionally had devastating effects on Michigan. Often, when straight-line winds occur, the presence of the forceful winds with velocities over 58 mph may be confused with a tornado occurrence. Severe winds have the potential to cause loss of life from falling trees, property damage, and flying debris. However, the property damage from straight-line winds can be more widespread than a tornado. In addition to property damage to buildings (especially less sturdy structure such as storage sheds, outbuildings, etc.), there is a risk of infrastructure damage from downed power lines due to falling limbs and trees. Large-scale power failures, with hundreds of thousands of customers affected, are common during straight-line wind events.

Severe wind events also include microbursts and derechos. A microburst is a localized but powerful wind gust that typically occurs from a single storm. Microbursts result in what are often referred to as straight-line wind damage, and usually result in damage that is comparable to a brief, weak tornado. Derechos are usually large-scale storm systems that travel hundreds of miles and are many counties wide. The damage path of a derecho often exceeds 250 miles in length, with damage reports typically stretching across many states. Derechos can happen any time of the year, but are most common in Michigan during the warmer half of the year. Wind speeds in derechos can exceed 100 mph at times and often result in damage that is more widespread than most other storms and tornadoes in Michigan.

Jackson County Perspective

There were 125 severe wind events reported in the County between 1996 to 2017 that resulted in a total of \$11,400,000 in property damage and \$30,000 in agriculture damage. Please see Appendix A for the history of severe wind events in Jackson County.

Past Gubernatorial Declaration

- Date: 7/21/80 | incident(s): *Thunderstorms and Severe Winds* | area: *Jackson and other 8 other counties (and various municipalities)* | declaration: *Disaster*

Tornadoes | Natural Hazards | Weather Hazards



Source: Wikipedia

Past Presidential Declaration

- Date: 3/20-27/1976 | incident(s): *Ice storm and Tornadoes* | area: *Jackson and 28 other counties* | declaration: *Major Disaster*

Tornadoes in Michigan are most frequent in the spring and early summer when warm, moist air from the Gulf of Mexico collides with cold air from the Polar Regions to generate severe thunderstorms. These thunderstorms often produce the violently rotating columns of wind called tornadoes. Powerful winds exert most of a tornado's destructive force, knocking down walls and lifting roofs from buildings in the storm's path. The violently rotating winds then carry debris aloft that may blow through the air as dangerous missiles.

The typical length of a tornado path is approximately 16 miles, but there are reports of tracks much longer than that—even up to 200 miles. Tornado path widths are generally less than one-quarter mile wide. Even though an average tornado might spend only a few minutes on the ground, those few minutes can result in devastating damages.

Jackson County Perspective

The 2019 Michigan State Hazard Mitigation Plan reports that the County has seen 3 tornado events between 1996 – 2017 that resulted in no deaths, but \$700,000 in property damage and \$50,000 in crop damage. However, the same plan also reported that there were 15 tornados from 1950 – 2021 that ranged in intensity from EF0 - EF3 on the enhanced Fujita Scale (see the table). An EF3 tornado can result in roofs and some walls torn off well-constructed houses, trains overturned, and trees uprooted. Please see Appendix A for a table of historical of tornado event in Jackson County.

The Enhanced Fujita (EF) Scale of Tornado Intensity

EF-Scale	Intensity Descriptor	Wind Speed
EF0	Gale Tornado	65-85
EF1	Weak Tornado	86-110
EF2	Strong Tornado	111-135
EF3	Severe Tornado	136-165
EF4	Devastating Tornado	166-200
EF5	Incredible Tornado	200+

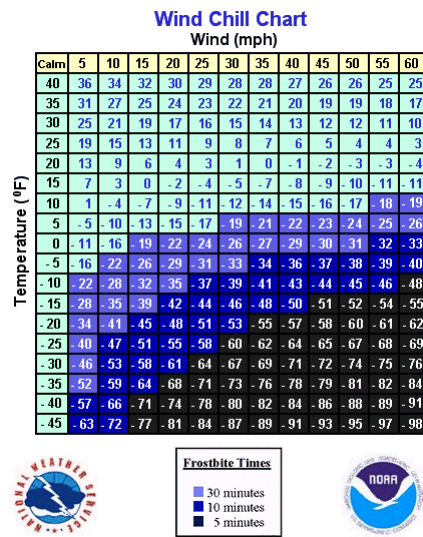
Extreme Temperatures | Natural Hazards | Weather Hazards



Source: Medical Xpress

Past Gubernatorial Declaration

- Date: 1/29/2019 | incident(s): *Extreme Cold* | area: *Jackson and all other 82 counties* | declaration: *Emergency*



Prolonged periods of extreme temperatures can pose severe and life-threatening problems. Although they are radically different in terms of initiating conditions, extremes of heat and cold share a commonality in that they both primarily affect the most vulnerable segments of the population—the elderly, children, impoverished individuals, and people in poor health. Extreme summer heat can result in heatstroke, heat exhaustion, heat syncope, and heat cramps. Extreme winter cold can result in hypothermia and frostbite.

In daily record temperature data, Michigan's new heat records outnumbered new cold records by 3-to-1 in the 1990s and by 6-to-1 in 2000s. Those trends are continuing for 2010's. Very high temperatures (above 90 degrees Fahrenheit) and/or humid conditions that cause an area's calculated Heat Index characterize extreme summer heat. When persisting for more than just a couple days, this phenomenon is classifiable as a heat wave. The Heat Index is a measure indicating the level of discomfort the average person experiences resulting from the combined effects of the temperature and humidity of the air.

In the wintertime, polar weather such as polar vortex events are becoming more common in the northern parts of the United States including Michigan. These and other dangerous cold weather events can produce extreme cold temperatures. The Wind Chill Factor or Index is a way cold weather is measured. This is defined as the temperature of windless air that would have the same effect on exposed human skin if there were a particular combination of wind speed and air temperature.

Jackson County Perspective

Extreme heat and cold are considered an annual occurrence within the County. There are typically a few days a year when extreme cold and/or extreme heat are recorded. The fluctuation in the recording of extreme temperatures may increase in the years ahead. Please see Appendix A for a history of extreme temperatures in Jackson County.

Fog | Natural Hazards | Weather Hazards



Source: SciTechDaily

Fog forms near the ground when water vapor condenses into tiny liquid water droplets that remain suspended in the air. Many different processes can lead to the formation of fog, but the main factor is water-saturated air. Two ways that air becomes saturated are by cooling it to its dew point temperature or evaporating moisture into it to increase its water vapor content. Although most fog, by itself, is not generally a hazard because it does not actually apply damaging forces, the interaction between humans and fog can be a dangerous situation, sometimes resulting in disastrous consequences. It must be noted, however, that freezing fog (a hazard for which the National Weather Service issues special statements) can cause direct harm by causing slickness on roadways, walkways, bridges, and highway ramps, and therefore leading to serious transportation accidents. One of the main risks involves morning school buses and the safety of students and their parents while waiting near roadways under conditions of very low visibility.

Jackson County Perspective

Fog is a common occurrence in the County, but only 1 severe fog event has been recorded between 1997 and 2017. Please see Appendix A for a history of extreme temperatures in Jackson County.

Flooding | Natural Hazards | Hydrological Hazards



Source: DataQuest

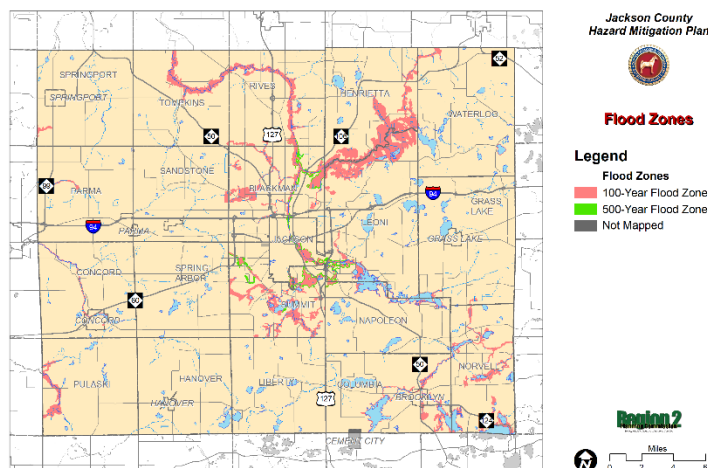
Past Presidential Declaration

- Date: 5/20/04-6/8/2004 | incident(s): *Thunderstorms and Flooding* | area: *Jackson and 22 other counties* | declaration: *Major Disaster**

Past Gubernatorial Declaration

- Date: 6/3/2004 | incident(s): *Thunderstorms and Flooding* | area: *Jackson and 22 other counties* | declaration: *Disaster**

* Also a Gubernatorial/Presidential Declaration



Floods can damage or destroy property, disable utilities, make roads and bridges impassable, destroy crops and agricultural lands, cause disruption to emergency services, and even result in fatalities. People may be stranded in their homes for several days without power or heat, or they may be unable to reach their homes at all. Long-term collateral dangers include the outbreak of disease, widespread animal death, broken sewer lines (causing water supply pollution), downed power lines, broken gas lines, fires, and the release of hazardous materials.

Riverine (i.e., fluvial) flooding is the periodic overflowing of rivers, streams, and channels—due to inadequate drainage capacity, drainage system failures, ice or log jams, accumulated sediments, erosion, or meandering—that results in nearby property damage, safety issues, disruption of infrastructure function and services, and/or decreased quality of life. Urban (i.e., pluvial) floods occur when there is accumulation of water in low-lying and inadequately drained areas, following heavy precipitation events, including structural or power failures in municipal sewage systems, causing waters to flood or back-up into houses, other structures, and infrastructure.

Jackson County Perspective

The Federal Emergency Management Agency (FEMA) has established flood zones in the County. A 100-year flood zone as an area having a 1% chance of being flooded in any given year. A 500-year flood zone as the area having a 0.2% annual chance of being flooded. The identified 100-year and 500-year flood zones in Jackson County are associated with the rivers, streams, lakes, and wetlands are shown on the map to the left. Most of the riverine flooding likely occurs around rivers and lakes like the Grand River. Urban flooding will be likely to occur in developed areas, especially areas that are low-lying and near rivers, like Downtown Jackson or Blackman Township residential developments along the Grand River. Major flooding events have historically occurred in Jackson, though not recently. Please see Appendix A for a history of extreme temperatures in the County.

Dam Failures | Natural Hazards | Hydrological Hazards



Source: ClickOnDetroit

A dam is a structure that stretches across a stream or other waterbody in order to control its flow or to convert the energy within the water into more convenient forms, such as electricity. The impounded waters may be used for agriculture, flood-control, artificial lakes, municipal water supplies, or for energy generation. Some dams have become obsolete, and should be removed to restore the natural water flow through the area. Otherwise, neglected dams will eventually fail, and would then be likely to cause a flash flood downstream, through the sudden release of their impounded waters. Wildlife constructs some dams, but they can pose similar risks. The challenges facing local emergency management officials are:

- minimize loss of life and property by working closely with dam owners in the development of Emergency Action Plans (EAPs) to ensure consistency with the Emergency Operations Plan (EOP) for the jurisdiction
- developing procedures in the EOP for responding to a dam failure
- participating in dam site exercises
- increasing public awareness of dam safety procedures

Jackson County Perspective

There are 35 dams in the County according to the EGLE database, and most of them have a with a “low potential hazard” designation. EGLE rates 1 dam a high hazard potential and 4 dams have a significant hazard potential (see the table). A third of the dams are in private ownership. The rest of the dams in Jackson County are owned by the State, the County or a township. The following are dam or dike breach events that have occurred in the county.

- 1986 - the Horton Mill Pond and Moscow Road Dams breached. They were reconstructed by the Jackson County Drain Commissioner’s Office.
- Prior to November 1994 – A storm caused the breach of the Mercedes Lake earthen dike, and the lake was drained. From 1995 – 2001 the Jackson County Drain Commissioner’s Office designed, financed, and reconstructed the dam. The reconstruction of the dike included the installation of driven sheet piling beneath the earthen dike, which was paid for by the property owners abutting the lake.

Jackson County Dams with a High or Significant Hazard Designation

Dam Name	Pond Name	Hazard
Brooklyn Dam	Brooklyn Pond	High
Michigan Center Dam	Center Lake	Significant
Horton Dam	Horton Mill Pond	Significant
Liberty Dam	Liberty Mill Pond	Significant
Mirror Lake Dam	Mirror Lake	Significant

Source: EGLE (Michigan Department of the Environment, Great Lakes, and Energy)

Drought | Natural Hazards | Hydrological Hazards



Source: New York Extension Disaster Education Network | Cornell

Drought is defined as a prolonged period of dryness due to a natural reduction in the amount of precipitation expected, over an extended period of time, usually a season or more in length. Large urbanized areas are more vulnerable to water shortages and business disruptions due to the sheer number of water users that are competing for the limited water resources. Rural agricultural areas in southern Lower Michigan are highly vulnerable to drought conditions that affect the quantity or quality of crops, livestock, and other agricultural activities. A prolonged drought can seriously effect local and regional income, which influences the local economy. Drought can also cause long-term problems that can affect the viability of some agricultural operations and increase the threat of wildfire.

A general trend toward a wetter Michigan climate has been in evidence for decades now. A pattern of fewer sustained and severe droughts is one of the benefits that Michigan has experienced as a result. Studies of climate have suggested that a gradual warming pattern has led to an increase in precipitation, since warmer air is capable of carrying more humidity. Climatological experts have advised, however, that the new pattern of concern in the medium-term is an increasing risk from seasonal droughts that may accompany heat waves. Within this historical overview, thanks to excellent historical data, we can see that the earliest years show 1 or 2 droughts per decade that reach sustained Statewide intensity that is at the severe D2 level on the Palmer Drought Classification or worse (see the table). By the mid-20th Century, the data shows an average of barely 1 major drought event per decade. No recent Michigan events have reached the same level as the severe historical droughts.

Palmer Drought Classification

Category	Description	Possible Impacts
D0	Abnormally Dry	Short-term dryness that slows crop growth
D1	Moderate Drought	Some damage to crops. Streams, reservoirs, wells are well
D2	Severe Drought	Crop loss likely. Water restrictions imposed.
D3	Extreme Drought	Major crop loss. Widespread water shortage or restrictions.
D4	Exceptional Drought	Exceptional crop loss. Shortages of water create water emergency.

Jackson County Perspective

The County receives approximately 76 inches of precipitation per year. The average annual rainfall is 34 inches, and the average annual snowfall is 39 inches. No measurement exists as to define a drought. However, much of that precipitation may occur during planting and harvesting rather than the growing season, affecting crop yields. Please see Appendix A for a history of droughts in Jackson County.

Wildfires | Natural Hazards | Ecological Hazards



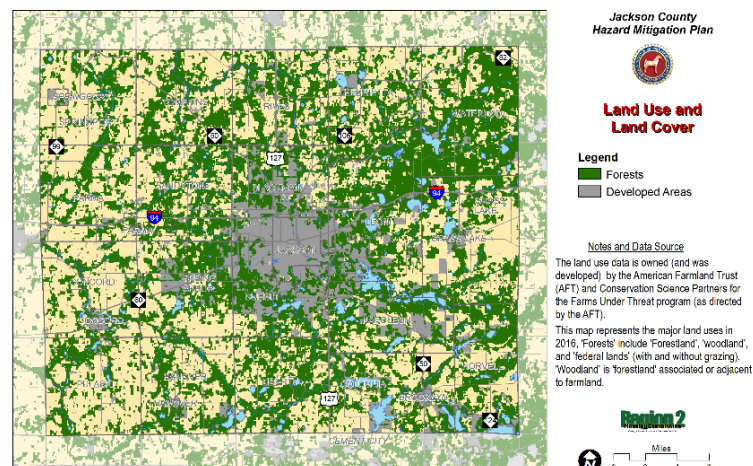
Michigan has the fifth largest timberland acreage in the country, with 19.3 million acres of hardwoods and soft woods; a substantial portion of Jackson County is wooded too (see the map). The forest cover is a boon for industry and recreation. However, it also makes many areas highly vulnerable to wildfires. Because the landscape has changed substantially over the last several decades, due to wild land development, the potential danger from wildfires has increased. More development in and around rural areas (a 60% increase in the number of rural homes Statewide since the 1980s) has increased the potential for loss of life and property from wildfires.

According to 2017 MDNR information, the leading causes of wildfires from the previous ten years were:

- Debris burning (32%)
- Miscellaneous (17%)
- Powerline (16%)
- Equipment (11%)
- Campfires (9%)
- Arson (6%)
- Lightning (4%)
- Fireworks (2%)
- Structural fires (2%)
- Smoking (1%)

Jackson County Perspective

There were 38 fires affecting 562 acres on MDNR controlled land in the County between 1981 and 2018. This should be taken as a conservative estimate of the expected annual number of wildfires, since information was not available or included regarding fire history on private, non-DNR lands. Though the general risk of wildfires is low across Jackson County based on DNR risk assessment, the Irish Hills (i.e., Columbia and Norvell Townships) is an area of specific concern, due to the exurban development which exists around its many lakes.



Invasive Species | Natural Hazards | Ecological Hazards



Past Gubernatorial Declaration

- Date: 4/30/2004 | incident(s): *Insect Infestation (Emerald Ash Borer)* | area: *Jackson and 10 other counties (and various municipalities)* | declaration: *Emergency*



An invasive species is defined as a species that is non-native (alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Invasive species can be plants, animals, and other organisms (e.g., microbes). Invasive species typically fall into two broad categories—terrestrial and aquatic.

Although invasive species, in most cases, primarily cause environmental damage and degradation, there are situations in which serious threats to public health, safety, and well-being can occur due to animal disease or plant and animal infestations. For example, certain diseases could wipe out large segments of an animal population, creating a potentially serious agricultural disaster and a potential public health emergency.

Different patterns of wildlife have already been concerned due to the lengthening average growing season in Michigan. Species previously found only in warmer areas to the south have started to appear in Michigan. Although the definition of invasive species specifically refers to human species introduction, to distinguish these patterns from naturally occurring ones, species transported by human action—including boats (see the figure)—are more likely to survive (and thus to become invasive) as climatic changes occur.

Jackson County Perspective

The State maintains a current, growing list of potential species and the habitats in which they are found. Continue to monitor resources like Jackson County Parks, MSU (Michigan State University) Extension, and the DNR (Michigan Department of Natural Resources) to find current information on invasive species lists, management, risks, and precautions.

Earthquakes | Natural Hazards | Geologic Hazards



Source: Science | HowStuffWorks

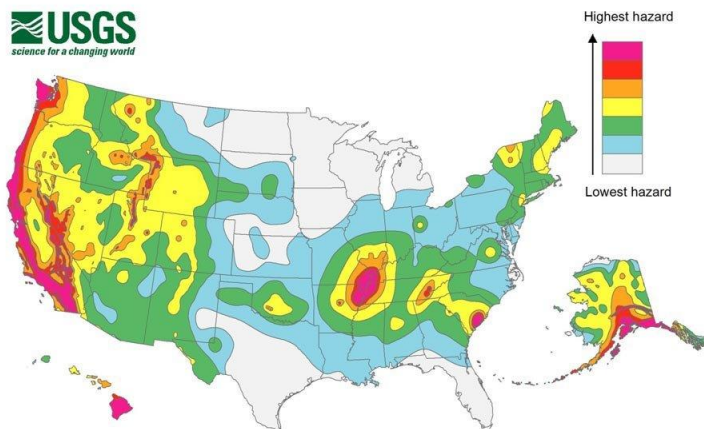
Earthquakes range in intensity from slight tremors to great shocks. Their duration may range from a brief instant to several minutes, or come as a series of tremors over a longer period of days or weeks. Earthquakes usually occur without warning, as scientists cannot yet predict exactly when or where an earthquake will occur. Earthquakes tend to strike repeatedly along faults in the Earth's crust formed where tectonic forces cause the movement of rock bodies against each other. The United States Geologic Survey (USGS) produced a national earthquake risk maps showing areas where different levels of earthquake are more likely to occur (see the figure). The USGS, National Oceanic and Atmospheric Administration (NOAA), and universities throughout the country conduct earthquake monitoring.

Jackson County Perspective

The County is located in an area in which there is a low probability of earthquakes. The New Madrid Seismic Zone near Memphis, Tennessee, and St. Louis, Missouri, poses the most significant threat. According to the previous edition of this plan, if an earthquake were to strike within Jackson County, there would only be a 1-in-50 chance of the resulting horizontal shaking accelerating more than 4-8% in the next 50 years. Fortunately, less than 1.5% of the land in the County is subject to landslides, which further reduces the risk that earthquakes pose in Jackson County.

It seems reasonable to estimate that one or two minor ground disturbances will be felt during the next decade, but that these will not cause any significant damage. There is some chance that a major earthquake may occur out-of-State during this timeframe and may cause some effects for Jackson County, such as energy disruptions or price increases, or the accommodation of refugees (in the case of a major New Madrid fault line event in the areas of Memphis and St. Louis).

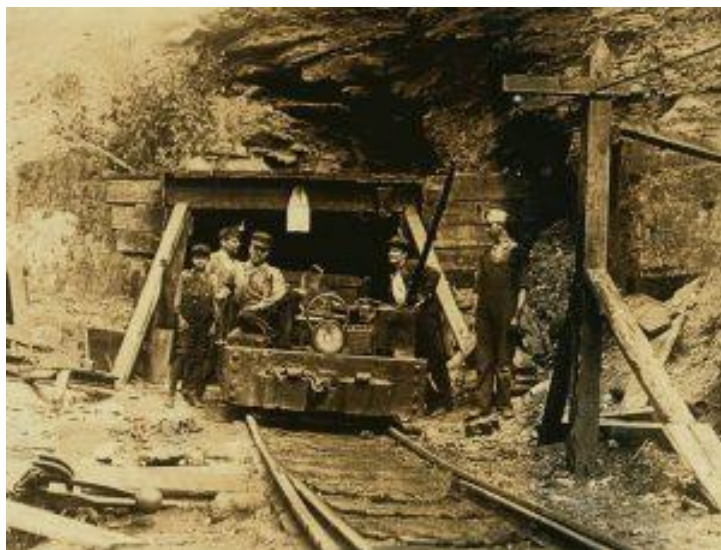
The greatest impact on Jackson County would probably come from the damage to natural gas and petroleum pipelines. If an earthquake occurs in the winter, fuel shortages may affect the County. Damage would probably be negligible in well-designed and constructed buildings. However, poorly designed and constructed buildings could suffer considerable damage under the right circumstances.



Subsidence | Natural Hazards | Geologic Hazards



Source: Science | NOAA's National Ocean Service



Source: Jackson County District Library, Jackson Coal Mine

Subsidence is the lowering or collapse of the land surface due to a loss of subsurface support. A variety of natural or human-induced activities can cause it. Natural subsidence, such as sinkholes, occurs when the ground collapses into underground cavities produced by the dissolution of limestone or other soluble materials by groundwater. Generally, subsidence poses a greater risk to property than to life. Groundwater withdrawal, drainage of organic soils, and underground mining are the principal causes of human-induced subsidence. In Southern Lower Michigan, the primary causes of subsidence are salt mining, gypsum mining, and coal mining.

Jackson County Perspective

Coal was discovered in Jackson in 1835 and several small underground and surface mines were opened (and eventually closed). A subsidence incident occurred in October, 1984 when the abandoned Andrews Street Coal Mine in the County partially collapsed, causing a detached garage, driveway and vehicle at a residence to collapse into a shallow sinkhole. A \$12,000 emergency reclamation project was instituted in that subsidence incident. Since only one limited-scale event was noted in recent years, the probability of a similar event occurring again is difficult to estimate, but is certainly possible.

Space Weather | Natural Hazards | Geologic Hazards



Source: Tech Explorist

A number of space weather events and celestial impacts may affect the United States. Solar geomagnetic storms can cause widespread failures of important satellite, electronic, communication, navigation, guidance and electric power systems. This hazard is fairly likely in the near term to cause notable disruptive effects, large economic impacts, and even some direct health risks to persons who are flying in aircraft in the far northern or southern areas of the planet (where the exposure to charged particles occurs in greater quantities). Solar flares and storms are important because of their potential impacts and possible disruption of complex modern communication systems (e.g., satellites, television, radio, GPS, power supply networks) and the extensive human and technological infrastructure that relies upon those communication and utility networks.

Space weather impacts can result in transportation delays and communication interference and some cases may result in fatal transportation accidents, large economic losses, and widespread power supply interruptions. Key facilities for electrical infrastructure were affected in the past, but the industry has reported improvements to reduce the chance of a widespread blackout resulting from a major solar storm. The key built infrastructure most at-risk in Michigan appears to be some of its pipelines and power grids.

Jackson County Perspective

An event like this is a rare occurrence in the County. Agencies could consider operating procedures that include back-up systems allowing complex systems (e.g. air traffic control) to continue to function when key technological systems (e.g. GPS, radio communications, satellites) malfunction. Addressing issues associated with pipelines and power grids is also of critical importance. Other mitigation strategies include the use of special procedures, equipment, and redundancies by utility systems (e.g. electrical power and pipeline systems) to minimize the potential for geomagnetic effects to cause inappropriate shutdowns, impaired or lost functionality, and system damage.

Celestial Impacts | Natural Hazards | Geologic Hazards



Source: Science | National Space Society

Among the potential celestial impact hazards are the potential the effects of large masses affecting the Earth's atmosphere or surface. Most such forces are extraterrestrial in origin—meteors or meteorites that were originally asteroids or comets from elsewhere in the solar system—but consideration also needs to be given to the crashing of human space vehicles and artificial satellites.

Meteors burn up in the atmosphere, but may cause strong winds and explosive blast forces when striking the Earth's surface. It must be emphasized that even in cases where a large meteor does not actually strike our planet's surface, the explosive energies from its impact upon the many layers of atmosphere can create an intense heat and blast area, along with very strong winds, and can release more energy than even the largest nuclear bombs. Meteorites are physical objects that have at least partially survived their plunge through the atmosphere and then strike the Earth's surface. Space vehicles and satellites occasionally fall to Earth, causing a state of heightened alert as information about its decaying orbit is gathered and tracked. Bolide events occur when a large meteor hits the atmosphere with such force that it violently flares up, often with an accompanying sonic boom, and literally appears as a giant fireball, explosion, or bright pulse of light as it continues to plunge toward the ground. In Michigan, the most likely impact is upon communication and utility networks and the extensive human and technological infrastructure system that rely upon them.

Jackson County Perspective

These kind of events are not expected to occur in the County or Michigan within the next several decades. Certain types of costs are likely whenever there is an emergency alert in response to a particular event or threat, but tend to be well within the normal range of activities routinely undertaken by agencies who deal with emergencies.

Structural Fires | Technological Hazards | Industrial Hazards



Source: YouTube

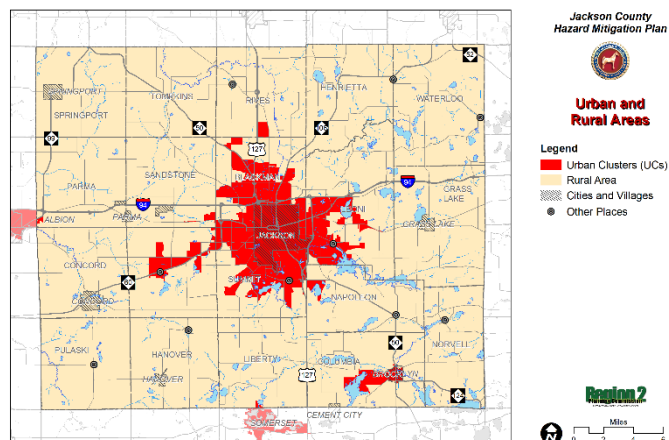
Structural fires are the most common and universal hazard facing any community. They include large fires occurring in buildings or structures that have the potential to affect a community, natural gas explosions in pipelines and wells as well as small residential fires. Each year in the United States, fires result in approximately 5,000 deaths and 25,000 injuries requiring medical treatment.

Unfortunately, death can be an outcome of structural fires, and Michigan's fire death rate in 1996 of 21.2 persons per million people puts it in the upper third of all states in the nation. According to the office of the State Fire Marshal, an average of 254 persons a year died in Michigan fires from 1975 through 2002.

Michigan has not had a catastrophic structural fire disaster in recent years that resulted in a significant loss of human life or significant injury. However, in any given year it is common for several multiple-casualty residential structural fires to occur throughout the State. Despite the best efforts of fire officials in fire safety education and prevention, deadly residential fires continue to occur year after year.

Jackson County Perspective

Hundreds of fires will occur annually in an area the size of the County, but not all of these will be extremely serious events on a community-wide scale. Approximately 775 separate fire events might be estimated (based on the history of past occurrences) to cause an average of \$5,725 damage per event, totaling about \$4.4 million in damage per year within Jackson County. For example, arson destroyed a large factory building on March 26, 2001.



Scrap Tire Fires | Technological Hazards | Industrial Hazards



Source: Eco Green Equipment

Management of scrap tires has become a major economic and environmental issue, as Michigan generates 10 million scrap tires annually. From an emergency management perspective, the most serious problem that scrap tire disposal sites pose is that they can be a tremendous fire hazard if not properly designed and managed. Tire disposal sites can be serious fire hazards due to the sheer number of tires typically present at a site. This large quantity of “fuel,” coupled with the fact that the shape of a tire allows air to flow into the interior of a large tire pile, renders standard firefighting practices nearly useless. Flowing burning oil released by the tires spreads the fire to adjacent areas. Some scrap tire fires have burned for months, creating acrid smoke and an oily residue that can leach into the soil, creating long-term environmental problems.

Scrap tire fires differ from conventional fires in several respects:

- even relatively small scrap tire fires can require significant resources to control and extinguish;
- the costs of fire management are often far beyond that which local government can absorb;
- the environmental consequences of a major tire fire are significant; and
- the extreme heat converts a standard passenger vehicle tire into about two gallons of oily residue, which can leach into the soil or drain into streams.

Current technologies are sufficient to address the reuse of newly generated scrap tires, but some waste tires still end up in a scrap tire collection site.

Jackson County Perspective

There were no County-based scrap tire collection sites, haulers, or processors registered with the Michigan Department of Environment, Great Lakes, and Energy (EGLE) in 2020 and there has not been a recorded significant tire fire in Jackson County. Consequently, there is no real basis for estimating the probability of a tire scrap fire.

Hazardous Material Incidents | Technological Hazards | Industrial Hazards

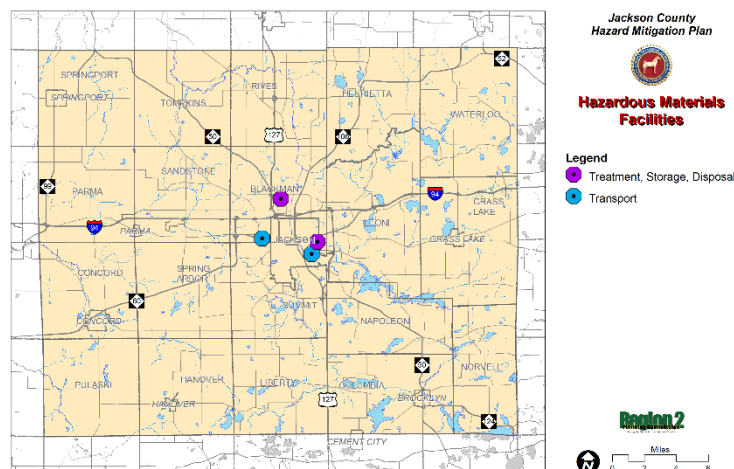


A hazardous material is any solid, liquid, or gas that can harm humans and other living organisms due to its being radioactive, flammable, explosive, toxic, or corrosive; a bio-hazard, oxidizer, or asphyxiant; or capable of causing severe allergic reactions. Mitigating the risks associated with hazardous materials often requires extensive safety precautions during their transport, use, disposal and storage. Modes of transportation for hazardous materials include road, rail, pipeline, air, and water.

Industrial accidents differ from hazardous material incidents in the scope and magnitude of offsite impacts. Hazardous material incidents typically involve an uncontrolled release of material into the surrounding community and environment that may require evacuations or in-place sheltering of the affected population. The impacts of industrial accidents are often confined to the site or facility itself, with minimal physical outside impacts. Industrial accidents such as fires, explosions, and excessive exposure to hazardous materials, may cause injury or loss of life to workers at the facility, and significant property damage. They can also cause severe economic disruption to the facility and surrounding community, as well as significant long-term impacts on the families of the workers injured or killed.

Jackson County Perspective

There are several transport and treatment, storage, and disposal facilities identified by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) in the County (see the map). There were also 51 SARA (Superfund Amendments and Reauthorization Act) Title III sites in Jackson County as of June 2010. The Michigan Hazard Analysis recorded no recent industrial accidents of any significance in the County and no reported hazardous materials incidents of any significance since 1976, the first year such records were kept.



Nuclear Power Plant Accidents | Technological Hazards | Industrial Hazards



Source: Business Insider

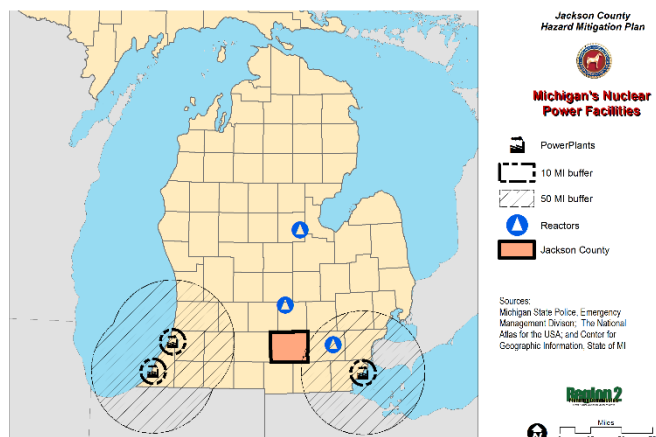
Even though the Nuclear Regulatory Commission (NRC) closely monitors the construction and operation of nuclear power plants, accidents at these plants are a possibility and appropriate on-site and off-site emergency planning is conducted. The following significant worldwide nuclear power plant accidents have occurred (including an accident in Michigan):

- 1986 — Chernobyl, Ukraine
- 1979 — Three Mile Island, Harrisburg, Pennsylvania
- 1966 — Enrico Fermi-1, Monroe County, Michigan

A primary emergency planning zone (EPZ) is established within a 10-mile radius of each nuclear power plant (see the map). Within this zone, plans are developed to protect the public through in-place sheltering and evacuation in the event of an accident. A secondary emergency management zone is established within a 50-mile radius around most plants, exists for planning considerations that prevent the introduction of radioactive contamination into the food chain.

Jackson County Perspective

There are no nuclear power plants in the County. However, portions of Columbia, Grass Lake, and Norvell Townships are located within the 50-mile EPZ for the Enrico Fermi 2 Nuclear Power Plant near Monroe, Michigan. No such events are anticipated to affect Jackson County, although there is a slight possibility that one could happen.



Transportation Hazardous Material Incidents | Technological Hazards | Industrial Hazards

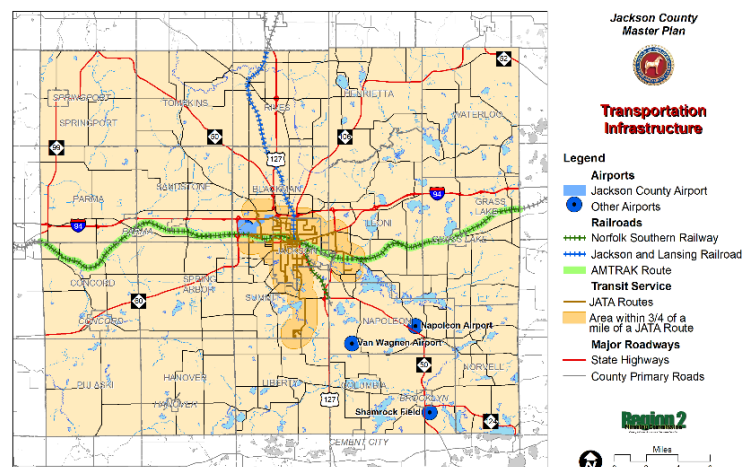


Source: MABAS Division 3

A transportation hazardous material incident is an uncontrolled release of hazardous materials during transport capable of posing a risk to life, health, safety, property or the environment. Several state highways traverse Jackson County (e.g., I-94; BL-94; US-127; M-50; M-52; M-60; M-99; & M-106). Highways—in addition to major local roads and streets—are the most likely thoroughfares utilized for the transport of hazardous materials (see the map). However, it is important to note that parts of many hazardous material transport trips will occur on minor local roads and streets. Freight railroads are also used for the transport of hazardous materials. There are two rail lines located in the County.

Jackson County Perspective

No post-1978 (the first year of records) County hazardous material transportation incidents have been recorded. For planning purposes, it is tentatively estimated that there is about a 20% chance of a major hazardous material incident (either fixed or transportation related) in Jackson County over the next decade. Based on the recent history of past events within the County, the estimated chance of a transportation hazardous materials incident is 8% per year.



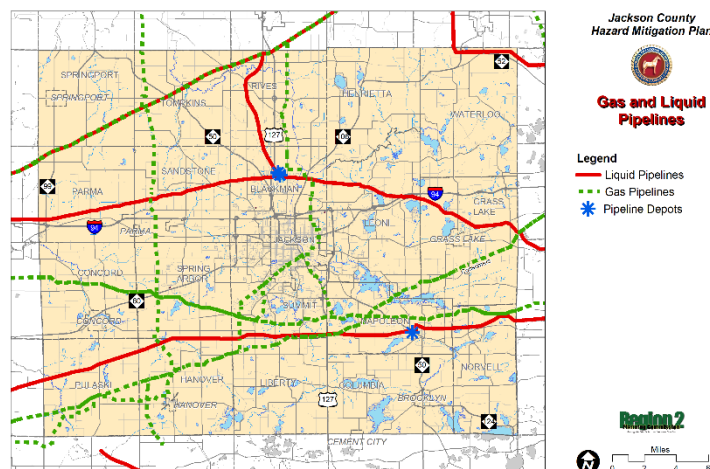
Petroleum and Natural Gas Pipeline Accidents | Technological Hazards | Industrial Hazards



Source: Wall Street Journal

Past Gubernatorial Declaration

- Date: 6/7/2000 | incident(s): Gasoline Pipeline Rupture | area: Blackman Township | declaration: Emergency



Though often overlooked, petroleum and natural gas pipelines pose a real threat in many Michigan communities. Petroleum and natural gas pipelines can leak or fracture and cause property damage, environmental contamination, injuries, and even loss of life. Third party damage caused the vast majority of Michigan pipeline accidents, often due to construction or some other activity that involves trenching or digging operations.

Jackson County Perspective

Pipelines traverse many parts of the County (see the map). A disruption in a strategic pipeline could lead to an energy emergency in the County. The following events have occurred since 1995.

- **January 30, 2019.** At 10:33am, a fire occurred at an important Consumer's Energy facility in Armada Township (Macomb County), and when the impacts of this fire were calculated to eventually lead toward natural gas shortages, the head of that major utility, followed by the Governor, appealed to residential and industrial customers to voluntarily reduce the use of natural gas. By reducing thermostat levels to the recommended 65 degrees or below, until the end of the day on January 31, and temporarily scaling back production activities at certain facilities, this collective effort succeeded in preventing the complete interruption of gas delivery that otherwise was expected to occur. The problem did not involve a supply of natural gas, but the ability to deliver that gas throughout the State's network. Temporary power failures occurred in some locations, affecting thousands of residents and businesses but did not lasting long.
- **June 7, 2000.** A section of pipeline ruptured in Blackman Township releasing 75,000 gallons of gasoline into the environment and forcing the evacuation of more than 500 homes in one square mile area around the spill. Wolverine Pipeline Company expended \$10 million in response.
- **February 1996.** A house exploded in Napoleon, resulting in 2 fatalities. The cause of the explosion was a natural gas build-up.

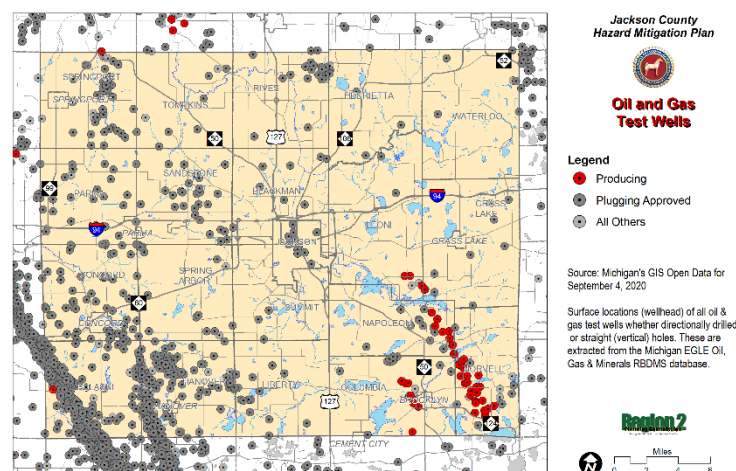
Oil and Natural Gas Well Accidents | Technological Hazards | Industrial Hazards



Over the years, Michigan has experienced periodic upward and downward trends in oil and natural gas production as new reservoirs were discovered and older ones became depleted. There are 56,525 oil and gas well scattered across the 63 counties in the Lower Peninsula. Michigan reaps tremendous economic and social benefits from oil and natural gas production. As with all industrial and commercial activities, along with those benefits come some risks as well. Despite the best efforts of the State's Office of Geological Survey and the drilling companies to minimize oil and natural gas well accidents, it is inevitable that such accidents will occur from time to time. When they do, the affected local communities must be prepared to respond to the accident, institute necessary protective actions, and coordinate with State officials and the drillers.

Jackson County Perspective

There are 40 producing oil and gas wells as of 2012 in the County, although many more were drilled (see the map). It is difficult to ascertain how many oil and gas incidents have actually occurred in Jackson County. Although many wells are present in the County, not all are currently active, and probability of any producing a major effect is quite low.



Infrastructure Failures | Technological Hazards | Infrastructure Hazards



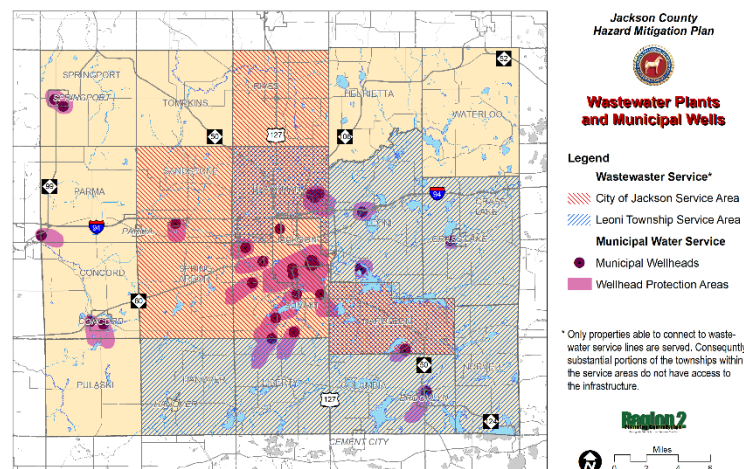
Source: PACE

Michigan's citizens are dependent on the public and private utility infrastructure to provide essential life supporting services such as electric power, heating and air conditioning, water, sewage disposal and treatment, storm drainage, communications, and transportation. When one or more of these independent, yet interrelated systems fail due to disaster or other cause—even for a short period of time—it can have devastating consequences. A study completed by the American Society of Civil Engineers in 2009 found the top three infrastructure concerns for Michiganders was:

- roads,
- wastewater Infrastructure, and
- bridges

Jackson County Perspective

The County has been spared the difficulties related to disastrous infrastructure failures. Such failures are possible, however (e.g., the water treatment disaster in Flint). There are 2 wastewater treatment systems in Jackson County and wellhead protection areas are established for municipal wells (see the map). Surface pavement condition information for federally-funded and non-federally funded road is collected annually through the State funded Pavement Surface Evaluation Program (PASER). This information can be used in the decision making process about road improvement projects. The City of Jackson and the County maintain the database on the roads within their boundaries. To date, disastrous infrastructure failures in Jackson County are likely similar in frequency to a significantly damaging earthquake, subsidence, or dam failure events.



Energy Emergencies | Technological Hazards | Infrastructure Hazards



Source: ValleyCentral.com

An adequate energy supply is critical to Jackson County’s economic and social well-being. The economy and lifestyle are dependent on a non-interrupted, reliable, and relatively inexpensive supply of energy that includes gasoline to fuel our vehicles, and electricity, natural gas, fuel oil, and propane to operate our homes, businesses and public buildings (see the table). Major events like the 1973/74 Oil Embargo, the 1991 Gulf War, the aftermath of the September 11, 2001 terrorist attacks, and the COVID-19 pandemic have highlighted our continued vulnerability.

There are three types of energy emergencies:

- the physical destruction to energy production or distribution facilities caused by severe storms, tornadoes, floods, earthquakes, or sabotage;
- a sharp sudden escalation in energy prices, usually resulting from a curtailment of oil supplies; and
- a sudden surge in energy demand caused by a national security emergency involving mobilization of U.S. defense forces.

Jackson County Perspective

The County has experienced numerous and severe electrical power outages. Some of these are related to weather events while others are due to infrastructure failures. The event below highlights how local energy emergencies effect Jackson.

- **June 2000.** Jackson County: Petroleum Product Pipeline Rupture On the morning of June 7, 2000 a Wolverine Pipeline Company pipeline ruptured in Jackson County’s Blackman Township, releasing 75,000 gallons of gasoline into the environment and forcing the evacuation of more than 500 homes in a one square mile area around the spill. The leak was detected when a drop in pressure was recorded at a metering station along the 80-mile pipeline that runs through Blackman Township from Joliet, Illinois to Detroit. In addition to causing significant environmental and public safety problems, the spill shut down 30% of the State’s gasoline transportation capability for 9 days. The ruptured pipeline was capable of carrying approximately seven million gallons of gasoline per day. (This is equivalent to having 467 tanker trucks with a capacity of 9,000 gallons each making daily round trips from Jackson to Detroit.) While the pipeline was being repaired, tanker trucks from several surrounding states were brought in to help make up for the loss of the pipeline. As truck deliveries could not

Type of Energy Used
Michigan vs United States

Type	MI	US
Coal	63%	51%
Nuclear	23%	20%
Natural Gas	10%	17%
Renewable Power	3%	2%
Petroleum	1%	3%
Hydro	0.5%	7%

fully replace the pipeline transportation capacity, drivers began falling behind on deliveries and a growing number of gas stations were without one or more grades of gasoline for periods of time. The pipeline was not returned to service until June 17, and then at only 80% of capacity. The pipeline rupture caused short-term supply problems in Southeast Michigan and, along with other factors, contributed to an increase in gasoline prices from an average of \$1.68 per gallon, when the pipeline broke, to over \$2.00 per gallon in the ensuing weeks of June. One of the major contributing factors to the shortages and price increases was that Michigan had very low gasoline inventories going into that summer. In some areas of the Midwest, inventories were 13.5% below average in May 2000—their lowest levels since 1981. The closing of the Total Refinery in Alma in December 1999 also contributed to the supply problem. The Alma refinery's capacity of just under one million gallons per day had satisfied approximately 8% of Michigan's average daily gasoline demand. The closing of the refinery increased Michigan's reliance on the Chicago area gasoline markets, thereby increasing the dependence on the Wolverine pipeline. A final contributing factor was a reduction in transportation capacity caused when one of the two barges supplying petroleum products to marine terminals in Traverse City, Cheboygan, and Bay City was in dry dock for repairs. Supply problems in northern Michigan and Bay City were eased once the barge returned to service in early June 2000. All of these factors combined to make gasoline supplies very tight even before the Wolverine pipeline ruptured.

This is a common annual event although the severity of each year's events may vary. Multiple energy emergencies of one type or another are therefore expected to occur each year (also see the significant infrastructure failure hazard, which overlaps in classification).

Transportation Accidents | Technological Hazards | Infrastructure Hazards



Source: CNN.com

A passenger transportation accident is defined as a crash or accident involving an air, land, or water-based commercial passenger carrier. While the safety record of passenger commercial transportation is very good for aircraft buses, and trains, crashes will occur. There is a potential for harm or fatalities.

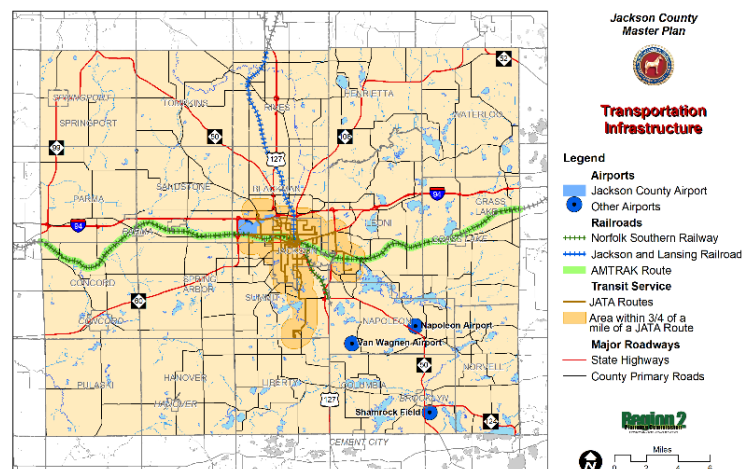
When responding to any of these types of commercial transportation accidents, emergency personnel may be confronted with a number of problems, including:

- suppressing fires;
- rescuing and providing emergency first aid for survivors;
- establishing mortuary facilities for victims;
- detecting the presence of explosive or radioactive materials; and
- providing crash site security, crowd and traffic control, and protection of evidence.

Airplane crashes and train derailments pose the largest problems potential to cause mass casualties and significant local property destruction. On a smaller scale, but still potentially devastating to smaller or rural areas like in Jackson, would be major highway accidents involving passenger buses that result in heavy casualties, with the potential to overwhelm smaller emergency medical systems in those areas.

Jackson County Perspective

There are a number of significant transportation facilities within the County. Interstate I-94 and US-127 traverse Jackson County. There are several airports, including the Jackson County Airport-Reynolds Field located south of I-94 in Blackman Township (see the map). Brooklyn Shamrock Field is located south of M-124, southeast of the Village of Brooklyn. Napoleon Airport, a basic utility airport, is located on the northeast corner of Napoleon Township. The County is served by transit agencies like the Jackson Area Transportation Authority and Greyhound. AMTRAK and other rail service also run through and serve the County. Jackson County has had no serious crashes involving commercial carriers.

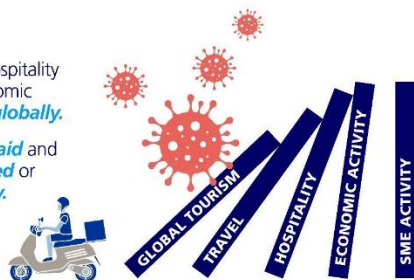


Catastrophic Incidents | Human-Related Hazards

The domino effect.

Global tourism, travel and hospitality companies close down economic activities, **impacting SMEs globally.**

This affects the **least well-paid** and those who are **self-employed** or working in the **gig economy.**



Source: World Economic Impact

A catastrophic incident—a large-scale event that has severe effects upon large numbers of persons, across a wide area, and immediately overwhelms State, tribal, and local response capabilities—is now one of the many hazards with the potential to have a direct impact within Michigan. Such incidents are likely to require coordination activities from many states. Since 2000, disastrous events affecting the nation caused various states, including Michigan, to undertake significant actions to respond to assist or help accommodate the impact of events that took place outside of their borders.

The COVID-19 pandemic (occurring during the writing of this plan) is an example of a catastrophic incident comprising a public health crisis that also affects the worldwide economy, including Michigan. As more people get sick and overwhelm the health care system, the economy also suffers due to decreases in employment and spending. Authorities also asked people to change their behaviors—wearing masks outside of the home, staying at least 6 feet apart, and vigilant hand washing—which impacts how they interact with each other in local communities.

Jackson County Perspective

The County has experienced these events, including the aftermath of the September 11, 2001, terrorist attacks and the Great Blackout of 2003. Jackson County is currently experiencing the COVID-19 pandemic, and like other communities around the world, trying to manage the fluid situation. The County is working with the State in trying to keep its residents safe while allowing the local economy to continue. Jackson County will continue to seek guidance and resources from the State and Federal governments in pursuing the defeat of the novel virus and the economic downturn.

Past Presidential Declaration

- Date: 9/07/2005 | incident(s): Hurricane Evacuation | area: Jackson and all 82 other counties | declaration: Emergency*

Past Gubernatorial Declaration

- Date: 9/4/2005 | incident(s): Hurricane Evacuation | area: Jackson and all other 82 counties | declaration: Disaster*

* Also a Gubernatorial/Presidential Declaration

Civil Disturbances | Human-Related Hazards



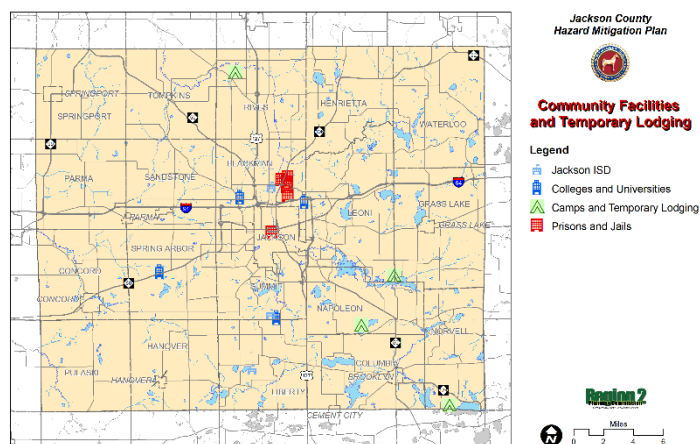
Source: Center for Disaster Philanthropy

Civil disturbances can be classified as single events. However, they can also be understood as a series of related events, and should be considered that way, especially as it relates to effecting a larger community and planning or preparing for an emergency response. Single event civil disturbances include the following:

- **Acts or demonstrations of protest.** Protests usually contains some level of formal organization or shared discontent that allows collective pursuance of goal-oriented activities like political protests and labor disputes. Many protest actions and demonstrations are orderly, lawful, and peaceful, but some may become threatening, disruptive, and even deliberately destructive or malicious. Events should only be classified as civil disturbance when they take a turn for the worse.
- **Hooliganism.** Hooliganism is relatively unorganized and involves individual or collective acts of deviance inspired by the presence of crowds. Examples include the disorder that has followed various sporting events and college parties. Common problems include the widespread destruction of property, numerous types of assault and disorderly conduct, and criminal victimization.
- **Riots.** Riots may stem from motivations of protest, but lacks the organization that formal pro-tests include. Riots tend to involve violent gatherings of persons whose level of shared values and goals is not sufficiently similar to allow their collective concerns or efforts to coalesce in a relatively organized manner. There tends to be a diffused sense of shared discontent, but relatively few norms to shape these strivings into clearly coherent action.
- **Insurrection.** Insurrection involves a deliberate collective effort to disrupt or replace the established authority of a government or its representatives by persons within a society or under its authority. A few prison uprisings may fall into this category, but most are classified as riots or protests, depending upon the presence/extent of specific goals and organization, and the type of action used to achieving them.

Jackson County Perspective

Though there has been a history of State and national civil disturbances happening in Jackson, there have been just a few events to note.



Correctional Facilities in Jackson County

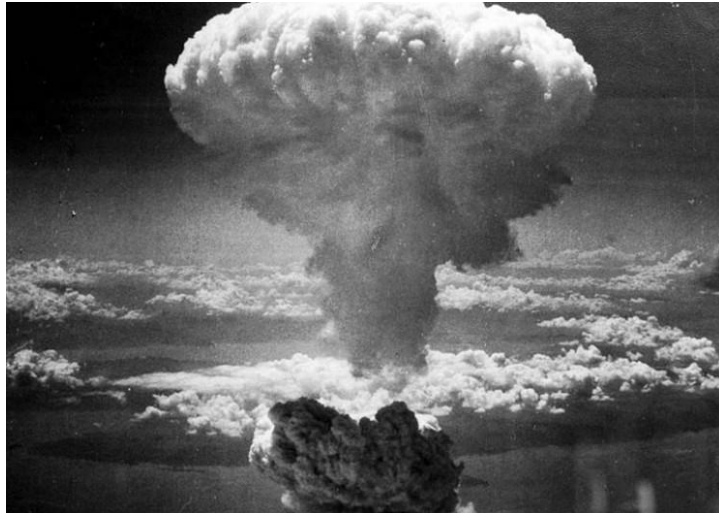
Name	Location
Charles Egeler Correctional Facility - MDOC	Blackman Township
Cooper Street Correctional Facility - MDOC	Blackman Township
G. Robert Cotton Correct. Facility - MDOC	Blackman Township
Parnall Correctional Facility - MDOT	Blackman Township
Wesley Street Jail - Jackson County	City of Jackson
Chanter Road Jail – Jackson County	Blackman Township

Source: Region 2 Planning Commission

- **May 2020 and onward – Protest - George Floyd Demonstrations.** Numerous protests occurred nationally after a pattern of widely publicized occurrences involving methods that some police had used when involved with members of visible minority groups. The key national event involved the video-recorded detainment of an African-American man, George Floyd, in Minneapolis, Minnesota, which caused the man’s death on May 25, 2020. This was just one in a long series of incidents in which video had documented questionable police activities, and grew into a national movement toward greater civilian protections and police reform. Michigan’s protests were more peaceful and well-organized than many other states saw, yet some criminal activities did occur along with occasional violence and substantial destruction of property. In Jackson there were peaceful protest that took place around the community.
- **1964 -1972 – Protests - Jackson, Anti-War Demonstrations**
- **1952 - Insurrection – Jackson County Prison Uprising.** Although violence is a fact of life in Michigan’s prisons, large-scale, deadly prison uprisings are relatively rare. However, there have been two such incidents in the Michigan prison system over the past 50 years that have caused significant injury, loss of life, property destruction, and response support from other State agencies and the involved local government (see the map and table). The first of those incidents occurred from April 20-24, 1952, at the Southern Michigan Prison in Jackson. That five-day siege resulted in the death of one inmate and serious injury to nine others. More than a dozen guards were held hostage throughout the uprising. Eventually, all were released, though several had been beaten or were otherwise wounded. Officials estimated that approximately one-half of the prison’s 6,500 inmates had participated in some way in the rioting. Numerous prison buildings had been severely damaged or burned to the ground. When the dust settled, the official damage estimate was put at \$2.5 million. Sometime after that, a new Department of Corrections riot squad was formed to handle any such incidents in the future. It is interesting to note that this incident at Southern Michigan Prison was the worst in a string of 30 major prison riots that occurred across the country in 1952 and 1953.
- **1981 – Insurrection – Jackson, Marquette, and Ionia Prison Uprising.** The second major prison uprising in Michigan occurred over the Memorial Day weekend in

1981 at the State Prison of Southern Michigan in Jackson, Marquette Branch Prison in Marquette, and the Michigan Reformatory in Ionia. The uprisings, which occurred on May 22 at Jackson and Ionia, and again on May 26 at Jackson and Marquette, were thought to be related. Although all three facilities were damaged, the State Prison of Southern Michigan incurred the worst damage. The disturbances began when officials from the Michigan Corrections Organization at the State Prison of Southern Michigan attempted to take administrative control of the prison and lock down prisoners over the Memorial Day weekend. Rioting broke out at the facility, which then spread to the Michigan Reformatory in Ionia later in the day. The situation temporarily settled over the weekend, but rioting began again on May 26 at the State Prison of Southern Michigan, which then spread to Marquette Branch Prison. Both disturbances were quelled later in the evening, but only after major physical damage had been inflicted on the facilities. The final damage figures for the two days of rioting were significant. The May 22 disturbances at the State Prison of Southern Michigan and the Michigan Reformatory resulted in 67 inmates and 27 staff members being injured, many requiring hospitalization. The May 26 disturbances saw an additional 44 staff members injured, along with 42 inmates. Fortunately, no lives were lost in either disturbance. The physical damage to the three facilities totaled \$5 million, with another \$4.1 million in riot-related costs incurred. Damages at the State Prison of Southern Michigan included fire and smoke damage to eight cell blocks, destruction of eight modular units, and damage to the academic vocational building, the inmate store, and the food service facility. The master key system also had to be replaced. At the Michigan Reformatory, two cell blocks were damaged, in addition to the prison chapel, the food service building, and the school. The master key system also had to be replaced at this facility as well. It took many months for the damage at the three facilities to be totally repaired and services brought back to normal. In the end, legal and disciplinary actions were taken against 19 corrections personnel and numerous inmates for their roles in the two disturbances.

Nuclear Attack | Human-Related Hazards



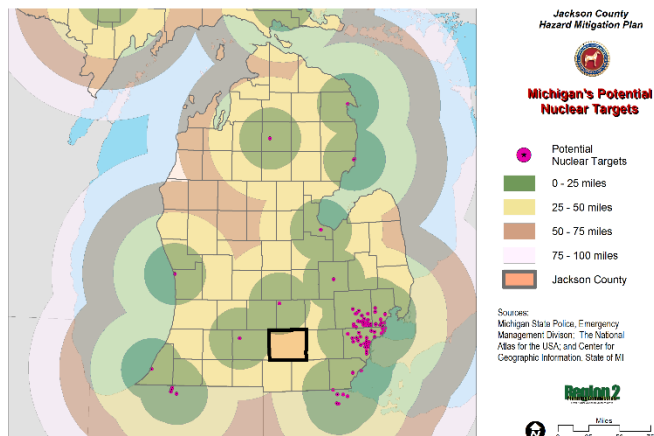
Source: Interesting Engineering

World events in recent years have greatly changed the nature of the nuclear attack threat against the United States. However, while the threat of attack is diminished, it is still a possibility due to the large number of nuclear weapons still in existence in present-day Russia and throughout the rest of the world. Based upon the Nuclear Attack Planning Base 1990 (NAPB-90), the Federal Emergency Management Agency categorizes seven potential types of nuclear targets:

- commercial power plants
- chemical facilities
- counterforce military installations
- other military bases
- military support industries
- refineries
- political targets

Jackson County Perspective

There is no reason to suspect that the County would be specifically targeted for nuclear attack in the current geopolitical environment. However, potential targets are located in nearby counties (see the map).



Public Health Emergencies | Human-Related Hazards



Source: KESQ

Public health emergencies can take many forms including the following possibilities:

- disease epidemics,
- large-scale incidents of food or water contamination,
- extended periods without adequate water and sewer services,
- harmful exposure to chemical, radiological or biological agents, and
- large-scale infestations of disease-carrying insects or rodents.

Public health emergencies can occur as primary events by themselves, or they may be secondary events to another disaster. They also have the potential to adversely impact a large number of people. The world is in the midst of the COVID-19 pandemic at the writing of this plan.

Jackson County Perspective

There are at least 4 Statewide emergencies affected local residents:

- **COVID-19.** On March 10, 2020 the Michigan Department of Health & Human Services identified the first two positive cases of COVID-19 in Michigan and a State of Emergency was declared. More cases were subsequently identified. The epidemic has largely disrupted the daily lives of Jackson County residents.
- **Foodborne Contamination (Hepatitis A).** Almost 300 cases of Hepatitis A in at least 4 school districts in the Spring of 1997 were caused by frozen strawberries.
- **Chemical Contamination (Polybrominated Biphenyl).** Thousands of cattle and other animals died in 1973 from poisoning after a chemical company accidentally sent bags of a fire retardant in conjunction with a shipment of a livestock feed supplement.
- **Communicable Disease Epidemic (Influenza Pandemic).** “Influenza is an example of a potential public health emergency of [a] very large proportion.” Flu pandemics caused widespread deaths nationally in 1957-1958 and 1968-1969. People suffer from the flu in the County every year.

Terrorism | Human-Related Hazards



Source: time.com

Terrorism is the use of violence to achieve political goals by creating fear. The political motives of terrorism distinguish it from ordinary crime. The United States is threatened not only by international terrorists, but also by homegrown domestic terrorist groups. Terrorists, including bombings, shootings, arson, and hijacking, can use a wide range of techniques. The goal of terrorists is to frighten as many people as possible, not necessarily to cause the greatest damage possible. Media coverage allows terrorists to affect a much larger population than those who are directly attacked.

Emergency management should prepare for crimes that impact large portions of the population. Such attacks may require resources not available to local law enforcement agencies. Crimes of this sort include mass shootings, random sniper attacks, sabotage of infrastructure, and cyber-attacks. There are five major categories of terrorist:

- **Nationalists** fight on behalf of a subset of a national population that wish to have an independent government.
- **Religious extremist terrorists** are violent adherents of a specific religion.
- **Left wing terrorists** tend to target the government, powerful institutions, and symbols of authority. Examples include socialist and communist terrorists and the Weathermen.
- **Right wing terrorists** tend to fight for “traditional values.” Right wing groups tend to target members of hated ethnic or religious minorities, or government employees. They are associated with anti-immigration, white supremacy, anti-government, and Christian Identity movements.
- **Single-issue terrorists** commit to an all-encompassing belief system and are intensely concerned with one particular cause (e.g., anti-abortion, pro animal-rights).

Cyberattacks are also on the rise, especially against governmental entities. While cyberattacks have been present for a number of years, ransomware attacks have moved beyond some of the “cyber graffiti/vandalism” it started out as, it has now reached a point where government, hospitals, and even law enforcement systems are under attack for bitcoin ransom. This can mean many things as it impacts continuity of services, but will potentially get worse as more employees “work from home” and are outside of their normal networks.

Jackson County Perspective

The County has not been subject to any local events of terrorism. However, a cyberattack could effect local governments, health care systems, and/or law enforcement at any time. Predicting when an event may occur is difficult, as there is rarely any notice prior to any event happening.

Past Presidential and Gubernatorial Disaster Declarations

Jackson County was included in the following disasters declared by Michigan's Governor and/or the U.S. President, listed by hazard type:

Gubernatorial Declarations | 1977-2019

Ice Storms/Sleet Storms

- Date: 1/15/1985 | incident(s): *Ice Storm* | area: *Jackson and 12 other counties* | declaration: *Disaster (Emergency)*

Snowstorms

- Date: 1/26/78 | incident(s): *Blizzard and Snowstorm* | area: *Jackson and all other 82 counties* | declaration: *Disaster**

Severe Wind Events

- Date: 7/21/80 | incident(s): *Thunderstorms and Severe Winds* | area: *Jackson and other 8 other counties (and various municipalities)* | declaration: *Disaster*

Extreme Temperatures

- Date: 1/29/2019 | incident(s): *Extreme Cold* | area: *Jackson and all other 82 counties* | declaration: *Emergency*

Flooding

- Date: 6/3/2004 | incident(s): *Thunderstorms and Flooding* | area: *Jackson and 22 other counties* | declaration: *Disaster**

Invasive Species

- Date: 4/30/2004 | incident(s): *Insect Infestation (Emerald Ash Borer)* | area: *Jackson and 10 other counties (and various municipalities)* | declaration: *Emergency*

Petroleum and Natural Gas Pipeline Accidents

- Date: 6/7/2000 | incident(s): *Gasoline Pipeline Rupture* | area: *Blackman Township* | declaration: *Emergency*

Catastrophic Incident

- Date: 9/4/2005 | incident(s): *Hurricane Evacuation* | area: *Jackson and all other 82 counties* | declaration: *Disaster**

Presidential Declarations | 1953-2019

Ice Storms/Sleet Storms

- Date: 3/20-27/1976 | incident(s): *Ice storm and Tornadoes* | area: *Jackson and 28 other counties* | declaration: *Major Disaster*
- Date: 4/5/1972 | incident(s): *Snowstorm and Freezing Rain* | area: *Jackson and 8 other counties* | declaration: *Major Disaster*

Snowstorms

- Date: 12/11-31/2000 | incident(s): *Blizzard and Snowstorm* | area: *Jackson and 38 other counties* | declaration: *Emergency*
- Date: 1/2-15/1999 | incident(s): *Blizzard and Snowstorm* | area: *Jackson and 30 other counties* | declaration: *Emergency*
- Date: 1/26-27/1978 | incident(s): *Blizzard and Snowstorm* | area: *Jackson and all 82 other counties* | declaration: *Emergency**
- Date: 4/5/1972 | incident(s): *Snowstorm and Freezing Rain* | area: *Jackson and 8 other counties* | declaration: *Major Disaster*

Tornadoes

- Date: 3/20-27/1976 | incident(s): *Ice storm and Tornadoes* | area: *Jackson and 28 other counties* | declaration: *Major Disaster*

Flooding

- Date: 5/20/04-6/8/2004 | incident(s): *Thunderstorms and Flooding* | area: *Jackson and 22 other counties* | declaration: *Major Disaster**

Catastrophic Incident

- Date: 9/07/2005 | incident(s): *Hurricane Evacuation* | area: *Jackson and all 82 other counties* | declaration: *Emergency**

*Also a Presidential/Gubernatorial Declaration

Hazard Rankings

The hazard mitigation planning process incorporated a public involvement opportunity in the form of a series of workshops which took place remotely in late October of 2020 via Zoom due to the COVID-19 pandemic. Staff sent a flyer (see opposite) to stakeholder organizations via email with a request that they distribute it to their members/staff. Staff also publicized the opportunities on the [Jackson County Hazard Mitigation Planning webpage](#) on the [Region 2 website](#). Twenty-five people participated in the workshops.

Workshop Agenda

Each workshop followed a set agenda:

- **Orientation.** Staff and participants introduced themselves and staff provided a brief synopsis of the hazard mitigation planning process.
- **Inventory and Analysis.** Staff made presentations regarding the community profile and potential hazards elements prepared for the hazard mitigation plan. Participants were then invited them to take part in a survey (via Survey Monkey) ranking each hazards based upon likelihood, intensity, and impact.

Hazard Analysis

At the conclusion of each workshop, participants were encouraged to complete a survey ranking the risk that each of the 32 hazards poses to Jackson County in terms of likelihood, intensity, and impact. Staff provided each participant a link to the questionnaire, hosted on Survey Monkey®, along with the request. Eleven participants completed the survey.

The questionnaire asked respondents to rank each hazard type from 1 to 10—with 1 indicating the least risk and 10 indicating the greatest risk—for each of the following criteria:

- Likelihood of Occurrence (35%)
- Percent of Population Affected (15%)
- Potential for Causing Casualties (15%)
- Potential for Negative Economic Impact (15%)
- Public Awareness of the Hazard (15%)
- Corollary Effects (5%)

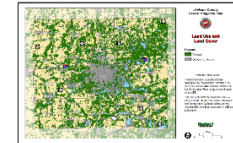
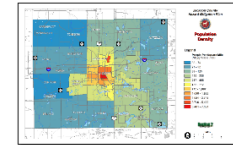


Stakeholder Workshop

Help to inform Jackson County regarding the hazards of greatest local concern to you. The Novel Coronavirus (COVID-19) is a worldwide catastrophic incident. Hazardous material threats, powerful electrical storms, tornadoes, and a broken gas pipeline occurred locally. These disasters are costly, disruptive, and threaten human life as well as local infrastructure and the economy. The Jackson County Hazard Mitigation Plan anticipates a wide variety of hazards and identifies actions to minimize their effect when they occur.

Jackson County is currently updating the plan and seeks your input by participating in a workshop that will assess the risk posed by the hazards known to strike Jackson County and its vulnerability to those hazards by ranking them. There are several opportunities to participate in the first workshop series (see below).

More information is available on the Jackson County Hazard Mitigation Planning webpage on www.region2planning.com. Contact Grant Bauman, project manager, with any questions at (517) 768-6711 or gbauman@mijackson.org.



October 22
Thursday
10:00 AM - 12:00 Noon

October 26
Monday
2:00 - 4:00 PM

October 27
Tuesday
6:00 - 8:00 PM

Please see the other side for registration and attendance information!



SCAN ME

Jackson County Hazard Mitigation Plan – October 22, 2020
10:00 AM EST – 12:00 Noon EST

https://zoom.us/join/register/WN_OTJL22eSo2f401X3e2K8g

Join By Phone 1-312-626-6799 Webinar ID # 987 4471 5664



SCAN ME

Jackson County Hazard Mitigation Plan – October 26, 2020
2:00 PM EST – 4:00 PM EST

https://zoom.us/join/register/WN_aPBYPzHlySdvWoUfkCXdmKq

Join By Phone 1-312-626-6799 Webinar ID # 962 1238 5285



SCAN ME

Jackson County Hazard Mitigation Plan – October 26, 2020
6:00 PM EST – 8:00 PM EST

https://zoom.us/join/register/WN_ZaegOza_SleMZTBPvIHJA

Join By Phone 1-312-626-6799 Webinar ID # 946 0715 6318

Staff then added the average of each criteria together, applying the weighting indicated above, to determine the following ranking:

- | | | |
|--|---|---|
| 1. Public Health Emergencies (8.5) | Catastrophic Incidents (5.7) | 22. Oil and Natural Gas Accidents (4.7) |
| 2. Snow Storms (7.1) | 12. Civil Disturbances (5.6) | 23. Invasive Species (4.6) |
| 3. Ice Storms and Sleet Storms (6.8) | Extreme Temperatures (5.6) | 24. Drought (4.2) |
| 4. Transportation Accidents (6.2) | 14. Tornadoes (5.4) | 25. Nuclear Power Plant Accidents (3.8) |
| 5. Energy Emergencies (6.1) | 15. Transp. Hazardous. Mat. Incidents (5.3) | 26. Space Weather (3.5) |
| Infrastructure Failures (6.1) | 16. Structural Fires (5.2) | Dam Failures (3.5) |
| 7. Terrorism (5.9) | 17. Hazardous Material Incidents (5.0) | 28. Celestial Impacts (3.4) |
| 8. Severe Wind Events (5.8) | Flooding (5.0) | 29. Wildfires (3.3) |
| Lightning (5.8) | 19. Nuclear Attack (4.9) | 30. Earthquakes (3.2) |
| 10. Petroleum and Natural Gas Pipeline | Hail (4.9) | 31. Subsidence (3.0) |
| Accidents. (5.7) | 21. Fog (4.8) | 32. Scrap Tire Fires (2.1) |